



Powerware Plus 18

Operator's Manual

# 1 Introduction

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The Powerware Plus 18 is a high-performance, online, microprocessor-controlled UPS designed to protect your equipment from corruption or loss of information because of electrical-line disturbances. During a power failure, the UPS supplies backup power from maintenance-free batteries, providing additional time to complete computer activity and safely store data. When commercial power is present, the UPS supplies filtered and regulated power to your equipment and maintains the battery in a charged condition. The advanced switching technology used in this UPS enables the unit to handle a wide range of input voltages and frequencies.

## Special Features

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All Powerware Plus 18 UPS models come with the following special features:

- True online, double-power conversion operation for complete load protection
- Reliable, high-quality power whether operating from utility, battery, or generator
- Local/Remote emergency power-off feature that can disconnect your protected equipment from all power sources
- Automatic and maintenance bypass (*not available for 400-Hz units*)
- Easy access to input, output, and battery circuit breakers
- Latching lid protects circuit breakers
- Sturdy, line-up and match cabinets are attractive enough for any office or computer room
- Sealed, maintenance-free batteries
- Casters for easy installation and mobility
- Digital front panel allows user-programmable output voltage and frequency (*user-programmable output frequency is not available for 400-Hz units*)
- Rectifier, inverter, and I/O modules are housed in factory-sealed field replaceable units (FRUs) for safety, easy repair, and quick upgrades
- 20% additional output kVA for nonlinear load applications
- Two year Best Power limited warranty and extended warranty service (USA and Canada)

## System Overview

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During normal operation, incoming commercial power is filtered to reduce noise and spikes. The rectifier provides isolated, regulated, and filtered DC power to the inverter. A portion of the input power to the rectifier is used to charge the battery. The inverter provides further regulated and filtered AC power to the load. In the event of a severe overload or unit failure, the Auto Bypass feature switches the load to the filtered input power (Bypass feature must be enabled). If bypass is not available, the inverter can still support difficult loads for a short period of time.

If utility power falls out of tolerance, the UPS remains online, deriving power from the battery. During extended power outages, the battery supplies power until nearly discharged at which time the UPS shuts off power to the load. When the utility power returns within tolerance, the UPS automatically restarts and supplies power to your protected equipment while recharging the battery.

## System Requirements

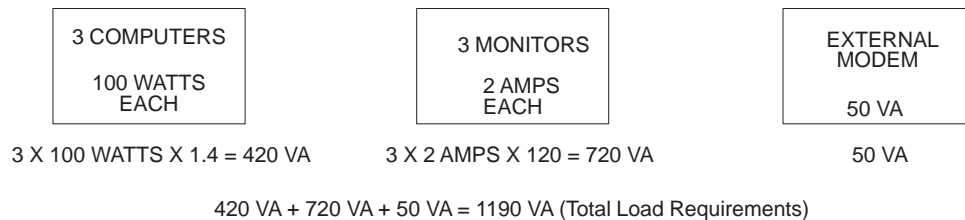
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Determine the total load requirements, in volt-amperes, of the equipment you intend to protect with your UPS. The UPS load should not exceed the UPS rating. See Figure 1 and the following procedure to determine the total load requirements:

1. Obtain the load ratings from either the nameplate or operator's manual of the equipment you intend to protect. The ratings are listed in either watts (W), amperes or amperes max (A), or volt-amperes (VA).
2. If the rating is in watts, multiply by 1.4 to obtain the VA requirement (this is the typical relationship between watts and volt-amperes ratings in most computing equipment).

If the rating is in amperes or amperes max, multiply by the input voltage (200, 208, 220, 230, or 240 VAC) to obtain the VA requirement.

3. Add all of the resultant VA ratings together to obtain the total load requirement of the equipment to be protected. See the example in Figure 1.



**Figure 1. Volt-Amperes Calculations Example**

If the total load requirements of your protected equipment exceeds the capacity of your UPS, you must either reduce the number of pieces of equipment you are protecting, or use a UPS with a larger load capacity.

When deciding on which pieces of equipment to remove from UPS protection, remember that printers generally have a lower priority. Computers, monitors, and modems typically have a higher priority because they could be processing or transmitting data when a power outage occurs.

**NOTE:** Your UPS is designed to work with three-phase, AC power sources.

You need to install an input/output options cabinet if your requirements include: 220/380 VAC, 230/400 VAC, 240/415 VAC, an external maintenance bypass, power distribution unit (PDU), or input filter. See "Installing the Input/Output Cabinet" on page 51 for more information about this option.

## Estimated Battery Run Times

The estimated accuracy of the battery support times is  $\pm 10\%$ .

Output Watts	Standard Battery Configuration	Two EBC2 Cabinets <sup>††</sup>	One EBC1 Cabinet <sup>†</sup> + Two EBC2 Cabinets <sup>††</sup>	Three EBC2 Cabinets <sup>††</sup>
1000	146	198	250	301
2000	76	105	133	161
3000	50	70	89	109
4000	37	52	68	83
5000	28	40	52	65
6000	22	33	43	53
7000	18	27	36	44
8000	15	22	30	38
9000	12	19	26	33
10000	10	16	22	29
11000	8	14	20	25
12000	7	12	17	22

<sup>†</sup>EBC1 is one-half full battery cabinet. <sup>††</sup>EBC2 is one full battery cabinet.

## Special Symbols

These common symbols may be found on your UPS:



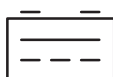
**On** indicates the on position of a switch.



**Off** indicates the off position of a switch.



**Bypass** indicates bypass control switches.



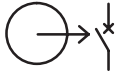
**Battery** indicates that the power provided to the load is coming from batteries.



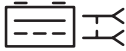
**Input Breaker** indicates an input circuit breaker.



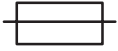
**DC Breaker** indicates a DC circuit breaker.



**Output Breaker** indicates an output breaker.



**Battery Connector** indicates the 2-position connector for battery input.



**Fuse** indicates a fuse.



**Input Neutral Configuration Switch** indicates the input neutral configuration switch.



**Bypass Reset Switch** indicates the bypass reset switches.



**Ground** indicates the customer ground connections.



**Emergency Power-Off** indicates an emergency power-off switch or connection.



**Delta** indicates the switch position for a delta (3-wire) input.



**Wye** indicates the switch position for a wye (4-wire) input.



**Input** indicates the input connections.



**Output** indicates the output connections.



**Inverter** indicates the inverter module.



**Risk Of Electric Shock** indicates that a risk of electric shock is present and the associated warning should be observed.



**Caution: Refer To Operator's Manual** – Refer to your operator's manual for additional information.



## 2 UPS Operations

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The following sections describe the UPS control panel functions, UPS operating modes and error conditions, and the Bypass and Emergency Power-Off features.

### UPS Control Panel Functions

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Indicator lights are located on the front panel display (see Figure 3 on page 13). Most are invisible when the UPS is operating normally and illuminate only when one of the following conditions is present:

- **NORMAL:** Green when UPS is in Normal operating mode. If Bypass is enabled, this indicator flashes when Bypass is unavailable.
- **BYPASS:** Yellow when UPS is in Bypass mode. Bypass flashes in the event of a phase rotation (installation) alarm or loss of one phase.
- **BATTERY:** Yellow when UPS is operating in the On-Battery mode. Flashes when there is approximately two minutes or less of battery time remaining. If the UPS is not running on battery, this indicator flashes when the UPS battery is disconnected (battery breaker open or battery disconnected).
- **OVERLOAD:** Yellow when UPS is in an Overload condition.

**NOTE:** *If all the indicators flash simultaneously, there is a problem with the UPS. Please contact your field service representative.*

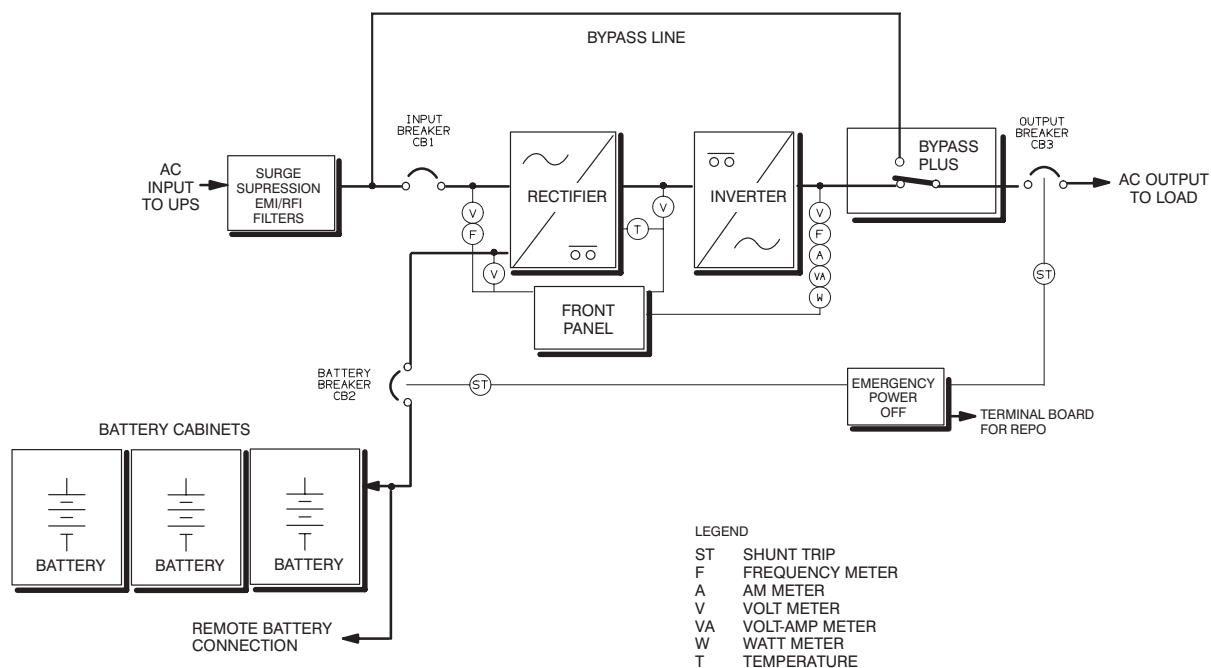
The UPS automatically switches between Normal, On-Battery, and Bypass modes, as required, with no operator intervention. Sophisticated detection and switching logic ensures that any change in mode of operation is automatic and transparent to the load. The UPS monitoring system indicates the current mode of operation and various critical parameters.

### Operating Modes

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The Powerware Plus 18 UPS has five operating modes that are described in this section. See Figure 2 for a block diagram of the UPS operation and Figure 3 on page 13 for the location of the UPS front panel indicators.





**Figure 2. UPS Block Diagram**

### Normal Mode

In Normal mode, incoming AC commercial power is filtered to reduce spikes and noise. A portion of the utility power is automatically redirected to charge the battery. During this mode, the battery charge condition is monitored. If the utility AC fails or falls out of specified limits, the UPS automatically goes to On-Battery mode. The UPS automatically returns to Normal mode when the utility power returns to within specified limits.

The Normal indicator lights during normal system operation. If Automatic Bypass is enabled and the utility goes out of specified limits, the Normal indicator flashes and Bypass is not available.

### On-Battery Mode

In On-Battery mode, the battery system provides DC power that is converted to conditioned AC by the UPS. Depending upon the battery capacity, the system operates in the On-Battery mode until the battery is fully drained. Output power is then no longer available to the load. If incoming power returns within specified parameters, the UPS automatically returns to Normal mode.

When the utility fails and the unit transfers to On-Battery mode, the Normal indicator goes off, the Battery indicator illuminates, and the alarm sounds. Press the Horn Silence button to turn off the alarm. The Battery indicator flashes and the alarm sounds again when the battery is almost discharged. When the battery reserves are depleted, the Battery indicator goes off and the UPS no longer provides power.

### Overload Mode

The Overload indicator illuminates when the system goes into an overload condition due to one of the following conditions: overload current is between 106% to 124% of rating for 10 minutes, 125% to 149% for 30 seconds, or greater than 150% of the output current rating for 10 cycles. The alarm sounds. Push the Horn Silence button to turn off the alarm. If the Bypass feature is disabled or not available, the unit shuts down. If Bypass is enabled, the unit transfers to Bypass mode in an overload condition.

## **Bypass Mode** *(not available on 400-Hz units)*

In the Bypass mode, the UPS transfers the critical load directly to the filtered utility power, provided the bypass source is available. The transfer occurs due to one of the following conditions:

- Load current is between 106-124% of rating for 10 minutes, 125-149% for 30 seconds, or >150% for 10 cycles.
- UPS internal temperature exceeds safe operating range.
- UPS output falls out of the specified voltage limits.
- Output real power exceeds specified limits.
- Load current inrush (surge) exceeds peak current capability.

When the unit is in Normal mode and automatically transfers to Bypass due to an output current overload condition, the UPS attempts to return to Normal mode. After an output power overload or any other abnormal condition, return to Normal mode must be done manually (system startup). The UPS remains in Bypass mode if three auto-start attempts fail within a 10-minute period.

To switch to Bypass (with Bypass Configuration switch enabled), hold the UPS Off button for three seconds. The Normal indicator goes off and the Bypass indicator illuminates.

**Caution:** If the alarm sounds when the UPS Off button is pressed, then Bypass is not available. If the UPS Off button is pressed for three seconds with Bypass not available, the UPS enters Load Power-Off Mode.

If the Bypass mode was entered from Normal mode, wait approximately one minute before trying to return to Normal mode. The UPS waits for internal voltages to bleed down before proceeding to normal mode of operation. Press the UPS On button once to return to the Normal mode.

## **Load Power-Off Mode**

To switch to Load Power-Off from Bypass mode, hold the UPS Off button for three seconds. The alarm sounds while the UPS Off button is held, and the Bypass indicator goes off when the bypass voltage is removed from the load. Press the UPS On button once to return to Bypass mode.

If Bypass is not enabled or the Bypass indicator is blinking (indicating that Bypass is not available), the UPS enters Load Power-Off mode from Normal mode. To switch to Load Power-Off from Normal mode, hold the UPS Off button for three seconds. The alarm sounds while the UPS Off button is held, and the Normal indicator goes off when the voltage is removed from the load. The UPS waits for internal voltages to bleed down before proceeding to Normal mode of operation. Press the UPS On button once to return to the Normal mode.

Load Power-Off can also be entered by turning off (O) the output breaker.

## **Audible Alarm**

An audible alarm sounds a pulsing tone when the UPS is in Overload or On-Battery mode. When there is one minute or less of battery time remaining, a constant tone sounds. The alarm also sounds a constant tone if the UPS is **not** on battery and the UPS battery is disconnected (battery breaker is open or battery disconnected).

## Bypass Plus (50/60-Hz inputs and outputs only)

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The UPS Bypass Plus feature contains two features in one: Automatic Bypass and Maintenance Bypass. The UPS Bypass Plus features are available only when the Bypass Configuration switch is enabled; this switch is factory-configured according to your order.

Bypass operation requires that input and output voltage and frequency are the same. If the UPS is operating as a voltage and/or frequency converter, bypass must be disabled. See “Final Configuration” on page 47.

### **Automatic Bypass** *(not available on 400-Hz units)*

The UPS automatically transfers the protected equipment directly to the utility AC power, provided the bypass source is available, when one of the following conditions is true:

- Load current is between 106% to 124% of rating for 10 minutes, 125% to 149% for 30 seconds, or greater than 150% for 10 cycles.
- UPS internal temperature exceeds safe operating range.
- UPS output falls outside of the specified limits of voltage.
- Output real power exceeds specified limits.
- Load current inrush exceeds peak current capability (surge).

When the unit is in Normal mode and automatically transfers to Bypass mode due to an overload condition, the UPS attempts to return to Normal mode. After output real-power overload failure or any other abnormal condition, return to Normal mode must be done manually (system startup). The UPS remains in Bypass mode if three auto-start attempts fail within a 10-minute period.

### **Maintenance Bypass** *(not available on 400-Hz units)*

The Maintenance Bypass switch is located under the top cover of the UPS (see Figure 10 on page 39). When activated, this switch allows for onsite servicing of the UPS. Be sure that the output breaker is turned on ( I ).

**Danger:** This equipment is always electrically live. Users must remove utility power by external means.

**Caution:** Failure to follow instructions results in load power interruption.

**Caution:** When operating in Maintenance Bypass, your equipment is not protected from power outages.

To transfer the load to Maintenance Bypass:

1. Hold the UPS Off button until the Normal indicator goes off and the Bypass indicator illuminates.
2. Turn the Maintenance Bypass switch from off to on.
3. Open (O) the input breaker and battery breaker.

To transfer the load back to the UPS:

1. Close ( I ) the input breaker and battery breaker.
2. Turn the Maintenance Bypass switch from on to off.
3. Press the UPS On button and wait until the Normal indicator illuminates indicating that the UPS is operating in Normal mode.

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## Local/Remote Emergency Power-Off

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The Emergency Power-Off (EPO) feature disconnects the protected equipment from all power sources by opening (O) the UPS battery breaker and the output breaker. The EPO does not disconnect the UPS from the input AC power source.

To operate, press the Emergency Power-Off button located on the front panel of the UPS (see Figure 3 on page 13).

**NOTE:** *After the EPO button is pressed, the internal logic power supply is on if AC power is present at the UPS input.*

With the Emergency Power-Off feature, a Remote Emergency Power-Off (REPO) switch can be wired to the UPS. This allows a normally open, pushbutton switch to be wired to the UPS. This REPO switch can perform the same functions as the EPO pushbutton located on the UPS front panel. See “Electrical Installation” on page 43 for information regarding its electrical ratings and installation.

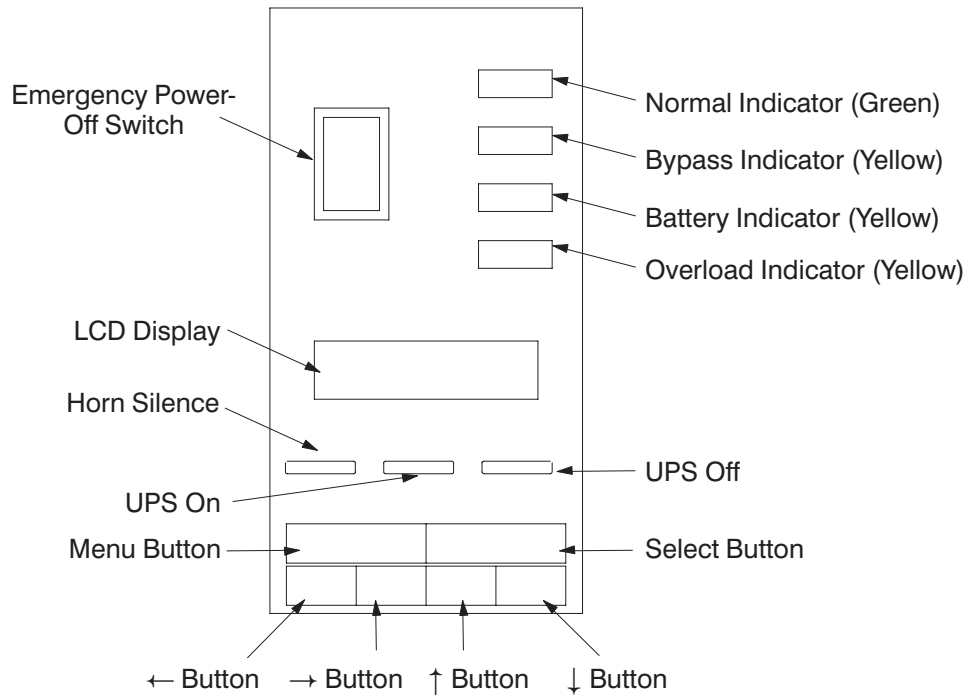
After the EPO or REPO switch has turned off the UPS, you can restart the unit by first opening (O) all the circuit breakers (input, output, and battery) and proceeding with the system startup defined in “System Startup” on page 24.



### 3 UPS Control Panel

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The following sections identify the controls and indicators on the front panel (see Figure 3) and the front panel display functions.



**Figure 3. Front Panel Controls**

#### Control Keys and Indicators

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These pushbutton controls are on the front panel:

##### **Emergency Power-Off**

Press the Emergency Power-Off switch to turn off the load power during an emergency condition. The UPS must be restarted after an emergency power-off.

##### **UPS On**

Press to start up the UPS.

##### **Horn Silence**

Press to silence the audible alarm, to perform a lamp test, or to test audible alarm.

Press the Horn Silence button for approximately 12 seconds to perform the Horn and Lights test. During the first four seconds, the panel indicators illuminate. During the next four to six seconds, one or more of the indicators go out. During the last few seconds, the alarm sounds. The test ends when you release the Horn Silence button after the alarm sounds.

##### **UPS Off**

Press to shut down the UPS.

## Menu Button

Press the Menu button to return to previous menu level. If you are not sure which menu is currently displayed, press the Menu button repeatedly until the Main Menu displays **1. UPS Status**.

## Select Button

Selects the currently displayed item shown on the second line of the LCD Display or enters the next menu level. For example, if the display shows **MAIN MENU** on the top line and **2. Meters** on the second line, pressing the Select button enters the Meters menu and shows the **INPUT VOLTS (L–N)** option.

## Up or Down Arrow Buttons

Changes the cursor position within the menus, status screen, or event queue. For example, if the display shows **MAIN MENU** on the top line of the LCD Display and **1. UPS Status** on the second line, press the down arrow button to move to the next menu item, **2. Meters**.

## Right or Left Arrow Buttons

Shows possible device settings in menus and scrolls through the screen messages; or moves the cursor position when entering the password or the date and time. For example, if the LCD Display shows **Password** on the top line and AAAAAA on the second line, press the right arrow button to move the cursor one position to the right (**AA**AAAA).

See “UPS Control Panel Functions” on page 7 for information on the Normal, Bypass, On-Battery, and Overload indicators.

## Using the Front Panel Display

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You can use the front panel display to set up and monitor the UPS. The display has a Main Menu and a System Setup menu with several user-selectable options.

### The Main Menu

The Main Menu contains the following options:

- 1. UPS Status
- 2. Meters
- 3. Alarm Queue
- 4. Active Alarms
- 5. Battery Data
- 6. SW Version
- 7. System Setup

Use the up and down arrow buttons to display the Main Menu options. Press the Select button to enter one of the submenus.

## 1. UPS Status

The UPS Status option displays the number of currently active alarms and the conditions. The following table describes the different UPS conditions.

<b>System Normal</b>	Inverter supplying load (bypass available)
<b>UPS On Battery</b>	UPS is on battery
<b>Load On Inverter</b>	Inverter supplying load (bypass not available)
<b>Syncing To Bypass</b>	Inverter has ramped, but load is still on bypass
<b>Inverter Ramping Up</b>	Inverter has been started and is ramping
<b>Rectifier Ramping Up</b>	Rectifier has been started and is ramping
<b>UPS On</b>	Rectifier or inverter on but not supplying load
<b>UPS Off</b>	Rectifier and inverter off
<b>Inverter Overload</b>	Overload condition indicated from inverter
<b>Rectifier Overload</b>	Overload condition indicated from rectifier
<b>Output Brkr Open</b>	Output breaker open (O); UPS not supplying power to the load
<b>UPS On Bypass</b>	Bypass is supplying power to the load

## 2. Meters

The Meters option displays system meter values obtained through the serial communications network or calculated from the values obtained through the network. Use the up and down arrow buttons to view the following metered values:

- **Input Volts (L–N)**, input voltage (each phase and line-to-line)
- **Input Volts (L–L)**, input voltage (each phase and line-to-line)
- **Output Volts (L–N)**, output voltage (each phase and line-to-line)
- **Output Volts (L–L)**, output voltage (each phase and line-to-line)
- **Average Battery Voltage**
- **DC Link Voltage**
- **Inverter Frequency**
- **Input Frequency**
- **Output kW**, shown as bar graphs with each block representing approximately 10% of capacity (400-Hz units only)
- **Output kVA**, shown as bar graphs with each block representing approximately 10% of capacity (50/60-Hz units only)
- **Phase Load Current** load currents (phase A, B, and C) are shown as bar graphs with each block representing approximately 10% of capacity (50/60-Hz units only)
- **Time & Date**, displayed in the MM/DD/YY; HH:MM:SS format



### 3. Alarm Queue

The Alarm Queue option displays the 200 most recent alarms and events in chronological order (most recent first). Use the right and left arrow buttons to pan across the screen and view entire descriptions. Use the up and down arrow buttons to scroll through the queue. The alarms are displayed in the following format: sequence number, date, time, and description of the alarm.

### 4. Active Alarms

The Active Alarms option displays a description of each active alarm.

### 5. Battery Data

The Battery Data option displays information about the battery. If the UPS is running with normal utility, the Battery Charge bar chart is displayed. If the UPS is running on battery, the Battery Time Remaining bar chart is displayed. Each block on the bar chart represents approximately 10% of the total time. This calculation assumes a constant load on the UPS. If custom batteries are selected, the battery voltage is displayed.

### 6. S. W. Versions

The S. W. Versions option displays the software versions for the front panel, inverter, and rectifier.

### 7. System Setup

Select the System Setup option to enter the System Setup menu. This menu is password-protected and prompts you for the System Setup password. After entering a valid password, the System Setup menu appears.

**NOTE:** *The default password is MEMORY. It is recommended to change the default password to ensure security (see page 20). Contact your field service representative if you have misplaced your password.*

## The System Setup Menu

From the System Setup menu, use the Menu button to return to the Main Menu. When altering settings under the System Setup menu, the Select button saves a change and the Menu button cancels the change (unless otherwise indicated). An asterisk (\*) displayed on the left side of the item indicates that the item is currently selected.

The System Setup menu contains the following options:

- 1. Select Type
- 2. H. W. Modules
- 3. Sync Range
- 4. Adj Out Volts
- 5. Comm Setup
- 6. Relay Setup
- 7. Set Language
- 8. Set Time & Date
- 9. Contrast Adj
- 10. Horn Volume
- 11. Clr Alarm Queue
- 12. Set User Pwd
- 13. Battery Config

Use the up and down arrow buttons to display the System Setup options. Press the Select button to enter one of the submenus.

### 1. Select Type

Use the Select Type option to select the output voltage and output frequency type for the UPS. The UPS kVA rating is displayed for information only, it cannot be changed.

Use the right and left arrow buttons to display all options for each category. Press the Select button to save an option. In this submenu, pressing the Menu button does not cancel changes; it returns the cursor to the previous menu.

The UPS must be off and the output breaker must be open (O) in order to change the Select Type setting. If the UPS not turned off and the output breaker is closed (I), you can only view the type setting.

After selecting a new type option, press the Menu button to exit the Select Type submenu before turning on the UPS.

The Select Type submenu contains the following options:

- Output Voltage
  - 115/200V, 200V
  - 120/208V, 208V
  - 127/220V, 220V
  - 220/380V, 380V
  - 230/400V, 400V
  - 240/415V, 415V
- Output Frequency
  - 50 Hz
  - 60 Hz
  - 400 Hz (*this option is factory-configured and cannot be changed by the user*)
- Model Number

} These options are preselected during installation and cannot be changed by the user.

## 2. H. W. Modules

Use the H. W. Modules option to view and change the present system hardware configuration. This option contains the following entries:

- Bypass Installed
- Number of Output Phases
- Inverter Installed
- Rectifier Installed
- Comm Board Installed

Use the up and down arrow buttons to view the entries. Only the Comm Board Installed option can be changed by the user. Use the left and right arrow buttons to change the value. Press the Select button to save your changes.

The UPS must be off and the output breaker must be open (O) in order to change the H. W. Modules setting. If the UPS is not off and the output breaker is closed (I), you can only view the H. W. Modules.

After selecting a new value, press the Menu button to exit the H. W. Modules submenu before turning on the UPS.

## 3. Sync Range

Use the Sync Range option to select a deviation of the utility frequency from the nominal inverter frequency. The inverter tracks the utility within the range entered in this option. If the utility is outside of range, the inverter operates at nominal frequency. The ranges are:

- $\pm 0.5$  Hz
- $\pm 1.0$  Hz
- $\pm 1.5$  Hz
- $\pm 2.0$  Hz
- $\pm 2.5$  Hz
- $\pm 3.0$  Hz

Use the up and down arrow buttons to view the entries. Use the left and right arrow buttons to change the value. Press the Select button to save your changes.

The UPS must be off and the output breaker must be open (O) in order to change the Sync Range setting. If the UPS is not off and the output breaker is closed (I), you can only view the Sync Range submenu.

After selecting a new value, press the Menu button to exit the Sync Range submenu before turning on the UPS.

#### 4. Adj Out Volts

Use the Adjust Output Volts option to adjust the output voltage to  $\pm 5\%$  of the nominal output voltage. The UPS must in Normal mode while adjusting the output voltage.

Use the up arrow button to increase the percentage; the down arrow button to decrease the percentage. The changes are made in real-time and remain effective after you exit the Adjust Output Volts submenu. The Menu button does not cancel changes within this submenu.

**NOTE:** *As an exception in the 127/220V configuration, the output voltage may **not** be adjusted up.*

#### 5. Comm Setup

Use the Comm Setup to set up the serial port for communication with a terminal and printer or in a computer mode. Output modes are for ASCII computer, binary computer, terminal, and printer. The I/O port must have the following parameters set up correctly to establish and maintain communications: baud rate, data size, hardware handshake, software handshake, and parity. Three standard sets of I/O port parameters are available for modem, two-wire terminal (no handshaking), and terminal with software handshake. All I/O port parameters can be customized.

Use the up or down arrow buttons to view the list of set up parameters. Use the right and left arrow buttons to view other settings.

See Chapter 4, “UPS Communications” for more information on the communication interface.

#### 6. Relay Setup

Use the Relay Setup option to display and change the LAN Relay Interface configuration. Standard configurations include: AS/400<sup>®</sup>, Novell<sup>®</sup>, and AT&T<sup>®</sup>/Default 1. In addition, all relays can be customized. Use the up and down arrow buttons to view the list of options.

#### 7. Set Language

Use the Set Language option to select a language for the display. You can select English, French, German, Portuguese, or Spanish. Use the up and down arrow buttons to view the options.

#### 8. Set Time & Date

**Use the Set Time & Date** option to set the time, date, and format of the values. Use the right and left arrow buttons to change the format (for example, MM/DD/YY to DD/MM/YY). Use the up and down arrow buttons to change the numeric values.

#### 9. Control Adj

Use the Contrast Adjust option to change the contrast on the display. This option may not be available for some Plus 18 models. Use the up and down arrow buttons to adjust the contrast. Press the Select button to save the setting.

## 10. Horn Volume

Use the Horn Volume option to set the alarm horn volume. Two volume settings are available for the UPS alarm: loud and soft. Use the left or right arrow button to view the setting.

## 11. Clr Alarm Queue

Use the Clear Alarm Queue option to empty the list of alarms in the alarm queue. Press the Select button to clear the alarm queue.

## 12. Set User PWD

Use the Set User PWD option to modify the user password for the System Setup menu. When entering this option, **AAAAAA** appears on the display. Use the left and right to move the cursor position in the password field. Use the up and down arrow buttons to scroll through the character values. To save the password, you must press the Select button.

## 13. Battery Config

Use the Battery Config option to set your battery configuration or set up the system for custom batteries. See page 65 to use this option for configuring remote batteries. The following configurations are available for the Battery Config option:

- No Battery
- Custom Battery
- 1 EBC2
- 2 EBC2s
- 3 EBC2s
- 4 EBC2s
- 1 EBC1 & 1 EBC2
- 2 EBC1 & 1 EBC2
- 1 EBC1 & 2 EBC2
- 1 EBC1
- 2 EBC1s
- 3 EBC1s
- 1 EBC18
- 2 EBC18s
- 3 EBC18s
- 4 EBC18s

Use the up and down arrow buttons to change the value. To save the value, press the Select button.

## 4 UPS Communications

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Refer to the *Plus Communications Manual* for additional information about the LAN Relay Interface. The LAN Relay Interface is set up through the Communication Option in the System Setup menu on the front panel display. It has programmable relays for Novell and Banyan<sup>®</sup> networks, as well as for the IBM AS/400. Each relay can be individually programmed by the customer.

### Communications Interface

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The Powerware Plus 18 UPS has an RS-232 port that provides you with full RS-232 communications. It has selectable baud rates of 2400, 4800, 9600, or 19200 and operates in the modes described below. Refer to the *Plus Communications Manual* for additional information about these features.

**Terminal Mode:** This mode provides an alternate user interface to the UPS running data through an ANSI x3.64-compatible terminal such as a VT100. The displayed data is user-selectable by a menu screen. When a data screen is selected, it continuously updates to reflect the state of the UPS. The following options are available from the menu screen: Alarm/Event Queue, Active Alarms, Meters Screen, Mimic Screen, Battery Data, and Set Time and Date.

**Printer Mode:** This mode provides a hard copy of the alarm messages in the alarm history queue using a serial printer. After selection, Printer mode scans the current alarm history queue and prints all the alarm entries that have not been printed yet. Subsequent alarms are printed as they occur. Options exist to reprint the alarm queue, to print all active alarms, metered data, or machine configuration.

**ASCII Computer Mode:** This mode outputs information that reflects the state of the UPS. Using the factory-available protocol, you can write software to interface with the information provided by the front panel display.

**Binary Computer Mode:** This mode also outputs information that reflects the state of the UPS, and you can write software to interface with it. In addition, this computer mode allows the system to operate remotely by sending the UPS control commands.



## 5 UPS Startup and Shutdown

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The following sections describe the UPS initial power-on, system startup, and system shutdown. Make sure you have completed the installation and configuration of your UPS before performing these procedures.

Before connecting your protected equipment to the UPS and starting the system, take a few minutes to identify all controls and indicators on the front panel (see Figure 3 on page 13).

### Initial Power-on

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Since the system type is factory-set according to your order, it is not mandatory that you set the type. See the label on the rear of the unit for type information. If you want to verify or change the system type, perform the following steps:

1. Open the top cover of the UPS. Verify that all three breakers — input breaker, battery breaker, and output breaker — are in the OFF (O) position.
2. Apply AC input power and close ( I ) the input breaker in the UPS cabinet.

The front panel indicators come on and then go off. The alarm sounds, indicating that the battery breaker is open (O). Press the Horn Silence button to turn off the alarm.

3. Press the Menu button to display **MAIN MENU 1. UPS Status**.
4. Press the down arrow button until **MAIN MENU 7. System Set Up** appears. Press the Select button. The prompt **Password AAAAAA** appears.

**NOTE:** The default password is MEMORY. It is recommended to change the default password to ensure security (see page 20). Contact your field service representative if you have misplaced your password.

5. Enter the password by using the up and down arrow buttons to scroll through the letters; press the right and left arrow buttons to move to other character positions.
6. Press the Select button after entering the password. The display shows **System Setup 1. Select Type**.
7. Press the Select button to display the **Output Voltage** option. Figure 4 shows the unit types and possible configurations provided by the **Output Voltage** option.

**NOTE:** You can press the down arrow button to scroll through all of the menu options. The selected setting is indicated with an asterisk (\*).

Unit Type	Possible Configurations	Menu Selections
Low Voltage	115/200 VAC 120/208 VAC 127/220 VAC	Any of the three configurations may be selected.
High Voltage	220/380 VAC 230/400 VAC 240/415 VAC	Factory-configured. Not user-selectable. <i>This option is not available for 400-Hz units.</i>

**Figure 4. Output Voltage Options**



8. Press the right and left arrow buttons to view the possible settings for the **Output Voltage** option. Press the Select button to select an Output Voltage setting. The line-to-neutral (l–n) and line-to-line voltages (l–l) are displayed on the menu.
9. Press the down arrow button to view the **Output Frequency** option. Use the right and left arrow buttons to view the settings. Press the Select button to select an Output Frequency setting. *This option is not available for 400-Hz units.*

**NOTE:** *If an asterisk does not appear to the left of the newly selected output voltage or frequency setting, verify that the UPS is off and that the output breaker is off (O).*
10. Press the down arrow button to display the UPS Model number. This is a view only option; you cannot change this selection.
11. Wait 15 seconds for the UPS configuration to complete; then press the Menu button four times to return to normal operation. Press the Select button once to return to the **UPS Status** menu.

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## System Startup

Make sure that the UPS is off (all indicators are off). Start up your system according to one of the following procedures, depending on whether the Bypass feature is enabled or disabled.

### With Bypass Disabled

The Bypass Configuration switch is in the DISABLE position. *This is a mandatory setting for 400-Hz units.*

1. Apply AC power to the UPS by raising the top cover and turning on ( I ) the input breaker (all indicators illuminate for approximately ten seconds and then go off).
2. Turn on ( I ) the output breaker.
3. Turn on ( I ) the battery breaker. Power is not supplied to the load yet.
4. Press the UPS On button; the alarm beeps and the Battery and Bypass indicators flash as the rectifier turns on.

After approximately 15 seconds, the Bypass and Normal indicators flash as the inverter turns on. When the UPS is on, the Normal indicator remains lit indicating that the UPS is operating in Normal mode.

### With Bypass Enabled

The Bypass Configuration switch is in the ENABLE position. *This setting is not available for 400-Hz units.*

1. Apply AC power to the UPS by raising the top cover and close ( I ) the input breaker (all indicators illuminate for approximately 10 seconds and then turn off).
2. Turn on ( I ) the output breaker.
3. Turn on ( I ) the battery breaker. The Bypass indicator remains on.

The UPS supplies incoming AC power to the load. The Bypass indicator flashes in the event of a phase rotation error. See page 45 for the appropriate input wiring.

4. Press the UPS On button. The alarm beeps and the Battery and Bypass indicators flash as the rectifier turns on.

After approximately 15 seconds, the Bypass and Normal indicators flash as the inverter turns on. When the UPS is on, the Normal indicator remains lit indicating that the UPS is operating in Normal mode.

**NOTE:** *If the Bypass and Battery, or Bypass and Normal indicators flash for more than one minute, or if the indicators flash in any combination other than those mentioned in this section, call your field service representative.*

## System Shutdown

---

Shut down your system according to one of the following procedures, depending on whether the Bypass feature is enabled or disabled.

### With Bypass Disabled

The Bypass Configuration switch is in the DISABLE position. This is a mandatory setting for 400-Hz units.

1. Press and hold the UPS Off button. The alarm sounds for three seconds and the Normal indicator goes off.
2. Turn off (O) the input breaker, battery breaker, and output breaker to ensure that all power is removed from the protected equipment.

### With Bypass Enabled

The Bypass Configuration switch is in the ENABLE position. This setting is not available for 400-Hz units.

1. Press and hold the UPS Off button until the unit transfers to Bypass. The Bypass indicator illuminates and the alarm sounds.
2. Turn off (O) the input breaker, battery breaker, and output breaker to ensure that all power is removed from the protected equipment. The Bypass indicator turns off.



## 6 Troubleshooting

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If you have installed your UPS and it does not perform properly, consult the chart below. If the condition persists, contact a qualified service personnel.

Condition	Possible Cause	Action To Take
Power is applied to the UPS, but the UPS does not start up and the Bypass indicator is flashing.	Output type set incorrectly.	Reset the output voltage and frequency to match the inputs (see page 17).
	Input wiring not in proper rotation.	Have an electrician check the input phase rotation.
Power is applied to the UPS, but the UPS does not start up and no indicators are on.	Improper voltage applied to the unit.	Check the utility input voltage.
	Output breaker is open (O).	Close the output breaker ( I ).
	UPS is in Load Power-Off mode.	Press the UPS On button.
UPS starts, enters Normal mode, and then turns off; or Battery indicator flashes and alarm sounds while UPS is <b>not</b> on battery.	Battery not connected.	Contact qualified service personnel.
	Battery breaker is not closed (O).	Close ( I ) battery breaker.
Normal indicator flashing (bypass not available).	Input (bypass) out of frequency or voltage limits.	Check set type and sync range.

If you have any questions or problems with your UPS, call the **Help Desk** at one of the following numbers:

In the United States and Canada **1-800-356-5737**  
Or **1-608-565-2100**  
Or your nearest local Best Power office



## 7 Product Specifications

### Powerware Plus 18 UPS Technical Specifications

<b>Rating</b>	3600-012K: 12 kVA, 8 kW 3600-015K: 15 kVA, 10 kW 3600-018K: 18 kVA, 12 kW																											
<b>Nominal Input Voltage</b>	115/200 VAC three-phase 120/208 VAC three-phase 127/220 VAC three-phase																											
<b>Input Power Factor</b>	0.95 lag minimum																											
<b>Nominal Frequency</b>	50/60 Hz (400 Hz only available on special units) <b>Note:</b> Bypass functionality is <b>not</b> available for 400-Hz output.																											
<b>Nominal Input Phase Current*</b>	<table> <tr> <td>3600-012K:</td> <td>115/200 VAC</td> <td>29A</td> </tr> <tr> <td></td> <td>120/208 VAC</td> <td>28A</td> </tr> <tr> <td></td> <td>127/220 VAC</td> <td>27A</td> </tr> <tr> <td>3600-015K:</td> <td>115/200 VAC</td> <td>36A</td> </tr> <tr> <td></td> <td>120/208 VAC</td> <td>35A</td> </tr> <tr> <td></td> <td>127/220 VAC</td> <td>33A</td> </tr> <tr> <td>3600-018K:</td> <td>115/200 VAC</td> <td>43A</td> </tr> <tr> <td></td> <td>120/208 VAC</td> <td>42A</td> </tr> <tr> <td></td> <td>127/220 VAC</td> <td>39A</td> </tr> </table>	3600-012K:	115/200 VAC	29A		120/208 VAC	28A		127/220 VAC	27A	3600-015K:	115/200 VAC	36A		120/208 VAC	35A		127/220 VAC	33A	3600-018K:	115/200 VAC	43A		120/208 VAC	42A		127/220 VAC	39A
3600-012K:	115/200 VAC	29A																										
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3600-018K:	115/200 VAC	43A																										
	120/208 VAC	42A																										
	127/220 VAC	39A																										
<b>Nominal Output Phase Current</b>	<table> <tr> <td>3600-012K:</td> <td>115/200 VAC, 120/208 VAC</td> <td>34A</td> </tr> <tr> <td></td> <td>127/220 VAC</td> <td>31A</td> </tr> <tr> <td>3600-015K:</td> <td>115/200 VAC, 120/208 VAC</td> <td>42A</td> </tr> <tr> <td></td> <td>127/220 VAC</td> <td>39A</td> </tr> <tr> <td>3600-018K:</td> <td>115/200 VAC, 120/208 VAC</td> <td>50A</td> </tr> <tr> <td></td> <td>127/220 VAC</td> <td>47A</td> </tr> </table>	3600-012K:	115/200 VAC, 120/208 VAC	34A		127/220 VAC	31A	3600-015K:	115/200 VAC, 120/208 VAC	42A		127/220 VAC	39A	3600-018K:	115/200 VAC, 120/208 VAC	50A		127/220 VAC	47A									
3600-012K:	115/200 VAC, 120/208 VAC	34A																										
	127/220 VAC	31A																										
3600-015K:	115/200 VAC, 120/208 VAC	42A																										
	127/220 VAC	39A																										
3600-018K:	115/200 VAC, 120/208 VAC	50A																										
	127/220 VAC	47A																										
<b>Output Power Factor</b>	0.6 lagging - 0.6 leading																											
<b>Heat Dissipation (208V input full load at 0.8 pf)</b>	3600-012K: 5200 BTU/hr (1310 kg-cal/hr) 3600-015K: 6500 BTU/hr (1638 kg-cal/hr) 3600-018K: 7800 BTU/hr (1965 kg-cal/hr)																											
<b>Neutral Current Capability</b>	175% of phase current																											
<b>Crest Ratio</b>	3:1																											
<b>Unbalanced Load Capability</b>	100%																											
<b>Operating Environment</b>	Operating Temperature: 0° to 40° C Humidity: 5% to 95% (noncondensing)																											

\*Input current is the same as the output current when load is powered through bypass.

### Powerware Plus 18 UPS Physical Specifications

Parameter	Power Processor Cabinet	Battery Cabinet	I/O Cabinet
Height	28" (71 cm)	28" (71 cm)	28" (71 cm)
Width	8.5" (21.6 cm)	8.5" (21.6 cm)	8.5" (21.6 cm)
Depth	29" (73.7 cm)	24.5" (62 cm)	27" (69 cm)
Weight*	210 lb (95 kg)	295 lb (134 kg) for 7 AH 350 lb (159 kg) for 18 AH	314 lb (142 kg)
Floor Loading	1.73 lb/in <sup>2</sup> (.12 kg/cm <sup>2</sup> )	2.43 lb/in <sup>2</sup> (.17 kg/cm <sup>2</sup> ) for 7 AH 2.88 lb/in <sup>2</sup> (.20 kg/cm <sup>2</sup> ) for 8 AH	

\*Power Processor with one full battery cabinet: 475 lb (215 kg)

### Powerware Plus 18 UPS with I/O Cabinet Technical Specifications

<b>Rating</b>	3600-012K: 12 kVA, 8 kW 3600-015K: 15 kVA, 10 kW 3600-018K: 18 kVA, 12 kW
<b>Nominal Input Voltage</b>	220/380 VAC three-phase 230/400 VAC three-phase 240/415 VAC three-phase
<b>Input Power Factor</b>	0.95 lag minimum
<b>Nominal Frequency</b>	50/60 Hz
<b>Nominal Input Phase Current*</b>	3600-012K: 220/380 VAC 16A 230/400 VAC, 240/415 VAC 15A 3600-015K: 220/380 VAC 20A 230/400 VAC 19A 240/415 VAC 18A 3600-018K: 220/380 VAC, 230/400 VAC 24A 240/415 VAC 22A
<b>Nominal Output Phase Current</b>	3600-012K: 220/380 VAC 18A 230/400 VAC, 240/415 VAC 17A 3600-015K: 220/380 VAC 23A 230/400 VAC 22A 240/415 VAC 21A 3600-018K: 220/380 VAC 27A 230/400 VAC 26A 240/415 VAC 25A
<b>Output Power Factor</b>	0.6 lagging - 0.6 leading
<b>Heat Dissipation (208V input full load at 0.8 pf)</b>	3600-012K: 5200 BTU/hr (1310 kg-cal/hr) 3600-015K: 6500 BTU/hr (1638 kg-cal/hr) 3600-018K: 7800 BTU/hr (1965 kg-cal/hr)

<b>Neutral Current Capability</b>	175% of phase current
<b>Crest Ratio</b>	3:1
<b>Unbalanced Load Capability</b>	100%
<b>Operating Environment</b>	Operating Temperature: 0° to 40° C Humidity: 5% to 95% (noncondensing) Elevation: 5000 ft (1500 m) without derating

\*Input current is the same as the output current when load is powered through bypass.

### Powerware Plus 18 UPS Battery Specifications

<b>Nominal Battery-String Voltage</b>	240 Vdc (120 cells)
<b>Nominal Battery Current</b>	3600-012K: 40A 3600-015K: 50A 3600-018K: 60A
<b>Battery Type</b>	Sealed, maintenance-free, high-rate discharge, lead-acid cells
<b>Expected Life</b>	5 years or a maximum of 200 deep discharges





# Powerware Plus 18 Installation

**Warning:** Only qualified service personnel (such as a licensed electrician) should perform the UPS installation. Risk of electrical shock.



## 8 Installation

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The following sections describe your UPS package and the installation and physical setup of the UPS, the optional input/output (I/O) cabinet, and remote batteries.

### Unpacking and Inspection

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Upon receiving your UPS, optional battery cabinet(s), or I/O cabinet, carefully examine the packing containers for any signs of physical damage or leakage. Notify the carrier immediately if damage is present.

Carefully unpack the UPS and battery cabinets, making sure you retain the packaging materials for future shipment of the units. Examine each unit carefully. Immediately notify your distributor if you find any damage. Do not operate any unit that is leaking liquid, or if a white, powdery residue is present.

### Site Preparation

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For optimum system operation, be sure that your site conforms to the following specifications and requirements:

- The maximum elevation for normal operation is 5000 ft (1500 m). Derating is required for higher elevations.
- Equipment weights are provided for typical configurations (see page 30). Contact your local sales representative if additional information is needed.
- Additional battery cabinets may be added for extended battery time.
- The unit should be installed with these environmental specifications: operating temperature of 0° to 40° C and humidity of 5% to 95% (noncondensing).

### Important Safeguards

- Do not tilt the cabinet more than 12 degrees; the unit may tip over.
- Do not connect more than three battery cabinets to the UPS unit to avoid fire and electrical shock hazard.

## Installing the UPS and Battery Cabinets

**Warning:** Only qualified service personnel (such as a licensed electrician) should perform the UPS installation. Risk of electrical shock.

To perform the Powerware Plus 18 installation, you need the following tools: a 5/16 and a 1/4 hex driver. Make sure that you read all of the caution and warning statements in "Safety Considerations" beginning on page *i* before performing the installation.

If your UPS is connected to a remote battery provided by another manufacturer, disregard all references to battery cabinets in this section and see "Installing Remote Batteries" on page 63 for more information on installation and configuration.

If you are using the optional input/output cabinet, follow the procedure beginning on page 51.

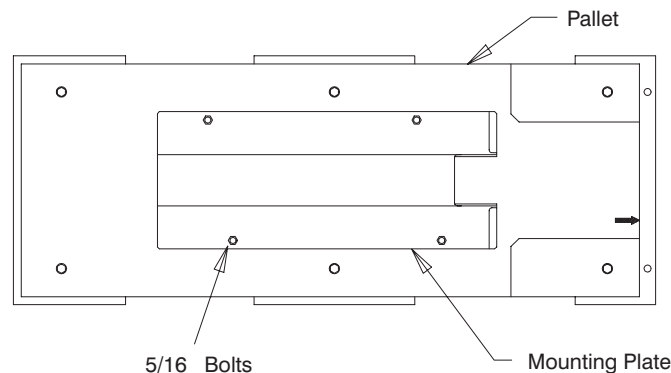
The following instructions assume you have already removed the unit and battery cabinets from the pallets according to the unloading instructions on the outside of shipping box.

Use the following procedure to set up the UPS and battery cabinets:

1. Place the UPS and battery cabinet(s) near the operating site. Make sure the air vents and air exhausts are free of obstructions and the UPS is not near a heat source or in direct sunlight.

**NOTE:** It is recommended to allow 24" minimum of space on the left side of the unit for access by qualified service personnel and 8" of minimum space on the rear side for proper ventilation.

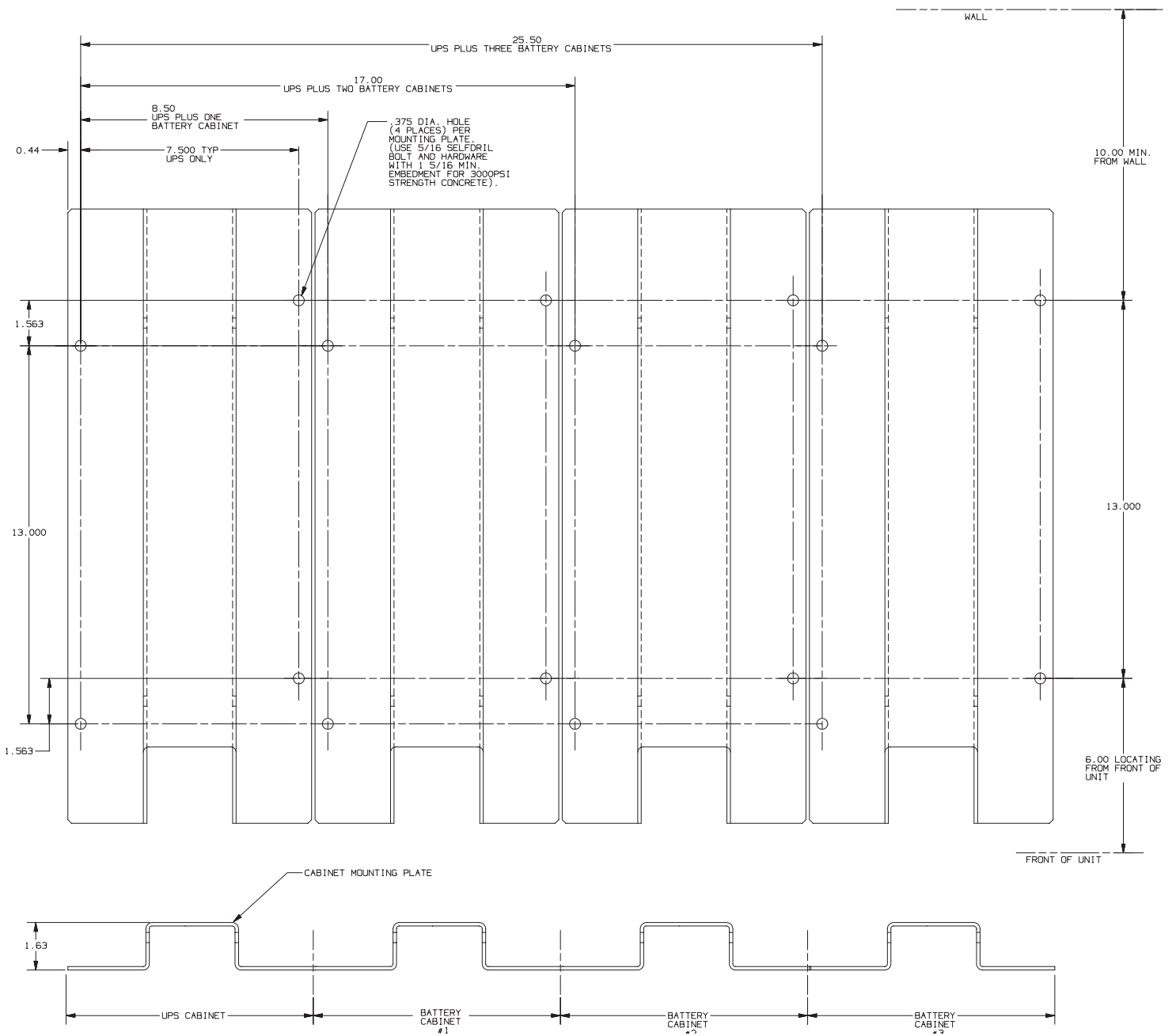
2. Remove the joining kit hardware from the shipping carton. The hardware kit should contain four joining brackets (one notched) and eight #10-32 × .50 large hex-head screws.
3. Remove the mounting plates from the pallets (see Figure 5).



**Figure 5. UPS Mounting Plate**

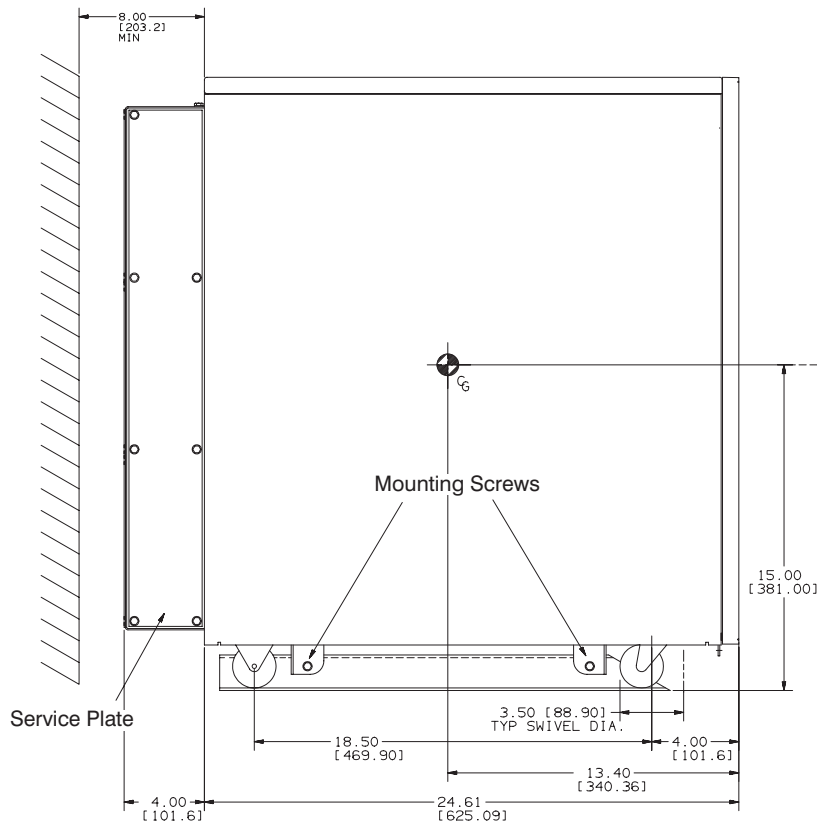
4. A seismic installation of the UPS requires that the mounting plates be bolted to the floor. See Figure 6 for a detailed drill and mounting pattern. If a seismic installation is not required, it is not necessary to bolt the mounting plates to the floor.

**NOTE:** For Zone 4, it is recommended to use 5/16" self-drill bolts and hardware with 1 5/16" minimum embedment for 3000PSI-strength concrete. Refer to your local building codes for seismic mounting requirements.



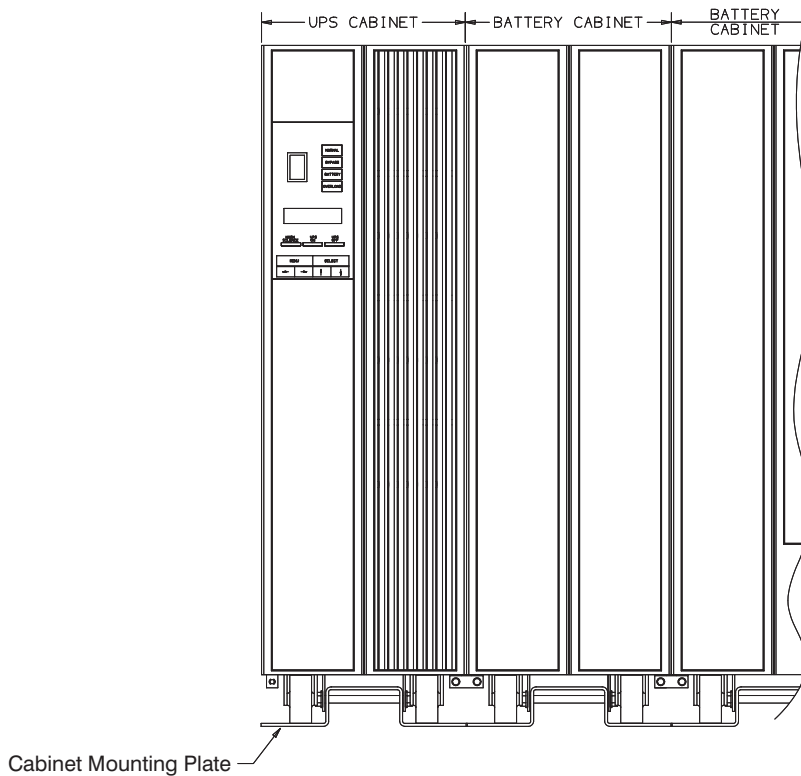
**Figure 6. Seismic Installation Mounting Pattern**

- Using the 5/16 bolts you took out when unloading each cabinet, bolt each cabinet to the mounting plate as shown in Figure 7.



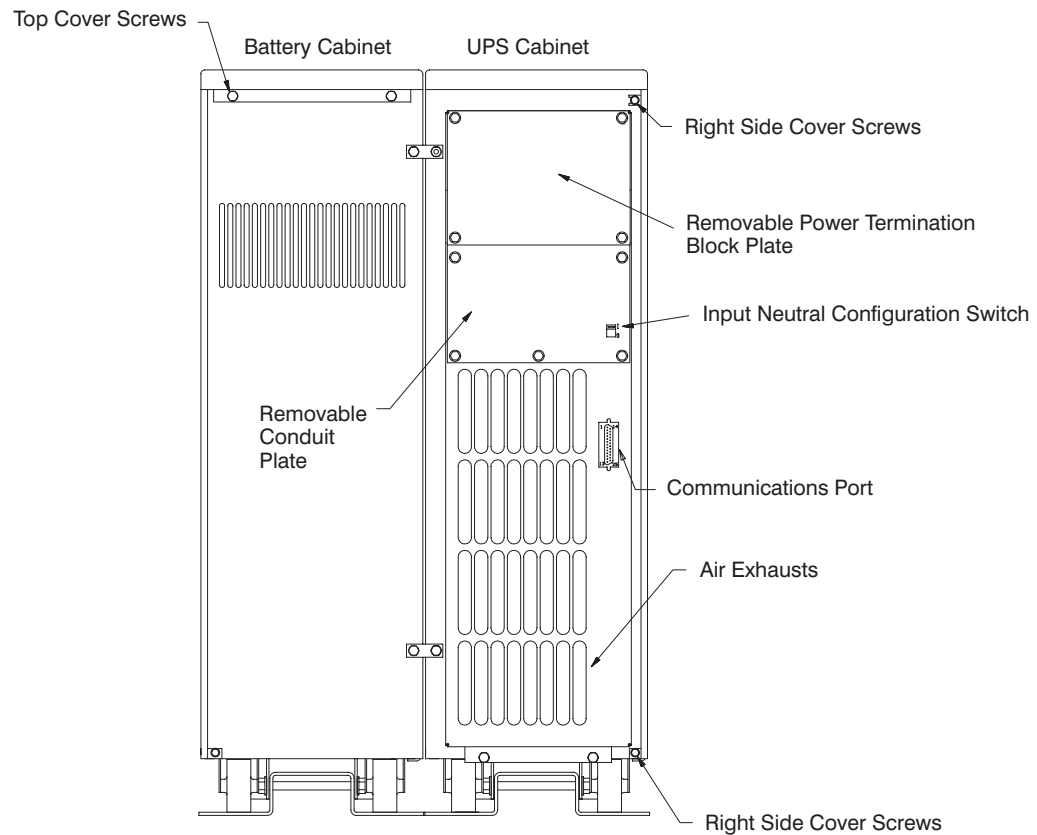
**Figure 7. Securing the UPS Cabinet and Mounting Plate**

6. Position the cabinets into the approximate final operating position with the battery to the right of the UPS cabinet as shown in Figure 8.



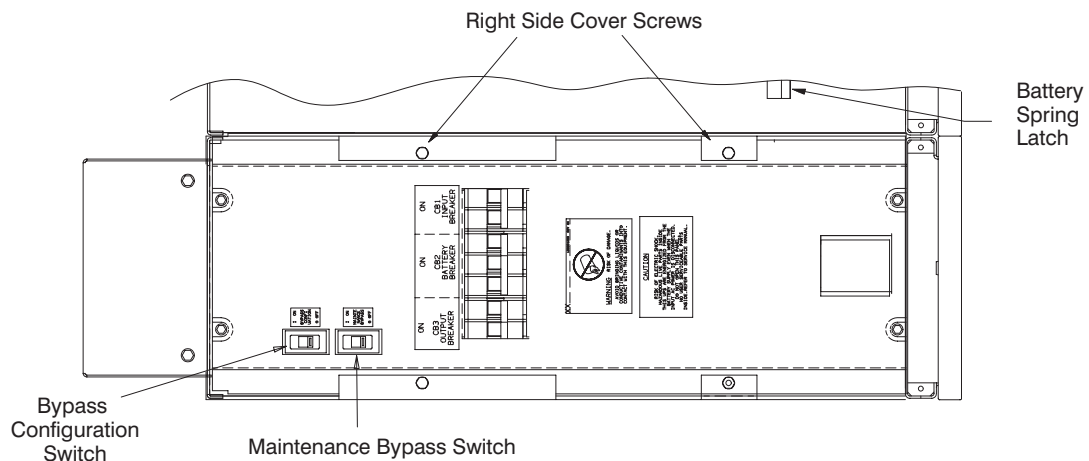
**Figure 8. Front View of the Powerware Plus 18 UPS**

7. Remove the two screws located at the top rear of the battery cabinet (see Figure 9). Retain the screws.



**Figure 9. Rear View of the Powerware Plus 18 UPS**

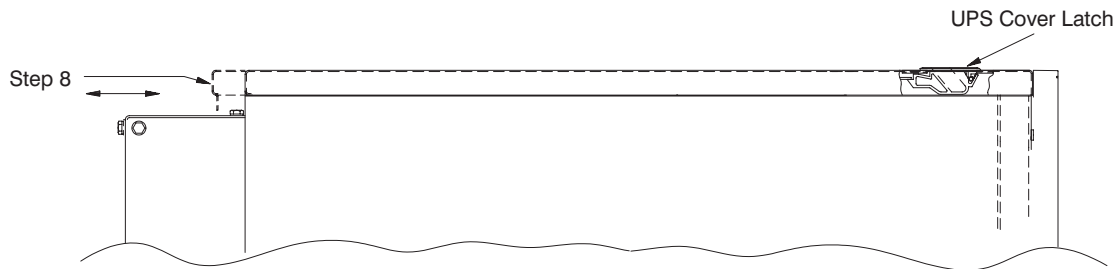
8. Remove the top cover of the battery cabinet by pulling the top cover toward the rear of the unit to release the spring latch and lift the cover off the cabinet.



**Figure 10. Top View with UPS Cover Removed**

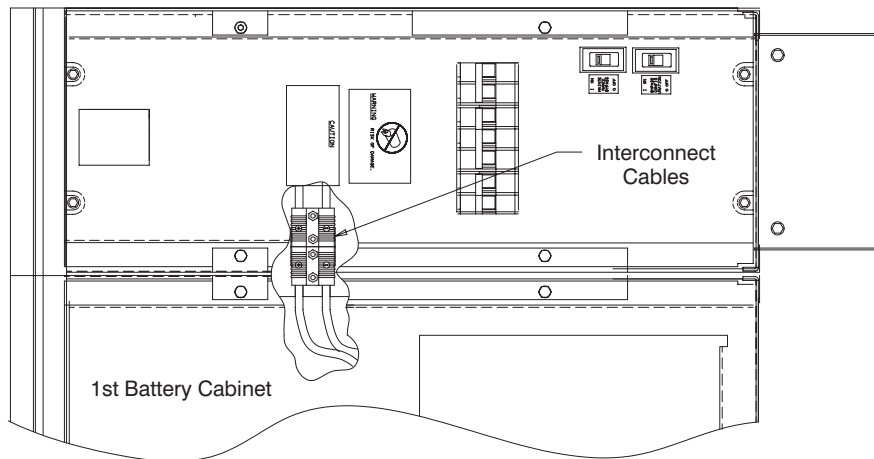


9. Open the top cover of the UPS cabinet by sliding the cover latch forward and lift up as shown in Figure 11.



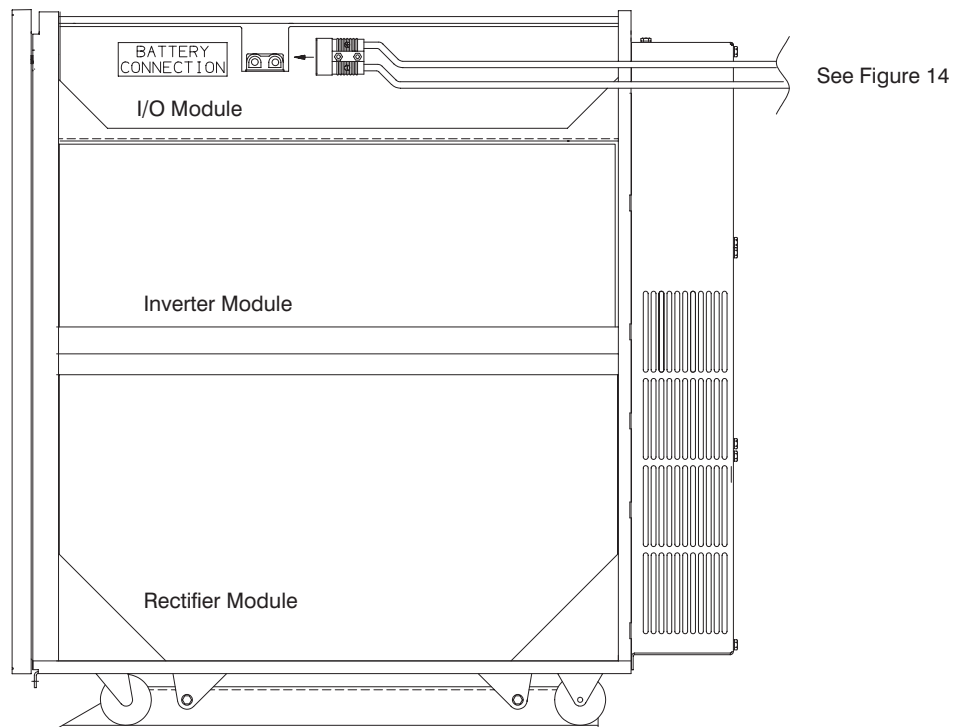
**Figure 11. Removing the Top Cover from the UPS Cabinet**

10. Remove the right side cover of the UPS cabinet by removing the mounting screws (four each) as shown in Figures 9 and 10.
11. Pull the right side cover out from the top and then detach it from the system. Retain the side cover and mounting hardware.
12. Find the two interconnect cables secured to the top of the battery tray.
13. Select either one of the cables. Cut the retaining straps.
14. Connect the UPS to the first battery cabinet through the top cutout in the battery cabinet (Figure 12).



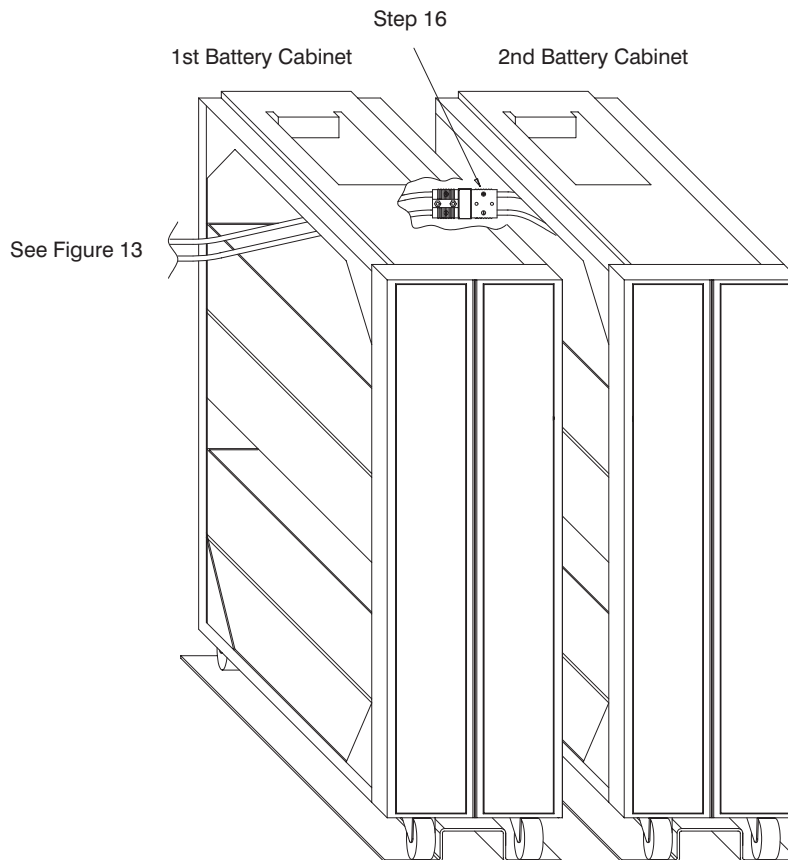
**Figure 12. Connecting the UPS and Battery Cables (Top View)**

15. Mate the connector with the mating half located in the I/O module as shown in Figure 13. If the cabinets are not permanently mounted to the floor, you can slide them apart to make the connection.



**Figure 13. Connecting the UPS and Battery Cables (Right Side View)**

16. Connect a second battery cabinet by selecting either one of the two interconnect cables located in the second battery cabinet. Cut and remove the retaining straps. Connect to mating connector in the first battery cabinet.



**Figure 14. Connecting a Second Battery Cabinet**

17. Join the cabinets together in four places as shown in Figure 15.

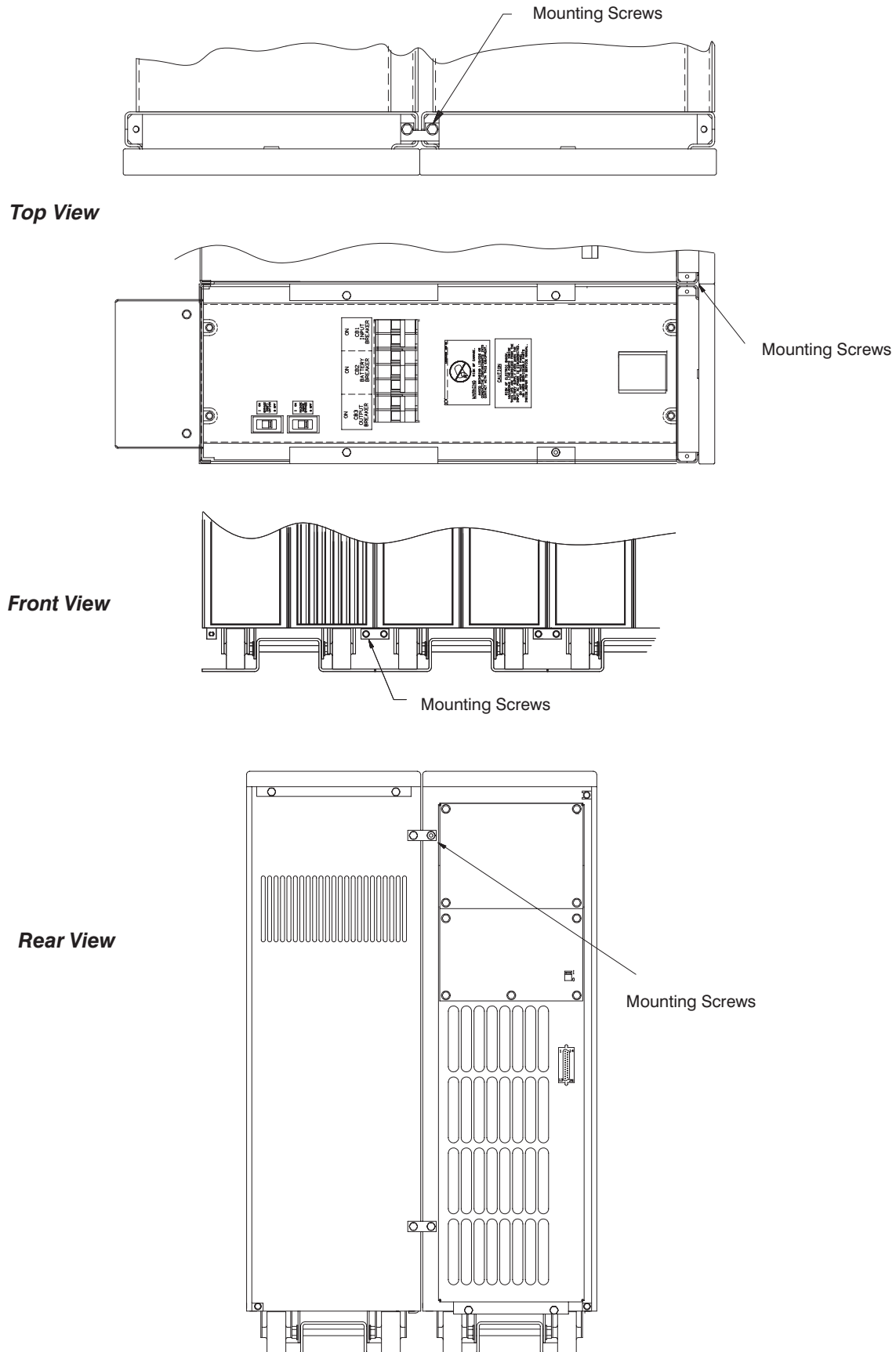


Figure 15. Joining the Cabinets (Front and Rear View)

18. Remount the right side cover that was removed from the UPS cabinet in Step 10 to the right side of the end battery cabinet. Use the original hardware provided in the joining kit.
19. Remount the top cover of the battery cabinet by offsetting the cover toward the back. Push it forward so that the spring latch engages the frame top. Secure the cover using the original hardware.
20. Close the top cover of the UPS unit.
21. Continue to “Electrical Installation” on page 43.

**NOTE:** *If you are installing an optional Power Distribution Module (PDM), continue to page 48.*

**Caution:** All cabinets must be secured to prevent them from moving when installation is complete. Secure the cabinets either by lowering all leveling feet to take the weight off the casters, or by bolting the cabinets to the floor using the seismic installation procedure. Failure to do so violates safety rules and results in the unit losing its safety agency approvals.

## Electrical Installation

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**Warning:** Only qualified service personnel (such as a licensed electrician) should perform the electrical installation. Risk of electrical shock.

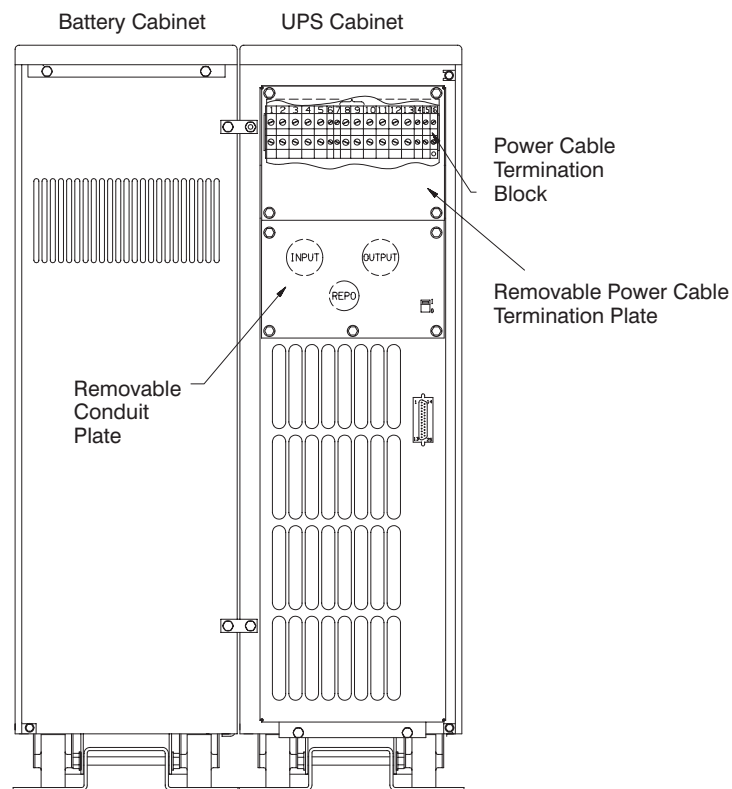
Refer to your national and local electrical codes for acceptable external wiring practices. Material and labor for the external wiring are customer-supplied. An external protective device for the input source must be provided and sized for the currents indicated on the UPS nameplates.

**NOTE:** *Upstream protection must be coordinated with the load current requirements under nominal as well as low-line and overload conditions. The recommended input stream service protection is 60 amps.*

The UPS must be grounded at the input terminal block to a single-point local or utility earth ground. The ground conductor should be sized according to your national and local electrical codes. In the United States, the output is a separately-derived source.

If you are using remote batteries, a DC breaker suitable for branch circuit protection is required. The DC breaker is customer-supplied and must be rated at 250V, 75A. The maximum fault current from a remote battery cannot be more than 4500 amps.

See Figure 16 for the location of the power cable terminal block and the conduit access. Use the following procedure to perform the electrical installation for your UPS.



**Figure 16. Terminal Block and Conduit Access**

1. Determine your equipment's grounding requirements according to your local electrical code.
2. Remove the screws on the terminal block plate and the conduit plate of the UPS rear panel with a 1/4 hex-nut driver.
3. Hardwire the input and output terminations for the UPS. See the following table for specifications and tightening torque.

**Caution:** The UPS contains its one energy source (battery). There is high voltage present at terminals 8 and 9 (terminals for remote battery connection) when a battery cabinet is connected to the UPS.

Power Cable Terminations				Tightening Torque
Wire Function	Terminal Position	Terminal Wire Size Rating*	Conduit Connection (Entry Size)	
Ground	1, 7, 16	18 – 6 AWG (.5 – 10 mm <sup>2</sup> )	N/A	10.6 – 12.3 lb/in
Input	2, 3, 4, 5	10 – 4 AWG (2.5 – 16 mm <sup>2</sup> )	1.0 (25.4 mm)	
No Connection	6	18 – 6 AWG (.5 – 10 mm <sup>2</sup> )	N/A	
Remote Battery (Positive)	8	10 – 4 AWG (2.5 – 16 mm <sup>2</sup> )	0.75 (19.05 mm)	
Remote Battery (Negative)	9			
Output	10, 11, 12, 13		1.0 (25.4 mm)	
Remote Emergency Power-Off (REPO)	14, 15	22 – 10 AWG (.5 – 4 mm <sup>2</sup> )	0.5 (12.7 mm)	3.5 – 5.3 lb/in

\*Use #8-AWG 75°C copper wire. Use #6-AWG 75°C copper wire for terminals 2 and 10 (for a double-rated neutral).

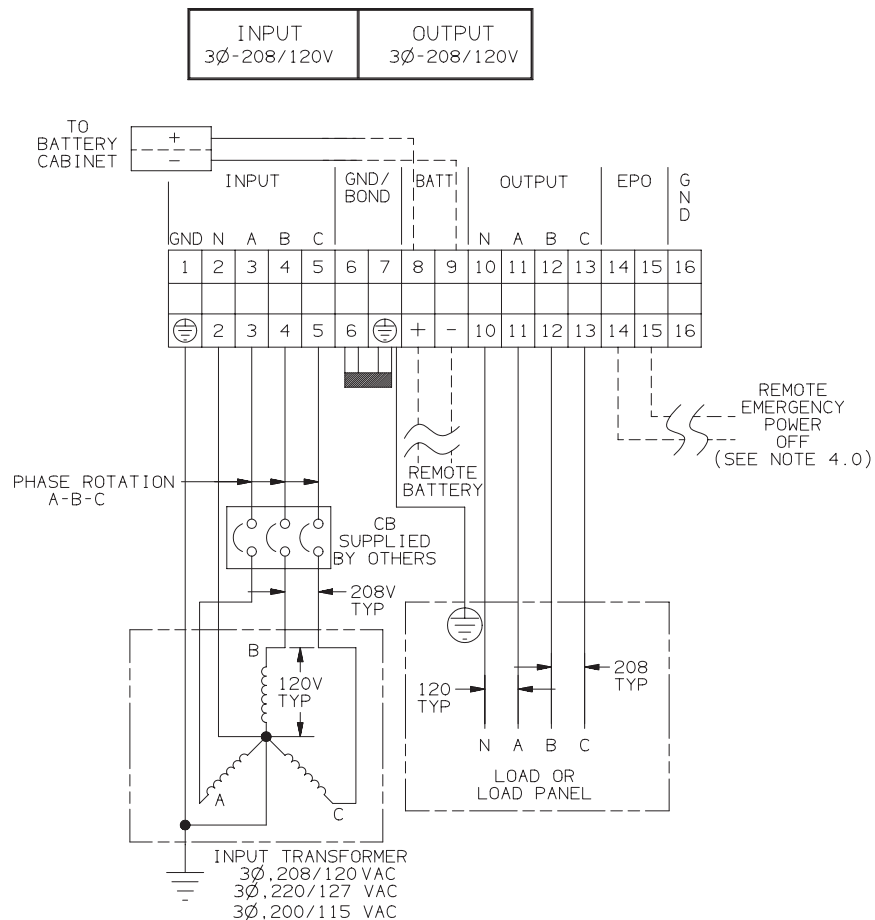
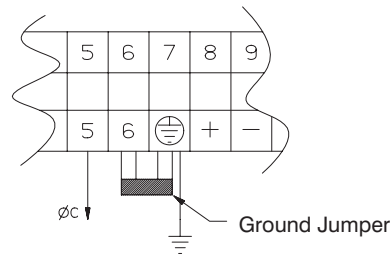


Figure 17. Power Cable Terminal Blocks

4. As part of the branch circuit that supplies this unit, install an insulated grounding conductor. Use the following specifications for the grounding conductor that connects to input terminal block.
  - **Material and insulation thickness:** must be identical to the grounded and ungrounded branch-circuit supply conductors
  - **Color:** should be green with or without a yellow stripe(s)
  - **Ground:** should be grounded to the earth ground in the service equipment or in the supply transformer (if supplied by a separately-derived system)

**NOTE:** All attachment plug-receptacles on or connected to your UPS or system equipment must be a grounding type. The grounding conductors serving these receptacles must be connected to the earth ground in the service equipment.

5. Locate the grounding jumper between terminals 6 and 7 as shown in Figure 18.



**Figure 18. Grounding Jumper**

6. The neutral conductor of the output circuit is bonded to the chassis/ground as configured at the factory. If output neutral is not to be grounded, remove the grounding jumper between terminals 6 and 7.

**NOTE:** It is recommended to remove the grounding jumper for three-wire delta output.

7. If you are using a Remote Emergency Power-Off switch, hardwire the terminal block positions 14 and 15. See the termination table on page 45 for proper connections. See Figure 17 on page 45 for the connection locations.

The REPO switch is a customer-supplied switch that can disconnect the UPS output voltage from your protected equipment. The REPO function activates when the REPO wires are shorted together. Use the following specifications for the REPO switch:

- The switch should be a wall-mounted, momentary-contact, normally open, pushbutton switch.
- Minimum ratings of 120 VAC and 125 mA.

**Caution:** The REPO wires are at high-voltage potential (240V). Refer to your local electrical code for proper installation of the high-voltage REPO wires.

8. Replace the terminal block plate and the conduit plate on the UPS rear panel.
9. Continue to the following section, “Final Configuration.”

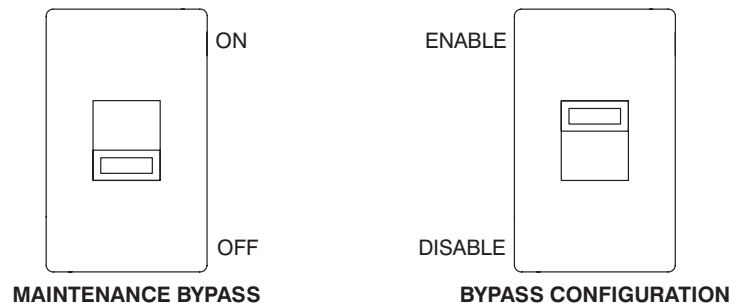
## Final Configuration

After you have installed the UPS, perform the following steps for the bypass and input configuration.

### Bypass Configuration

**Caution:** Any change to the bypass configuration must be made when there is no power to the unit. Failure to do so may result in damage to the load.

1. Locate the Bypass Configuration switch and Maintenance Bypass switch on the top panel of the UPS (see Figure 10 on page 39).

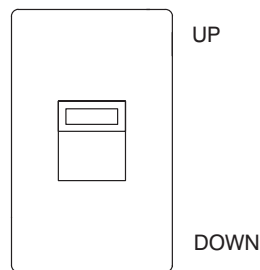


**Figure 19. Maintenance Bypass and Bypass Configuration Switches**

2. Set the Maintenance Bypass switch to the OFF position.
3. If your UPS uses automatic or maintenance bypass, set the Bypass Configuration switch to the ENABLE position.
4. If your UPS does not use automatic or maintenance bypass, set the Bypass Configuration switch to the DISABLE position. *This is a mandatory setting for 400-Hz outputs.*

### Input Configuration

1. Locate the Input Neutral Configuration switch on the rear panel of the UPS (Figure 9 on page 39).



**INPUT NEUTRAL CONFIGURATION**

**Figure 20. Input Neutral Configuration Switch**

2. If the UPS has a Wye input (4-wire), set the Input Neutral Configuration switch (S2) in the Wye (UP) position.
3. If the UPS has a Delta input (3-wire), set the Input Neutral Configuration switch (S2) in the Delta (DOWN) position.
4. Your UPS is now installed and ready to start up. Continue to Chapter 5, “UPS Startup and Shutdown,” on page 23 to start up your UPS.



## Installing the Power Distribution Module (optional)

---

The Power Distribution Module provides customer receptacle options for single- and three-phase applications. The PDM also has a hardwire output panel for mixing hardware and receptacle output configurations.

**NOTE:** *The PDM cannot be installed on units with a 127/220V configuration.*

**Warning:** Only qualified service personnel (such as a licensed electrician) should perform the PDM installation. Risk of electrical shock.

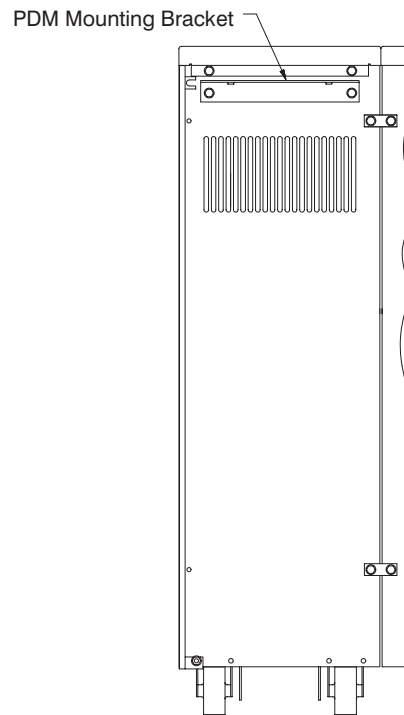
To perform the PDM installation, you need the following tools: a 1/4" hex-nut driver, a small flat-head screwdriver, and a 1 3/8" wrench. Make sure that you read all of the caution and warning statements in "Safety Considerations" beginning on page *i* before performing the installation.

The following instructions assume you have already installed the UPS and battery cabinets according to the procedure in "Installing the UPS and Battery Cabinets" on page 36.

**Caution:** The critical load is de-energized during the PDM cabinet installation. Make sure your UPS is shut down before performing any steps in this section (see page 25).

Use the following procedure to install the PDM:

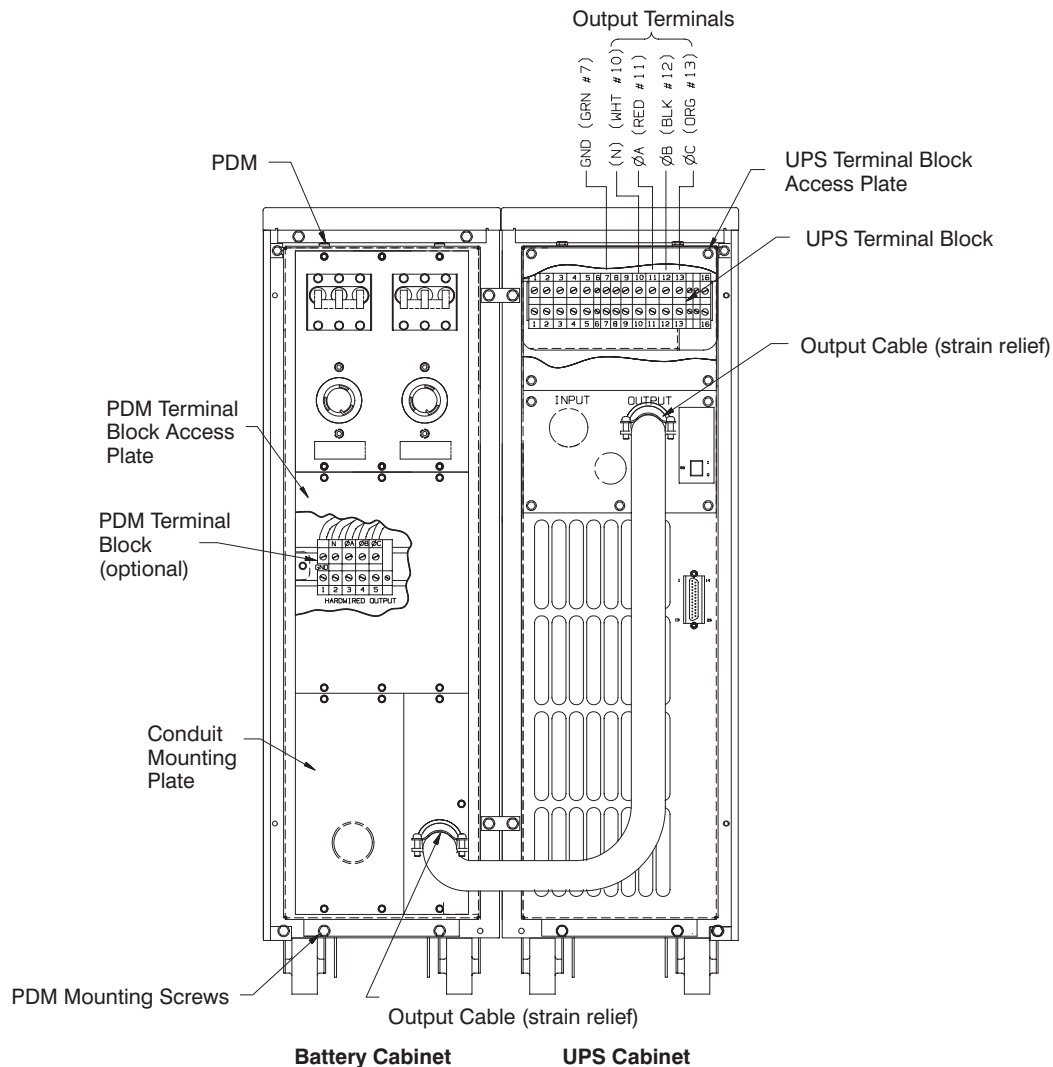
1. Open the top cover of the UPS and make sure that all breakers (input, output, and battery) are in the OFF (O) position.
2. If output is already connected to your unit, disconnect all output connections from the terminals on the UPS rear panel.
3. Using the two hex screws provided in the hardware kit, install the PDM mounting bracket to the rear panel of the battery cabinet.



**Figure 21. Battery Cabinet with PDM (Rear View)**

4. Make sure the PDM circuit breakers are in the OFF (O) position.
5. Hang the PDM on the PDM mounting bracket. Align the mounting holes on the PDM with the holes on the mounting bracket. Using the four hex-head screws provided in the hardware kit, secure the PDM to the top and bottom frame of the battery cabinet.
6. Remove the PDM terminal block access plate and retain the screws.
7. Attach the strain relief connected to each end of the output cable to the conduit mounting plate by removing the nut and placing it on the back side of the conduit mounting plate. Secure tightly.

To ensure proper strain relief of the cable, do not loosen or remove the strain relief clamp from the cable during installation.



**Figure 22. PDM Rear Panel with UPS and Battery Cabinets**

8. Connect the wires from the PDM to the UPS output terminal block as shown in Figure 22. Refer to the label located on the inside of the PDM for terminal block torque requirements. Use only #6-AWG 75° C copper wire (minimum).

If you are using the optional hardwired PDM, connect the wiring to the terminal block according to the label located on the inside of the PDM for the UPS output. Use the conduit plate for conduit landing.

**Caution:** The UPS contains its one energy source (battery). There is high voltage present at terminals 8 and 9 (terminals for remote battery connection) when a battery cabinet is connected to the UPS.

9. Reattach the PDM terminal access plate.
10. Turn the PDM circuit breaker to the ON ( I ) position.
11. Configure the UPS for bypass and input configuration (see page 47).
12. Continue to “UPS Startup and Shutdown” on page 23 to start up your UPS.

## Installing the Input/Output Cabinet (optional)

**Warning:** Only qualified service personnel (such as a licensed electrician) should perform the I/O installation. Risk of electrical shock.

The input/output cabinet provides operation at 220/380 VAC, 230/400 VAC, or 240/415 VAC.

**Caution:** Do not wire 380, 400, or 415 VAC directly to the UPS cabinet.

To perform the I/O cabinet installation, you need the following tools: a 5/16" and a 1/4" hex-nut driver. Make sure that you read all of the caution and warning statements in "Safety Considerations" beginning on page *i* before performing the installation.

If your UPS is connected to a remote battery provided by another manufacturer, disregard all references to battery cabinets in this section and see "Remote Batteries" on page 63 for more information on installation and configuration.

The following instructions assume you have already removed the unit and battery cabinets from the pallets according to the unloading instructions on the outside of shipping box.

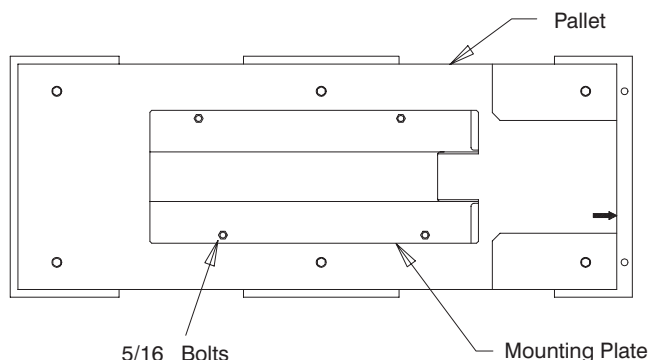
**Caution:** The critical load is de-energized during the I/O cabinet installation. Shut down your load properly before performing any steps in this section. See page 25 for information on shutting down your UPS.

Use the following procedure to set up the UPS and battery cabinets:

1. Place the UPS and battery cabinet(s) near the operating site. Make sure the air vents and air exhausts are free of obstructions and the UPS is not near a heat source or in direct sunlight.

**NOTE:** It is recommended to allow 24" minimum of space on the left side of the unit for access by qualified service personnel and 10" of minimum space on the rear side for proper ventilation.

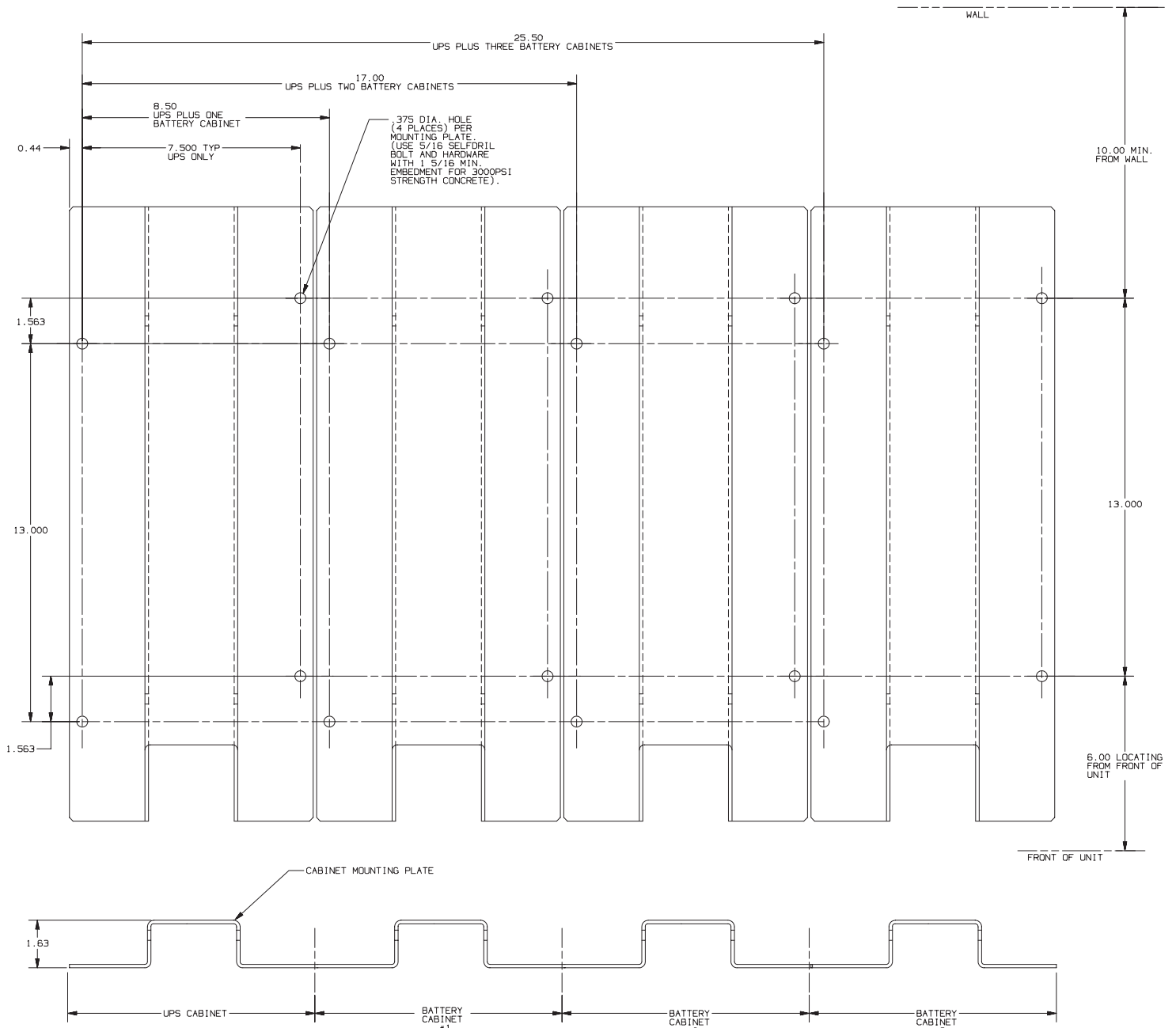
2. Remove the joining kit hardware from each of the cabinets. The hardware kits should include:
  - Four joining brackets (one notched)
  - Eight #10-32 × .50 large hex-head screws
  - A neutral shorting bar
  - A conduit plate
3. Remove the mounting plates from the pallets (see Figure 23).



**Figure 23. UPS with I/O Mounting Plate**

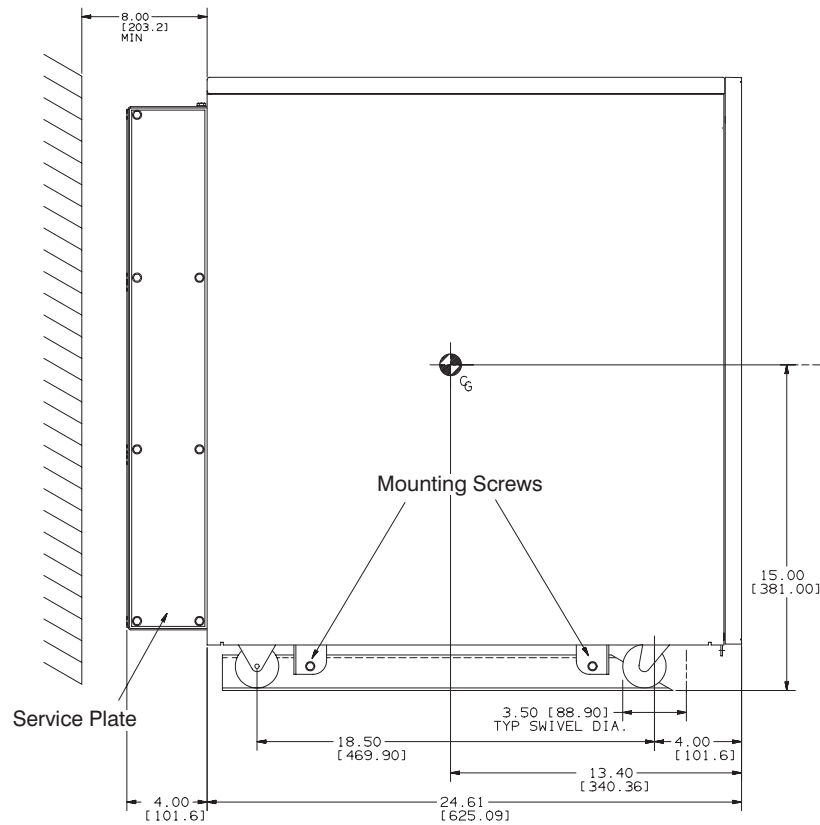
- A seismic installation of the UPS requires that the mounting plates be bolted to the floor. See Figure 24 for a detailed drill and mounting pattern. If a seismic installation is not required, it is not necessary to bolt the mounting plates to the floor.

**NOTE:** For Zone 4, it is recommended to use 5/16 self-drill bolts and hardware with 1 5/16 minimum embedment for 3000PSI-strength concrete. Refer to your local building codes for seismic mounting requirements.



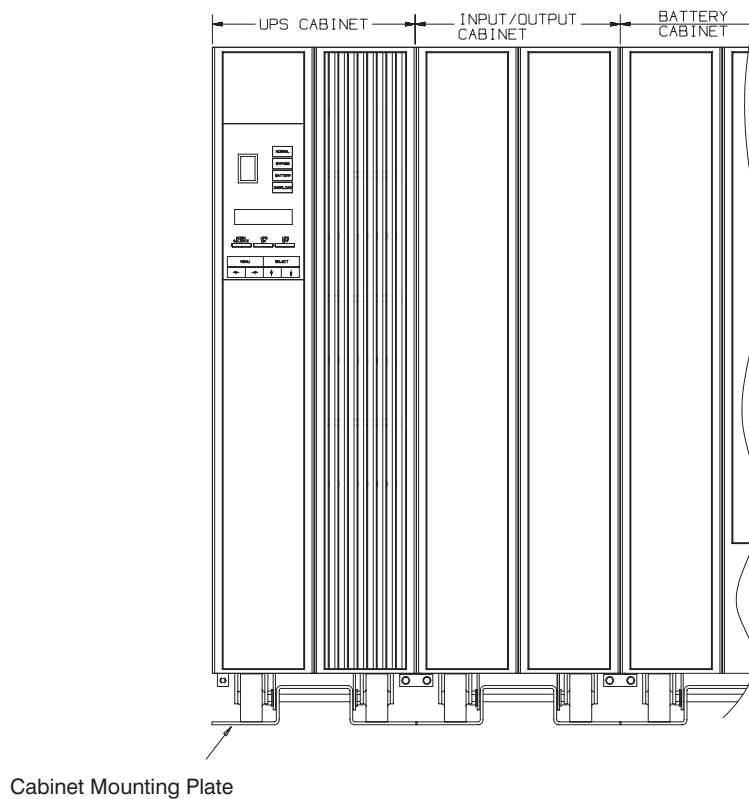
**Figure 24. I/O Seismic Installation Mounting Pattern**

- Using the 5/16 bolts you took out when unloading each cabinet, bolt each cabinet to the mounting plate as shown in Figure 25.



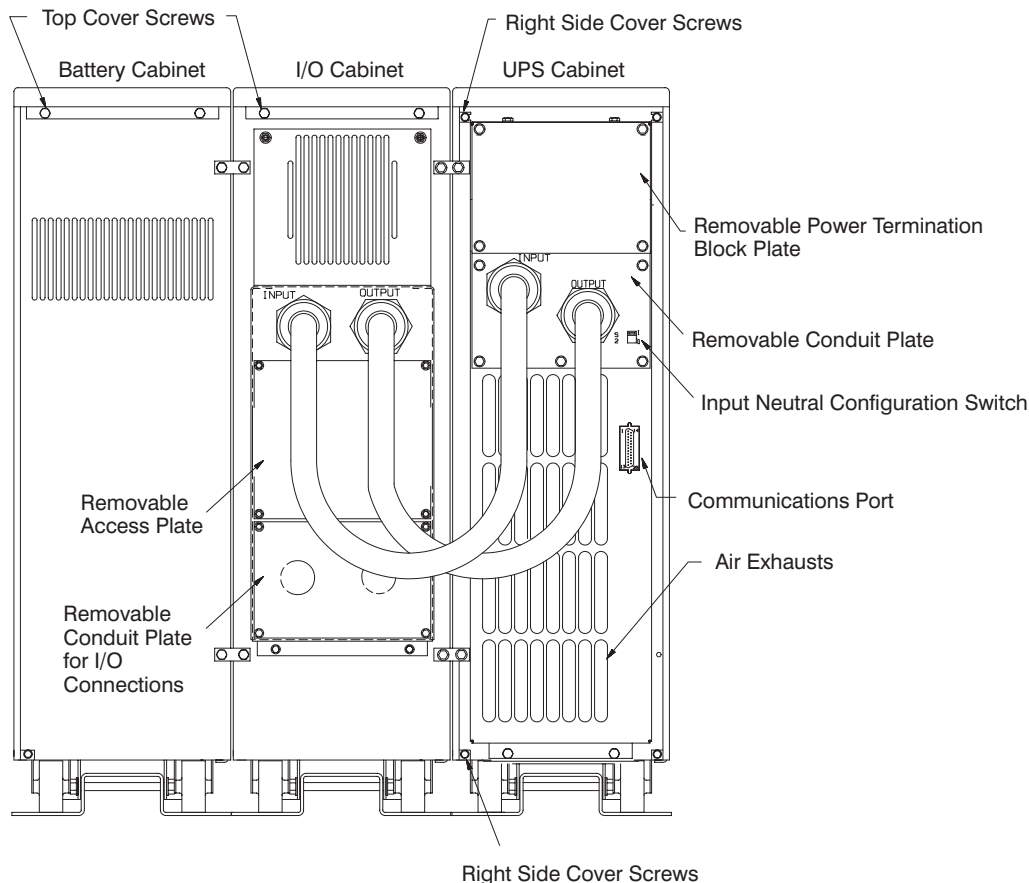
**Figure 25. Mounting the UPS and I/O Cabinet**

- Position the cabinets into the approximate final operating position with the battery to the right of the UPS cabinet as shown in Figure 26.



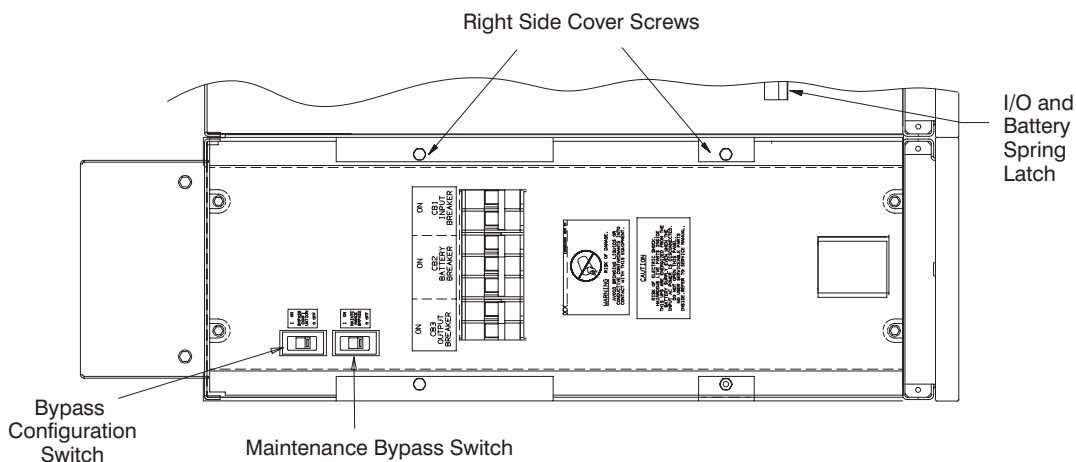
**Figure 26. Front View of the Powerware Plus 18 UPS with I/O Cabinet**

7. Remove the two screws located at the top rear of the battery and I/O cabinets (see Figure 27). Retain the screws.



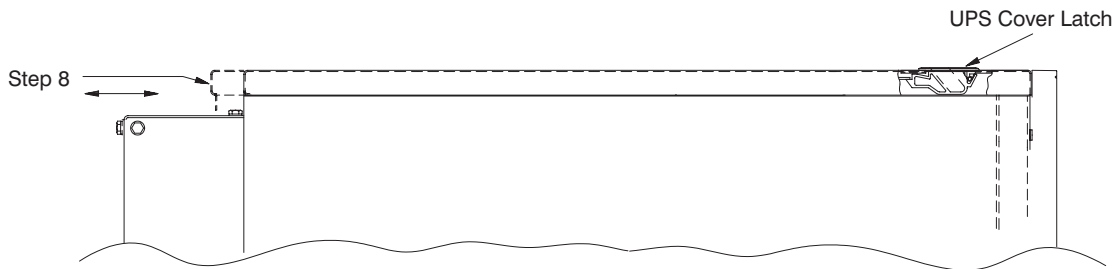
**Figure 27. Rear View of the Powerware Plus 18 UPS with I/O Cabinet**

8. Remove the top covers of the battery and I/O cabinets by pulling the top cover toward the rear of the unit to release the spring latch and lift the cover off the cabinet.



**Figure 28. Top View with UPS and I/O Cover Removed**

9. Open the top cover of the UPS cabinet by sliding the cover latch forward and lift up as shown in Figure 29.



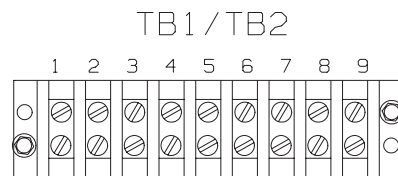
**Figure 29. Removing the Cover Latch from the UPS and I/O Cabinet**

10. Remove the right side cover of the UPS cabinet by removing the mounting screws (four each) as shown in Figures 27 and 28. Retain the screws.
11. Pull the right side cover out from the top and then detach it from the system. Retain the side cover and mounting hardware.
12. If you need to change the factory-set output voltage, you should reconfigure the output voltage before joining the cabinets.

If you do not need to change the output voltage continue to Step 14.

**Caution:** Failure to complete output voltage configuration could result in an unbalanced output load. Only qualified service personnel (such as a licensed electrician) should change the output voltage.

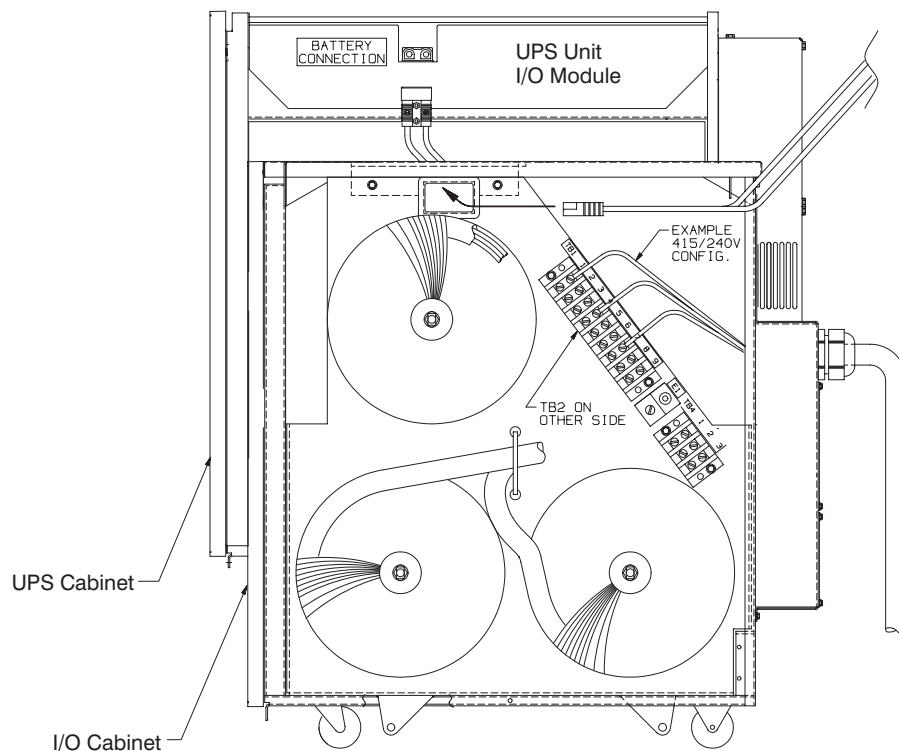
13. To reconfigure the output voltage, see the table below for wire positions.



Position	Voltage	Phase
1 Yellow	240/415 VAC	A
2 Orange	230/400 VAC	A
3 Red	220/380 VAC	A
4 Yellow	240/415 VAC	B
5 Orange	230/400 VAC	B
6 Red	220/380 VAC	B
7 Yellow	240/415 VAC	C
8 Orange	230/400 VAC	C
9 Red	220/380 VAC	C

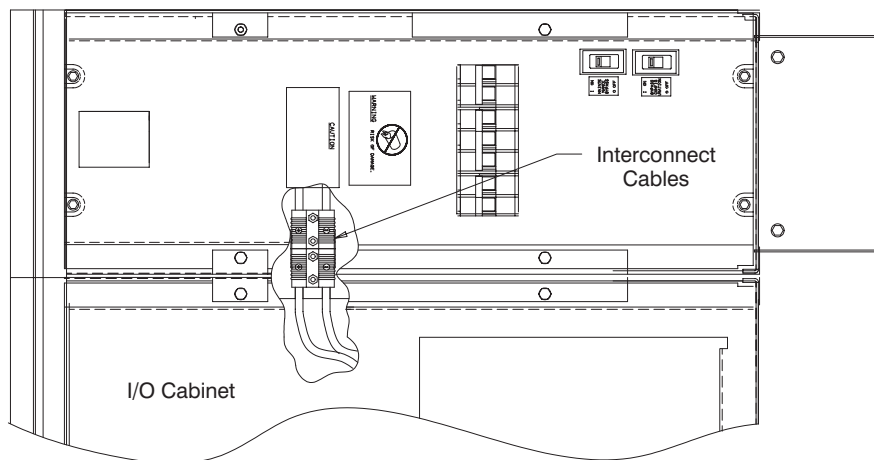
**Example.** For a 240/415V configuration, place the wire already on TB1 (and TB2) position 1, 2, or 3 on position 1. Place the wire already on TB1 (and TB2) position 4, 5, or 6 on position 4. Place the wire already on TB1 (and TB2) position 7, 8, or 9 on position 7. See Figure 30.





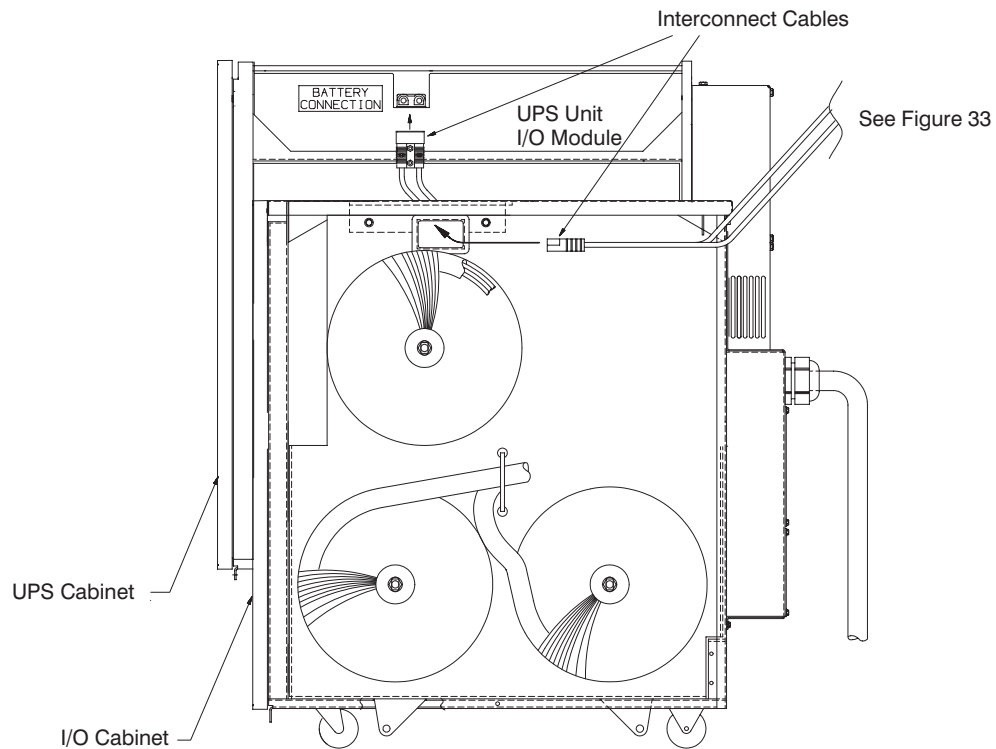
**Figure 30. Changing the Output Voltage**

14. Find the two interconnect cables secured to the top of the battery tray.
15. Select the longer of the two cables. Cut the retaining straps.
16. Connect the UPS to the first battery cabinet through the top cutout in the I/O cabinet (Figure 31).



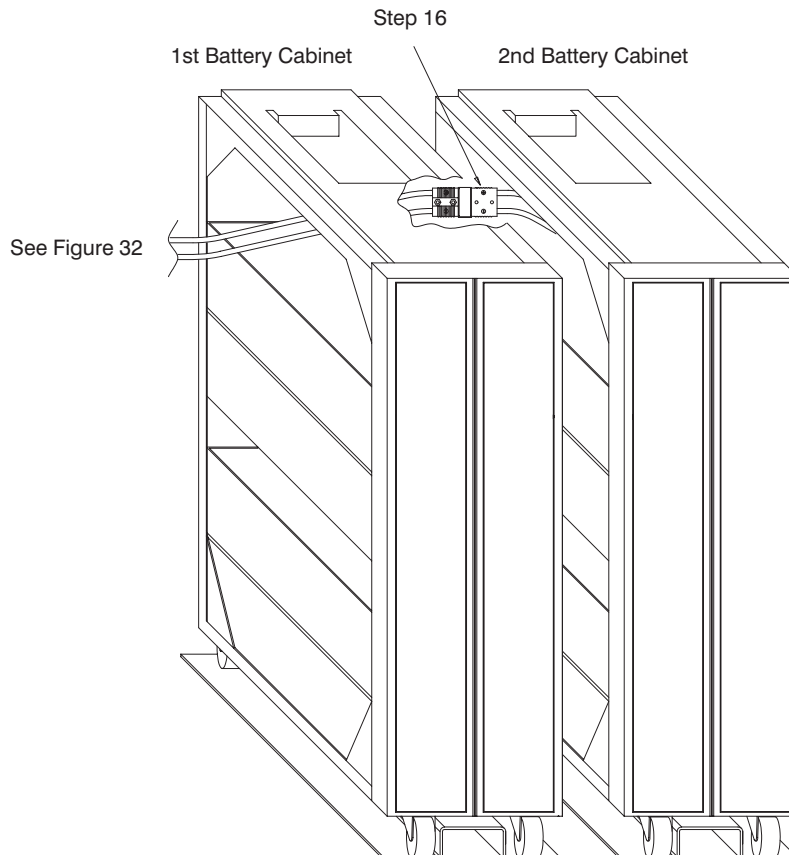
**Figure 31. Connecting the Battery Cables – UPS and I/O Cabinets (Top View)**

17. Mate the connector with the mating half located in the I/O module as shown in Figure 32. If the cabinets are not permanently mounted to the floor, you can slide them apart to make the connection.



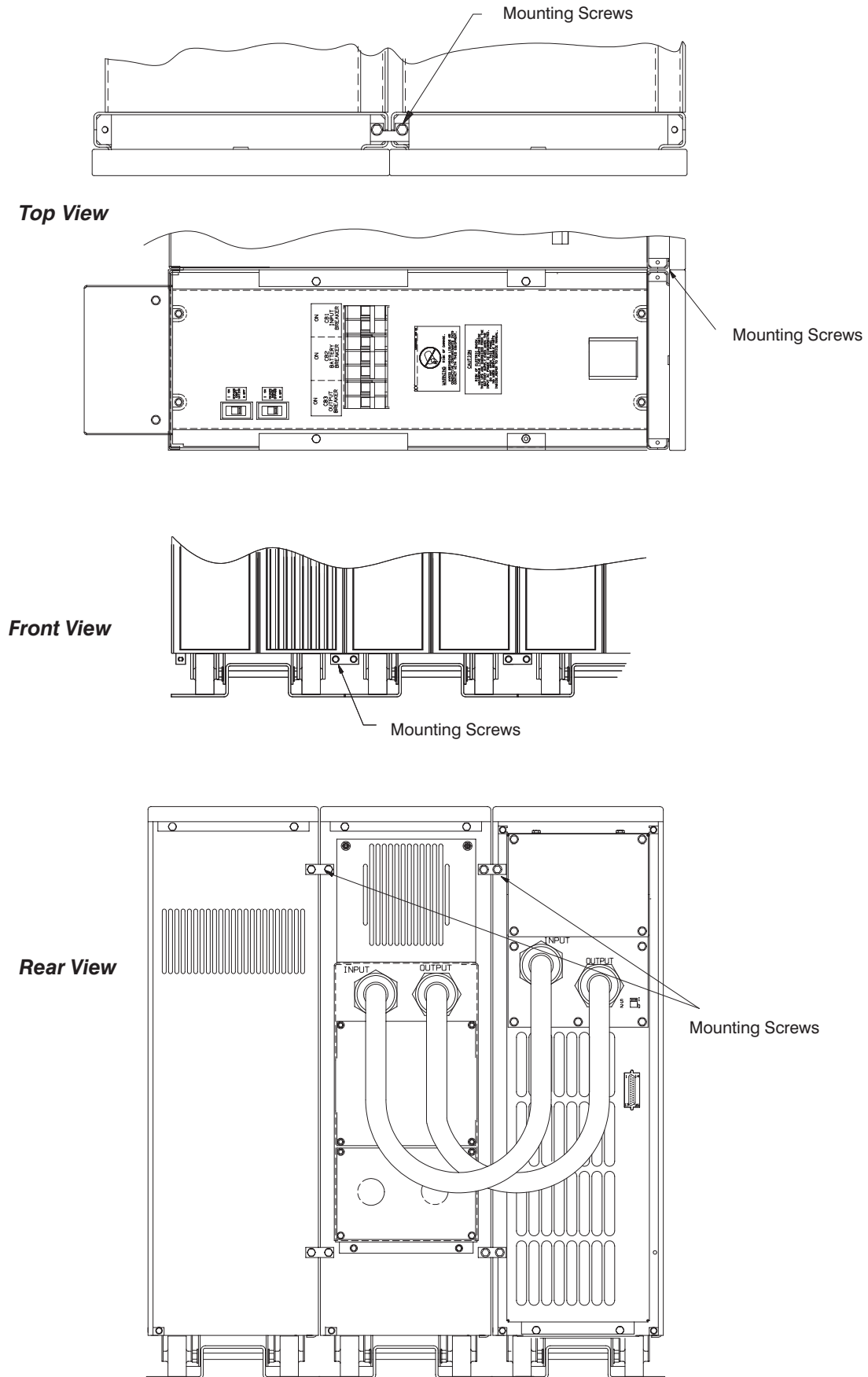
**Figure 32. Connecting the Battery Cables – UPS and I/O Cabinets (Right Side View)**

18. Connect a second battery cabinet by selecting either one of the two interconnect cables located in the second battery cabinet. Cut and remove the retaining straps. Connect to mating connector in the first battery cabinet.



**Figure 33. Connecting a Second Battery Cabinet**

19. Join the cabinets together in four places as shown in Figure 34.



**Figure 34. Joining the Cabinets (Front and Rear View)**

20. Remount the right side cover that was removed from the UPS cabinet in Step 10 to the right side of the end cabinet. Use the original hardware provided in the joining kit.
21. Remount the top covers of the battery and I/O cabinets by offsetting the cover toward the back. Push it forward so that the spring latch engages the frame top. Secure the cover using the original hardware.
22. Close the top cover of the UPS unit.
23. Continue to the following section “Electrical Installation with I/O Cabinet.”

**Caution:** All cabinets must be secured to prevent them from moving when installation is complete. Secure the cabinets either by lowering all leveling feet to take the weight off the casters, or by bolting the cabinets to the floor using the seismic installation procedure. Failure to do so violates safety rules and results in the unit losing its safety agency approvals.

### Electrical Installation with I/O Cabinet

**Warning:** Only qualified service personnel (such as a licensed electrician) should perform the electrical installation. Risk of electrical shock.

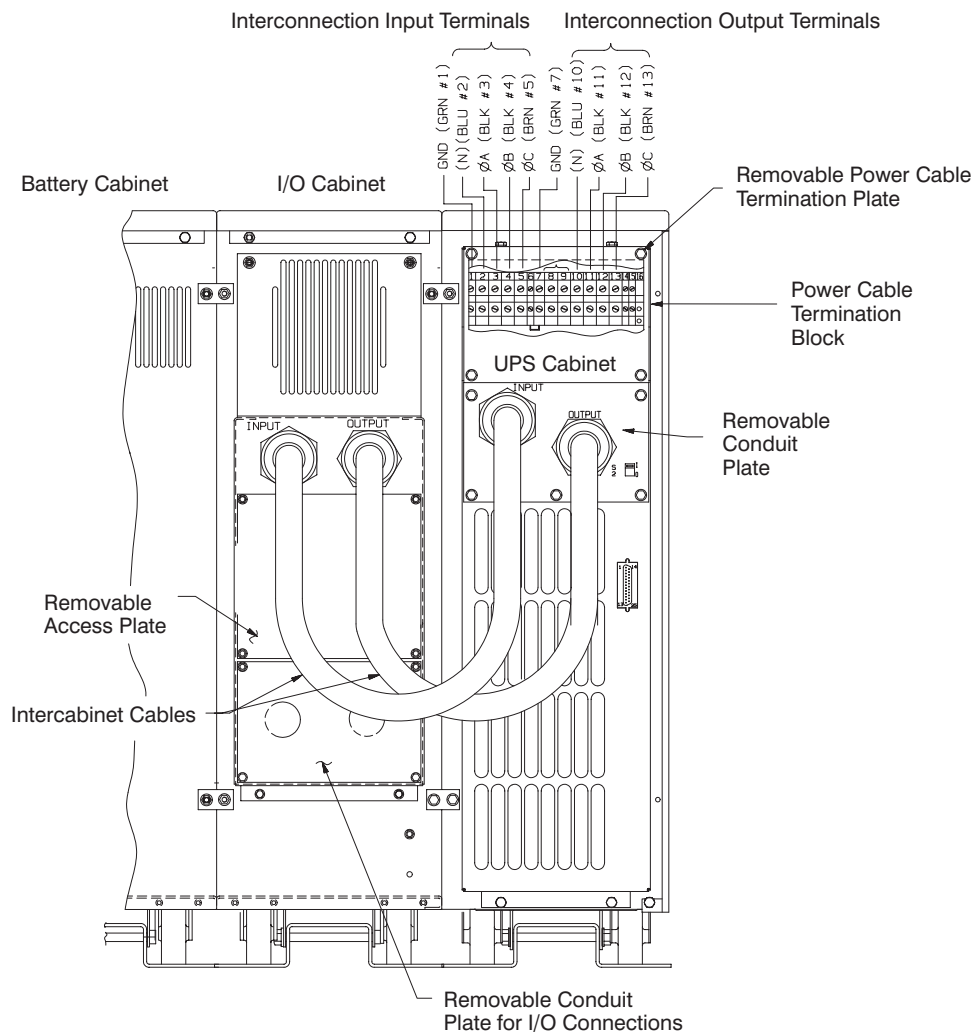
Refer to your national and local electrical codes for acceptable external wiring practices. Material and labor for the external wiring are customer-supplied. An external protective device for the input source must be provided and sized for the currents indicated on the UPS nameplates.

**NOTE:** *Upstream protection must be coordinated with the load current requirements under nominal as well as low-line and overload conditions. The recommended input upstream service protection is 32 amps.*

The UPS must be grounded at the input terminal block to a single-point local or utility earth ground. The ground conductor should be sized according to your national and local electrical codes. In the United States, the output is a separately-derived source.

If you are using remote batteries, a DC breaker suitable for branch circuit protection is required. The DC breaker is customer-supplied and must be rated at 250V, 75A. The maximum fault current from a remote battery cannot be more than 4500 amps.

See Figure 16 for the location of the power cable terminal block and the conduit access. Use the following procedure to perform the electrical installation for your UPS.



**Figure 35. I/O Cabinet to UPS Cabinet Wiring (Rear View)**

1. Determine your equipment's grounding requirements according to your local electrical code.
2. Open the top cover of the UPS and make sure that all breakers (input, output, and battery) are in the OFF (O) position.
3. Remove the screws on the terminal-block plate and the conduit plate of the UPS rear panel with a 1/4 hex-nut driver.

Discard the conduit plate and retain the screws.

4. Attach the strain relief connected to the end of each cable to the conduit mounting plate by removing the nut and placing it on the back side of the conduit mounting plate. Secure tightly.

To ensure proper strain relief of the cable, do not loosen or remove the strain relief clamp from the cable during installation.

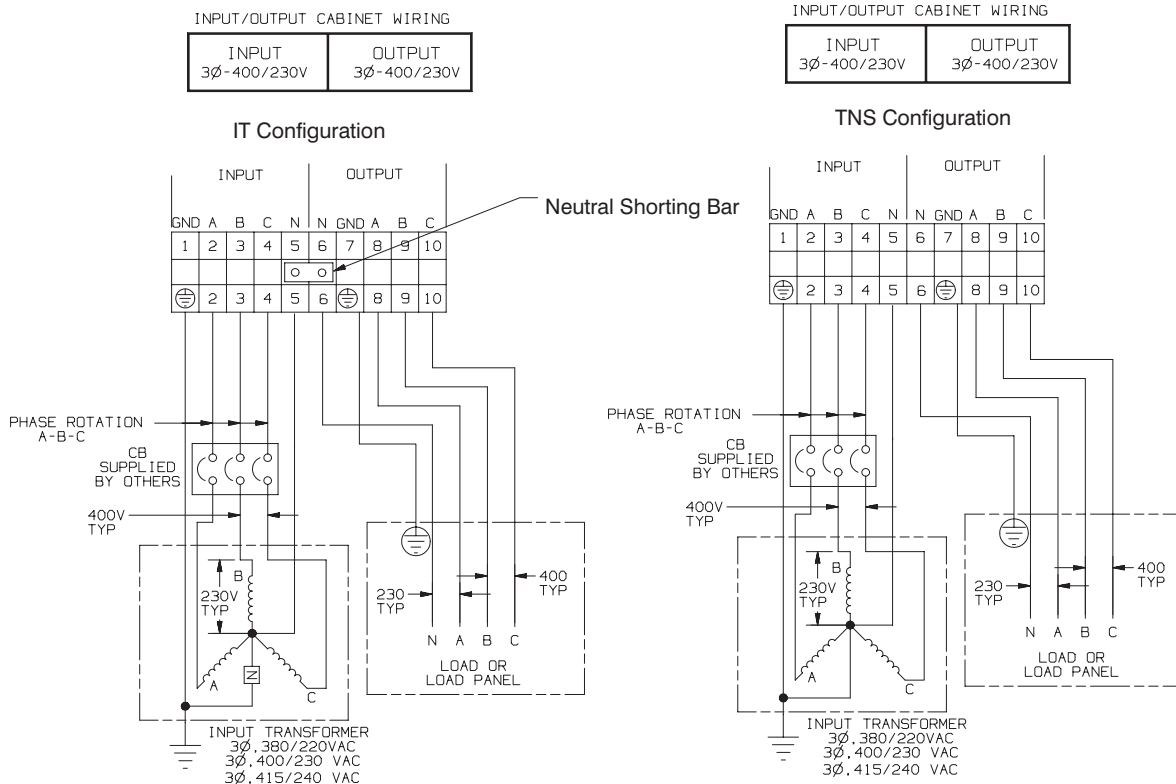
5. Connect the wires from the I/O cabinet to the UPS output terminal block as shown in Figure 35. See the label on the inside of the UPS for terminal block torque requirements.
6. Attach the conduit plate (provided in the hardware kit) to the UPS using the retained screws from Step 3.

7. Remove the I/O access plate and connect the wiring to the terminal block according to the following table and Figure 36 for the UPS output. Use the conduit plate for conduit landing.

**Caution:** The UPS contains its one energy source (battery). There is high voltage present at terminals 8 and 9 (terminals for remote battery connection) when a battery cabinet is connected to the UPS.

Power Cable Terminations on I/O Cabinet			Tightening Torque
Wire Function	Terminal Position	Terminal Wire Size Rating*	
Ground	1, 7	18 – 6 AWG (.5 – 10 mm <sup>2</sup> )	10.6 – 12.3 lb/in (1893.16 – 2196.78 G/cm)
Input/Output	2 – 6, 8 – 10	10 – 4 AWG (2.5 – 16 mm <sup>2</sup> )	

\*Use only 16 mm<sup>2</sup> AWG 75°C copper wire.

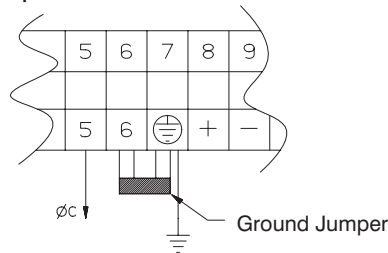


**Figure 36. Power Cable Terminal Blocks**

8. As part of the branch circuit that supplies this unit, install an insulated grounding conductor. Use the following specifications for the grounding conductor that connects to input terminal block.
- **Material and insulation thickness:** Must be identical to the grounded and ungrounded branch-circuit supply conductors
  - **Color:** should be green with or without a yellow stripe(s)
  - **Ground:** should be grounded to the earth ground in the service equipment or in the supply transformer (if supplied by a separately-derived system)

**NOTE:** All attachment plug-receptacles on or connected to your UPS or system equipment must be a grounding type. The grounding conductors serving these receptacles must be connected to the earth ground in the service equipment.

9. Locate the grounding jumper between terminals 6 and 7 (see Figure 18).



**Figure 37. Grounding Jumper**

10. The UPS is factory-set with the output neutral connected to the ground in a TNS configuration (see Figure 36). If you want to operate the UPS in an IT configuration:
- Remove the grounding jumper from the UPS terminal board on the back of the UPS cabinet (see Figure 37).
  - Connect the UPS system input and output neutrals together with a shorting bar between terminals 5 and 6 of the I/O cabinet customer connection terminals. The shorting bar is located in a bag on the rear of the UPS cabinet.
11. If you are using a Remote Emergency Power-Off switch, hardwire the terminal block positions 14 and 15. See the termination table on page 45 for proper connections. See Figure 17 on page 45 for the connection locations.

The REPO switch is a customer-supplied switch that can disconnect the UPS output voltage from your protected equipment. The REPO function activates when the REPO wires are shorted together. Use the following specifications for the REPO switch:

- The switch should be a wall-mounted, momentary-contact, normally open, pushbutton switch.
- Minimum ratings of 120 VAC and 125 mA.

**Caution:** The REPO wires are at high-voltage potential (240V). Refer to your local electrical code for proper installation of the high-voltage REPO wires.

12. Replace the terminal block plate on the UPS rear panel and the I/O access plate on the I/O cabinet rear panel.
13. Configure the UPS for bypass and input configuration (see page 47).
14. Continue to “UPS Startup and Shutdown” on page 23 to start up your UPS.

### Voltage Metering

If your Powerware Plus 18 is already operational and you need to add the I/O cabinet, a trained and qualified service person must change the meter values. Do not be concerned if the UPS meter displays 208V after the I/O cabinet has been installed. Your UPS and I/O cabinet are operating properly in accordance with your factory-set voltage of 380, 400, or 415 VAC. Contact your dealer or distributor if you have any questions.

## Installing Remote Batteries

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The following sections describe how to determine the battery capacity and install and configure the remote batteries.

### Determining the Battery Capacity

When a battery cabinet is not supplied with the UPS, DC power can be supplied by remote batteries. It is recommended to use sealed maintenance-free, lead-acid type batteries. To determine the battery capacity you need for your UPS:

1. Determine the active load KW and load power factor PF of the critical load to be protected by the UPS. KW is calculated from the apparent power kVA and the load power PF as:

$$(KW) = (kVA) \times PF$$

2. Determine the power to be delivered by the battery  $KW_{Batt}$ . The efficiency of the UPS is taken into consideration and can be calculated using the following expression:

$$(KW_{Batt}) = \frac{(KW)}{.085 - 0.05 \times (1 - PF)}$$

3. Nominal battery voltage is 240 Vdc (120 cells @ 2.0 Vdc). Float voltage should not exceed 270 Vdc.
4. Determine the desired backup time and the operating temperature.
5. The low-battery shutdown voltage is customer-selectable. It can be set between 1.67 Vdc/cell and 1.85 Vdc/cell. Select a value suitable for your application to size your battery and make sure you set the value when configuring the UPS.
6. Follow the battery manufacturer's application notes and charts to calculate the battery capacity necessary for your application.
7. The UPS has a cyclic battery charger (turn on = 265 Vdc, turn off = 285 Vdc) that delivers a maximum current of 5 amps. The internal charger must be disabled when an external charger is used. For battery sizes above 75 AH, an external charger is recommended.

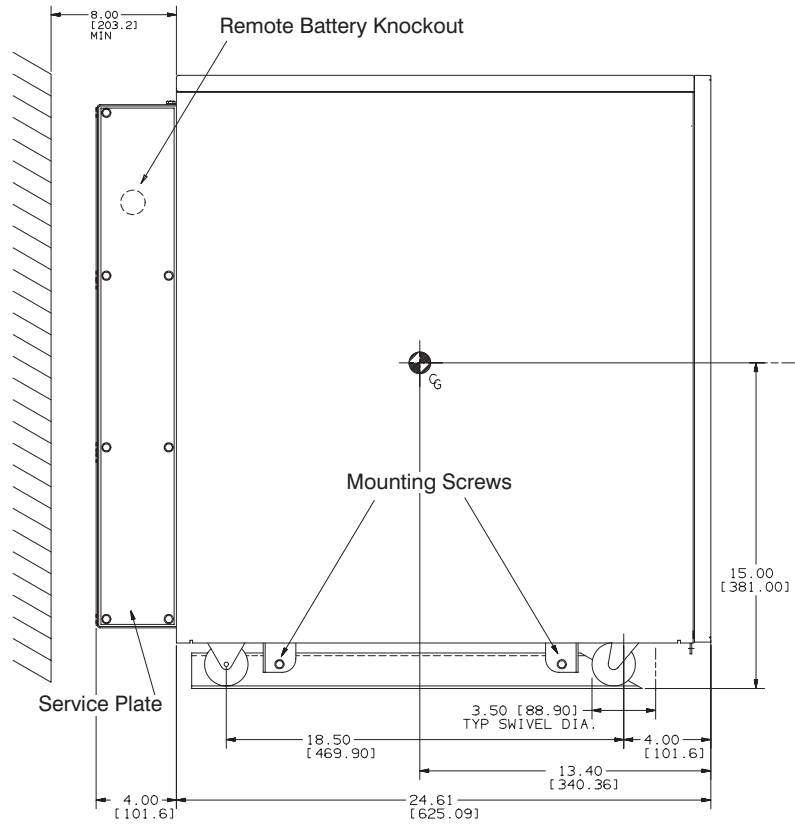
### Remote Battery Installation

The following instructions assume you have already installed the UPS according to the instructions beginning on page 36.

**Caution:** Do not add remote batteries if a battery cabinet is already connected to the UPS.

1. Refer to the battery manufacturer's operator's manual for battery installation and maintenance instructions.
2. Remove the knock-out for the conduit as shown in Figure 38.





**Figure 38. Remote Battery Access**

3. Follow the wiring instructions in “Electrical Installation” on page 43.
4. Configure the Bypass and Input Configuration switches as described on page 47.
5. Continue to the following section, “Remote Battery Configuration,” to change the UPS setup.

## Remote Battery Configuration

After the remote battery has been installed, change the UPS setup. See Chapter 5, “UPS Startup and Shutdown,” on page 23 before applying power to the unit for the first time. Perform the following steps without removing the AC input power:

1. Verify the system type.
2. Press the Menu button. **MAIN MENU 1. UPS Status** appears.
3. Press the down arrow button until **MAIN MENU 7. System Setup** appears. Press the Select button. The prompt **Password AAAAAA** appears.

**NOTE:** *The default password is MEMORY. It is recommended to change the default password to ensure security (see page 20). Contact your field service representative if you have misplaced your password.*

4. Enter the password using the up and down arrow buttons to scroll through the letters. Use the right and left arrow buttons to move to another character position.
5. After you have entered the password, press the Select button. The display now shows **SYSTEM SETUP 1. Select Type**.
6. Press the down arrow button until **13. Battery Cfg** appears. Press the Select button.
7. Using the up and down arrow buttons, scroll to **Custom Battery**. Press the Select button.
8. A battery charger disable/enable menu appears that allows you to enable or disable the UPS built-in battery charger. Select either **Enable** or **Disable** by using the left and right arrow buttons. Press the Select button. An asterisk appears beside the newly selected option.

Press the down arrow button. A **Custom DCUV** menu appears that allows you to select the low-battery shutdown level.

Use the left and right arrow buttons to scroll through the different options. Press Select to choose the desired **DCUV** level. An asterisk appears to the left of the newly selected option.

**NOTE:** *If the Custom DCUV selection does not appear after selecting Custom Battery, verify that the UPS is off or on bypass.*

9. Press the Menu button four times to exit System Setup.

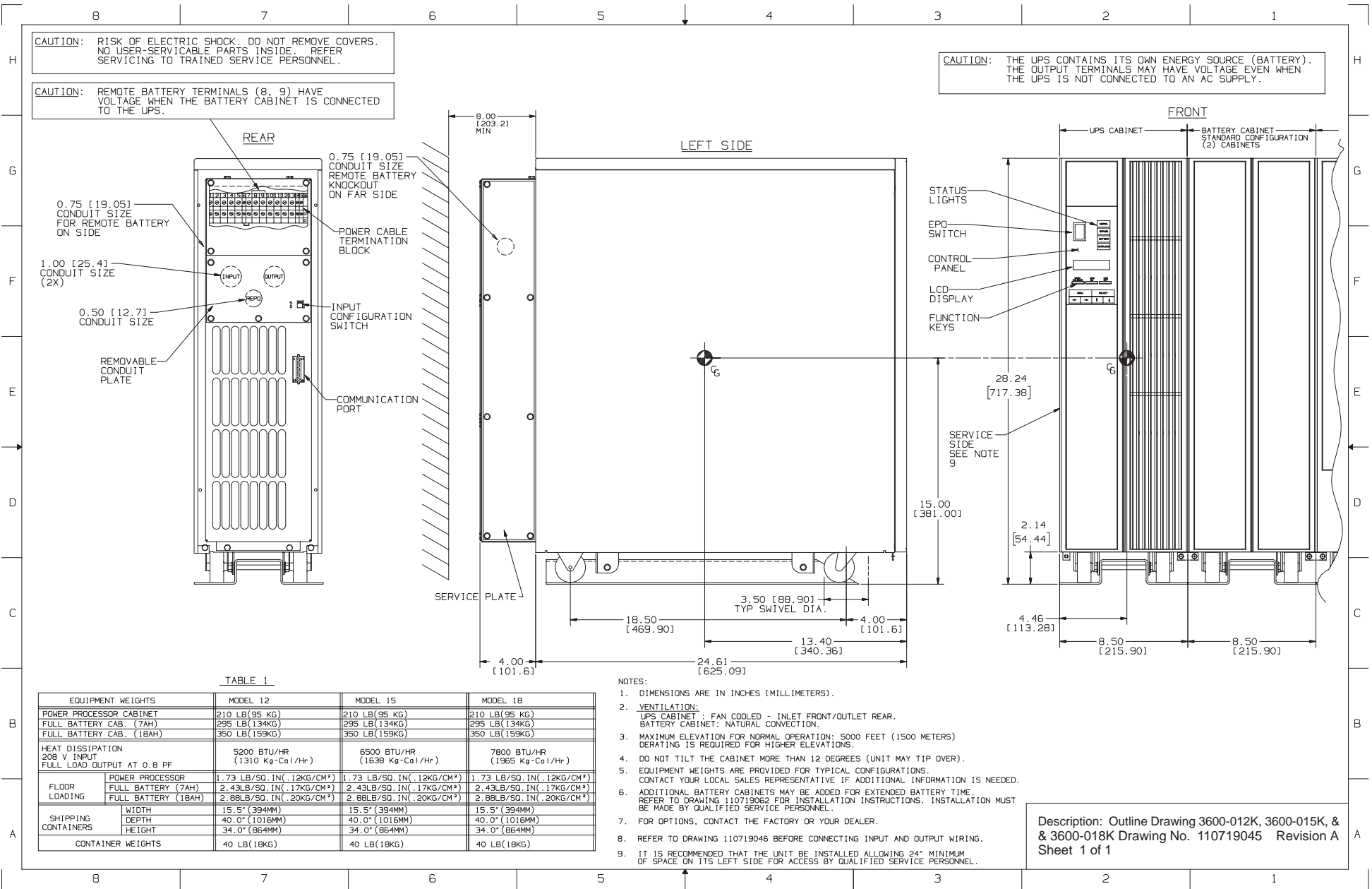


TABLE 1

EQUIPMENT WEIGHTS		MODEL 12	MODEL 15	MODEL 18
POWER PROCESSOR CABINET		210 LB(95 KG)	210 LB(95 KG)	210 LB(95 KG)
FULL BATTERY CAB. (7AH)		295 LB(134KG)	295 LB(134KG)	295 LB(134KG)
FULL BATTERY CAB. (18AH)		350 LB(159KG)	350 LB(159KG)	350 LB(159KG)
HEAT DISSIPATION				
208 V INPUT		5200 BTU/HR (1310 Kg-Cal/Hr)	6500 BTU/HR (1638 Kg-Cal/Hr)	7800 BTU/HR (1965 Kg-Cal/Hr)
FULL LOAD OUTPUT AT 0.8 PF				
FLOOR LOADING	POWER PROCESSOR	1.73 LB/SQ. IN.(12KG/CM <sup>2</sup> )	1.73 LB/SQ. IN.(12KG/CM <sup>2</sup> )	1.73 LB/SQ. IN.(12KG/CM <sup>2</sup> )
	FULL BATTERY (7AH)	2.43LB/SQ. IN.(17KG/CM <sup>2</sup> )	2.43LB/SQ. IN.(17KG/CM <sup>2</sup> )	2.43LB/SQ. IN.(17KG/CM <sup>2</sup> )
	FULL BATTERY (18AH)	2.88LB/SQ. IN.(20KG/CM <sup>2</sup> )	2.88LB/SQ. IN.(20KG/CM <sup>2</sup> )	2.88LB/SQ. IN.(20KG/CM <sup>2</sup> )
SHIPPING CONTAINERS	WIDTH	15.5" (394MM)	15.5" (394MM)	15.5" (394MM)
	DEPTH	40.0" (1016MM)	40.0" (1016MM)	40.0" (1016MM)
	HEIGHT	34.0" (864MM)	34.0" (864MM)	34.0" (864MM)
CONTAINER WEIGHTS		40 LB(18KG)	40 LB(18KG)	40 LB(18KG)

NOTES:

- DIMENSIONS ARE IN INCHES (MILLIMETERS).
- VENTILATION:  
UPS CABINET : FAN COOLED - INLET FRONT/OUTLET REAR.  
BATTERY CABINET: NATURAL CONVECTION.
- MAXIMUM ELEVATION FOR NORMAL OPERATION: 5000 FEET (1500 METERS) DERATING IS REQUIRED FOR HIGHER ELEVATIONS.
- DO NOT TILT THE CABINET MORE THAN 12 DEGREES (UNIT MAY TIP OVER).
- EQUIPMENT WEIGHTS ARE PROVIDED FOR TYPICAL CONFIGURATIONS. CONTACT YOUR LOCAL SALES REPRESENTATIVE IF ADDITIONAL INFORMATION IS NEEDED.
- ADDITIONAL BATTERY CABINETS MAY BE ADDED FOR EXTENDED BATTERY TIME. REFER TO DRAWING 110719062 FOR INSTALLATION INSTRUCTIONS. INSTALLATION MUST BE MADE BY QUALIFIED SERVICE PERSONNEL.
- FOR OPTIONS, CONTACT THE FACTORY OR YOUR DEALER.
- REFER TO DRAWING 110719046 BEFORE CONNECTING INPUT AND OUTPUT WIRING.
- IT IS RECOMMENDED THAT THE UNIT BE INSTALLED ALLOWING 24" MINIMUM OF SPACE ON ITS LEFT SIDE FOR ACCESS BY QUALIFIED SERVICE PERSONNEL.

Description: Outline Drawing 3600-012K, 3600-015K, & 3600-018K Drawing No. 110719045 Revision A Sheet 1 of 1

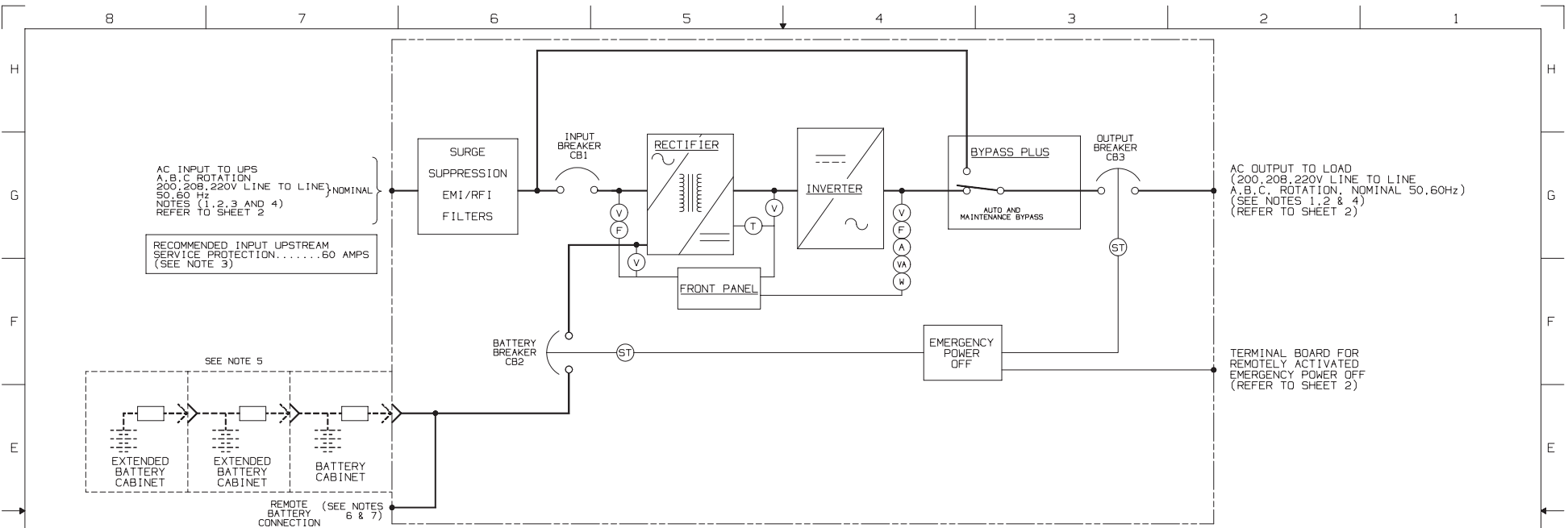


TABLE 1

	NOMINAL VOLTAGE	NOMINAL INPUT CURRENT PER PHASE *			NOMINAL OUTPUT CURRENT PER PHASE			NOMINAL OUTPUT POWER			BATTERY CURRENT		
		MODEL 12	MODEL 15	MODEL 18	MODEL 12	MODEL 15	MODEL 18	MODEL 12	MODEL 15	MODEL 18	MODEL 12	MODEL 15	MODEL 18
THREE-PHASE INPUT	200/115	29 A	36 A	43 A	34 A	42 A	50 A	8 KW	10 KW	12 KW	40 A	50 A	60 A
THREE-PHASE OUTPUT	208/120	28 A	35 A	42 A	34 A	42 A	50 A	8 KW	10 KW	12 KW	40 A	50 A	60 A
	220/127	26 A	33 A	39 A	31 A	39 A	47 A	8 KW	10 KW	12 KW	40 A	50 A	60 A

\* INPUT CURRENT IS THE SAME AS THE OUTPUT CURRENT WHEN LOAD IS POWERED THROUGH THE BYPASS

NOTES:

- REFER TO NATIONAL AND LOCAL ELECTRICAL CODES FOR ACCEPTABLE EXTERNAL WIRING PRACTICES.
- MATERIAL AND LABOR FOR EXTERNAL WIRING ARE TO BE PROVIDED BY OTHERS.
- AN EXTERNAL PROTECTIVE DEVICE FOR THE INPUT SOURCE MUST BE PROVIDED, AND SIZED FOR THE CURRENTS INDICATED ON THE NAMEPLATE, PER NATIONAL AND LOCAL ELECTRICAL CODES. (NOTE: UPSTREAM PROTECTION MUST BE COORDINATED WITH LOAD CURRENT REQUIREMENTS UNDER NOMINAL AS WELL AS LOW LINE AND OVERLOAD CONDITIONS.)
- THE UNIT SHALL BE GROUNDED AT THE INPUT TERMINAL BLOCK TO A SINGLE POINT LOCAL OR UTILITY EARTH GROUND. THE GROUND CONDUCTOR SHALL BE SIZED PER NATIONAL AND LOCAL ELECTRICAL CODE REQUIREMENTS. ON THE OUTPUT, FOLLOW APPLICABLE ELECTRICAL GROUNDING GUIDELINES. IN THE UNITED STATES THE OUTPUT IS A SEPARATELY DERIVED SOURCE.
- WARNING: TO AVOID FIRE AND ELECTRIC SHOCK HAZARD, DO NOT CONNECT MORE THAN THREE BATTERY CABINETS TO THE UPS UNIT.
- REMOTE BATTERIES REQUIRE DC BREAKER SUITABLE FOR BRANCH CIRCUIT PROTECTION (TO BE PROVIDED BY OTHERS), RATED 250V, 75A.
- MAXIMUM PERMITTED AVAILABLE FAULT CURRENT FROM A REMOTE BATTERY SUPPLY IS 4500 AMPS.

**CAUTION - RISK OF ELECTRIC SHOCK.**  
NO USER-SERVICEABLE PARTS INSIDE.  
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

**CAUTION:**  
THE UPS CONTAINS ITS OWN ENERGY SOURCE (BATTERY). THE OUTPUT TERMINALS MAY HAVE VOLTAGE EVEN WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

- LEGEND
- (ST) SHUNT TRIP
  - (F) FREQUENCY METER
  - (A) AMMETER
  - (V) VOLTMETER
  - (VA) VOLT-AMP METER
  - (W) WATTMETER
  - (T) TEMPERATURE

Description: Online and Installation 3600-012K,  
3600-015K, & 3600-018K Drawing No. 110719046  
Revision A1 Sheet 1 of 2

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CAUTION: RISK OF ELECTRIC SHOCK.  
 REMOTE BATTERY TERMINALS (8,9) HAVE  
 HIGH VOLTAGE WHEN THE BATTERY CABINET IS  
 CONNECTED TO THE UPS.

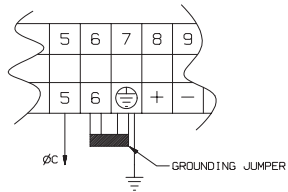


FIGURE 1

INSTALLATION INSTRUCTIONS:

ONLY QUALIFIED SERVICE PERSONNEL SHOULD ATTEMPT TO CONFIGURE THIS EQUIPMENT.

THE OUTPUT VOLTAGE AND FREQUENCY ARE SET USING THE FRONT PANEL. CONSULT THE OPERATOR'S MANUAL FOR DETAILS ON HOW TO CONFIGURE THE OUTPUT.

NOTES:

- 1.0 GROUNDING
  - 1.1 AN INSULATED GROUNDING CONDUCTOR THAT IS IDENTICAL IN SIZE, INSULATION MATERIAL, AND THICKNESS TO THE GROUNDED AND UNGROUNDED BRANCH-CIRCUIT SUPPLY CONDUCTORS EXCEPT THAT IS GREEN WITH OR WITHOUT ONE OR MORE YELLOW STRIPES IS TO BE INSTALLED AS PART OF THE BRANCH CIRCUIT THAT SUPPLIES THE UNIT, AND CONNECTED TO THE TERMINAL OF THE INPUT TERMINAL BLOCK.
  - 1.2 THE GROUNDING CONDUCTOR DESCRIBED ABOVE IS TO BE GROUNDED TO EARTH AT THE SERVICE EQUIPMENT OR, IF SUPPLIED BY A SEPERATELY DERIVED SYSTEM, AT THE SUPPLY TRANSFORMER.
  - 1.3 THE ATTACHMENT-PLUG RECEPTACLES IN THE VICINITY OF THE UNIT OR SYSTEM ARE ALL TO BE OF A GROUNDING TYPE, AND THE GROUNDING CONDUCTORS SERVING THESE RECEPTACLES ARE TO BE CONNECTED TO EARTH GROUND AT THE SERVICE EQUIPMENT.
  - 1.4 LOCATE THE GROUNDING JUMPER BETWEEN TERMINALS 6 AND 7 AS SHOWN IN FIGURE 1.
  - 1.5 IF OUTPUT NEUTRAL IS NOT TO BE GROUNDED, REMOVE THE GROUNDING JUMPER THAT IS LOCATED BETWEEN TERMINALS 6 AND 7. (IT IS RECOMMENDED THAT THE GROUNDING JUMPER BE REMOVED FOR 3 WIRE-DELTA OUTPUT.)
- 2.0 BYPASS CONFIGURATION
  - 2.1 DETERMINE THE INPUT AND OUTPUT VOLTAGE AND FREQUENCY.
  - 2.2 IDENTIFY THE BYPASS CONFIGURATION SWITCH S3, LOCATED ON THE TOP OF THE UNIT.
  - 2.3 IF INPUT AND OUTPUT VOLTAGE AND FREQUENCY ARE IDENTICAL, AND BYPASS IS DESIRED, SET THE BYPASS CONFIGURATION SWITCH S3 TO THE 'ENABLE' POSITION, AS SHOWN IN FIGURE 2.
  - 2.4 IF INPUT AND OUTPUT VOLTAGE AND FREQUENCY ARE NOT IDENTICAL, OR IF BYPASS IS NOT DESIRED, SET THE BYPASS CONFIGURATION SWITCH S3 TO THE 'DISABLE' POSITION.
- 3.0 INPUT CONFIGURATION SWITCH
  - 3.1 MAKE SURE THAT THE INPUT CONFIGURATION SWITCH S2, LOCATED ON THE REAR OF THE UNIT, (FIGURE 3), IS SET TO THE '1' POSITION FOR WYE (4-WIRE) INPUT, AND TO THE '0' POSITION FOR DELTA (3-WIRE) INPUT.
- 4.0 REMOTE EMERGENCY POWER OFF
  - 4.1 REMOTE EMERGENCY POWER OFF (REPO) SWITCH IS A WALL-MOUNTED, NORMALLY-OPEN, MOMENTARY-CONTACT PUSH-BUTTON SWITCH SUPPLIED BY OTHERS.
  - 4.2 MINIMUM RATINGS OF REPO SWITCH ARE 120V AND 125mA
  - 4.3 REPO WIRES ARE HIGH VOLTAGE. REFER TO LOCAL ELECTRICAL CODES FOR PROPER INSTALLATION.

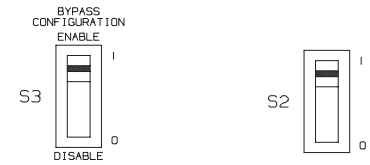
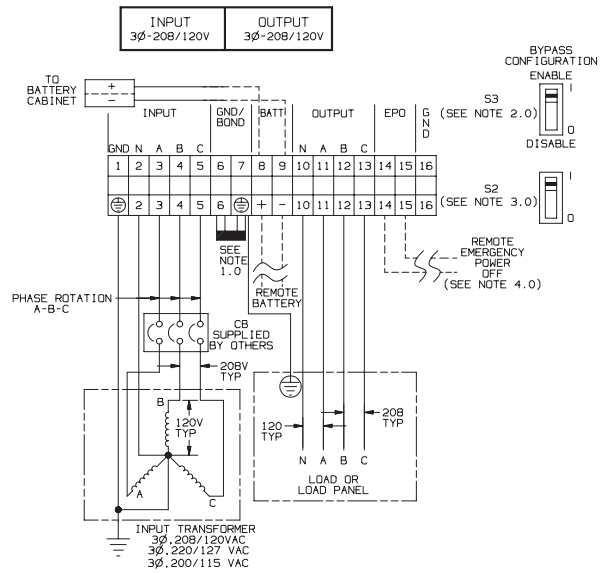


FIGURE 2

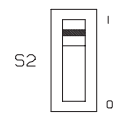


FIGURE 3

REFER TO NATIONAL AND LOCAL ELECTRICAL REGULATIONS FOR ACCEPTABLE EXTERNAL WIRING PRACTICES. TABLE 2 INDICATES INPUT/OUTPUT TERMINAL BLOCK WIRE RANGES AND REQUIRED TIGHTENING TORQUE.

TABLE 2

POWER CABLE TERMINALS		WIRE RANGE	TIGHTENING TORQUE
TERMINAL NO.	DESCRIPTION		
1,7,16	GROUND	18-6AWG (0.5-10 mm <sup>2</sup> )	10.6-12.3 lb-in
2,10	INPUT/OUTPUT	10-4AWG (2.5-16 mm <sup>2</sup> )	10.6-12.3 lb-in
6	NO CONNECTION	18-6AWG (0.5-10 mm <sup>2</sup> )	10.6-12.3 lb-in
8	REMOTE BATTERY POS.	10-4AWG (2.5-16 mm <sup>2</sup> )	10.6-12.3 lb-in
9	REMOTE BATTERY NEG.	10-4AWG (2.5-16 mm <sup>2</sup> )	10.6-12.3 lb-in
2,3,4,5,11,12,13,14,15	INPUT/OUTPUT	20-6AWG (0.5-10 mm <sup>2</sup> )	10.6-12.3 lb-in
14,15	EPO	22-10AWG (0.5-4 mm <sup>2</sup> )	3.5 - 5.3 lb-in

USE ONLY #8 AWG 75°C COPPER WIRE. FOR A DOUBLE RATED NEUTRAL, USE #6 AWG 75°C COPPER WIRE ON TERMINALS 2 AND 10.

LEGEND

1. E.P.O. - EMERGENCY POWER OFF
2. CB - CIRCUIT BREAKER
3. N - NEUTRAL
4. TYP - TYPICAL

Description: Online and Installation 3600-012K,  
 3600-015K, & 3600-018K Drawing No. 110719046  
 Revision A1 Sheet 2 of 2

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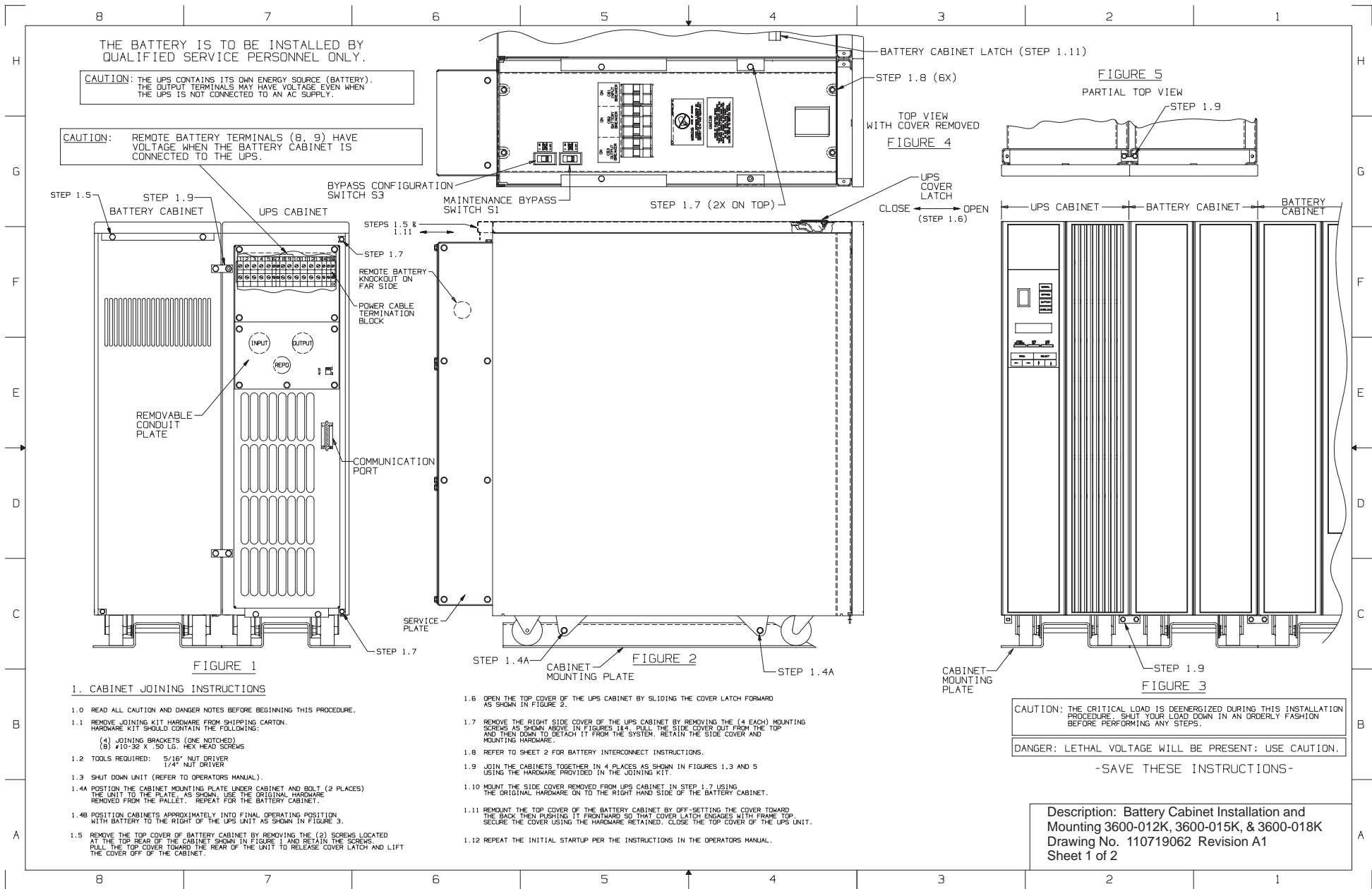
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THE BATTERY IS TO BE INSTALLED BY QUALIFIED SERVICE PERSONNEL ONLY.

**CAUTION:** THE UPS CONTAINS ITS OWN ENERGY SOURCE (BATTERY). THE OUTPUT TERMINALS MAY HAVE VOLTAGE EVEN WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

**CAUTION:** REMOTE BATTERY TERMINALS (8, 9) HAVE VOLTAGE WHEN THE BATTERY CABINET IS CONNECTED TO THE UPS.

FIGURE 1

1. CABINET JOINING INSTRUCTIONS

- 1.0 READ ALL CAUTION AND DANGER NOTES BEFORE BEGINNING THIS PROCEDURE.
- 1.1 REMOVE JOINING KIT HARDWARE FROM SHIPPING CARTON. HARDWARE KIT SHOULD CONTAIN THE FOLLOWING:
  - (4) JOINING BRACKETS (ONE NOTCHED)
  - (8) #10-32 X .50 LG. HEX HEAD SCREWS
- 1.2 TOOLS REQUIRED: 5/16" NUT DRIVER  
1/4" NUT DRIVER
- 1.3 SHUT DOWN UNIT (REFER TO OPERATORS MANUAL).
- 1.4A POSITION THE CABINET MOUNTING PLATE UNDER CABINET AND BOLT (2 PLACES) THE UNIT TO THE LEFT AS SHOWN. USE THE ORIGINAL HARDWARE REMOVED FROM THE PALLET. REPEAT FOR THE BATTERY CABINET.
- 1.4B POSITION CABINETS APPROXIMATELY INTO FINAL OPERATING POSITION WITH BATTERY TO THE RIGHT OF THE UPS UNIT AS SHOWN IN FIGURE 3.
- 1.5 REMOVE THE TOP COVER OF BATTERY CABINET BY REMOVING THE (2) SCREWS LOCATED AT THE TOP REAR OF THE CABINET SHOWN IN FIGURE 1 AND RETAIN THE SCREWS. PULL THE TOP COVER TOWARD THE REAR OF THE UNIT TO RELEASE COVER LATCH AND LIFT THE COVER OFF OF THE CABINET.

FIGURE 2

- 1.6 OPEN THE TOP COVER OF THE UPS CABINET BY SLIDING THE COVER LATCH FORWARD AS SHOWN IN FIGURE 2.
- 1.7 REMOVE THE RIGHT SIDE COVER OF THE UPS CABINET BY REMOVING THE (4 EACH) MOUNTING SCREWS AS SHOWN ABOVE. IN FIGURES 1&4, PULL THE SIDE COVER OUT FROM THE TOP AND THEN DOWN TO DETACH IT FROM THE SYSTEM. RETAIN THE SIDE COVER AND MOUNTING HARDWARE.
- 1.8 REFER TO SHEET 2 FOR BATTERY INTERCONNECT INSTRUCTIONS.
- 1.9 JOIN THE CABINETS TOGETHER IN 4 PLACES AS SHOWN IN FIGURES 1.3 AND 5 USING THE HARDWARE PROVIDED IN THE JOINING KIT.
- 1.10 MOUNT THE SIDE COVER REMOVED FROM UPS CABINET IN STEP 1.7 USING THE ORIGINAL HARDWARE ON TO THE RIGHT HAND SIDE OF THE BATTERY CABINET.
- 1.11 REMOUNT THE TOP COVER OF THE BATTERY CABINET BY OFF-SETTING THE COVER TOWARD THE BACK THEN PUSHING IT FORWARD SO THAT COVER LATCH ENGAGES WITH FRAME TOP. SECURE THE COVER USING THE HARDWARE RETAINED. CLOSE THE TOP COVER OF THE UPS UNIT.
- 1.12 REPEAT THE INITIAL STARTUP PER THE INSTRUCTIONS IN THE OPERATORS MANUAL.

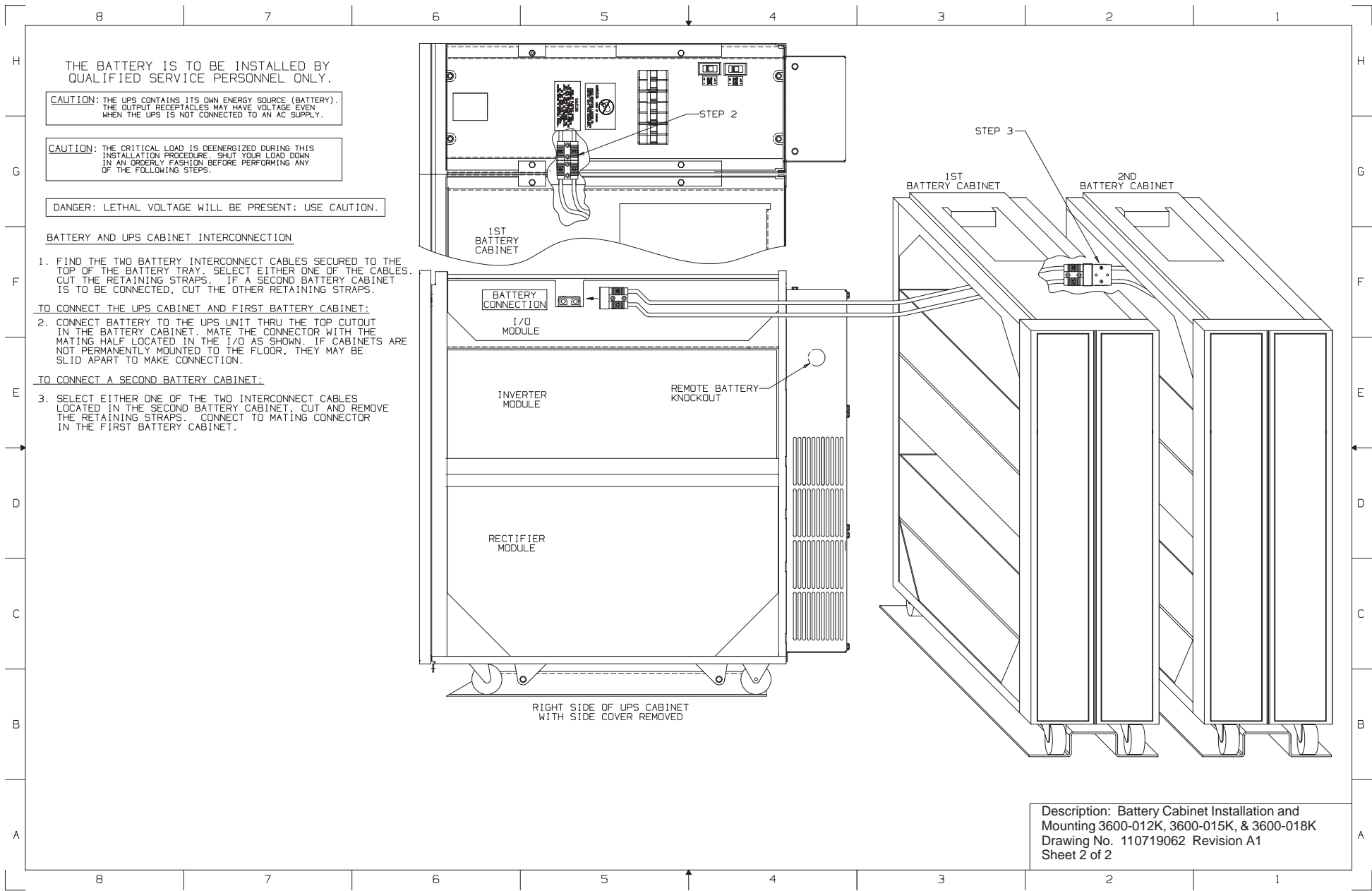
FIGURE 3

**CAUTION:** THE CRITICAL LOAD IS DEENERGIZED DURING THIS INSTALLATION PROCEDURE. SHUT YOUR LOAD DOWN IN AN ORDERLY FASHION BEFORE PERFORMING ANY STEPS.

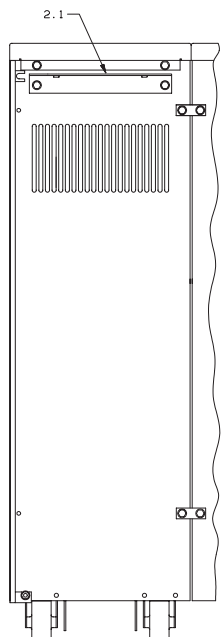
**DANGER:** LETHAL VOLTAGE WILL BE PRESENT: USE CAUTION.

-SAVE THESE INSTRUCTIONS-

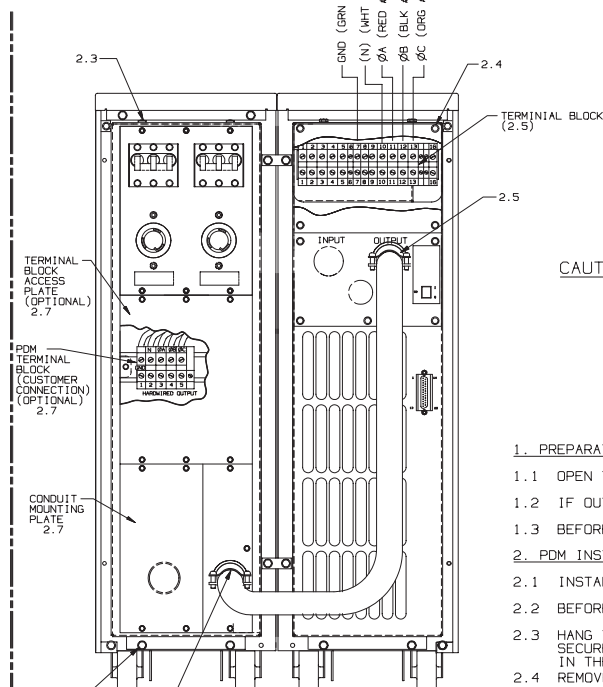
Description: Battery Cabinet Installation and Mounting 3600-012K, 3600-015K, & 3600-018K  
Drawing No. 110719062 Revision A1  
Sheet 1 of 2



(PDM)  
POWER DISTRIBUTION MODULE  
INSTALLATION



BACK SIDE OF  
BATTERY CABINET  
WITHOUT PDM  
FIGURE 1



BACK SIDE OF  
BATTERY CABINET  
WITH PDM  
BACK SIDE OF  
UPS CABINET  
FIGURE 2

PDM IS TO BE INSTALLED BY  
QUALIFIED SERVICE PERSONNEL ONLY

CAUTION:  
THE UPS CONTAINS ITS OWN ENERGY SOURCE (BATTERY).  
THE OUTPUT TERMINAL BLOCKS 8 & 9 MAY BE LIVE WITH 240VDC EVEN  
WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

CAUTION: CRITICAL LOAD IS DEENERGIZED DURING THIS  
INSTALLATION PROCEDURE. SHUT YOUR LOAD DOWN  
IN AN ORDERLY FASHION BEFORE PERFORMING  
ANY OF THE FOLLOWING STEPS.  
PDM IS NOT TO BE INSTALLED ON UNITS  
WITH A 127/220V CONFIGURATION.

1. PREPARATION OF UPS UNIT FOR POWER DISTRIBUTION MODULE INSTALLATION

- 1.1 OPEN THE TOP OF THE UPS CABINET AND PLACE ALL OF THE BREAKERS (CB1,CB2,CB3) IN THE OFF POSITION.
- 1.2 IF OUTPUT IS CURRENTLY CONNECTED. DISCONNECT ALL OUTPUT CONNECTIONS FROM THEIR TERMINALS. (FIGURE 2)
- 1.3 BEFORE MOUNTING TO THE BACKSIDE OF THE BATTERY, THE BATTERY CABINET AND UPS SHOULD BE JOINED TOGETHER.

2. PDM INSTALLATION INSTRUCTION

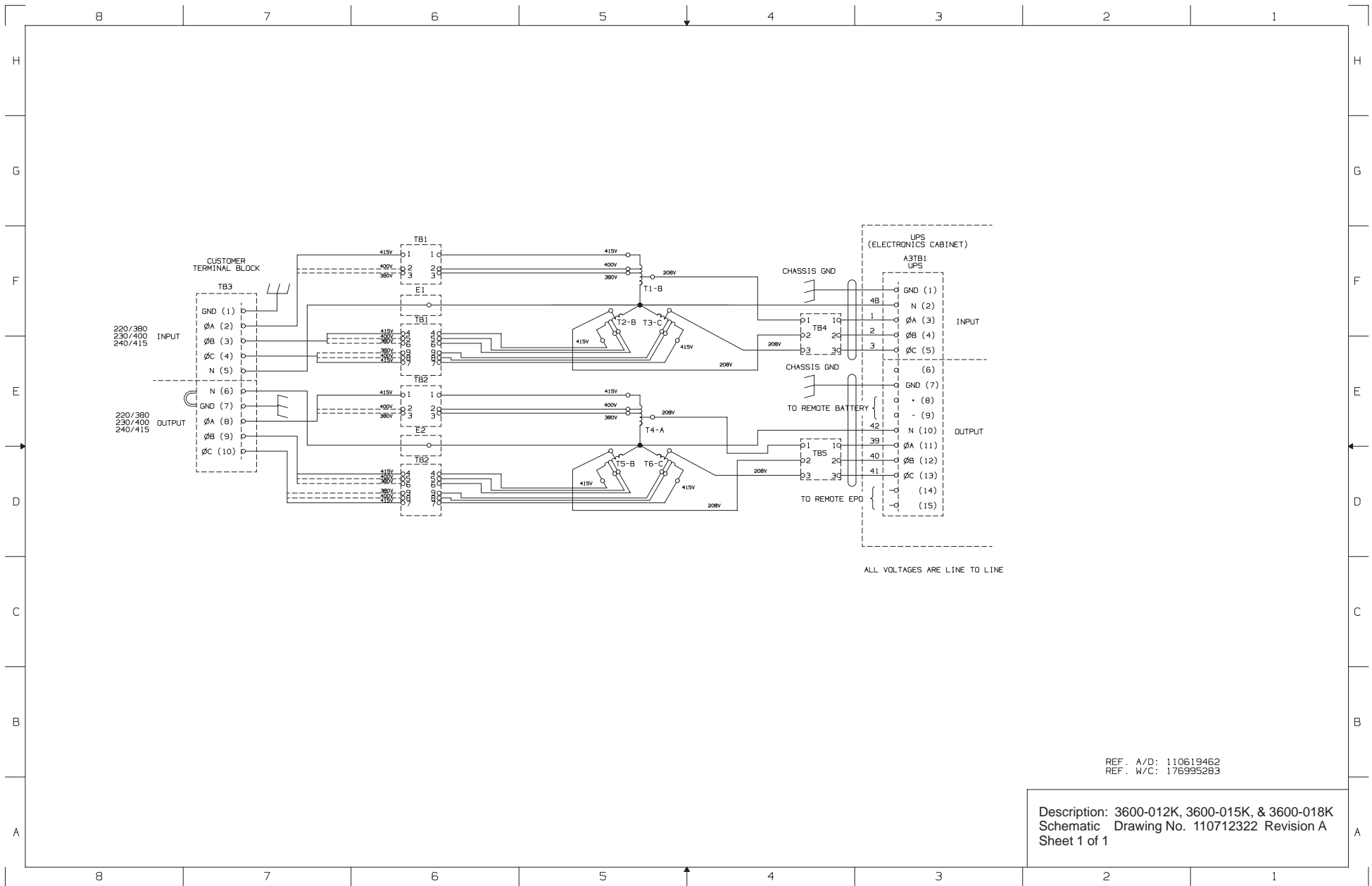
- 2.1 INSTALL THE PDM MOUNTING BRACKET USING (2) HEX HEAD SCREWS PROVIDED. (FIGURE 1)
- 2.2 BEFORE INSTALLING THE PDM, PLACE ALL CIRCUIT BREAKERS ON THE PDM IN THE OFF POSITION (DOWN).
- 2.3 HANG THE PDM MODULE ON THE PDM BRACKET ALIGNING THE MOUNTING HOLES WITH THE HOLES ON THE BRACKET. SECURE THE MODULE TO THE FRAME AT THE TOP AND AT THE BOTTOM USING (4) HEX HEAD SCREWS PROVIDED IN THE KIT.
- 2.4 REMOVE THE TERMINAL BLOCK ACCESS PLATE BY REMOVING (4) SCREWS AND RETAIN.
- 2.5 ATTACH THE STRAIN RELIEF CONNECTED TO THE END OF THE CABLE TO THE CONDUIT MOUNTING PLATE. BY REMOVING THE NUT AND PLACING IT ON THE BACK SIDE OF THE CONDUIT MOUNTING PLATE AND SECURING TIGHTLY. TO INSURE PROPER STRAIN RELIEF OF THE CABLE. DO NOT LOOSEN OR REMOVE THE STRAIN RELIEF CLAMP FROM THE CABLE DURING INSTALLATION. CONNECT WIRES FROM THE PDM TO THE UPS OUTPUT TERMINAL BLOCK AS SHOWN IN FIGURE 2. SEE LABEL ON INSIDE OF THE PDM FOR TERMINAL BLOCK TORQUE REQUIREMENTS. USE ONLY #6AWG 75°C COPPER WIRE MIN.
- 2.6 RE-ATTACH ACCESS PLATE USING THE (4) SCREWS RETAINED IN STEP 2.4.
- 2.7 IF YOU ARE USING OPTIONAL HARDWIRED PDM. REMOVE ACCESS PLATE AND CONNECT CONDUIT WIRING TO THE TERMINAL PER PHASE DIAGRAM FOR HARDWIRED OUTPUT. USE CONDUIT MOUNTING PLATE FOR CONDUIT LANDING. REPLACE ACCESS PLATE. LOCATE THE APPROPRIATE RECEPTACLES ON THE PDM PANEL IF SUPPLIED AND PLUG IN YOUR PROTECTED EQUIPMENT.
- 2.8 TURN ON (UP POSITION) THE PDM BREAKER(S).
- 2.9 TURN ON THE UPS MAIN OUTPUT BREAKER.
- 2.10 REFER TO THE OPERATORS MANUAL OPERATING INSTRUCTIONS.

- PDM INSTALLATION KIT INCLUDE:
- {1} POWER DISTRIBUTION MODULE (PDM)
  - {1} MOUNTING BRACKET AND HARDWARE KIT
- TOOLS NEEDED FOR INSTALLATION:
- 1/4" HEX NUT DRIVER
  - SMALL FLAT HEAD SCREWDRIIVER
  - 1 3/8" WRENCH

-SAVE THESE INSTRUCTIONS FOR FUTURE USE-

Description: Three-Phase PDM Installation 3600-012K,  
3600-015K, & 3600-018K Drawing No. 110719090  
Revision A1 Sheet 1 of 1





REF. A/D: 110619462  
 REF. W/C: 176995283

Description: 3600-012K, 3600-015K, & 3600-018K  
 Schematic Drawing No. 110712322 Revision A  
 Sheet 1 of 1

CAUTION: RISK OF ELECTRIC SHOCK. DO NOT REMOVE COVERS. NO USER-SERVICABLE PARTS INSIDE. REFER SERVICING TO TRAINED SERVICE PERSONNEL.

CAUTION: THE UPS CONTAINS ITS OWN ENERGY SOURCE (BATTERY). THE OUTPUT TERMINALS MAY HAVE VOLTAGE EVEN WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

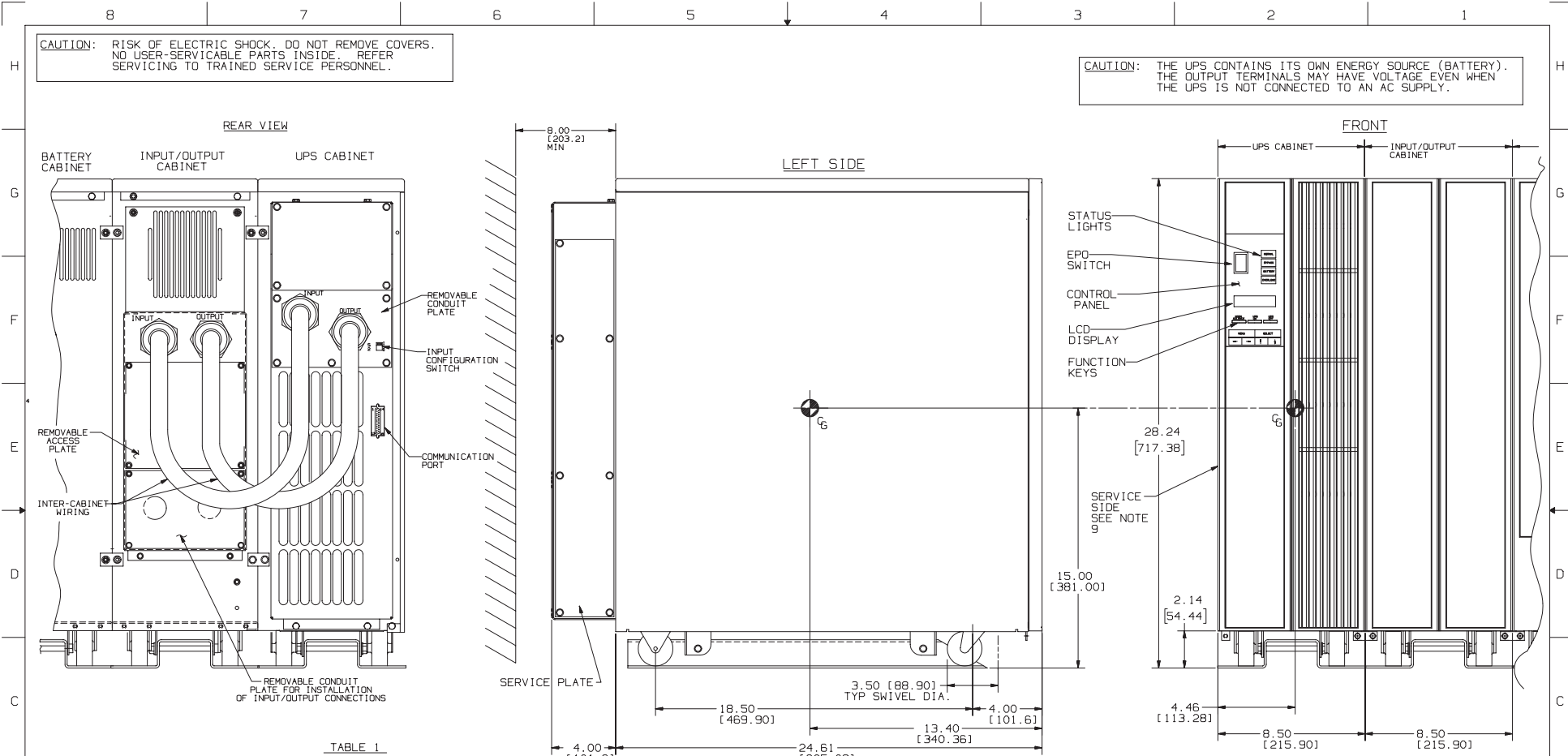


TABLE 1

EQUIPMENT WEIGHTS		MODEL 12	MODEL 15	MODEL 18
UPS CABINET		210 LB (95 KG)	210 LB (95 KG)	210 LB (95 KG)
HALF BATTERY CAB. (7AH)		165 LB (75 KG)	165 LB (75 KG)	165 LB (75 KG)
FULL BATTERY CAB. (7AH)		295 LB (134KG)	295 LB (134KG)	295 LB (134KG)
FULL BATTERY CAB. (18AH)		350 LB (159KG)	350 LB (159KG)	350 LB (159KG)
INPUT/OUTPUT CABINET		314 LB (142KG)	314 LB (142KG)	314 LB (142KG)
HEAT DISSIPATION		5200 BTU/HR (1310 Kg-Cal/Hr)	6500 BTU/HR (1637 Kg-Cal/Hr)	7800 BTU/HR (1965 Kg-Cal/Hr)
FULL LOAD OUTPUT AT 0.8 PF				
FLOOR LOADING	UPS	1.73 LB/SQ. IN (.12KG/CM <sup>2</sup> )	1.73 LB/SQ. IN (.12KG/CM <sup>2</sup> )	1.73 LB/SQ. IN (.12KG/CM <sup>2</sup> )
	HALF BATTERY (7AH)	1.36LB/SQ. IN (.09KG/CM <sup>2</sup> )	1.36LB/SQ. IN (.09KG/CM <sup>2</sup> )	1.36LB/SQ. IN (.09KG/CM <sup>2</sup> )
	FULL BATTERY (7AH)	2.43LB/SQ. IN (.17KG/CM <sup>2</sup> )	2.43LB/SQ. IN (.17KG/CM <sup>2</sup> )	2.43LB/SQ. IN (.17KG/CM <sup>2</sup> )
	FULL BATTERY (18AH)	2.88LB/SQ. IN (.20KG/CM <sup>2</sup> )	2.88LB/SQ. IN (.20KG/CM <sup>2</sup> )	2.88LB/SQ. IN (.20KG/CM <sup>2</sup> )
	INPUT/OUTPUT XFMR	2.58LB/SQ. IN (.18KG/CM <sup>2</sup> )	2.58LB/SQ. IN (.18KG/CM <sup>2</sup> )	2.58LB/SQ. IN (.18KG/CM <sup>2</sup> )
SHIPPING CONTAINERS	WIDTH	15.5" (394MM)	15.5" (394MM)	15.5" (394MM)
	DEPTH	40.0" (1016MM)	40.0" (1016MM)	40.0" (1016MM)
	HEIGHT	34.0" (864MM)	34.0" (864MM)	34.0" (864MM)
CONTAINER WEIGHTS		40 LB (18KG)	40 LB (18KG)	40 LB (18KG)

NOTES:

- DIMENSIONS ARE IN INCHES (MILLIMETERS).
- VENTILATION:  
UPS CABINET: FAN COOLED - INLET FRONT/OUTLET REAR.  
BATTERY CABINET: NATURAL CONVECTION.  
INPUT/OUTPUT CABINET: NATURAL CONVECTION.
- MAXIMUM ELEVATION FOR NORMAL OPERATION: 5000 FEET (1500 METERS) DERATING IS REQUIRED FOR HIGHER ELEVATIONS.
- DO NOT TILT THE CABINET MORE THAN 12 DEGREES (UNIT MAY TIP OVER).
- EQUIPMENT WEIGHTS ARE PROVIDED FOR TYPICAL CONFIGURATIONS. CONTACT YOUR LOCAL SALES REPRESENTATIVE IF ADDITIONAL INFORMATION IS NEEDED.
- ADDITIONAL BATTERY CABINETS MAY BE ADDED FOR EXTENDED BATTERY TIME. REFER TO DRAWING 110719062 FOR INSTALLATION INSTRUCTIONS. INSTALLATION MUST BE MADE BY QUALIFIED SERVICE PERSONNEL.
- FOR OPTIONS, CONTACT THE FACTORY OR YOUR DEALER.
- REFER TO DRAWING 110719175 BEFORE CONNECTING INPUT AND OUTPUT WIRING.
- IT IS RECOMMENDED THAT THE UNIT BE INSTALLED ALLOWING 34" MINIMUM OF SPACE ON ITS LEFT SIDE FOR ACCESS BY QUALIFIED SERVICE PERSONNEL.

-SAVE THESE INSTRUCTIONS-

Description: I/O Outline and Installation 3600-012K, 3600-015K, 3600-018K Drawing No. 110719176  
Revision B Sheet 1 of 1

AC INPUT  
 A, B, C ROTATION  
 380, 400, 415V LINE TO LINE } NOMINAL  
 220, 230, 240 LINE TO NEUTRAL }  
 50, 60 Hz  
 NOTES (1, 2, 3 AND 4)  
 REFER TO SHEET 2

RECOMMENDED INPUT UPSTREAM  
 SERVICE PROTECTION.....32 AMPS  
 (SEE NOTE 3)

AC OUTPUT TO LOAD  
 (380, 400, 415V LINE TO LINE  
 220, 230, 240 LINE TO NEUTRAL  
 A, B, C, ROTATION, NOMINAL 50, 60Hz)  
 (SEE NOTES 1, 2 & 4)  
 (REFER TO SHEET 2)

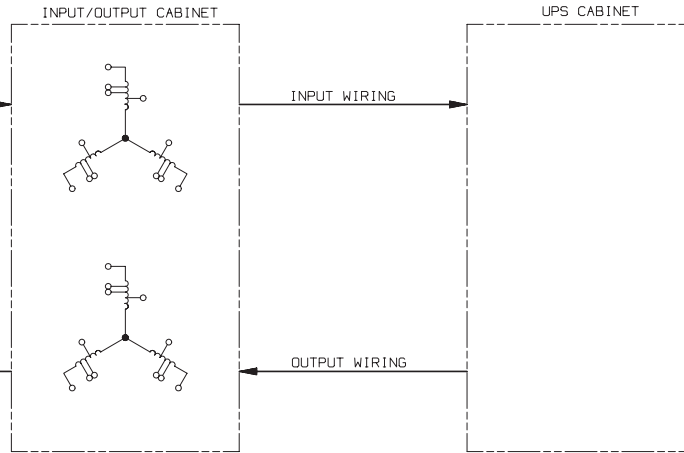


TABLE 1

	NOMINAL VOLTAGE	NOMINAL INPUT CURRENT PER PHASE *			NOMINAL OUTPUT CURRENT PER PHASE			NOMINAL OUTPUT POWER			BATTERY CURRENT		
		MODEL 12	MODEL 15	MODEL 18	MODEL 12	MODEL 15	MODEL 18	MODEL 12	MODEL 15	MODEL 18	MODEL 12	MODEL 15	MODEL 18
THREE-PHASE INPUT	380/220	16 A	20 A	24 A	18 A	23 A	27 A	8 KW	10 KW	12 KW	40 A	50 A	60 A
THREE-PHASE OUTPUT	400/230	15 A	19 A	24 A	17 A	22 A	26 A	8 KW	10 KW	12 KW	40 A	50 A	60 A
	415/240	15 A	18 A	22 A	17 A	21 A	25 A	8 KW	10 KW	12 KW	40 A	50 A	60 A

\* INPUT CURRENT IS THE SAME AS THE OUTPUT CURRENT WHEN LOAD IS POWERED THROUGH THE BYPASS

NOTES:

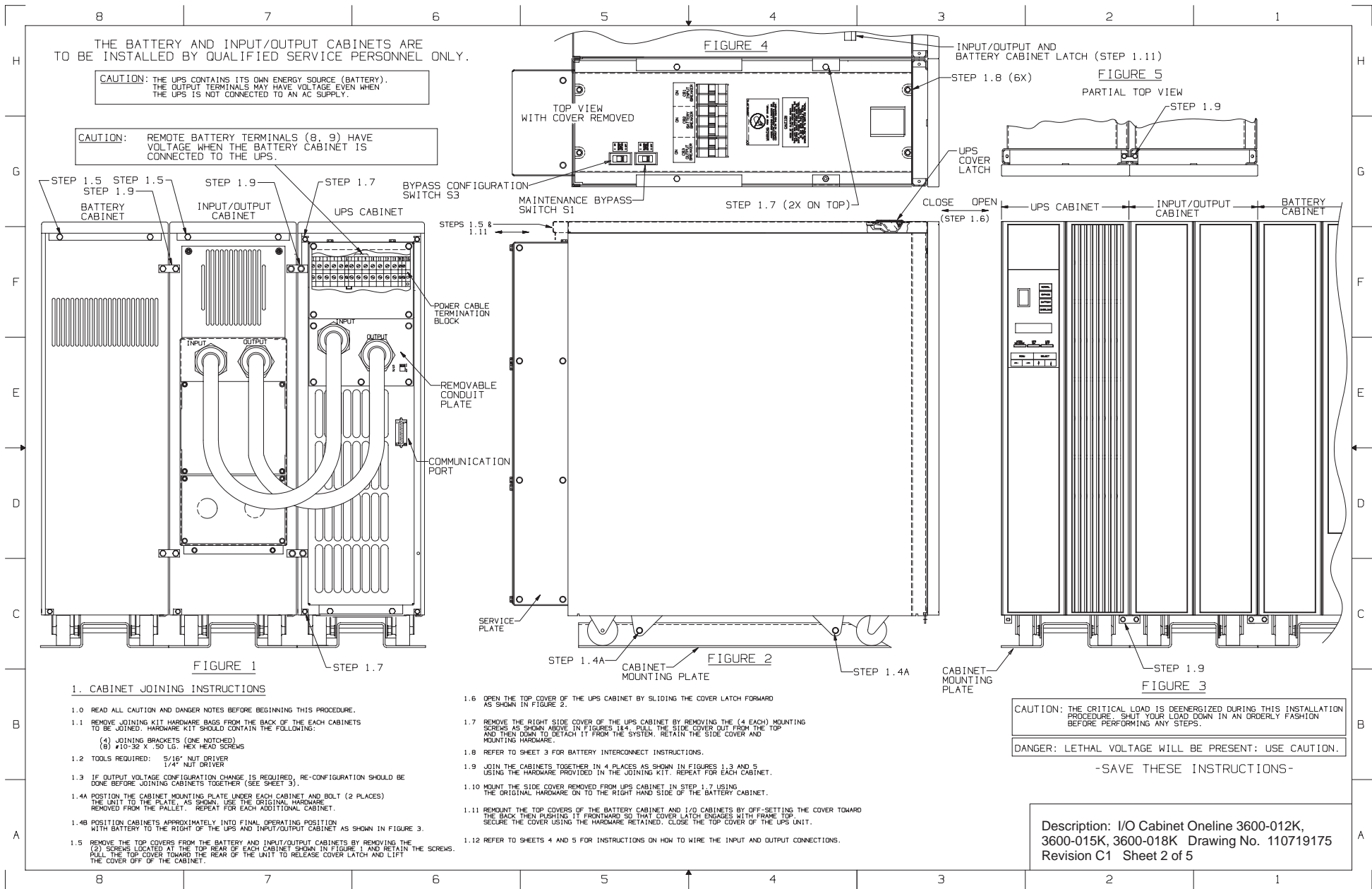
- REFER TO NATIONAL AND LOCAL ELECTRICAL CODES FOR ACCEPTABLE EXTERNAL WIRING PRACTICES.
- MATERIAL AND LABOR FOR EXTERNAL WIRING ARE TO BE PROVIDED BY OTHERS.
- AN EXTERNAL PROTECTIVE DEVICE FOR THE INPUT SOURCE MUST BE PROVIDED, AND SIZED FOR THE CURRENTS INDICATED ON THE INPUT/OUTPUT CABINET NAMEPLATE, PER NATIONAL AND LOCAL ELECTRICAL CODES. (NOTE: UPSTREAM PROTECTION MUST BE COORDINATED WITH LOAD CURRENT REQUIREMENTS UNDER NOMINAL AS WELL AS LOW LINE AND OVERLOAD CONDITIONS.)
- THE UNIT SHALL BE GROUNDED AT THE INPUT TERMINAL BLOCK TO A SINGLE POINT LOCAL OR UTILITY EARTH GROUND. THE GROUND CONDUCTOR SHALL BE SIZED PER NATIONAL AND LOCAL ELECTRICAL CODE REQUIREMENTS. ON THE OUTPUT, FOLLOW APPLICABLE ELECTRICAL GROUNDING GUIDELINES. IN THE UNITED STATES THE OUTPUT IS A "SEPARATELY DERIVED SOURCE".
- REFER TO SHEETS 2-5 OF THIS DRAWING FOR INSTALLATION AND JOINING. VOLTAGE CONFIGURATION AND BATTERY CONNECTIONS MUST BE MADE PRIOR TO JOINING THE CABINETS AND MAKING CONNECTION FROM THE INPUT/OUTPUT CABINET TO THE UPS CABINET.

CAUTION - RISK OF ELECTRIC SHOCK.

NO USER-SERVICEABLE PARTS INSIDE.  
 REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

-SAVE THESE INSTRUCTIONS-

Description: I/O Cabinet Online 3600-012K,  
 3600-015K, & 3600-018K Drawing No. 110719175  
 Revision C1 Sheet 1 of 5



THE BATTERY AND INPUT/OUTPUT CABINETS ARE TO BE INSTALLED BY QUALIFIED SERVICE PERSONNEL ONLY.

**CAUTION:** THE UPS CONTAINS ITS OWN ENERGY SOURCE (BATTERY). THE OUTPUT TERMINALS MAY HAVE VOLTAGE EVEN WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

**CAUTION:** REMOTE BATTERY TERMINALS (8, 9) HAVE VOLTAGE WHEN THE BATTERY CABINET IS CONNECTED TO THE UPS.

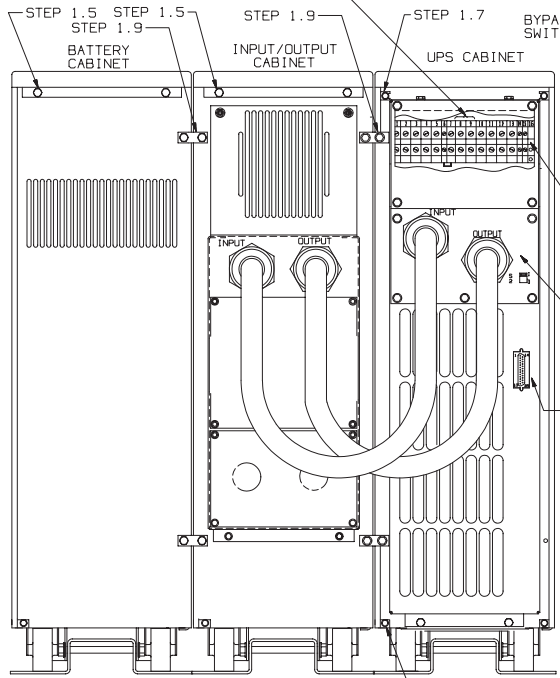


FIGURE 1

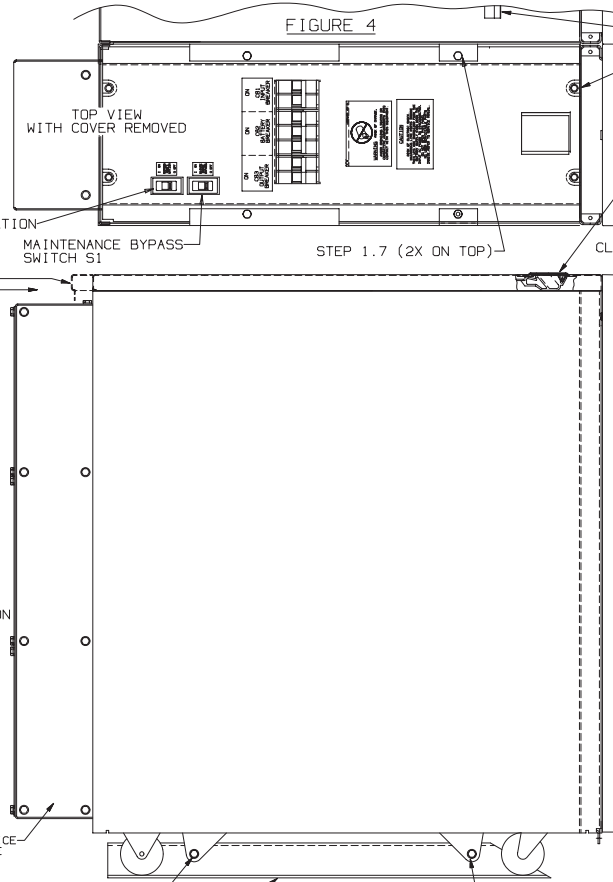


FIGURE 4

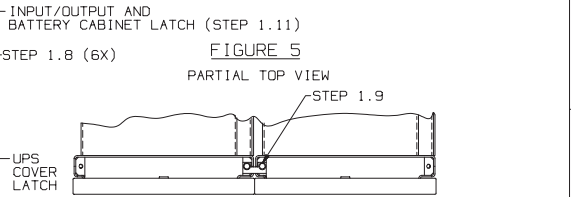


FIGURE 5

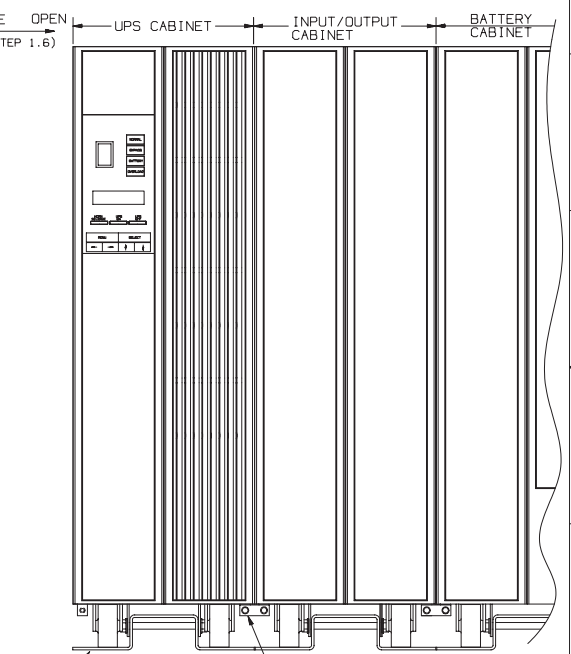


FIGURE 3

**1. CABINET JOINING INSTRUCTIONS**

- 1.0 READ ALL CAUTION AND DANGER NOTES BEFORE BEGINNING THIS PROCEDURE.
- 1.1 REMOVE JOINING KIT HARDWARE BAGS FROM THE BACK OF THE EACH CABINETS TO BE JOINED. HARDWARE KIT SHOULD CONTAIN THE FOLLOWING:
  - (4) JOINING BRACKETS (ONE NOTCHED)
  - (8) #10-32 X .50 LG. HEX HEAD SCREWS
- 1.2 TOOLS REQUIRED: 5/16" NUT DRIVER, 1/4" NUT DRIVER
- 1.3 IF OUTPUT VOLTAGE CONFIGURATION CHANGE IS REQUIRED, RE-CONFIGURATION SHOULD BE DONE BEFORE JOINING CABINETS TOGETHER (SEE SHEET 3).
- 1.4A POSITION THE CABINET MOUNTING PLATE UNDER EACH CABINET AND BOLT (2 PLACES) THE UNIT TO THE PLATE, AS SHOWN. USE THE ORIGINAL HARDWARE REMOVED FROM THE PALLET. REPEAT FOR EACH ADDITIONAL CABINET.
- 1.4B POSITION CABINETS APPROXIMATELY INTO FINAL OPERATING POSITION WITH BATTERY TO THE RIGHT OF THE UPS AND INPUT/OUTPUT CABINET AS SHOWN IN FIGURE 3.
- 1.5 REMOVE THE TOP COVERS FROM THE BATTERY AND INPUT/OUTPUT CABINETS BY REMOVING THE (2) SCREWS LOCATED AT THE TOP REAR OF EACH CABINET SHOWN IN FIGURE 1 AND RETAIN THE SCREWS. PULL THE TOP COVER TOWARD THE REAR OF THE UNIT TO RELEASE COVER LATCH AND LIFT THE COVER OFF OF THE CABINET.

- 1.6 OPEN THE TOP COVER OF THE UPS CABINET BY SLIDING THE COVER LATCH FORWARD AS SHOWN IN FIGURE 2.
- 1.7 REMOVE THE RIGHT SIDE COVER OF THE UPS CABINET BY REMOVING THE (4) EACH MOUNTING SCREWS AS SHOWN ABOVE. IN FIGURES 1B4, PULL THE SIDE COVER OUT FROM THE TOP AND THEN DOWN TO DETACH IT FROM THE SYSTEM. RETAIN THE SIDE COVER AND MOUNTING HARDWARE.
- 1.8 REFER TO SHEET 3 FOR BATTERY INTERCONNECT INSTRUCTIONS.
- 1.9 JOIN THE CABINETS TOGETHER IN 4 PLACES AS SHOWN IN FIGURES 1, 3 AND 5 USING THE HARDWARE PROVIDED IN THE JOINING KIT. REPEAT FOR EACH CABINET.
- 1.10 MOUNT THE SIDE COVER REMOVED FROM UPS CABINET IN STEP 1.7 USING THE ORIGINAL HARDWARE ON TO THE RIGHT HAND SIDE OF THE BATTERY CABINET.
- 1.11 REMOUNT THE TOP COVERS OF THE BATTERY CABINET AND I/O CABINETS BY OFF-SETTING THE COVER TOWARD THE BACK THEN PUSHING IT FORWARD SO THAT COVER LATCH ENGAGES WITH FRAME TOP. SECURE THE COVER USING THE HARDWARE RETAINED. CLOSE THE TOP COVER OF THE UPS UNIT.
- 1.12 REFER TO SHEETS 4 AND 5 FOR INSTRUCTIONS ON HOW TO WIRE THE INPUT AND OUTPUT CONNECTIONS.

**CAUTION:** THE CRITICAL LOAD IS DEENERGIZED DURING THIS INSTALLATION PROCEDURE. SHUT YOUR LOAD DOWN IN AN ORDERLY FASHION BEFORE PERFORMING ANY STEPS.

**DANGER:** LETHAL VOLTAGE WILL BE PRESENT: USE CAUTION.

-SAVE THESE INSTRUCTIONS-

Description: I/O Cabinet Online 3600-012K, 3600-015K, 3600-018K Drawing No. 110719175  
Revision C1 Sheet 2 of 5

THE BATTERY AND INPUT/OUTPUT CABINETS ARE TO BE INSTALLED BY QUALIFIED SERVICE PERSONNEL ONLY.

**INPUT/OUTPUT CONFIGURATION SET-UP**

TO CHANGE TO A VOLTAGE OTHER THAN WHAT YOUR UNIT HAS BEEN FACTORY SET TO, REFER TO TABLE 1 BELOW FOR THE TERMINAL STRIP TB1 AND TB2 CONNECTIONS.

**CAUTION:** FAILURE TO COMPLETE VOLTAGE CONFIGURATION COULD RESULT IN AN UNBALANCED OUTPUT LOAD.

TB1/TB2

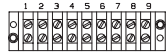


TABLE 1

POSITION	VOLTAGE	PHASE
1 YELLOW	415/240V	ØA
2 ORANGE	400/230V	ØA
3 RED	380/220	ØA
4 YELLOW	415/240V	ØB
5 ORANGE	400/230V	ØB
6 RED	380/220V	ØB
7 YELLOW	415/240V	ØC
8 ORANGE	400/230V	ØC
9 RED	380/220V	ØC

EXAMPLE: FOR A 415/240V CONFIGURATION, PLACE THE WIRE ALREADY ON TB1 (AND TB2) POSITION 1, 2 OR 3 ON POSITION 1. PLACE THE WIRE ALREADY ON TB1 (AND TB2) POSITION 4, 5 OR 6 ON POSITION 4. PLACE THE WIRE ALREADY ON TB1 (AND TB2) POSITION 7, 8 OR 9 ON POSITION 7. (SEE ILLUSTRATION)

**BATTERY AND UPS CABINET INTERCONNECTION**

**DANGER:** LETHAL VOLTAGE WILL BE PRESENT: USE CAUTION.

1. FIND THE TWO BATTERY INTERCONNECT CABLES SECURED TO THE TOP OF THE BATTERY TRAY. SELECT THE LONGER OF THE TWO. CUT THE RETAINING STRAP. IF A SECOND BATTERY CABINET IS TO BE CONNECTED, CUT THE OTHER RETAINING STRAP.

**TO CONNECT THE UPS CABINET AND FIRST BATTERY CABINET:**

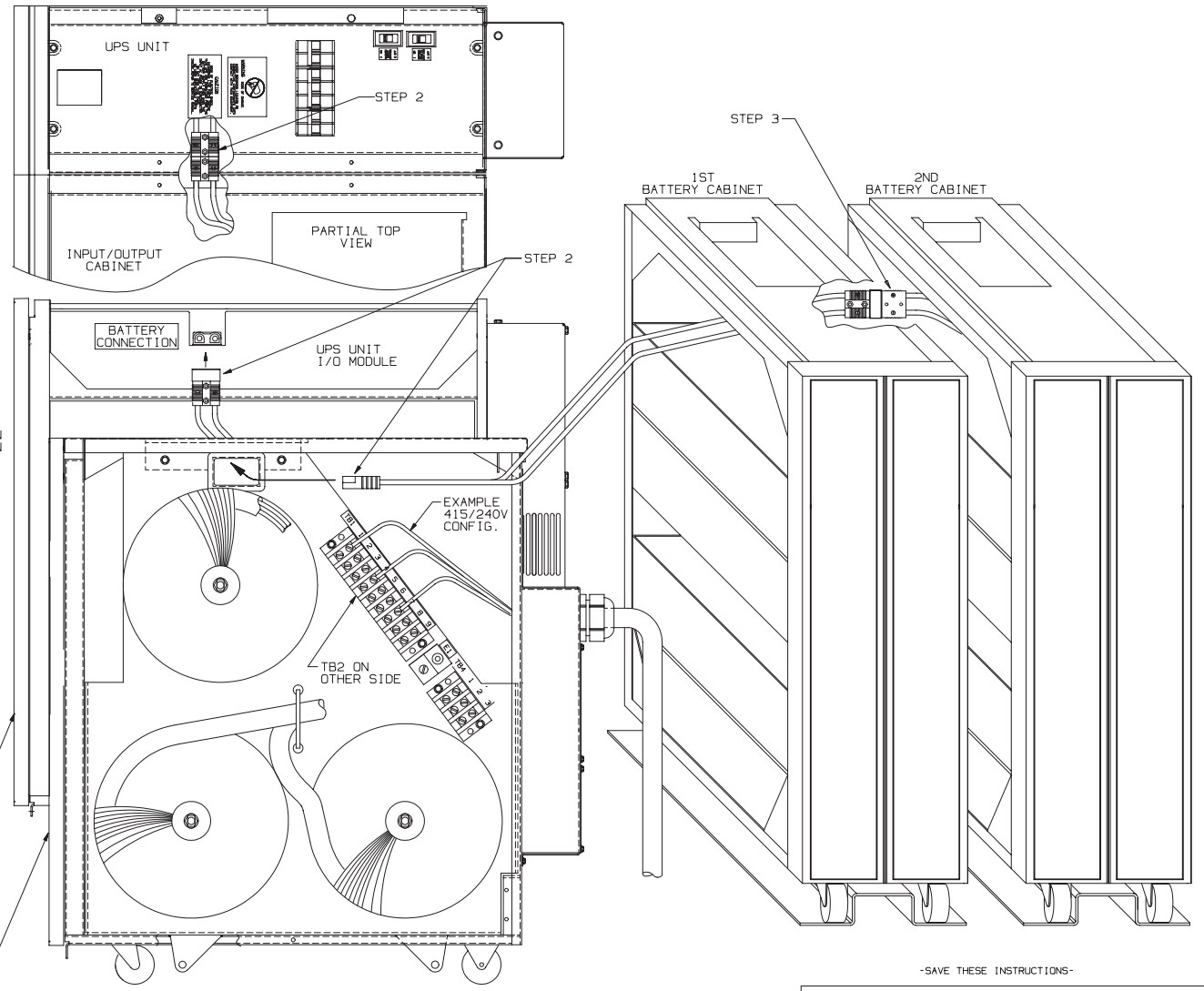
2. CONNECT BATTERY TO THE UPS UNIT THRU THE TOP CUTOUT IN THE I/O CABINET. PASS CABLE THRU THE INPUT/OUTPUT CABINET AND MATE THE CONNECTOR WITH THE MATING HALF LOCATED IN THE I/O OF THE UPS CABINET AS SHOWN. IF CABINETS ARE NOT PERMANENTLY MOUNTED TO THE FLOOR, THEY MAY BE SLID APART TO MAKE CONNECTION.

**TO CONNECT A SECOND BATTERY CABINET:**

3. SELECT EITHER ONE OF THE TWO INTERCONNECT CABLES LOCATED IN THE SECOND BATTERY CABINET. CUT AND REMOVE THE RETAINING STRAP. CONNECT TO MATING CONNECTOR IN THE FIRST BATTERY CABINET.

**CAUTION:** THE UPS CONTAINS ITS OWN ENERGY SOURCE (BATTERY). THE OUTPUT RECEPTACLES MAY HAVE VOLTAGE EVEN WHEN THE UPS IS NOT CONNECTED TO AN AC SUPPLY.

**CAUTION:** THE CRITICAL LOAD IS DEENERGIZED DURING THIS INSTALLATION PROCEDURE. SHUT YOUR LOAD DOWN IN AN ORDERLY FASHION BEFORE PERFORMING ANY OF THE FOLLOWING STEPS.



-SAVE THESE INSTRUCTIONS-

Description: I/O Cabinet Online 3600-012K, 3600-015K, & 3600-018K Drawing No. 110719175  
Revision C1 Sheet 3 of 5

**CAUTION**  
 REMOTE BATTERY TERMINALS (8, 9) HAVE  
 VOLTAGE WHEN THE BATTERY CABINET IS  
 CONNECTED TO THE UPS.

**INPUT/OUTPUT IS TO BE INSTALLED BY  
 QUALIFIED SERVICE PERSONNEL ONLY**

**INPUT/OUTPUT CABINET WIRING PREPARATION**

- BEFORE MAKING ELECTRICAL INTERCONNECTIONS: BATTERY CONNECTIONS, INPUT/OUTPUT VOLTAGE AND CABINET JOINING PROCEDURES MUST BE COMPLETED. SEE SHEET 2.
- OPEN THE TOP OF THE UPS CABINET AND PLACE ALL OF THE BREAKERS (CB1, CB2, CB3) IN THE "OFF" POSITION.

**INPUT/OUTPUT CABINET TO UPS CABINET WIRING INSTRUCTIONS**

- REMOVE THE TERMINAL BLOCK ACCESS PLATE ON THE UPS BY REMOVING (4) SCREWS AND RETAIN.
- REMOVE THE UPS CONDUIT PLATE BY REMOVING (4) SCREWS, RETAIN SCREWS. DISCARD PLATE AND REPLACE WITH PLATE SUPPLIED WITH KIT.
- ATTACH THE STRAIN RELIEF CONNECTED TO THE END OF EACH CABLE TO THE CONDUIT MOUNTING PLATE, BY REMOVING THE NUT AND PLACING IT ON THE BACK SIDE OF THE CONDUIT MOUNTING PLATE AND SECURING TIGHTLY. TO ENSURE PROPER STRAIN RELIEF OF THE CABLE, DO NOT LOOSEN OR REMOVE THE STRAIN RELIEF CLAMP FROM THE CABLE DURING INSTALLATION. CONNECT WIRES FROM THE I/O TO THE UPS OUTPUT TERMINAL BLOCK AS SHOWN IN FIGURE 2. SEE LABEL ON INSIDE OF THE UPS FOR TERMINAL BLOCK TORQUE REQUIREMENTS. ATTACH CONDUIT PLATE TO UPS USING SCREWS RETAINED IN STEP 1.2. RE-ATTACH TERMINAL BLOCK ACCESS PLATE.

**INPUT AND LOAD WIRE CONNECTION**

- REMOVE THE INPUT/OUTPUT ACCESS PLATE AND CONNECT CONDUIT WIRING TO THE TERMINAL BLOCK PER PHASE DIAGRAM FOR UPS OUTPUT (SEE SHEET 5). USE CONDUIT MOUNTING PLATE FOR CONDUIT LANDING. RE-ATTACH THE ACCESS PLATE AFTER WIRING HAS BEEN COMPLETED. USE ONLY 16mm<sup>2</sup> AWG 75° COPPER WIRE. REFER TO TABLE 2 ON SHEET 5 FOR TERMINAL BLOCK TORQUE REQUIREMENTS. REPEAT THE INITIAL STARTUP PER THE INSTRUCTIONS IN THE OPERATORS MANUAL.

**VOLTAGE METERING SETUP INSTRUCTIONS**

- THE SYSTEM SHOULD BE SET TO METER THE CORRECT INPUT AND OUTPUT VOLTAGE WHEN YOU RECEIVE IT. IF THE VOLTAGE METERING INDICATES 208 VAC OR IF YOU HAVE RECONFIGURED THE INPUT/OUTPUT CABINET TO A DIFFERENT VOLTAGE CONTACT YOUR DISTRIBUTOR, AGENT OR THE FACTORY FOR INSTRUCTIONS ON HOW TO RECONFIGURE THE METER SCREEN. THE "SERVICE" PASSWORD IS REQUIRED TO RECONFIGURE THE METER SCREEN.

**NOTE:**  
 THE UPS SYSTEM WILL OPERATE CORRECTLY EVEN IF THE METERING READS INCORRECTLY.

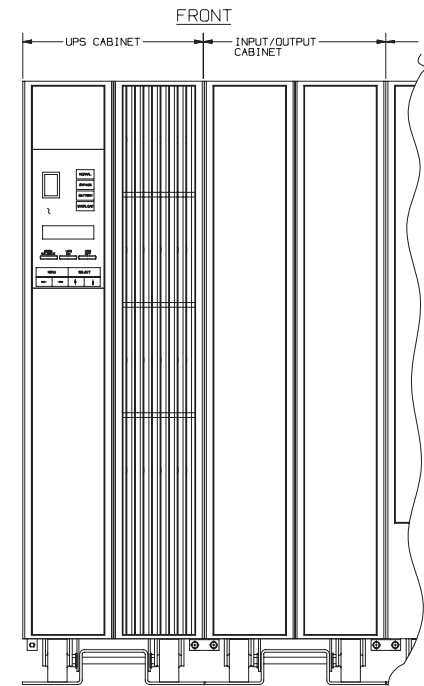
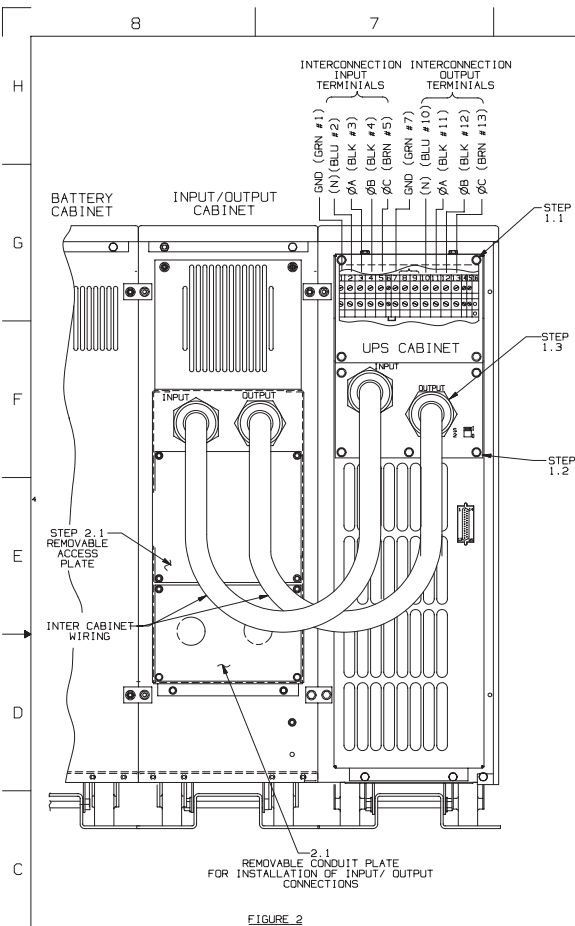


FIGURE 1

-SAVE THESE INSTRUCTIONS-  
 Description: I/O Cabinet Online 3600-012K,  
 3600-015K, & 3600-018K Drawing No. 110719175  
 Revision C1 Sheet 4 of 5

