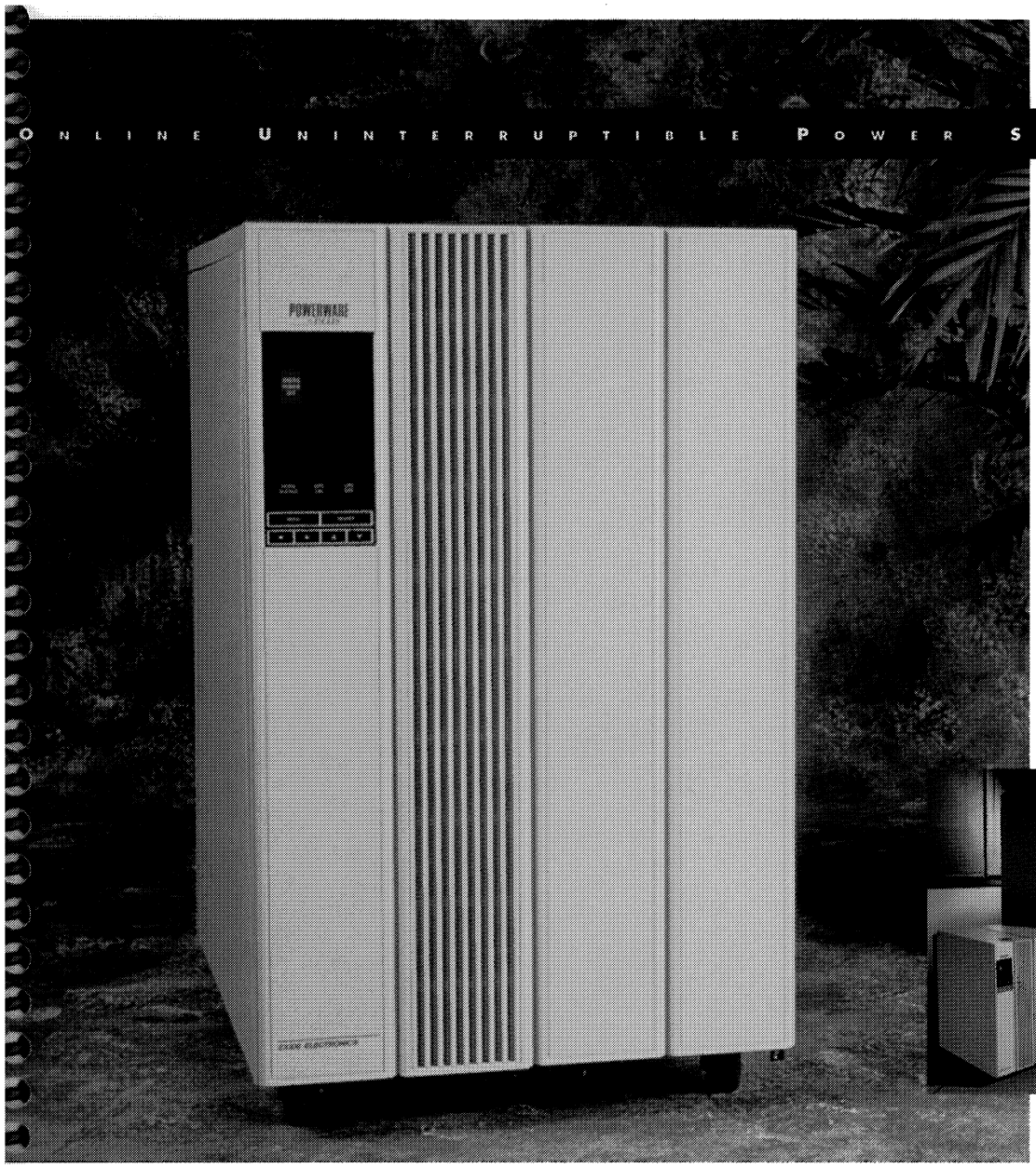
Powerware®

PLUS 12



Model 12

12kVA/8kW

10kVA/7kW

8kVA/6kW

Model 12HV

12kVA/8kW

10kVA/7kW

Supports Network Management Solutions

Field Upgradeable To Track Application Needs

Reliable Online Protection

OPERATOR'S MANUAL

Powerware®

P L U S 1 2

OPERATOR'S MANUAL

WARNING:
This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. The 60-Hz model has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

CONSERVER CES INSTRUCTIONS
CETTE NOTICE CONTIENT DES INSTRUCTIONS IMPORTANTES CONCERNANT LA SÉCURITÉ.

This manual contains important instructions for your Powerware® Plus 12 Uninterruptible Power Supply (UPS) that should be followed during installation and maintenance of the UPS, battery, and I/O cabinets.

To avoid equipment damage or personnel injury, use extreme care when handling the cabinets. Cabinet weights range from 180 lb (82 kg) to 300 lb (136 kg). Before transporting, test lift and balance the cabinets. Minimum tilt from vertical must be maintained at all times. The pallet supports the cabinets only if the forks are completely beneath the unit.

Since the UPS may contain batteries, the hazard of electric shock is present even when the power processor is off. To avoid any release of sulfuric acid vapors, maintain batteries below the maximum recommended temperature. Refer battery servicing to qualified service personnel only.

In the event of a fire involving the UPS and its batteries, use only carbon dioxide fire extinguishers or those approved for use in electrical fire fighting.

Because lethal voltages exist within the UPS during operation, extreme caution is necessary when performing maintenance. Be sure to observe all warnings and cautions in this manual. Make sure that qualified service personnel perform the procedures when noted in the instructions. Failure to comply may result in serious injury or death. When the UPS is in Maintenance Bypass mode, UPS components are de-energized with the exception of EMI capacitors, output terminals, bypass contactors, bypass control board, breakers, and battery cabinet. To achieve complete isolation, remove all input and battery power. Some cabinet components are not connected to chassis ground. A lethal shock hazard exists when any contact between floating circuits and the chassis occurs.

The Powerware Plus 12 UPS contains high DC and AC voltages. If you turn off the input power and disconnect the batteries, the high voltage at the filter capacitors and power circuits is discharged to under 30 Vdc within five minutes. In the event of a power failure, you should make the assumption that high voltage still exists after shutdown. Use voltmeters to check AC and DC voltage before making contact.

If you plan to use test equipment while the UPS has power, you must isolate both the test personnel and test equipment from direct contact with earth ground and the UPS chassis frame using rubber mats.

Safety Considerations

Danger: The UPS contains LETHAL VOLTAGES. All repairs should be performed by trained service personnel. There are no user-serviceable parts inside the UPS.

Caution: The UPS contains its own energy source (battery). The output receptacles may be live even when the UPS is not connected to an AC supply. There is high voltage present at terminals 9 and 10 (terminals for remote battery connection) when a battery cabinet is connected to the UPS.

Caution: To fully de-energize the UPS, turn off the output breaker. Then turn off the input breaker and the battery breaker.

Caution: Risk of electrical shock. Installation of battery cabinets must be done by trained service personnel.

Caution: Do not dispose of battery or batteries in a fire. The battery may explode when exposed to flames.

Caution: Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be toxic.

Caution: All cabinets must be secured to keep them from moving after installation is complete. Secure the cabinets by bolting the cabinets to the cabinet mounting plate. Failure to do so violates safety rules and results in the unit losing its safety agency approvals.

Caution: A battery can present a risk of electrical shock, burn from high short-circuit current, fire, or explosion from vented gases. Observe proper precautions.

Caution: Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

Attention: Une batterie peut présenter un risque de choc électricque, de brûlure par transfert d'énergie, d'incendie ou d'explosion des gaz dégagés. Suivre les précautions qui s'imposent.

Attention: L'élimination des batteries est règlementée. Consulter les codes locaux à cet effet.

Observe the following precautions to ensure personnel safety and continued equipment operation:

- Examine the packing container for damage. Notify the carrier immediately if damage is present.
- Do not disassemble the UPS.
- Do not operate near water or excessive humidity.
- Install in a well-ventilated area. Do not block the air vents.
- Do not operate near gas or electric heat sources, and avoid direct sunlight.

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1 Introduction

The Powerware Plus 12 UPS 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

All Plus 12 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 (EPO/REPO) feature that can disconnect your protected equipment from all power sources
- Automatic and maintenance bypass
- 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
- Rectifier, inverter, and I/O modules are housed in factory-sealed field replaceable units for safety, easy repair, and quick upgrades
- 20% additional output kVA for nonlinear load applications
- One-year Powercare® limited warranty and extended warranty service (USA and Canada)

System Overview

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 (if enabled) switches the load to the filtered input power. 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

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 requirements of the equipment to be protected.

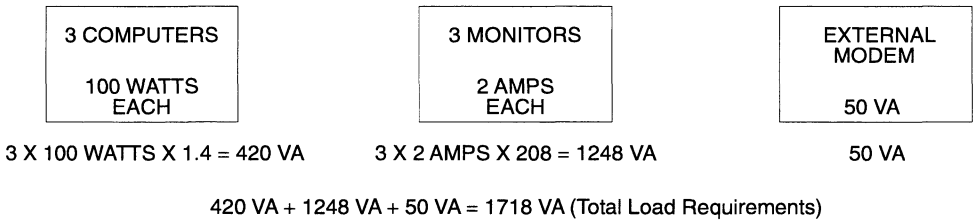


Figure 1. Volt-Amperes Calculations Example

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.

Estimated Battery Run Times

The estimated accuracy of the battery support times is ±10%. Battery times (in minutes) are shown according to the output watts and UPS configuration.

Output Watts	Standard Battery Configuration	Two EBC2 Cabinets††	One EBC1 Cabinet† + Two EBC2 Cabinets††	Three EBC2 Cabinets††
1000	100	209	264	318
2000	50	109	138	168
3000	32	72	92	112
4000	22	52	68	83
5000	16	40	52	65
6000	12	32	42	52
7000	9	26	35	44
8000	7	22	30	37

†EBC1 is one-half full battery cabinet. ††EBC2 is one full battery cabinet.

Special Symbols

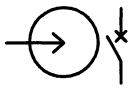
These common symbols may be found on your UPS:

On indicates the on position of a switch.

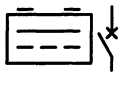
Off indicates the off position of a switch.

Bypass indicates bypass control switches.

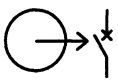
Battery indicates that the power provided to the load is coming from batteries.



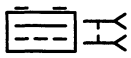
Input Breaker indicates an input circuit breaker.



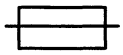
DC Breaker indicates a DC circuit breaker.



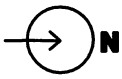
Output Breaker indicates an output breaker.



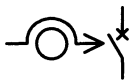
Battery Connector indicates the 2-position connector for battery input.



Fuse indicates a fuse.



Input Neutral Configuration Switch indicates the input neutral configuration switch.



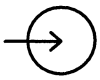
Bypass Reset Switch indicates the bypass reset switches.

Ground indicates the customer ground connections.

Emergency Power-Off indicates an EPO 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.

Powerware Plus 12 Operation

2 UPS Control Panel

The following sections identify the controls and indicators on the front panel (see Figure 2) and the front panel display functions.

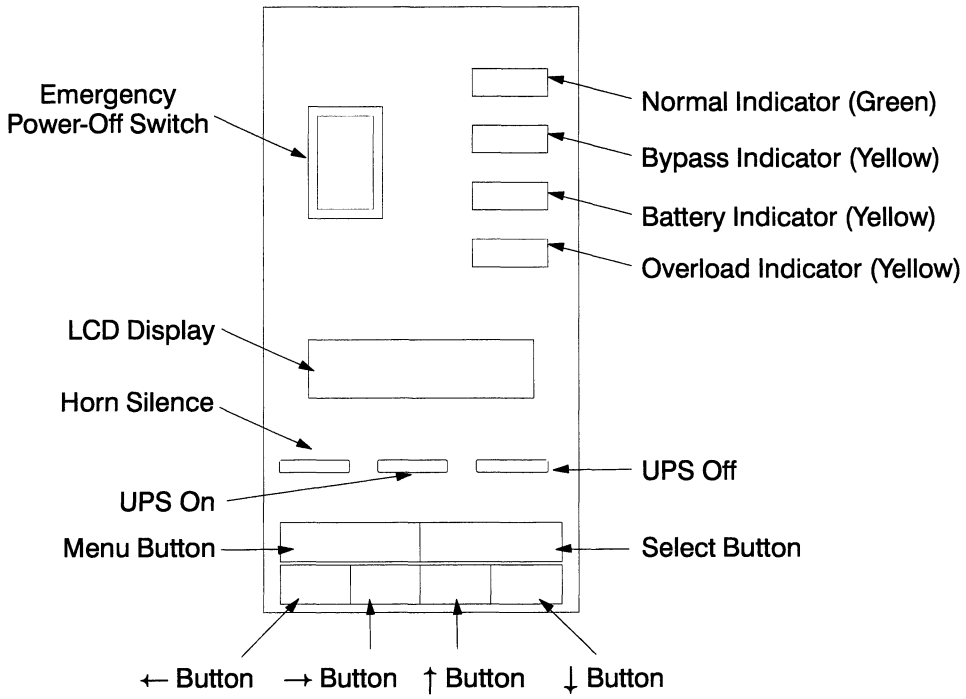


Figure 2. Front Panel Controls

Control Keys and Indicators

These pushbutton controls are on the front panel:

Emergency Power-Off

Press the EPO switch to turn off the load power during an emergency condition. The UPS must be restarted after an EPO.

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 **(AAAAAA)**.

See "UPS Control Panel Functions" on page 15 for information on the Normal, Bypass, Battery, and Overload indicators.

Using the Front Panel Display

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. S. W. Versions
- 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.

System Normal	Inverter supplying load (bypass available)
UPS On Battery	UPS is on battery
Load On Inverter	Inverter supplying load (bypass not available)
Syncing To Bypass	Inverter has ramped, but load is still on bypass
Inverter Ramping Up	Inverter has been started and is ramping
Rectifier Ramping Up	Rectifier has been started and is ramping
UPS On	Rectifier or inverter on but not supplying load
UPS Off	Rectifier and inverter off
Inverter Overload	Overload condition indicated from inverter
Rectifier Overload	Overload condition indicated from rectifier
Output Brkr Open	Output breaker open (O); UPS not supplying power to the load
UPS On Bypass	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-neutral)
- **Input Volts (L–L)**, input voltage (each phase and line-to-line)
- **Output Volts (L–N)**, output voltage (each phase and line-to-neutral)
- **Output Volts (L–L)**, output voltage (each phase and line-to-line)
- **Average Battery Voltage**
- **DC Link Voltage**
- **Inverter Frequency**
- **Input Frequency**
- **Output kVA**, shown as bar graphs with each block representing approximately 10% of capacity
- **Phase Load Current**, load currents (phase A, B, and C) are shown as bar graphs with each block representing approximately 10% of capacity
- **Time & Date**, displayed in the MM/DD/YY; HH:MM:SS or the DD/MM/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 13). 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 Cfg

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, output phase, 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; otherwise, 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
  100V
  105V
  110V
  115V
  120V
  125V
- Output Phase
  120°
  180°
  240°
- Output Frequency
  50 Hz
  60 Hz
- Model Number

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:

- ± 0.5 Hz
- ± 1.0 Hz
- ± 1.5 Hz
- ± 2.0 Hz
- ± 2.5 Hz
- ± 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 ±5% of the nominal output voltage. The UPS must be 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.

5. Comm Setup

Use the Comm Setup option 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 correctly set to establish and maintain communication: baud rate, data size, hardware handshake, software handshake, and parity. Two standard sets of I/O port parameters are available for 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 setup parameters. Use the right and left arrow buttons to view other settings. See Chapter 5, "UPS Communications" on page 25 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®, Novell®, and AT&T®/Default 1. All relays can also be customized. Use the up and down arrow buttons to view the list of options. Refer to the *Powerware Plus Communications Manual* for more information on the relay setup.

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. Contrast Adj

Use the Contrast Adjust option to change the contrast on the display. This option may not be available for some Plus 12 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 arrow buttons 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 Cfg

Use the Battery Cfg option to set your battery configuration or set up the system for custom batteries. See page 51 to use this option for configuring remote batteries. The following configurations are available for the Battery Cfg 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.

3 UPS Operations

This chapter describes the UPS front panel control functions, UPS operating modes and alarm conditions, and the Bypass and Emergency Power-Off features.

UPS Control Panel Functions

The front panel indicators illuminate only when one of the following conditions is present:

- **NORMAL:** Green when UPS is in Normal operating mode. If Bypass is enabled, the Normal indicator flashes when Bypass is unavailable.
- **BYPASS:** Yellow when UPS is in Bypass mode. The Bypass indicator 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. The Battery indicator flashes when there is approximately two minutes or less of battery time remaining. If the UPS is not operating 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.

Operating Modes

After you install and startup the Plus 12 UPS, the UPS filters and regulates incoming AC power, eliminating noise and voltage spikes, and provides consistent power to your equipment (see Figure 3).

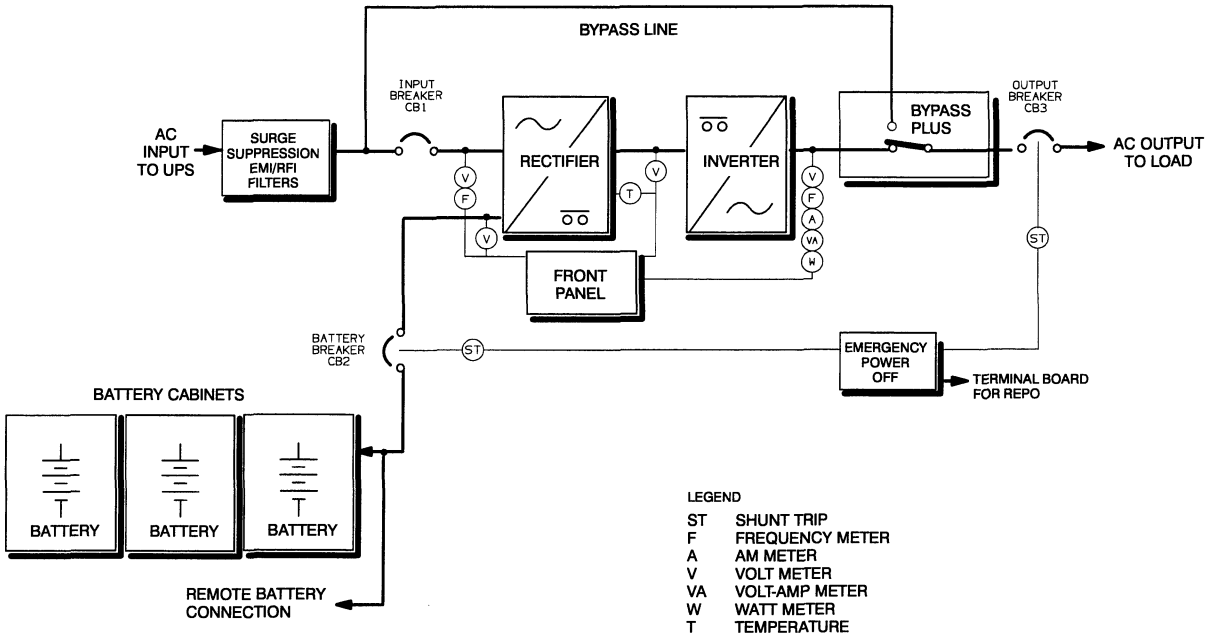


Figure 3. UPS Block Diagram

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, and 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.

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

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% to 124% of the rating for 10 minutes, 125% to 149% for 30 seconds, or greater than 150% for 10 cycles. (The UPS attempts three restarts.)
- UPS internal temperature exceeds safe operating range. (The UPS does not attempt a restart.)
- UPS output falls out of the specified voltage limits. (The UPS does not attempt a restart.)
- Output real power exceeds specified limits. (The UPS does not attempt a restart.)
- Load current inrush (surge) exceeds peak current capability. (The UPS continuously tries to restart.)

When the unit is in Normal mode and automatically transfers to Bypass due to a load current overload condition, the UPS attempts to return to Normal mode. If three auto-start attempts fail (due to a load current) within a 10-minute period, the UPS remains on Bypass. When the unit transfers to Bypass due to an overtemp, real-power overload, or inverter failure, the UPS remains on Bypass and does not attempt a restart. When a surge current causes the unit to transfer to Bypass, the UPS continuously tries to restart.

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

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, frequency, and phase displacement are the same. If the UPS is operating as a voltage and/or frequency converter, bypass must be disabled. See "Final Configuration" on page 45.

Automatic Bypass

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 (surge) exceeds peak current capability.

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

The Maintenance Bypass switch is located under the top cover of the UPS (see Figure 10 on page 37). 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. Wait until the Bypass indicator is the only indicator lit on the front panel.
3. Turn the Maintenance Bypass switch from off to on.
4. 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. Wait until the Bypass indicator is the only indicator lit on the front panel.
3. Turn the Maintenance Bypass switch from on to off.
4. Press the UPS On button and wait until the Normal indicator illuminates indicating that the UPS is operating in Normal mode.

Local/Remote Emergency Power-Off

The 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 EPO switch located on the UPS front panel (see Figure 2 on page 7).

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

With the EPO feature, a 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 switch located on the UPS front panel. See "Electrical Installation" on page 42 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 22.

4 UPS Startup and Shutdown

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 2 on page 7).

Initial Power-on

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 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 13). 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 voltage is indicated with an asterisk (*).*

Unit Type	Possible Configurations	Menu Selections
Low Voltage	100 VAC 105 VAC 110 VAC 115 VAC 120 VAC 125 VAC	Any of these configurations may be selected.

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 (l–l) voltages 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.

   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 view the **Output Phase** option. Use the right and left arrow buttons to view the settings (240 DEG, 120 DEG, 180 DEG). Press the Select button to select an Output Phase setting.

    NOTE: *Select a new output phase **only** if you receive a phase rotation error on the front panel.*

11. Press the down arrow button to display the UPS Model number. This is a view only option; you cannot change this selection.
12. 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.

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 disabled or enabled.

With Bypass Disabled

The Bypass Configuration switch is in the DISABLE position.

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 battery breaker.
3. Turn on (I) the output 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.

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 battery breaker.

3. Turn on (I) the output breaker. The Bypass indicator remains lit.

   The UPS supplies incoming AC power to the load. The Bypass indicator flashes in the event of a phase rotation error. See page 43 for the appropriate input wiring.

   NOTE: *If the Bypass indicator does not illuminate or flash, the UPS is in Load Power-Off mode. Press the UPS On button to supply power to the load. The Bypass indicator should illuminate.*

   NOTE: *When performing system startup after an EPO has occurred, the UPS may automatically switch to Normal mode when the output breaker is closed.*

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 disabled or enabled.

With Bypass Disabled

The Bypass Configuration switch is in the DISABLE position.

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.

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.

Caution: If the utility input voltage is removed from the UPS or the input breaker is left open for an extended period, the batteries will be discharged. The batteries must be disconnected from the UPS, opening the battery breaker will **NOT** remove all load from the batteries.

5 UPS Communications

The Powerware Plus 12 UPS has an RS-232 port that provides you with full RS-232 communication. It has selectable baud rates of 2400, 4800, 9600, or 19200 and operates in the modes described below.

Options for the LAN relay interface are available through the Relay Setup option in the System Setup Menu on the front panel display. It has programmable relays for Novell networks, as well as for the IBM AS/400. Each relay can be individually programmed by the customer.

Refer to the *Plus Communications Manual* for additional information about the RS-232 communication and the LAN relay interface.

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.

6 Troubleshooting

If you have installed your UPS and it does not perform properly, consult the chart below. If the condition persists, contact 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 11).
	Input wiring not in proper rotation.	Make sure the correct output phase is selected in the Select Type menu (see page 11). If the problem persists, 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 (I) the output breaker.
	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 **not** on battery.	Battery not connected.	Contact qualified service personnel.
	Battery breaker is not closed (O).	Close (I) the battery breaker.
Normal indicator flashing (bypass not available).	Input (bypass) out of frequency or voltage limits.	Check set type and sync range.

Obtaining Service

If you have any questions or problems with your UPS, call for service at one of the following telephone numbers and ask for a UPS technical representative.

In the United States **1–800–843–9433**
In Canada **1–800–461–9166**
All other countries **1–919–870–3028**

Please have the following information ready when you call for service:

- Model number
- Serial number
- Version number (if available)
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

NOTE: *For any warranty claim to be valid, the Warranty Registration Card must be on file, or Proof and Date of Purchase must be available.*

7 Product Specifications

Plus 12 UPS Technical Specifications

Rating	Model 12/8:	8 kVA, 6 kW	
	Model 12/10:	10 kVA, 7 kW	
	Model 12/12:	12 kVA, 8 kW	
Nominal Input Phase Current*	**Single-Phase**		
	Model 12/8:	100/200 VAC	38A
		110/220 VAC	34A
		115/230 VAC	33A
		120/240 VAC	32A
	Model 12/10:	100/200 VAC	44A
		110/220 VAC	40A
		115/230 VAC	38A
		120/240 VAC	37A
	Model 12/12:	100/200 VAC	50A
		110/220 VAC	46A
		115/230 VAC	44A
		120/240 VAC	42A
	Two-Phase		
	Model 12/8:	120/208 VAC	36A
	Model 12/10:	120/208 VAC	42A
	Model 12/12:	120/208 VAC	48A
	Three-Phase Input/Two-Phase Output		
	Model 12/8:	120/208 VAC	21A
	Model 12/10:	120/208 VAC	25A
	Model 12/12:	120/208 VAC	28A
Nominal Output Phase Current	**Single-Phase**		
	Model 12/8:	100/200 VAC	34A
		110/220 VAC	34A
		115/230 VAC	34A
		120/240 VAC	34A
	Model 12/10:	100/200 VAC	42A
		110/220 VAC	42A
		115/230 VAC	42A
		120/240 VAC	42A
	Model 12/12:	100/200 VAC	50A
		110/220 VAC	50A
		115/230 VAC	50A
		120/240 VAC	50A
	Two-Phase		
	Model 12/8:	120/208 VAC	34A
	Model 12/10:	120/208 VAC	42A
	Model 12/12:	120/208 VAC	50A
	Three-Phase Input/Two-Phase Output		
	Model 12/8:	120/208 VAC	34A
	Model 12/10:	120/208 VAC	42A
	Model 12/12:	120/208 VAC	50A

Input Power Factor	0.95 lag minimum
Nominal Frequency	50/60 Hz
Output Power Factor	0.6 lagging - 0.6 leading
Heat Dissipation (240V input full load at 0.8 pf)	Model 12/8: 3900 BTU/hr (1000 kg-cal/hr) Model 12/10: 4600 BTU/hr (1146 kg-cal/hr) Model 12/12: 5200 BTU/hr (1310 kg-cal/hr)
Neutral Current Capability	175% of phase current
Crest Ratio	3:1
Unbalanced Load Capability	100%
Operating Environment	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.

Plus 12 UPS Physical Specifications

Parameter	Power Processor Cabinet	Battery Cabinet
Height	28″ (71 cm)	28″ (71 cm)
Width	8.5″ (21.6 cm)	8.5″ (21.6 cm)
Depth	29″ (73.7 cm)	24.5″ (62 cm)
Weight*	180 lb (82 kg)	295 lb (134 kg) for 7 AH 350 lb (159 kg) for 18 AH
Floor Loading	1.48 lb/in^2 (.12 kg/cm^2)	2.43 lb/in^2 (.17 kg/cm^2) for 7 AH 2.88 lb/in^2 (.20 kg/cm^2) for 8 AH

*Power processor with one 7-AH battery cabinet: 475 lb (215 kg)
Power processor with one 18-AH battery cabinet: 530 lb (240 kg)

Plus 12 UPS Battery Specifications

Nominal Battery-String Voltage	240 Vdc (120 cells)
Nominal Battery Current	Model 12/8: 30A Model 12/10: 35A Model 12/12: 40A
Battery Type	Sealed, maintenance-free, high-rate discharge, lead-acid cells
Expected Life	5 years or a maximum of 200 deep discharges

Powerware Plus 12 Installation

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

8 Installation

The following sections describe your UPS package and the installation and physical setup of the UPS, optional Power Distribution Module (PDM), and remote batteries.

Unpacking and Inspection

Upon receiving your UPS, optional battery cabinet(s), or PDM, 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

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 Plus 12 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 "Installing Remote Batteries" on page 49 for more information on installation and configuration.

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

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

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

   NOTE: *It is recommended to allow a minimum of 24″ of space on the left side of the unit for access by qualified service personnel and a minimum of 8″ of 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).

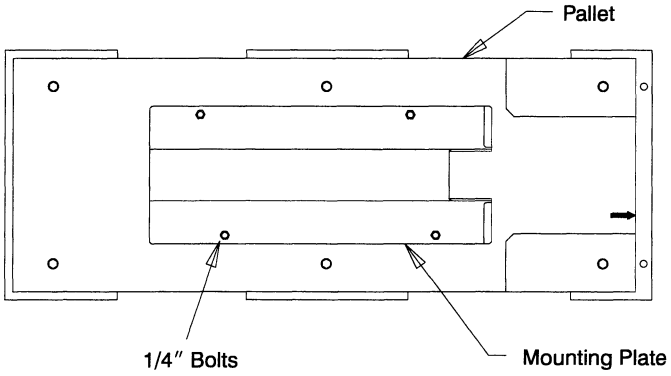


Figure 5. UPS Mounting Plate

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.*

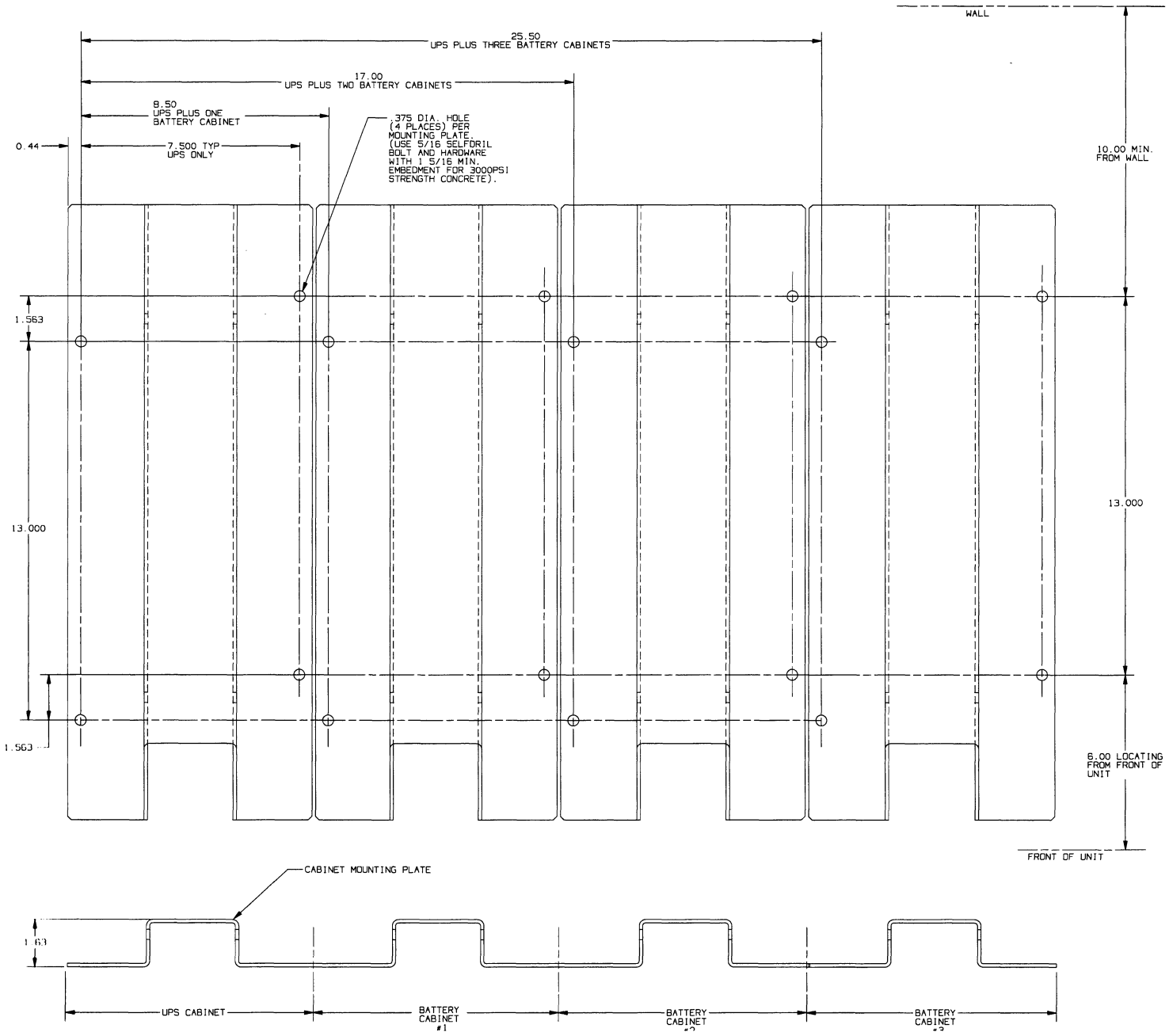


Figure 6. Seismic Installation Mounting Pattern

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

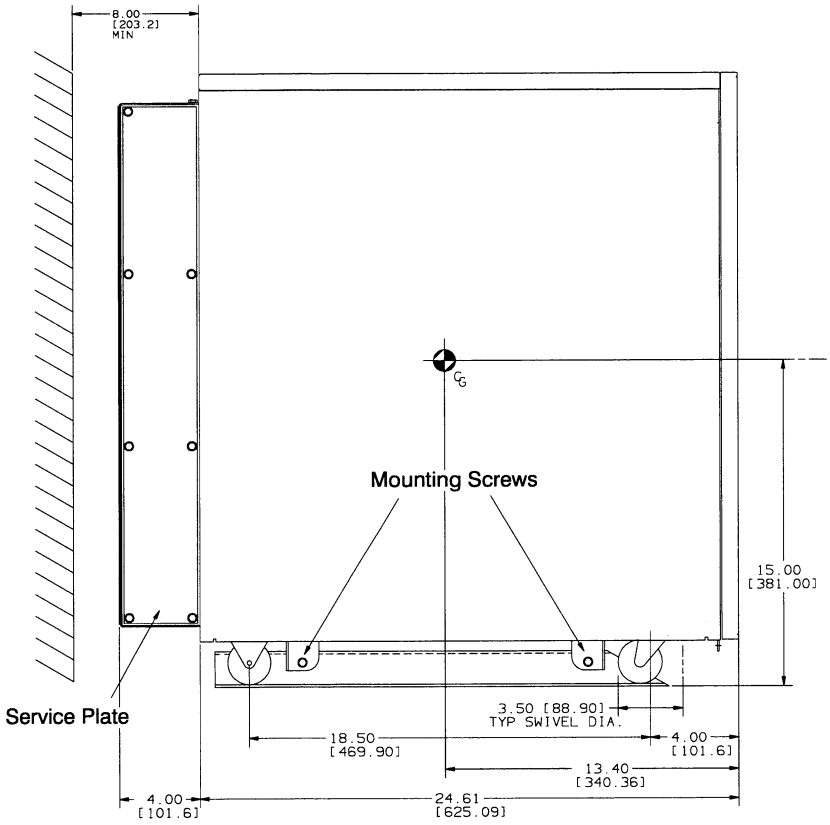


Figure 7. Securing the UPS Cabinet and Mounting Plate

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

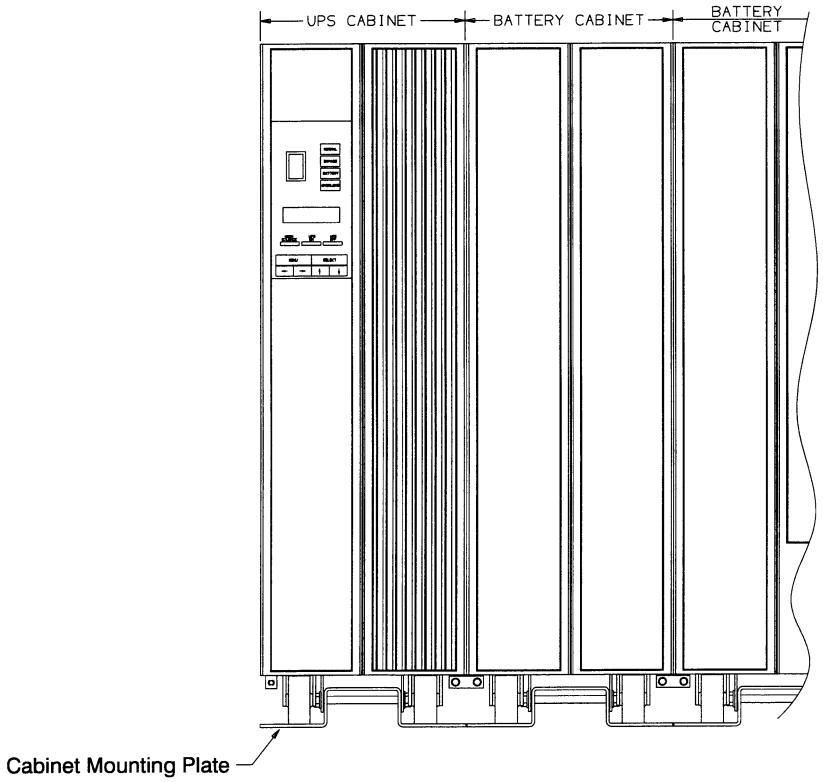


Figure 8. Front View of the Plus 12 UPS

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

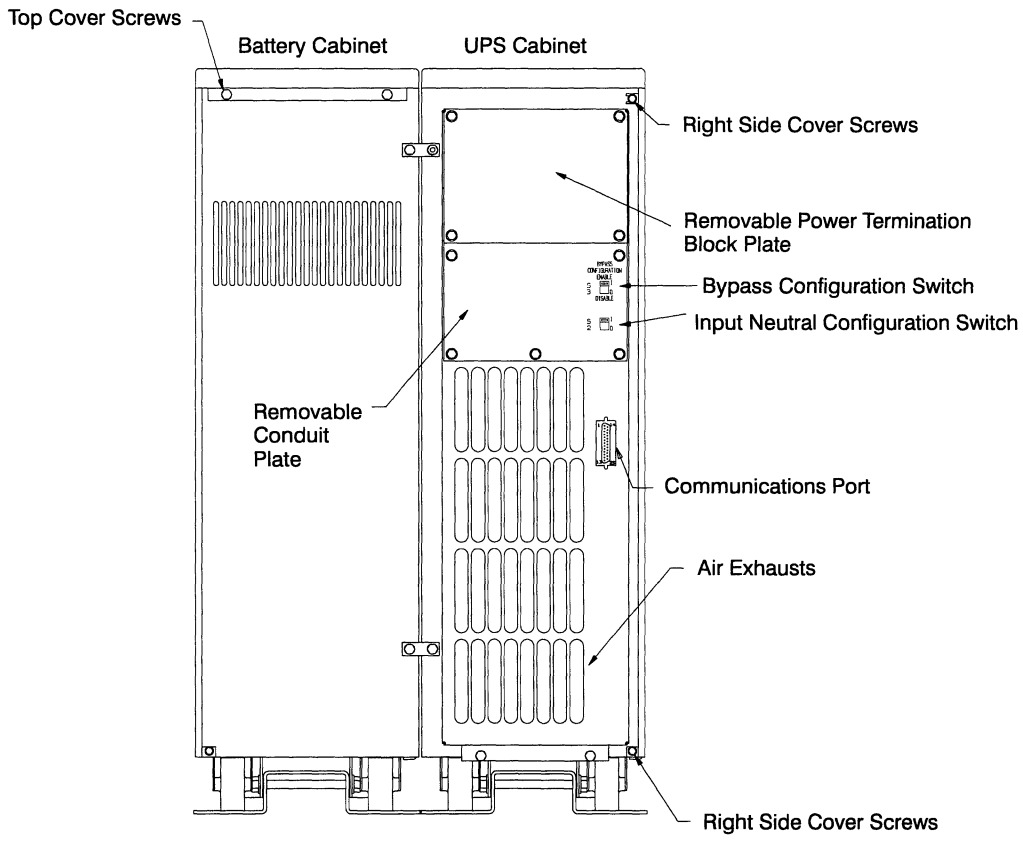


Figure 9. Rear View of the Plus 12 UPS

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.

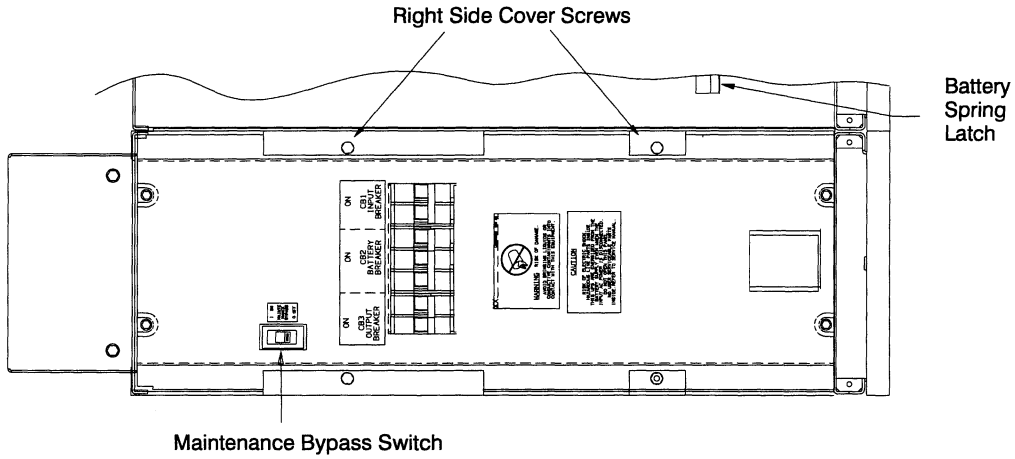


Figure 10. Top View with UPS Cover Removed

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

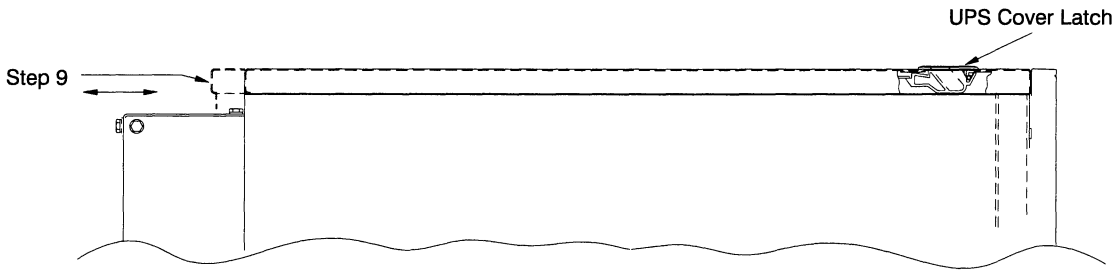


Figure 11. Removing the Top Cover from the UPS Cabinet

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).

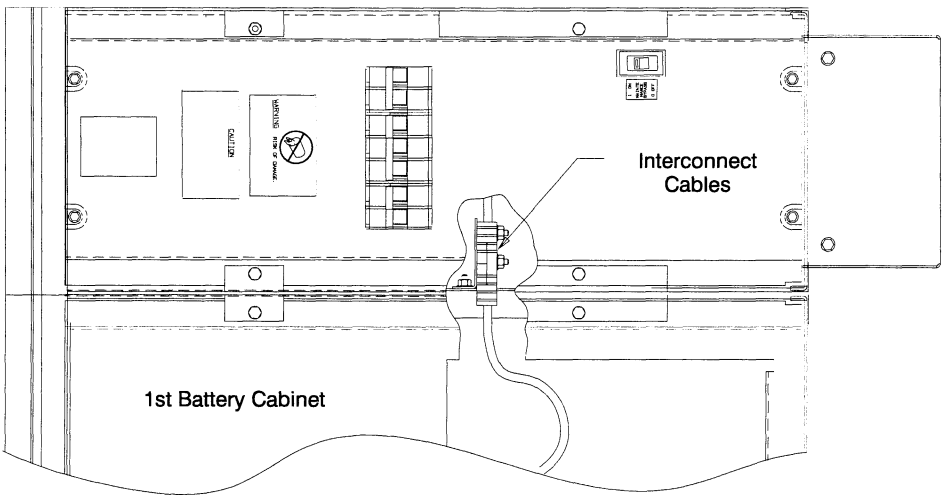


Figure 12. Connecting the UPS and Battery Cables (Top View)

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.

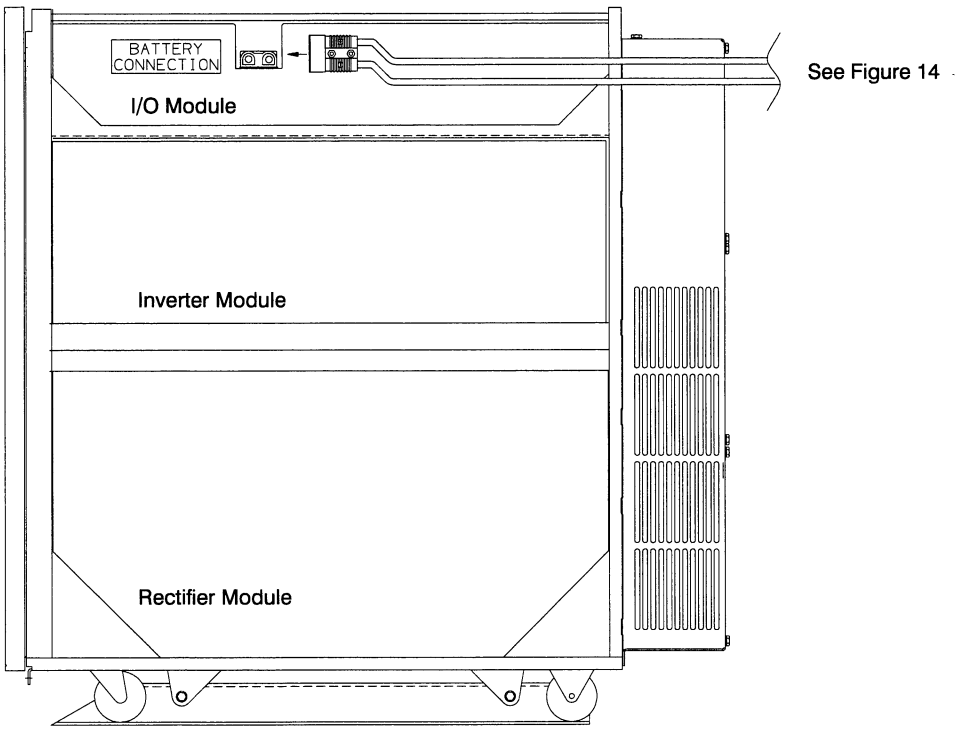


Figure 13. Connecting the UPS and Battery Cables (Right Side View)

16. To connect a second battery cabinet, select 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.

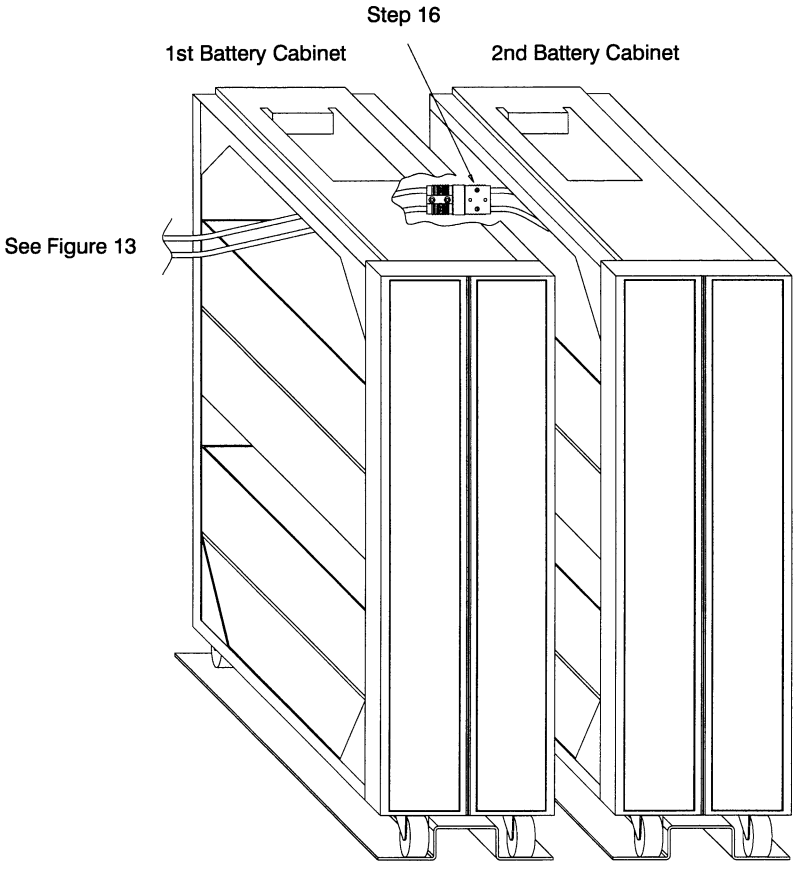


Figure 14. Connecting a Second Battery Cabinet

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

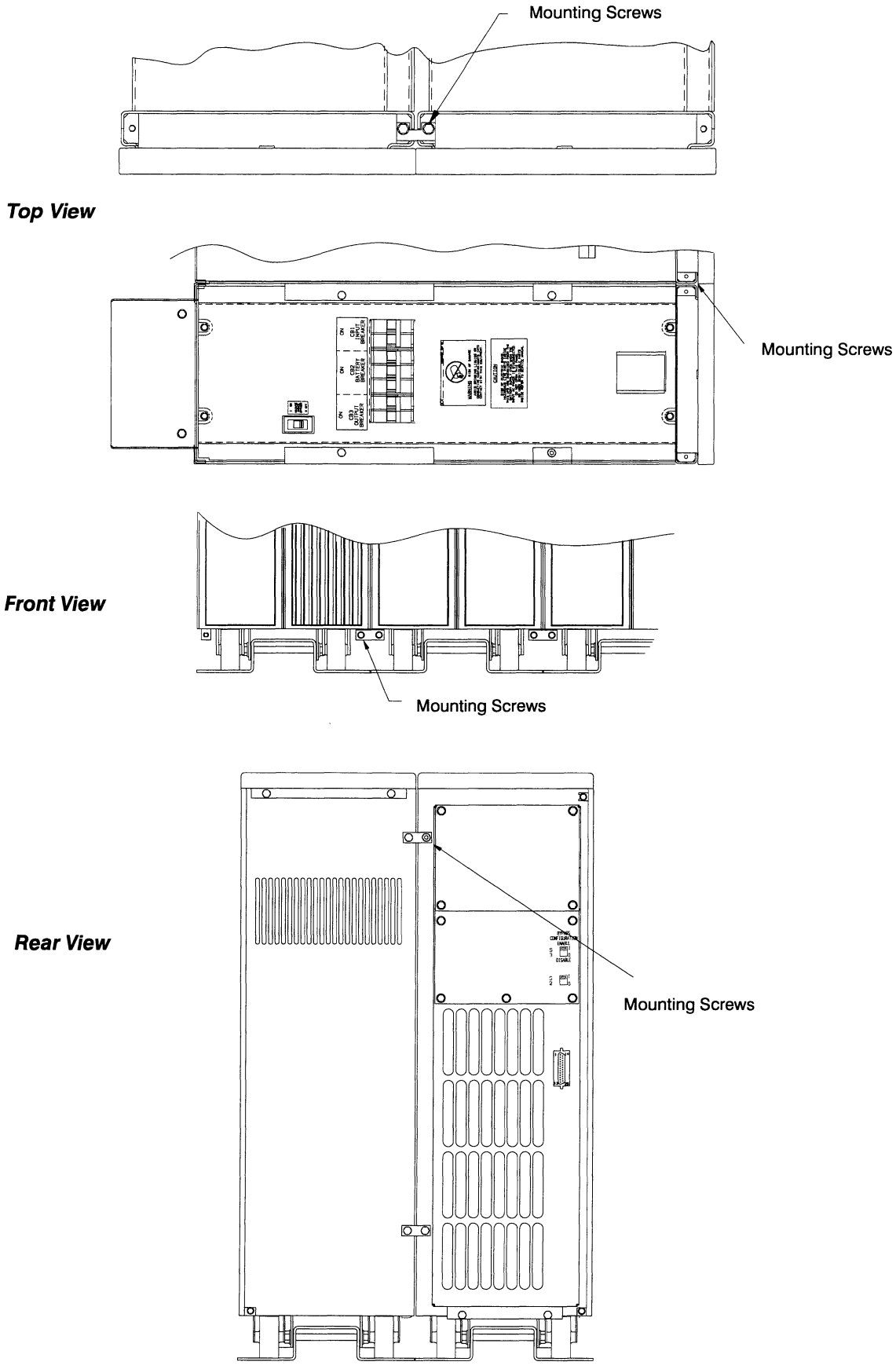


Figure 15. Joining the Cabinets (Top, Front, and Rear View)

18. Remount the right side cover that was removed from the UPS cabinet in Step 10 to the right side of the last 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 42.

    NOTE: *If you are installing an optional PDM, continue to page 46.*

Caution: All cabinets must be secured to keep them from moving after installation is complete. Secure the cabinets by bolting the cabinets to the cabinet mounting plate. Failure to do so violates safety rules and results in the unit losing its safety agency approvals.

Electrical Installation

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:

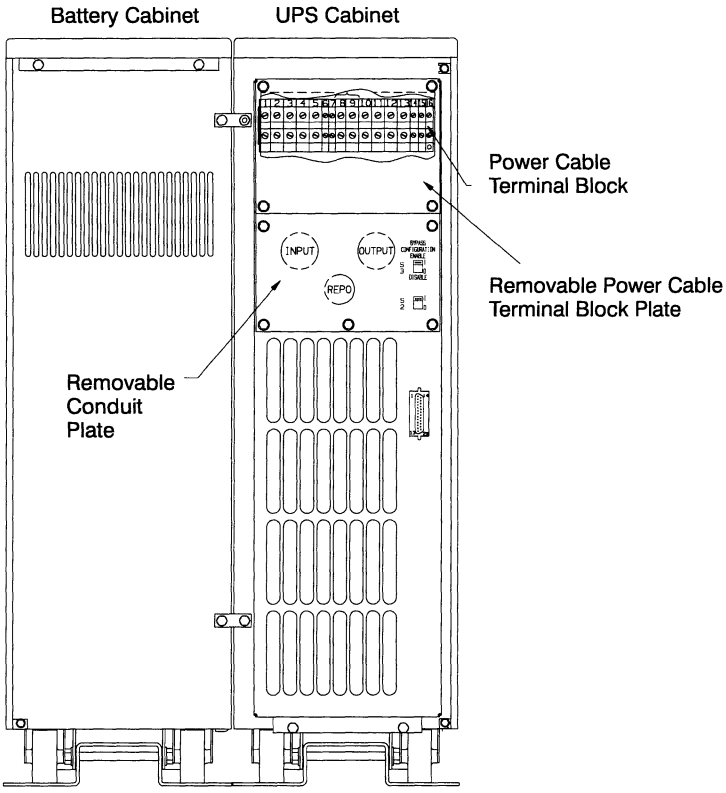


Figure 16. Terminal Block and Conduit Access

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. Refer to the label located on the inside of the UPS cabinet for terminal block torque requirements. See the Oneline Drawing (110719208) for terminal block diagrams.

> **Caution:** The UPS contains its own 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			
Wire Function	**Terminal Position**	**Terminal Wire Size Rating***	**Conduit Connection (Entry Size)**
Ground	1, 7	18 – 6 AWG (0.5 – 10 mm²)	N/A
Input Neutral	2	10 – 4 AWG (2.5 – 16 mm²)	1.0″ (25.4 mm)
Input Phases	3, 4, 5	18 - 6 AWG (0.5 – 10 mm²)	
No Connection	6, 8		N/A
Remote Battery (Positive)	9		0.75″ (19.05 mm)
Remote Battery (Negative)	10		
Output Neutral	11	10 – 4 AWG (2.5 – 16 mm²)	1.0″ (25.4 mm)
Output Phases	12, 13	18 - 6 AWG (0.5 – 10 mm²)	
Emergency Power-Off	14, 15	22 – 10 AWG (0.5 – 4 mm²)	0.5″ (12.7 mm)
*Use #8-AWG 75°C copper wire. Use #6-AWG 75°C copper wire for terminals 2 and 10 (for a double-rated neutral).			

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 the 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. For 120V output, continue to Step 6. For 220, 230, or 240V output skip to Step 11. See the Oneline Drawing (110719208) for the connection locations of your particular Plus 12 model.

6. Locate the grounding jumper between terminals 7 and 8 as shown in Figure 17.

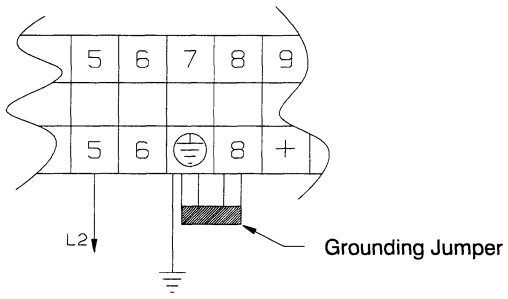


Figure 17. Grounding Jumper

7. 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 7 and 8.

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

8. Locate the grounding jumper and the neutral bonding jumper (provided in a bag located on the back of the unit).

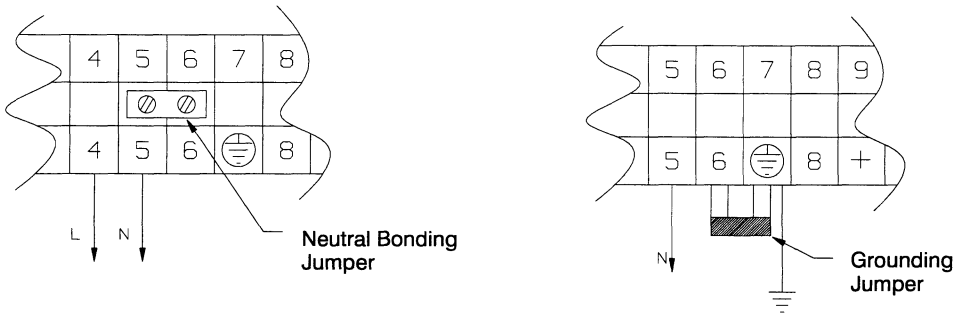


Figure 18. Grounding and Neutral Jumper

9. If input and output neutrals are to be bonded together (for IT and TT installations), install the neutral bonding jumper between terminals 5 and 6.

10. If output neutral is to be grounded (for TNS installation), install grounding jumper between terminals 6 and 7.

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 43 for proper connections.

    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 and the conduit plate on the UPS rear panel.

13. 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 on the rear panel of the UPS (see Figure 9 on page 37) and Maintenance Bypass switch on the top panel of the UPS (see Figure 10 on page 37).

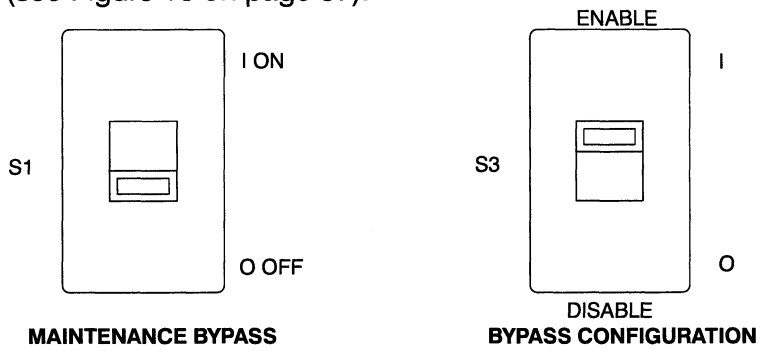


Figure 19. Maintenance Bypass and Bypass Configuration Switches

2. Set the Maintenance Bypass switch to the off (O) position.
3. If the input and output voltage, frequency, and phase displacement are identical and bypass is desired, set the Bypass Configuration switch to the ENABLE (I) position.
4. If the input and output voltage, frequency, and phase displacement are not identical or if bypass is not desired, set the Bypass Configuration switch to the DISABLE position.

Input Configuration

1. Locate the Input Neutral Configuration switch on the rear panel of the UPS (see Figure 9 on page 37).

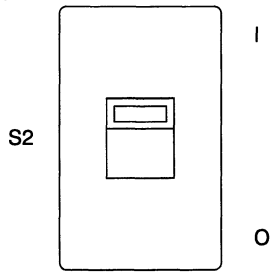


Figure 20. Input Neutral Configuration Switch

2. If the UPS has a Wye input (4-wire), set the Input Neutral Configuration switch (S2) in the Wye (I) position.
3. If the UPS has a Delta input (3-wire), set the Input Neutral Configuration switch (S2) in the Delta (O) position.
4. Your UPS is now installed and ready to start up. Continue to Chapter 4, "UPS Startup and Shutdown," on page 21 to start up your UPS.

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 own 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(s) to the ON (I) position.
11. Configure the UPS for bypass and input configuration (see page 45).
12. Continue to "UPS Startup and Shutdown" on page 21 to start up your UPS.

Installing Remote Batteries

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 fact 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:

$$(KW_{Batt}) = \frac{(KW)}{0.85 - 0.05 \times (1 - PF)}$$

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 34.

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 23.

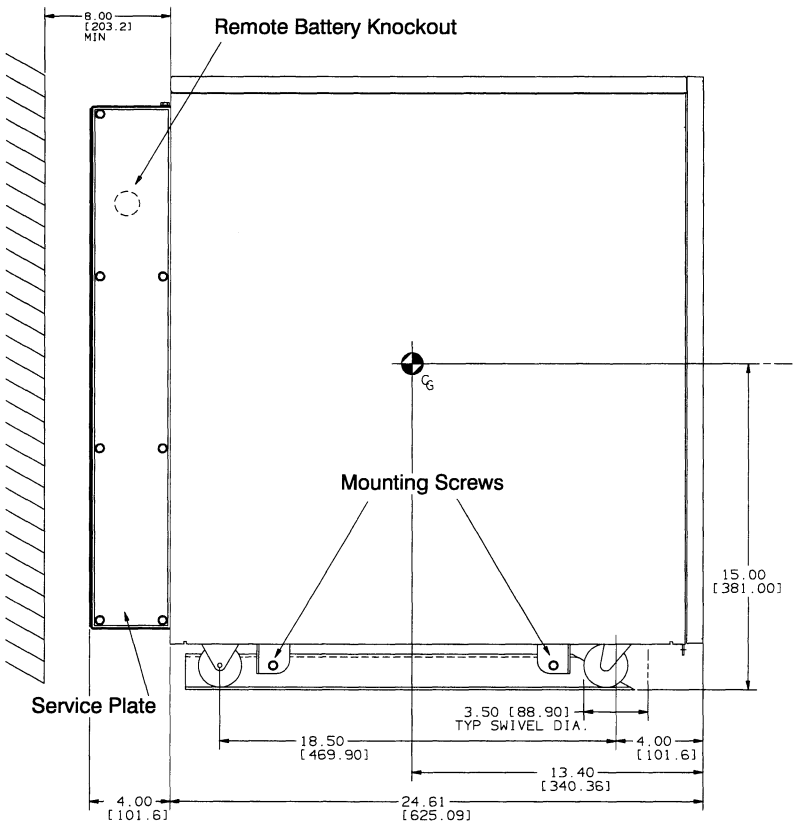


Figure 23. Remote Battery Access

3. Follow the wiring instructions in "Electrical Installation" on page 42.
4. Configure the Bypass and Input Configuration switches as described on page 45.
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 4, "UPS Startup and Shutdown," on page 21 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 13). 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 **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.

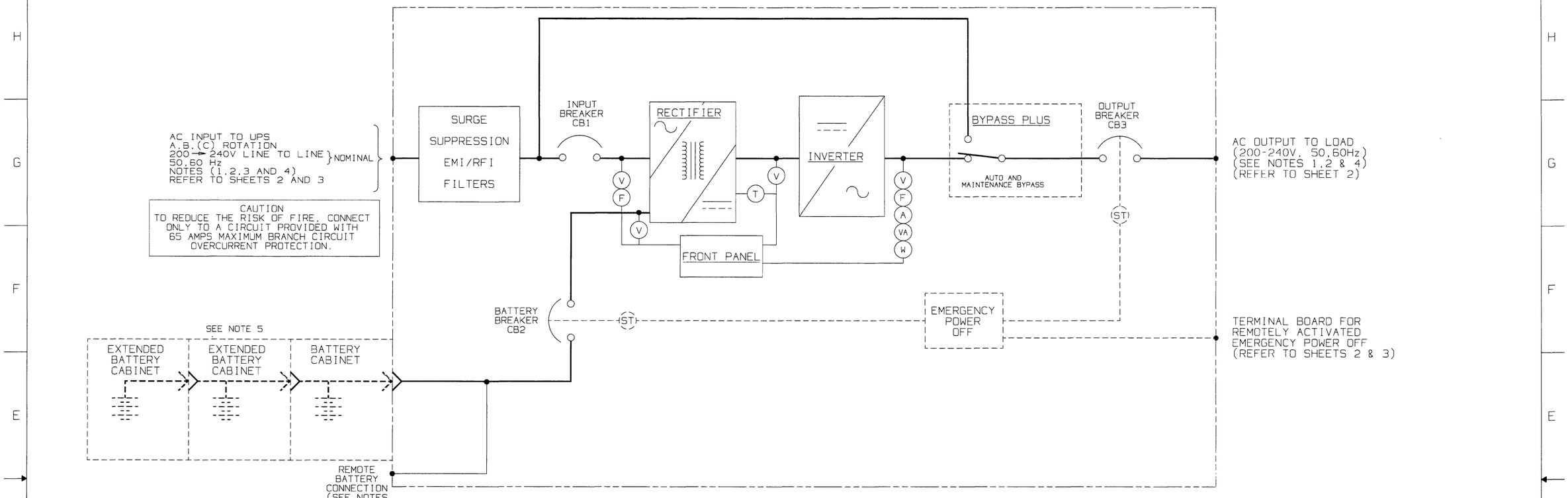


TABLE 1

	NOMINAL VOLTAGE	NOMINAL INPUT CURRENT PER PHASE *			NOMINAL OUTPUT CURRENT PER PHASE #			NOMINAL OUTPUT POWER			BATTERY CURRENT		
		MODEL 8	MODEL 10	MODEL 12	MODEL 8	MODEL 10	MODEL 12	MODEL 8	MODEL 10	MODEL 12	MODEL 8	MODEL 10	MODEL 12
SINGLE PHASE (WITH OR WITHOUT A CENTER TAP)	200, 100/100	38 A	44 A	50 A	34 A	42 A	50 A	6 KW	7 KW	8 KW	30 A	35 A	40 A
	220, 110/110	34 A	40 A	46 A	34 A	42 A	50 A	6 KW	7 KW	8 KW	30 A	35 A	40 A
	230, 115/115	33 A	38 A	44 A	34 A	42 A	50 A	6 KW	7 KW	8 KW	30 A	35 A	40 A
	240, 120/120	32 A	37 A	42 A	34 A	42 A	50 A	6 KW	7 KW	8 KW	30 A	35 A	40 A
TWO PHASE	208, 120/120	36 A	42 A	48 A	34 A	42 A	50 A	6 KW	7 KW	8 KW	30 A	35 A	40 A
THREE PHASE INPUT/ TWO PHASE OUTPUT	208/120 208, 120/120	21 A	25 A	28 A	34 A	42 A	50 A	6 KW	7 KW	8 KW	30 A	35 A	40 A

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

NOTES:

1. REFER TO NATIONAL AND LOCAL ELECTRICAL CODES FOR ACCEPTABLE EXTERNAL WIRING PRACTICES.
2. MATERIAL AND LABOR FOR EXTERNAL WIRING ARE TO BE PROVIDED BY OTHERS.
3. 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.)
4. 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 GUIDLINES. IN THE UNITED STATES THE OUTPUT IS A 'SEPERATELY DERIVED SOURCE'.
5. WARNING: TO AVOID FIRE AND ELECTRIC SHOCK HAZARD, DO NOT CONNECT MORE THAN THREE BATTERY CABINETS TO THE UPS UNIT.
6. REMOTE BATTERIES REQUIRE DC BREAKER SUITABLE FOR BRANCH CIRCUIT PROTECTION (TO BE PROVIDED BY OTHERS), RATED 250V, 75A.
7. MAXIMUM PERMITTED AVAILABLE FAULT CURRENT FROM A REMOTE BATTERY SUPPLY IS 4500 AMPS.

CAUTION - RISK OF ELECTRIC SHOCK.

DO NOT REMOVE COVERS. 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

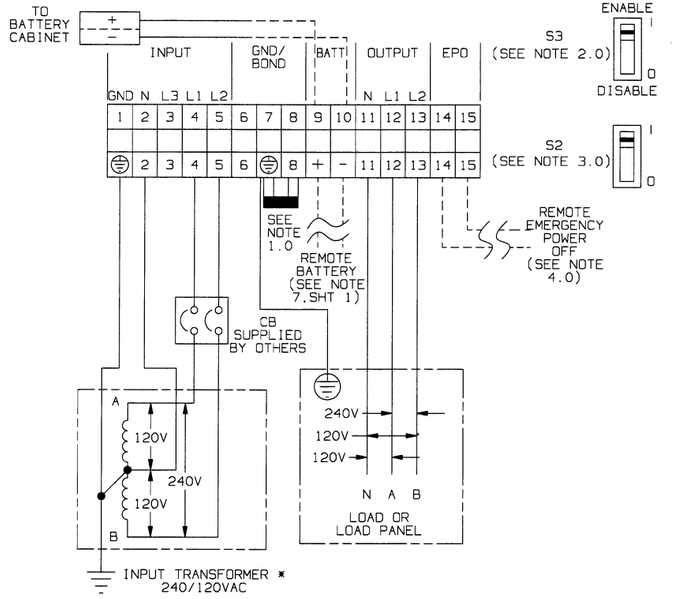
- (ST) SHUNT TRIP
- (F) FREQUENCY METER
- (A) AMMETER
- (V) VOLTMETER
- (VA) VOLT-AMP METER
- (W) WATTMETER
- (T) TEMPERATURE

Description: Oneline Drawing PWP 12

Drawing No. 110712208 Revision C

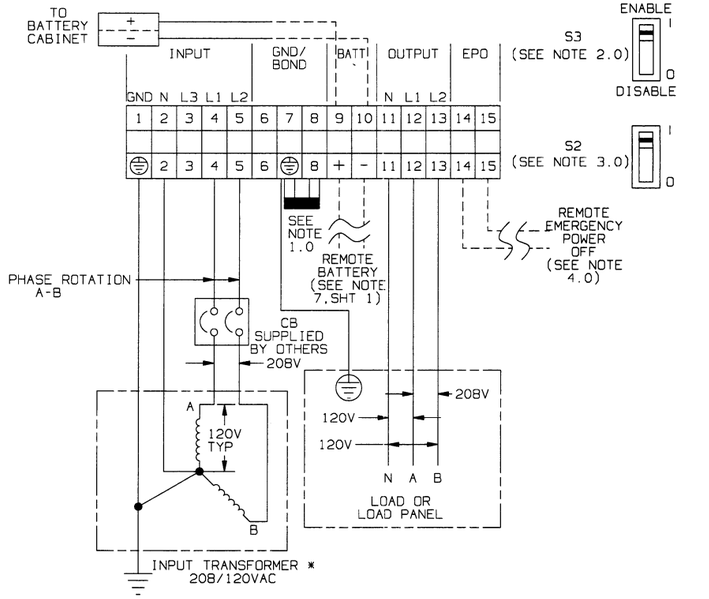
Sheet: 1 of 3

INPUT	OUTPUT
2Ø-240/120V	2Ø-240/120V



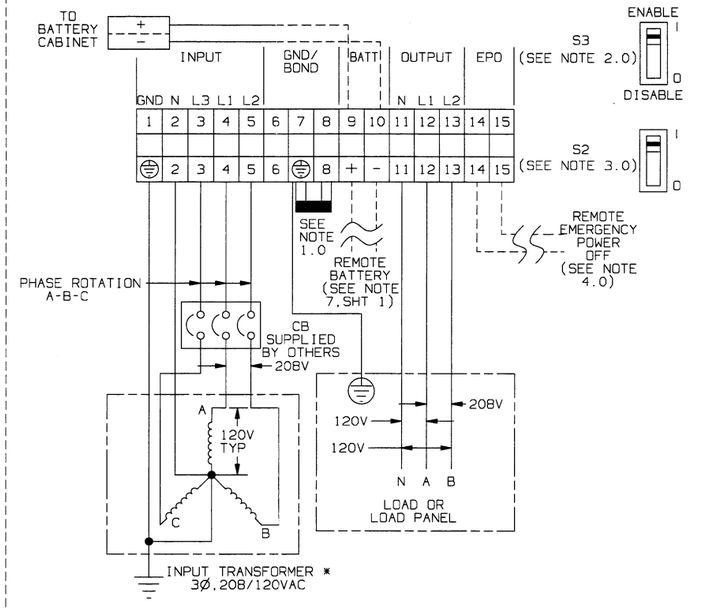
* SEE OPERATOR'S MANUAL FOR OTHER VOLTAGES AND FREQUENCIES.

INPUT	OUTPUT
2Ø-208/120V	2Ø-208/120V



* SEE OPERATOR'S MANUAL FOR OTHER VOLTAGES AND FREQUENCIES.

INPUT	OUTPUT
3Ø-208/120V	2Ø-208/120V



* SEE OPERATOR'S MANUAL FOR OTHER VOLTAGES AND FREQUENCIES.

CAUTION : RISK OF ELECTRICAL SHOCK
REMOTE BATTERY TERMINALS (9 AND 10) HAVE HIGH VOLTAGE WHEN THE BATTERY CABINET IS CONNECTED TO THE UPS.

INSTALLATION INSTRUCTIONS:

ONLY QUALIFIED SERVICE PERSONNEL SHOULD ATTEMPT TO CONFIGURE THIS EQUIPMENT.

THE OUTPUT VOLTAGE, FREQUENCY AND PHASE DISPLACEMENT 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 DETERMINE THE GROUNDING REQUIREMENTS.
1.2 LOCATE THE GROUNDING JUMPER BETWEEN TERMINALS 7 AND 8 AS SHOWN IN FIGURE 1.
1.3 IF OUTPUT NEUTRAL IS NOT TO BE GROUNDED, REMOVE THE GROUNDING JUMPER THAT IS LOCATED BETWEEN TERMINALS 7 AND 8 (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 REAR OF THE UNIT.
2.3 IF INPUT AND OUTPUT VOLTAGE, FREQUENCY AND PHASE DISPLACEMENT ARE IDENTICAL, AND BYPASS IS DESIRED, SET THE BYPASS CONFIGURATION SWITCH S3 TO THE "ENABLE" POSTION, AS SHOWN IN FIGURE 2.
2.4 IF INPUT AND OUTPUT VOLTAGE, FREQUENCY AND PHASE DISPLACEMENT ARE NOT IDENTICAL, OR IF BYPASS IS NOT DESIRED, SET THE BYPASS CONFIGURATION SWITCH S3 TO THE "DISABLE" POSITION, AS SHOWN IN FIGURE 2.

3.0 INPUT CONFIGURATION SWITCH
3.1 MAKE SURE THAT THE INPUT CONFIGURATION SWITCH S2, LOCATED ON THE REAR OF THE UNIT, IS SET TO THE "1" POSITION, AS SHOWN IN FIGURE 3. (SEE SHEET 3 FOR "0" POSITION)

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.

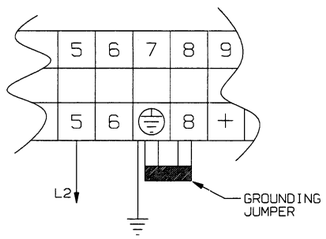


FIGURE 1

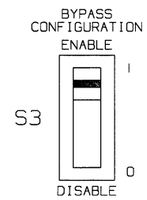


FIGURE 2

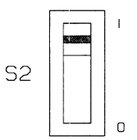


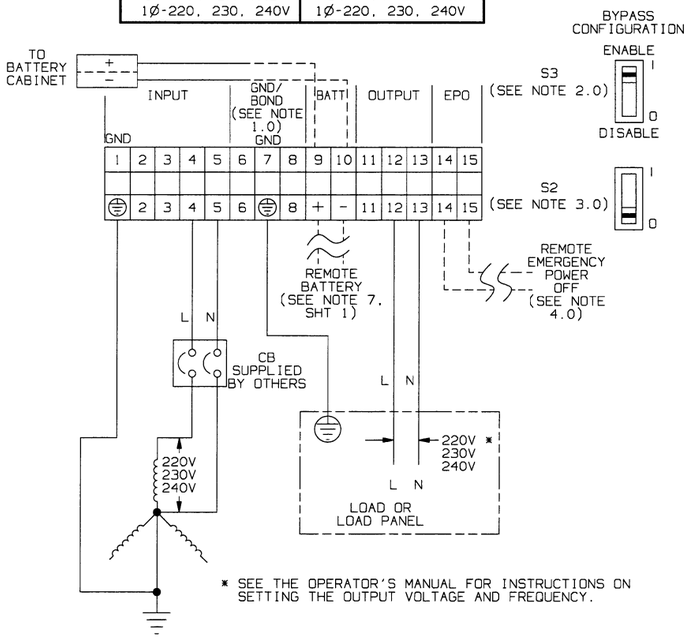
FIGURE 3

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

USE #6 AWG 75°C COPPER WIRE MINIMUM. FOLLOW LOCAL AND NATIONAL ELECTRICAL REGULATIONS FOR APPLICABLE DERATING FACTORS AND ACCEPTABLE WIRING PRACTICES.

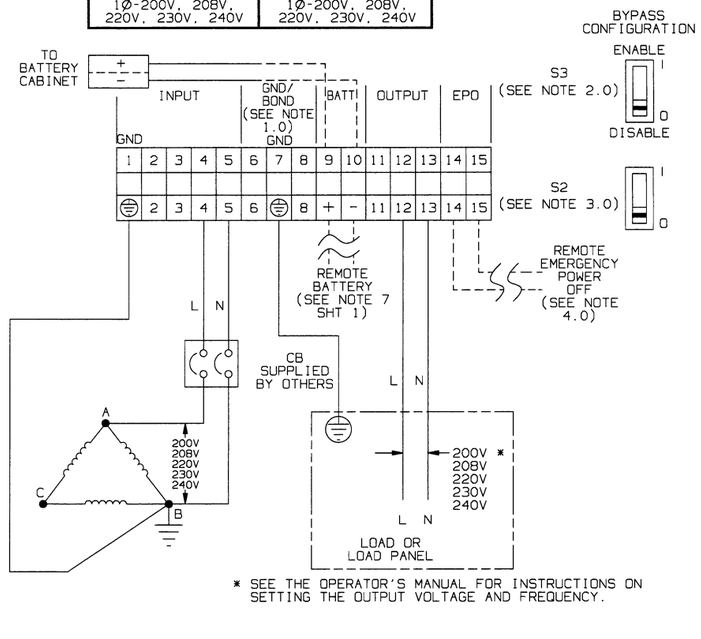
Description: Oneline Drawing PWP 12
Drawing No. 110719208 Revision C
Sheet: 2 of 3

INPUT INCLUDING IT, TT OR TNS 1Ø-220, 230, 240V	OUTPUT INCLUDING IT, TT OR TNS 1Ø-220, 230, 240V



* SEE THE OPERATOR'S MANUAL FOR INSTRUCTIONS ON SETTING THE OUTPUT VOLTAGE AND FREQUENCY.

DELTA INPUT 1Ø-200V, 208V, 220V, 230V, 240V	OUTPUT 1Ø-200V, 208V, 220V, 230V, 240V



* SEE THE OPERATOR'S MANUAL FOR INSTRUCTIONS ON SETTING THE OUTPUT VOLTAGE AND FREQUENCY.

LEGEND

CB = CIRCUIT BREAKER

EPO = EMERGENCY POWER OFF

CAUTION : RISK OF ELECTRICAL SHOCK
REMOTE BATTERY TERMINALS (9 AND 10) HAVE HIGH VOLTAGE WHEN THE BATTERY CABINET IS CONNECTED TO THE UPS.

INSTALLATION INSTRUCTIONS:

ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO CONFIGURE THIS EQUIPMENT

NOTES:

1.0 GROUNDING AND NEUTRAL BONDING
1.1 DETERMINE SYSTEM GROUNDING REQUIREMENTS.
1.2 LOCATE THE GROUNDING JUMPER (FIGURE 2), AND THE NEUTRAL JUMPER (PROVIDED IN A BAG LOCATED IN THE BACK OF THE UNIT).
1.3 IF INPUT AND OUTPUT NEUTRALS ARE TO BE BONDED TOGETHER, INSTALL NEUTRAL BONDING JUMPER BETWEEN TERMINALS 5 AND 6, AS SHOWN IN FIGURE 1 (FOR IT AND TT INSTALLATIONS).
1.4 IF OUTPUT NEUTRAL IS TO BE GROUNDED, INSTALL GROUNDING JUMPER BETWEEN TERMINALS 6 AND 7, AS SHOWN IN FIGURE 2 (FOR TNS INSTALLATIONS).

2.0 BYPASS CONFIGURATION
2.1 DETERMINE THE INPUT AND OUTPUT VOLTAGE AND FREQUENCY. REFER TO THE OPERATORS MANUAL FOR INFORMATION ON CHANGING THE OUTPUT VOLTAGE AND FREQUENCY.
2.2 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 3 (ENABLE="I").
2.3 IF INPUT AND OUTPUT VOLTAGE AND FREQUENCY ARE NOT IDENTICAL, OR IF BYPASS OPERATION IS NOT DESIRED, SET THE BYPASS CONFIGURATION SWITCH S3 TO THE "DISABLE" POSITION, AS SHOWN IN FIGURE 3 (DISABLE="O").

3.0 INPUT CONFIGURATION SWITCH
3.1 MAKE SURE THAT THE INPUT CONFIGURATION SWITCH S2, LOCATED ON THE REAR OF THE UNIT, IS SET TO THE "O" POSITION, AS SHOWN IN FIGURE 4.

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.

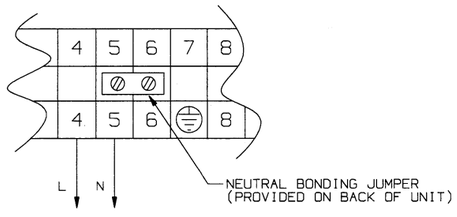


FIGURE 1

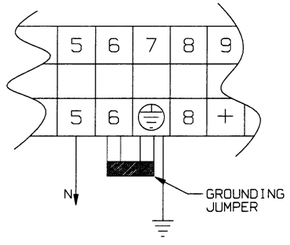


FIGURE 2

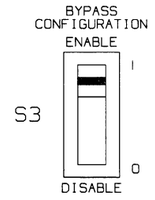


FIGURE 3

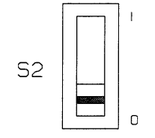


FIGURE 4

USE #6 AWG 75°C COPPER WIRE MINIMUM. FOLLOW LOCAL AND NATIONAL ELECTRICAL REGULATIONS FOR APPLICABLE DERATING FACTORS AND ACCEPTABLE WIRING PRACTICES.

Description: Oneline Drawing PWP 12

Drawing No. 110712208 Revision C

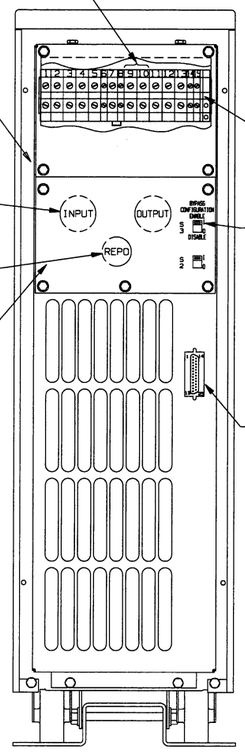
Sheet: 3 of 3

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

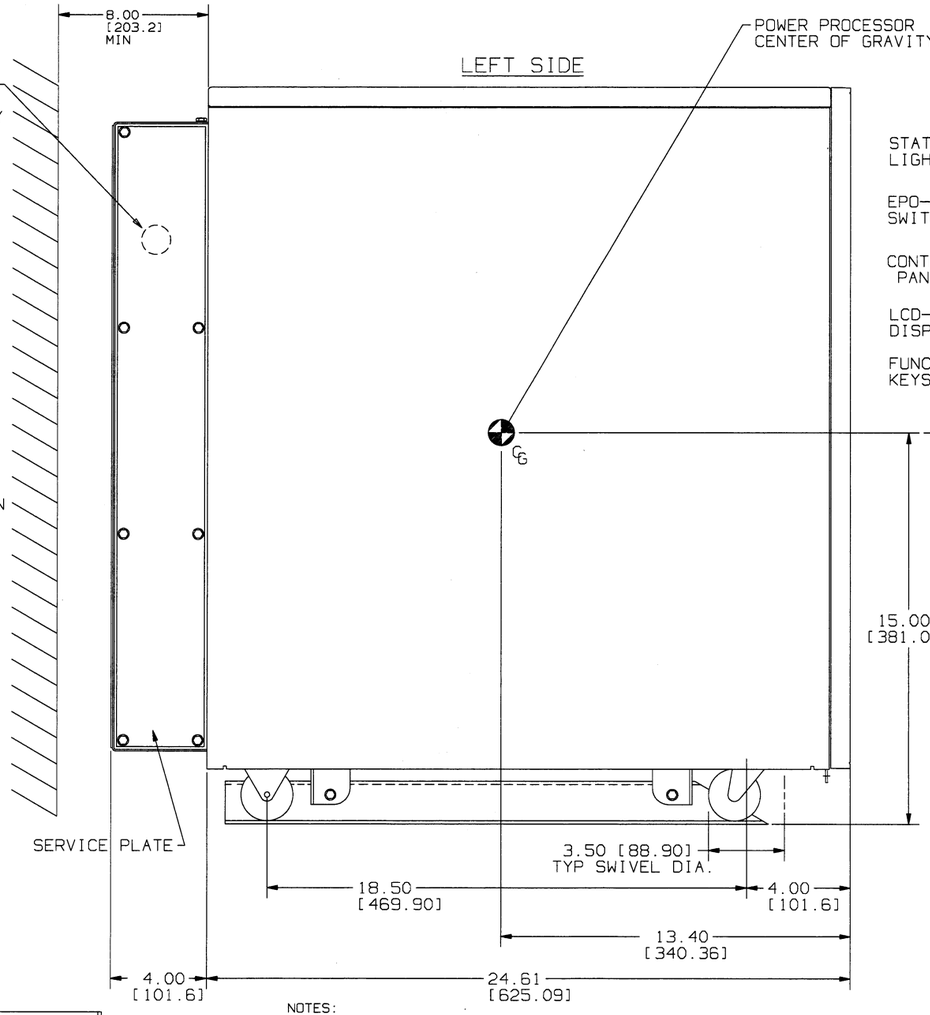
CAUTION: REMOTE BATTERY TERMINALS (9, 10) HAVE VOLTAGE WHEN THE BATTERY CABINET IS CONNECTED TO THE UPS.

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.

REAR



LEFT SIDE



FRONT

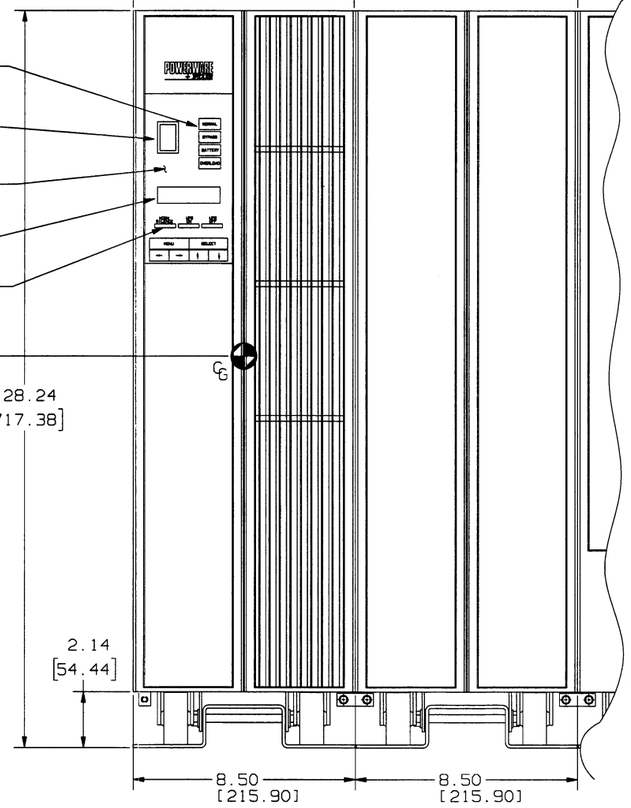


TABLE 1

EQUIPMENT WEIGHTS		MODEL 8	MODEL 10	MODEL 12
POWER PROCESSOR CABINET		180 LB(82 KG)	180 LB(82 KG)	180 LB(82 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 240 V INPUT FULL LOAD OUTPUT AT 0.8 PF		3900 BTU/HR (1000 Kg-Cal/Hr)	4600 BTU/HR (1146 Kg-Cal/Hr)	5200 BTU/HR (1310 Kg-Cal/Hr)
POINT LOADING	POWER PROCESSOR	45.0 LB(20KG)	45.0 LB(20KG)	45.0 LB(20KG)
	FULL BATTERY (7AH)	73.8 LB(34KG)	73.8 LB(34KG)	73.8 LB(34KG)
	FULL BATTERY (18AH)	87 LB(40KG)	87 LB(40KG)	87 LB(40KG)
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:

1. DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. VENTILATION:
   UPS CABINET : FAN COOLED - INLET FRONT/OUTLET REAR.
   BATTERY CABINET: NATURAL CONVECTION.
3. MAXIMUM ELEVATION FOR NORMAL OPERATION: 5000 FEET (1500 METERS) DERATING IS REQUIRED FOR HIGHER ELEVATIONS.
4. DO NOT TILT THE CABINET MORE THAN 12 DEGREES (UNIT MAY TIP OVER).
5. EQUIPMENT WEIGHTS ARE PROVIDED FOR TYPICAL CONFIGURATIONS. CONTACT YOUR LOCAL SALES REPRESENTATIVE IF ADDITIONAL INFORMATION IS NEEDED.
6. ADDITIONAL BATTERY CABINETS MAY BE ADDED FOR EXTENDED BATTERY TIME. REFER TO DRAWING 110719034 FOR INSTALLATION INSTRUCTIONS. INSTALLATION MUST BE MADE BY QUALIFIED SERVICE PERSONNEL.
7. FOR OPTIONS, CONTACT THE FACTORY OR YOUR DEALER.
8. REFER TO DRAWING 110712208 BEFORE CONNECTING INPUT AND OUTPUT WIRING.

TABLE 2

POWER CABLE TERMINATIONS		
TERMINATION NO.	DESCRIPTION	WIRE RANGE
1,7	GROUND	18-6AWG (0.5-10 mm^2)
2	INPUT NEUTRAL	10-4AWG (2.5-16 mm^2)
3,4,5	INPUT PHASES	18-6AWG (0.5-10 mm^2)
6,8	NO CONNECTION	18-6AWG (0.5-10 mm^2)
9	REMOTE BATTERY POS.	18-6AWG (0.5-10 mm^2)
10	REMOTE BATTERY NEG.	18-6AWG (0.5-10 mm^2)
11	OUTPUT NEUTRAL	10-4AWG (2.5-16 mm^2)
12,13	OUTPUT PHASES	18-6AWG (0.5-10 mm^2)
14,15	EPO	22-10AWG (0.5-4 mm^2)

Description: Outline Drawing PWP 12

Drawing No. 110719032 Revision C

Sheet: 1 of 1

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 (9, 10) HAVE VOLTAGE WHEN THE BATTERY CABINET IS CONNECTED TO THE UPS.

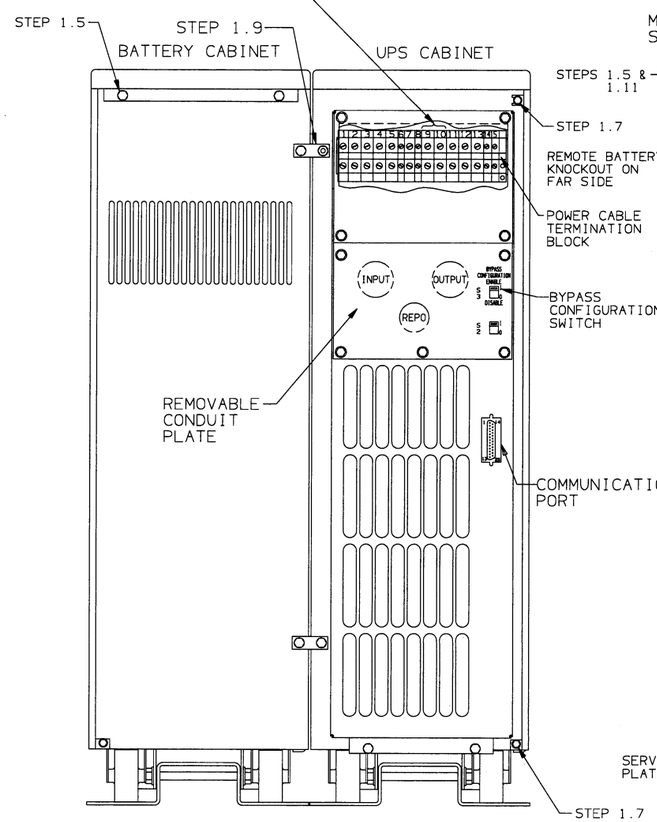
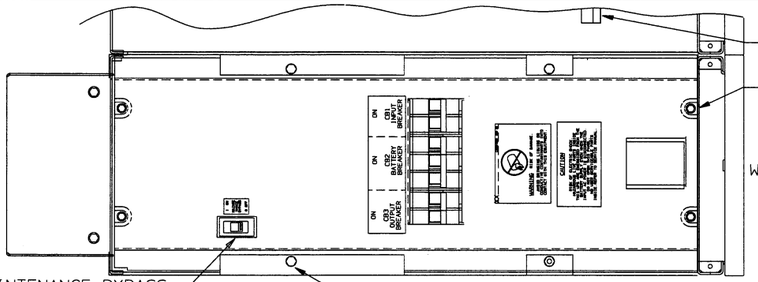


FIGURE 1



TOP VIEW WITH COVER REMOVED

FIGURE 4

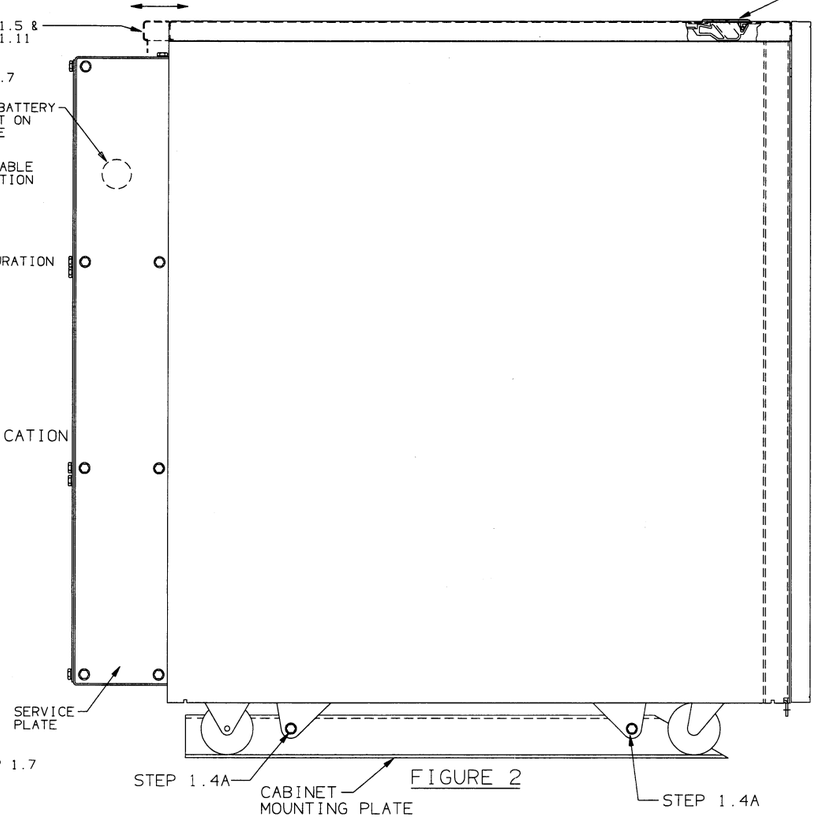
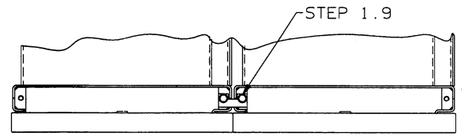


FIGURE 2

FIGURE 5

PARTIAL TOP VIEW



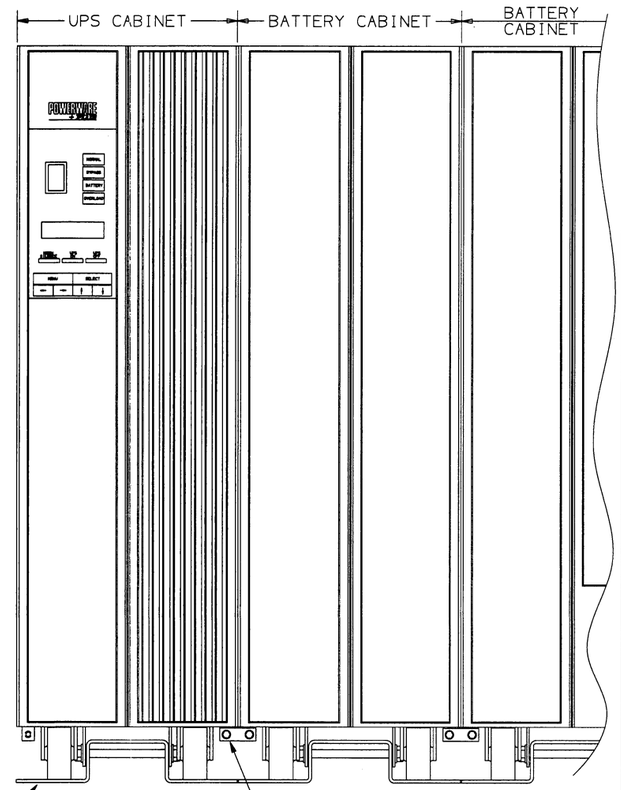


FIGURE 3

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 POSTION THE CABINET MOUNTING PLATE UNDER CABINET AND BOLT (2 PLACES) THE UNIT TO THE PLATE, 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.

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 COVERS 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 FRONTWARD 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.

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 PWP 12

Drawing No. 110719034 Revision B1

Sheet: 1 of 2

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

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.

DANGER: LETHAL VOLTAGE WILL BE PRESENT: USE CAUTION.

BATTERY AND UPS CABINET INTERCONNECTION

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

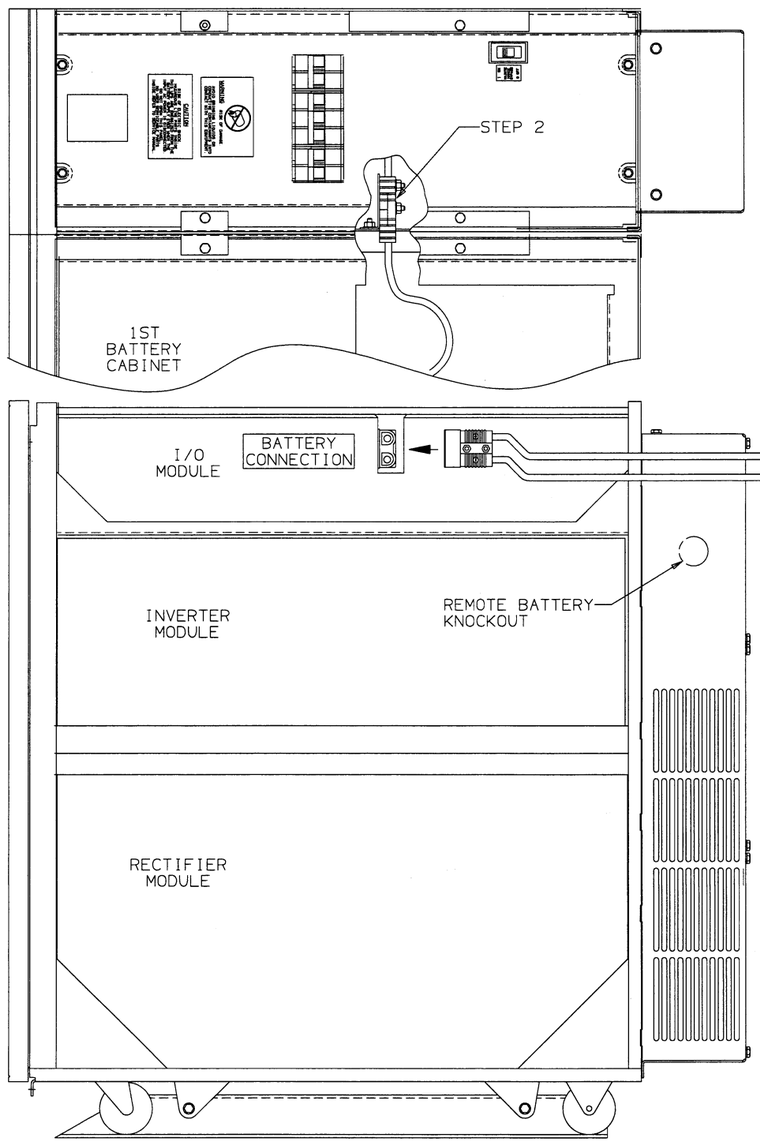
TO CONNECT THE UPS CABINET AND FIRST BATTERY CABINET:

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

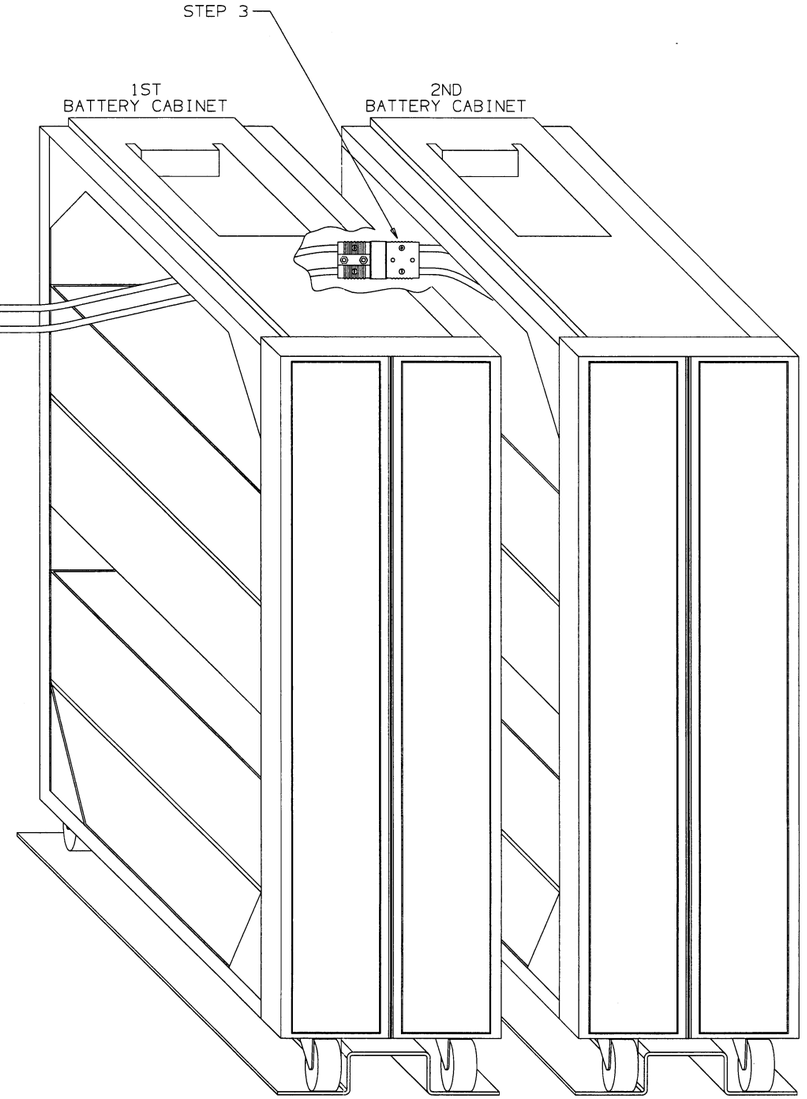
TO CONNECT A SECOND BATTERY CABINET:

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

4. MOUNT SIDE COVER REMOVED FROM THE UPS CABINET IN STEP 1.7 (SHEET 1) USING ORIGINAL HARDWARE ON RIGHT HAND SIDE OF THE SECOND BATTERY CABINET.

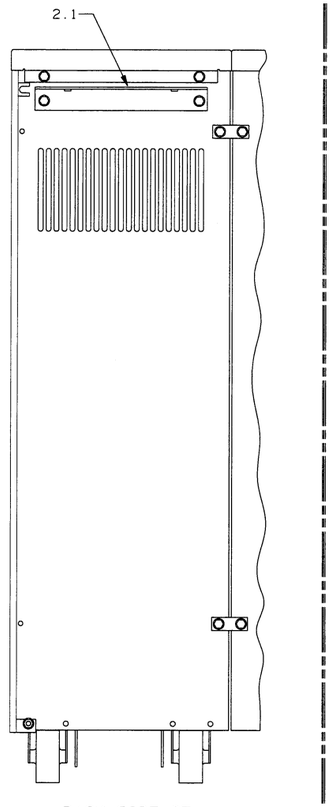


RIGHT SIDE OF UPS CABINET
WITH SIDE COVER REMOVED



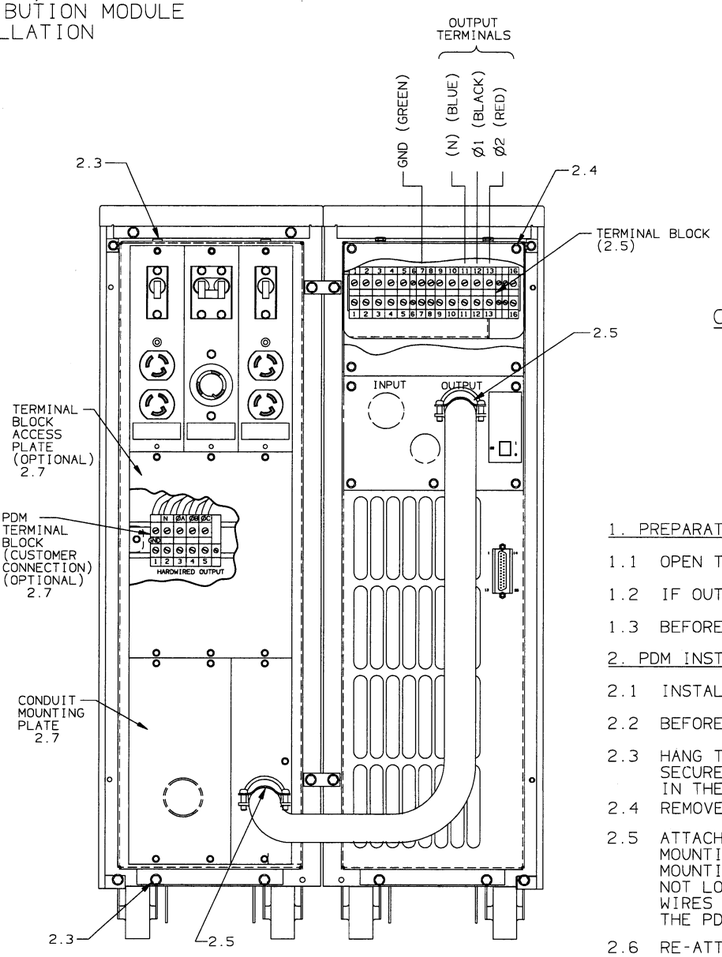
Description: Battery Cabinet Installation PWP 12
Drawing No. 110719034 Revision B1
Sheet: 2 of 2

(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 BACK 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.

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 ONLY #6AWG 75°C COPPER WIRE MIN. 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 MANUL FOR OPERATING INSTRUCTIONS.

PDM INSTALLATION KIT INCLUDE:

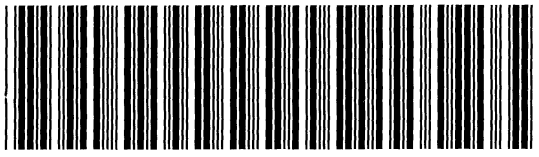
(1) POWER DISTRUBITION MODULE (PDM)
(1) MOUNTING BRACKET AND HARDWARE KIT

TOOLS NEEDED FOR INSTALLATION:

1/4" HEX NUT DRIVER
SMALL FLAT HEAD SCREWDRIVER
1 3/8" WRENCH

-SAVE THESE INSTRUCTIONS FOR FUTURE USE-

Description: PDM Installation PWP 12
Drawing No. 110719033 Revision C1
Sheet: 1 of 1



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