INSTALLATION MANUAL

for

International Power Machines'

Balanced Power

Model 27 and Model 43

Auxiliary Battery Cabinets

164201017 Rev. A

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety instructions that should be followed during installation and maintenance of the UPS and batteries.

International Power Machines®
10451 Brockwood Road
Dallas, Texas 75238-1641
Phone: (214) 342–7106
Service Hotline: (800) 843-9433

IMPORTANT SAFETY INSTRUCTIONS

Instructions Importantes Concernant La Sécurité

SAVE THESE INSTRUCTIONS

Conserver Ces Instructions

This manual contains important instructions for your battery system. You should follow these instructions during the installation and maintenance of the battery cabinets.

Cette notice contient des instructions importantes concernant la sécurité.

The installation of battery cabinets should be performed or supervised by personnel knowledgeable of batteries and their associated precautions. Keep unauthorized personnel away from battery cabinets.

Observe these precautions when working on or around battery cabinets:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries or battery cabinets.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- The battery cabinet frame is not referenced to the DC circuit.
- When replacing batteries, use the same number and type of sealed, lead-acid batteries.
- Refer to local codes for proper disposal requirements for used batteries.

CAUTION:
Do not dispose of battery or batteries in a fire. The battery may explode.

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

CAUTION:
A battery can cause electrical shock, burn from high short-circuit current, or fire. Observe proper precautions.

ATTENTION:
Une batterie peut prêsenter un risque de choc êlectrique, de brulure, ou d'incendie. Suivre les précautions qui s'imposent.

- Pour le remplacement, utiliser le même nombre et modéle des batteries.
- L'élimination des batteries est règlementée. Consulter les codes locaux à cet effet.

General Notes About Installing Battery Cabinets

Each battery cabinet is packed and crated separately for shipping. You should unpack and inspect each cabinet, roll it to its final position, and join it to the UPS or other cabinets (refer to Chapter 3) before installing wiring.

These general installation notes apply to *either* the Model 27 Battery Cabinet or the Model 43 Battery Cabinet (see Figure 1):

- Do not tilt battery cabinets more than ±10° during installation.
- The recommended minimum clearance over each battery cabinet is 305 mm (12 in.).
- The conduit landing plates are removable— to add conduit landing holes as required. The conduit landing plates should be removed when holes are added to keep metal particles from falling inside the battery cabinet. Plate material is 16 gauge steel (1.5 mm, 0.06 in. thick).
- Low voltage signal wiring must be installed in a separate conduit from the power wiring.
- Each battery cabinet can be installed as a stand-alone unit or as part of a redundant joined system.
- The instantaneous trip circuit breakers for the Model 27 and Model 43 Battery Cabinets must remain set at minimum (full counterclockwise).

Use Model 27 and 43 Battery Cabinets Only with These UPS Systems:

- Balanced Power 40
- Balanced Power 50
- Balanced Power 65
- Balanced Power 80
- Balanced Power 130
- Balanced Power 160

Conventions Used in This Manual

The text in this manual uses these conventions:

- **Bold type** highlights important concepts in discussions and key terms in procedures.
- *Italic type* highlights notes and new terms where they are defined.
- Rectangular boxes containing bold type are warnings or cautions that pertain to the battery system or its electrical connections.

In this manual, the term *UPS* refers only to the UPS cabinet and its internal elements. The term *UPS system* refers to your entire power protection system—the UPS cabinet plus battery cabinets that you have installed.

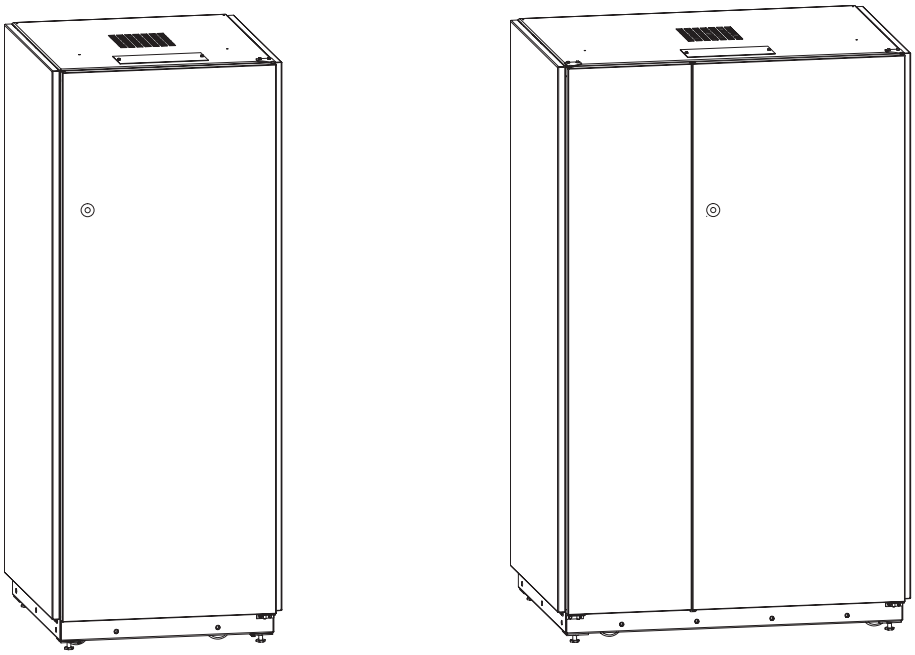
Read through each installation procedure before you begin it. Perform only those procedures that apply to the battery system you are installing.

NOTE: *The term "separate" refers to battery cabinets that are located close to the UPS, wired with contractor wiring, and use the UPS battery switch as the battery isolation disconnect. ("Close" is typically defined as being within the same room and within line of sight.)*
The term "remote" refers to battery cabinets that require a single protection and disconnect device located near the batteries.
Refer to applicable national or local code requirements for your installation.

1 Introduction

This manual describes how to install the Model 27 or Model 43 Battery Cabinet. It contains instructions for unpacking and inspecting the battery cabinet, locating the battery cabinet with respect to the UPS, and electrically connecting the battery cabinet to the UPS. The information you will use depends on the type of UPS and model of battery cabinet that you purchased.

Typical Battery Cabinets



Model 27 Battery Cabinet

Model 43 Battery Cabinet

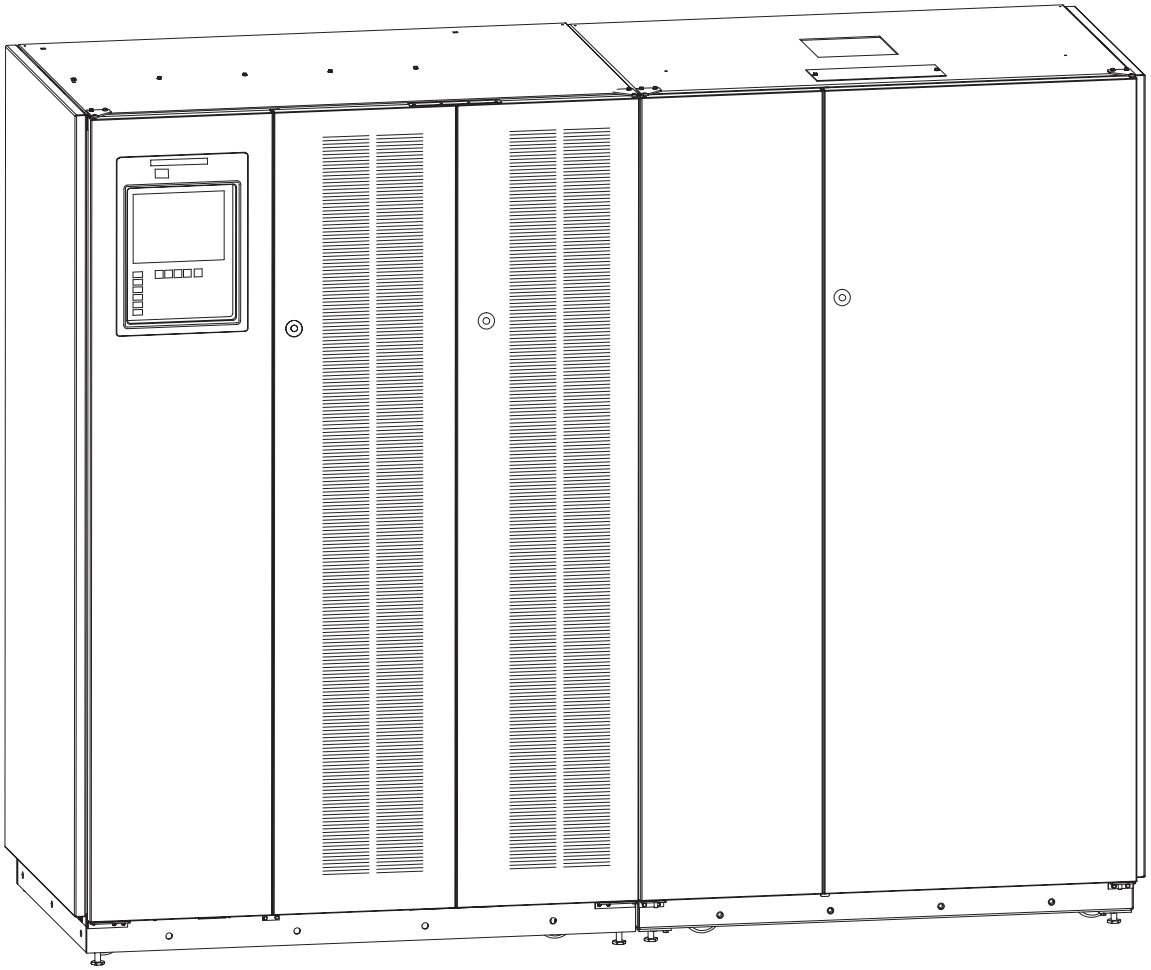
Figure 1. Typical Battery Cabinets

Two basic battery cabinet configurations are possible:

- The UPS and one or more battery cabinets in an integral configuration (see Figure 2).
- The UPS and one or more battery cabinets remotely installed (see Figure 3).

Identification of Your Battery System

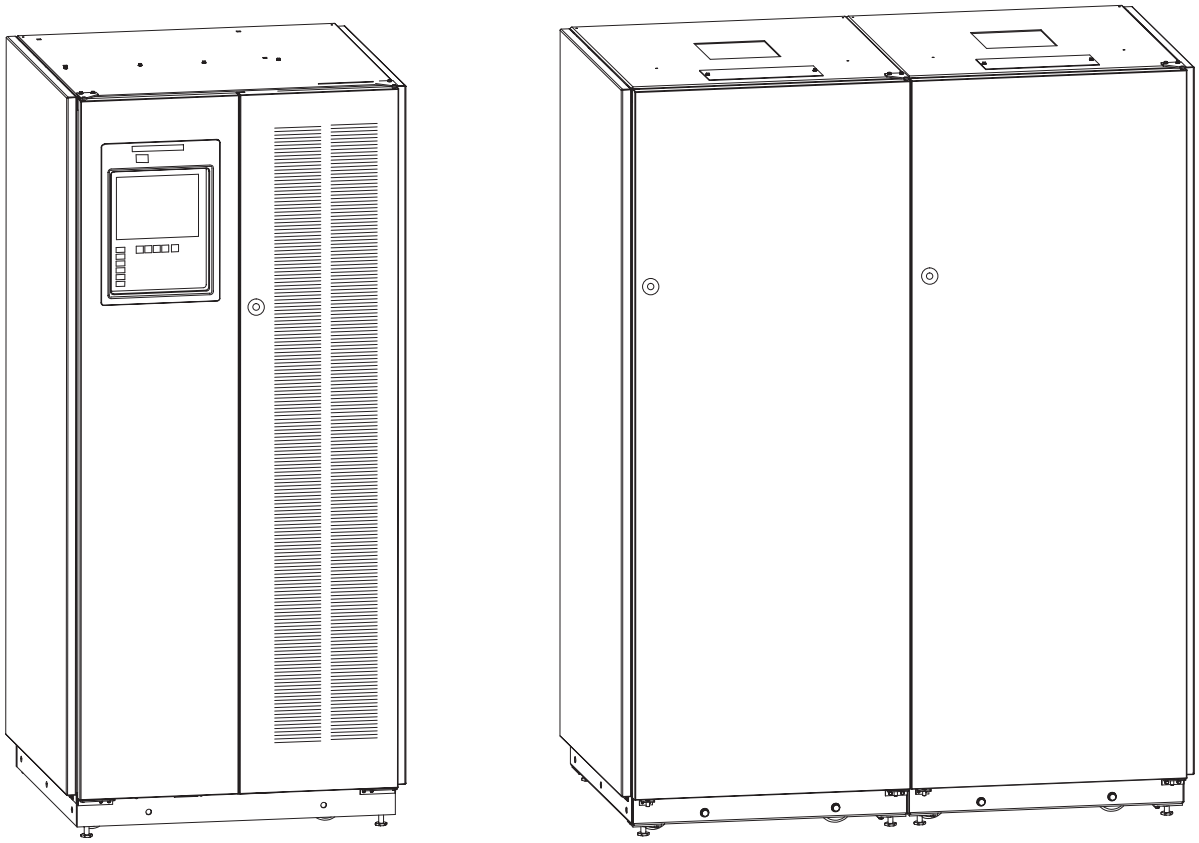
Refer only to the parts of this manual that apply specifically to your system configuration. See Figures 2, 3, and 4 to determine where to find your system installation instructions in this manual.



UPS Battery Cabinet

Figure 2. UPS with Integral Battery Cabinets

For installation instructions, refer to "The Balanced Power UPS with Integral Battery Cabinets" section of Chapter 3. Refer to Chapter 2, "Unpacking Your Battery Cabinet" for unpacking instructions.



UPS Battery Cabinet

Figure 3. UPS with Remote Battery Cabinets (Attached to Each Other)

For installation instructions, refer to "The Balanced Power UPS with Remote Battery Cabinets" section of Chapter 3 . Refer to Chapter 2, "Unpacking Your Battery Cabinet" for unpacking instructions.

For More Information

This manual describes how to install your battery cabinet. For more information about the operation and communications capabilities of your UPS system, refer to the following:

164201014 Balanced Power 30−80 kVA UPS Installation

Describes the Balanced Power 30−80 kVA UPS installation procedure; discusses optional accessories, environmental considerations, weight and point loading, connection diagrams, and information on other optional cabinets.

164201015 Balanced Power 100−160 kVA UPS Installation

Describes the Balanced Power 100−160 kVA UPS installation procedure; discusses optional accessories, environmental considerations, weight and point loading, connection diagrams, and information on other optional cabinets.

164201016 Balanced Power 30−160 kVA UPS Operation

Describes the UPS Cabinet Control Panel and Monitor Panel, and explains the functions of the UPS; discusses the standard features of the UPS and optional accessories; provides procedures for starting and stopping the UPS, and information about maintenance and responding to system events.

Contact your local Field Service office for information about how to obtain copies of these manuals.

Getting Help

If you have a question about any of the information in this manual, or if you have a question this manual does not answer, please call the International Power Machines Field Service office:

United States	**1-800-777-8922**
Canada	**1-800-461-9166**
Outside the U.S.	**Call your local representative**

2 i n ot n n co dor n

Each Model 27 or Model 43 Battery Cabinet is shipped on a separate pallet. Use a forklift or pallet jack to move the packaged cabinets to the installation site, or as close as possible to the site, before you unload them from the pallets.

Battery cabinets must be installed in accordance with all applicable codes and regulations, including the National Electrical Code (NEC), Article 480.

NOTE: *–b0VocU 0P6 SUeV0bBSP0D3Ae3ka aAScB6 1e UeVfSWMe6 SPDe 1e 0cbASVBe6 aeVdB3e UeVaSPPeD . ABa aeVdB3e Ba SffeVe6 0a U0VoSf bAe a0Dea 3SPb03bfSV eScV10bheVe aeabeM,*

Preparing Your Site

The basic environmental requirements for the battery system are:

Ambient Temperature Range: 10–40˚ C (50–104˚ F)

Recommended Operating Range: 20–25˚ C (68–77˚ F)

Maximum Relative Humidity: 95%

The Model 27 or Model 43 Battery Cabinets use convection cooling to regulate internal component temperature. Air inlets are in the bottom and top of the cabinets. You must allow minimum clearance above each cabinet 305 mm (12 in.) for proper air circulation. Additionally, clearance must be provided in front of the cabinet for component removal and maintenance 915 mm (36 in.). Maintaining this clearance will provide adequate airflow to the front of the cabinet.

Environmental Considerations

The life of the battery system will be adversely affected if the installation does not meet these guidelines:

1. The battery cabinet must be installed on a sealed concrete pad on a sealed concrete floor, or on a raised computer room floor.
2. The battery cabinet must be installed in a dust-free, nonconductive environment.
3. The battery cabinet must be installed in a humidity-controlled environment.

Preparing for Wiring the Battery Cabinet

For external wiring requirements, including the minimum AWG size of external wiring, refer to Appendix A, Table C.

Inspecting and Unpacking Each Cabinet

The first task in preparing for installation is inspecting and unpacking each cabinet. Cabinets arrive covered with protective packaging material, as shown in Figure 4.

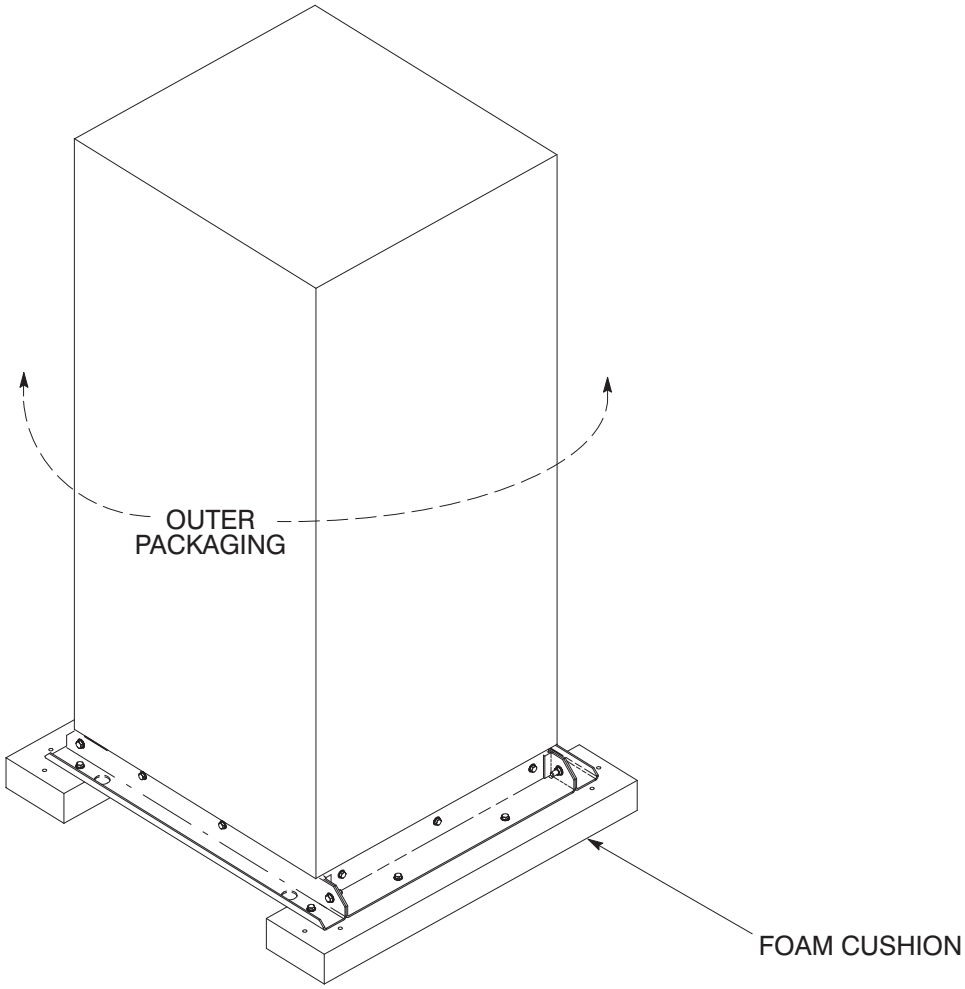


Figure 4. Cabinet as Shipped, with Outer Packaging and Pallet

1. Carefully inspect the outer packaging for evidence of damage during transit.

CAUTION:
DO NOT INSTALL A DAMAGED CABINET. REPORT ANY DAMAGE TO THE CARRIER AND CONTACT YOUR LOCAL SALES OR SERVICE.

2. Use appropriate material handling equipment to move the cabinet to a convenient unpacking area. Space is provided between the pallets to insert pallet jack blades on the bottom of the unit.

DANGER: RISK OF INSTABILITY!
DO NOT TILT CABINETS MORE THAN 10 DEGREES FROM VERTICAL OR THE CABINET MAY TIP OVER.

3. Set each pallet on a firm, level surface, allowing a minimum clearance of 4.6m (15 ft) on each side for removing the cabinets from the pallets.
4. Cut and remove the steel bands around each cabinet.
5. Remove the protective cardboard covering from the cabinets by vertically cutting one corner, using a knife blade no longer than 25 mm (1 in.).
6. Remove the corrugated corner protectors, box, plastic bag, and discard or recycle them in a responsible manner.

CAUTION:
IF YOU CAN SEE DAMAGE IN OR ON A CABINET, DO NOT INSTALL IT. REPORT ANY DAMAGE TO THE CARRIER AND CONTACT YOUR LOCAL SALES OR SERVICE OFFICE IMMEDIATELY.

Unloading the Battery Cabinet from the Pallet

The battery cabinet is bolted to a sheet metal pallet consisting of four supports secured to foam cushions. The foam cushions act as shock absorbers for the cabinet during shipment.

7. Remove the doors. Remove the retaining screw located inside of each door at the bottom hinge pivot point, then lift the door off. Save the retaining screws for reinstallation of the doors.
8. Locate the field kit (packed inside of the cabinet). Locate the four 1/2 in. jacking bolts and install them in the threaded holes in the front and rear supports. Place a floor protector underneath each jacking bolt, and screw the bolts down against them. The floor protectors will save the floor from being marred by the jacking bolts.

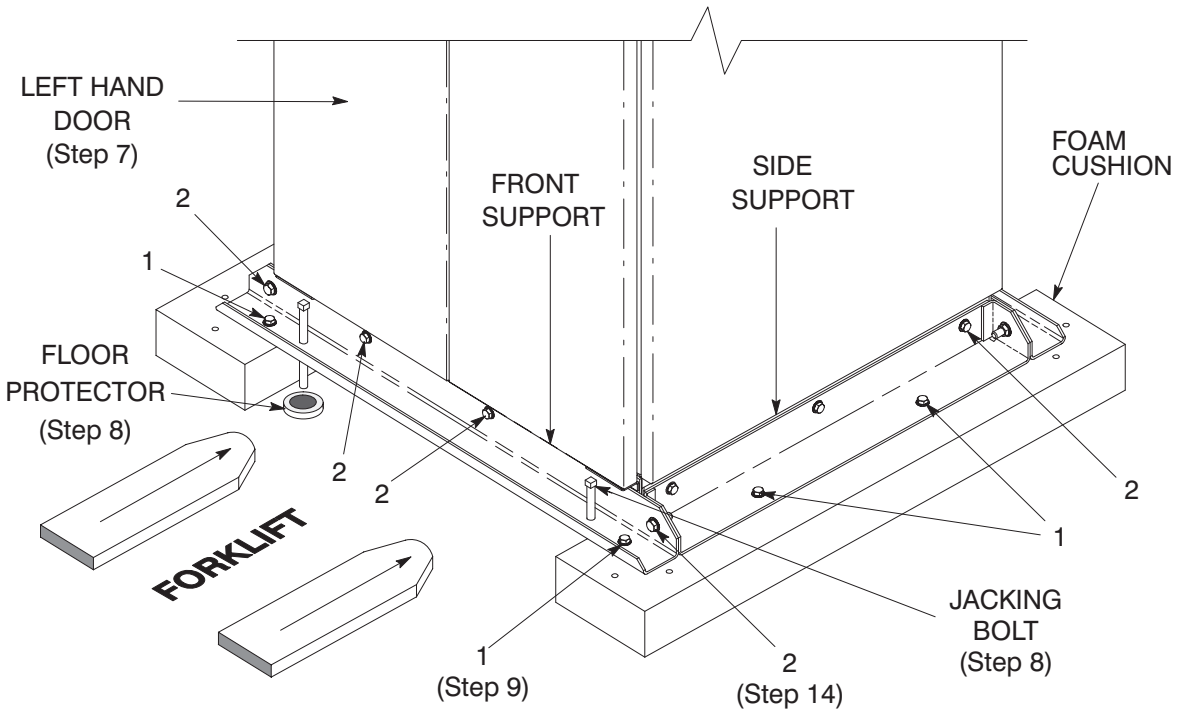


Figure 5. Removing Front and Rear Supports

9. Loosen, but do not remove, the hardware holding the foam cushions to the front and rear supports (labeled "1" in Figure 5).

WARNING: SERIOUS INJURY MAY OCCUR!
BATTERY CABINETS ARE EXTREMELY HEAVY. IF UNLOADING INSTRUCTIONS ARE NOT CLOSELY FOLLOWED, CABINET MAY TIP.

10. Turn each jacking bolt consecutively, two full turns, until the foam cushions clear the floor by approximately 3 mm (1/8 in.).

DANGER: RISK OF INSTABILITY!
TURNING THE JACKING BOLTS UNEVENLY MAY CAUSE THE CABINET TO BECOME UNBALANCED . TO PREVENT TIPPING THE CABINET, RAISE AND LOWER THE JACKING BOLTS EVENLY.

DANGER: CABINET MAY TIP!
THE BATTERY CABINET SHOULD ONLY BE RAISED APPROXIMATELY 3 mm (1/8 in.) ABOVE THE FLOOR (JUST ENOUGH TO ALLOW REMOVAL OF THE FOAM CUSHIONS).

11. After the foam cushions clear the floor, remove the hardware loosened in step 9. Pull the foam cushions out from under the battery cabinet and discard or recycle them in a responsible manner.

DANGER: CABINET MAY FALL!
DO NOT LOOSEN THE HARDWARE ATTACHING THE SIDE OR FRONT SUPPORTS TO THE CABINET BASE, OR THE FRONT AND SIDE SUPPORTS TO EACH OTHER, AT THIS TIME. THE CABINET MUST BE LOWERED BY THE JACKING BOLTS BEFORE THE SUPPORTS CAN BE REMOVED.

12. Carefully and evenly lower the cabinet by turning each jacking bolt consecutively two full turns (maximum) until the supports contact the floor, and the cabinet is no longer supported by the jacking bolts.
13. After the battery cabinet is resting on the floor, remove the jacking bolts and discard or recycle them in a responsible manner.
14. Remove the hardware, labeled "2" in Figure 5, holding the front, rear and side supports to the cabinet base. Discard or recycle the hardware and support brackets in a responsible manner.
15. Replace the doors that were removed in step 7. The battery cabinet is now ready to be rolled to its final location.
16. Repeat steps 1 through 15 for each cabinet you are preparing to install.

Creating an Installation Plan

Before beginning to install your battery cabinet, you should be sure that you understand the portions of this manual that apply to your system. Use the procedures and illustrations in the following sections to create a logical plan for installing the battery cabinet you purchased. Refer to Chapter 3, "Connecting to Balanced Power 40−160" to help plan your installation.

NOTES:

3 t r ndc i od

The method you use to install your battery cabinets depends on which UPS you have. For the purpose of discussion, this chapter uses the term *UPS* to refer to the UPS cabinet, and the term *battery cabinet* to refer to any battery cabinet. There are two different sizes of battery cabinets, but the procedure for connecting the cabinets to your UPS system is the same.

- Joining one or more battery cabinets to the UPS
- One or more battery cabinets remotely located from the UPS.

The Balanced Power UPS with Integral Battery Cabinets

Use this procedure to attach a Model 27 or Model 43 Battery Cabinet to any Balanced Power UPS cabinet (see Figure 6).

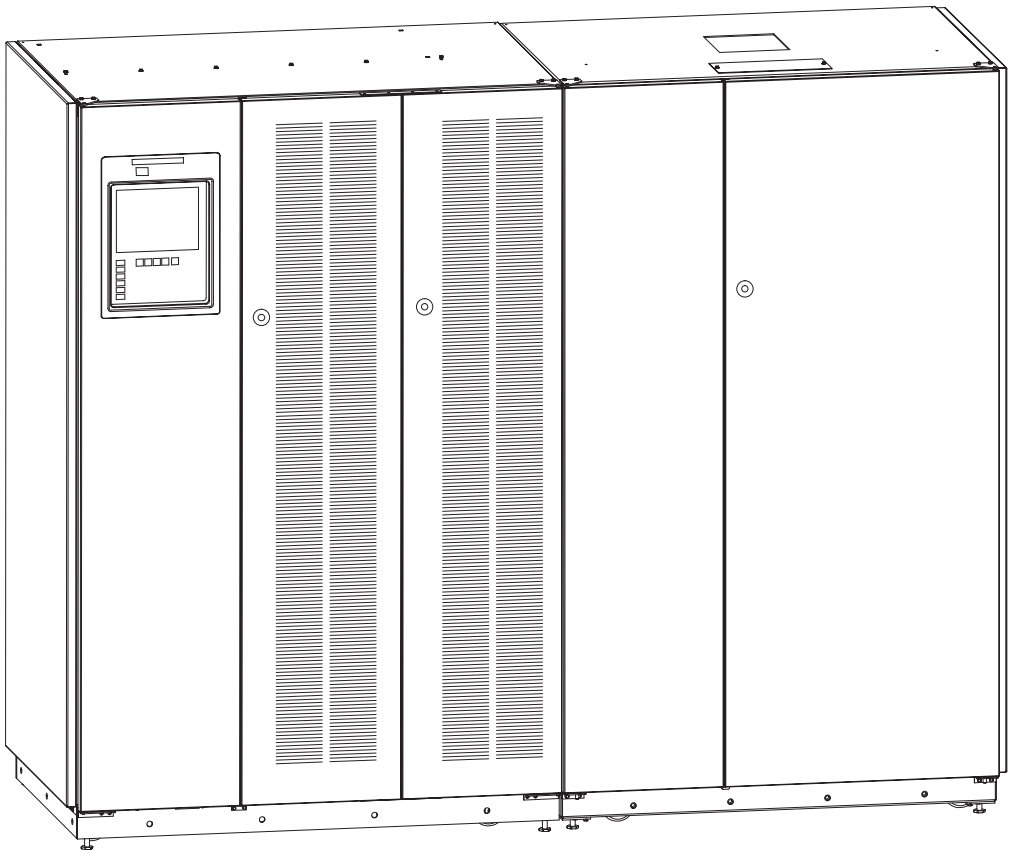


Figure 6. UPS with Integral Battery Cabinet

1. Make sure that the UPS is properly installed and secured with its leveling feet.
2. Roll the battery cabinet to a spot near the right-hand side of the UPS, as shown in Figure 7.
3. Remove the field kit. The field kit is integral with cable ties to the frame inside the door. Retain the field kit for later use.
4. If necessary, remove the cosmetic covers and hanger brackets from the right-hand side of the UPS. Save covers, screws, and brackets for later reuse.
5. Push the battery cabinet toward the UPS cabinet until the doors are flush with each other.
6. Three cabinet attachment brackets are provided for securing each cabinet at the top and bottom. Two flat brackets join the tops of the cabinets, one at the front and one at the back. A larger flat bracket joins the cabinets at the bottom. Attach the flat brackets to the cabinet tops first.

7. For Model 27 Battery Cabinets, remove the right-hand screw from the top right door hinge of the UPS cabinet. Align the hole in one flat bracket over this screw hole, and the other hole over the hole in the top of the battery cabinet. Replace the screw in the hinge, and attach the other end of the bracket to the top of the battery cabinet using an M4 × 10 hex screw from the field kit (see Figure 7).

8. For Model 43 Battery Cabinets, remove the right-hand screw from the top right door hinge of the UPS cabinet, and the right-hand screw from the top left door hinge of the battery cabinet. Align the holes in the flat bracket over these screw holes and then replace the screws in the hinges (see Figure 7).

9. Align the holes in the other small flat bracket with the two holes in the top rear of the UPS and the battery cabinet. Attach each end to its mating hole using an M4 × 10 hex screw from the field kit (see Figure 7).

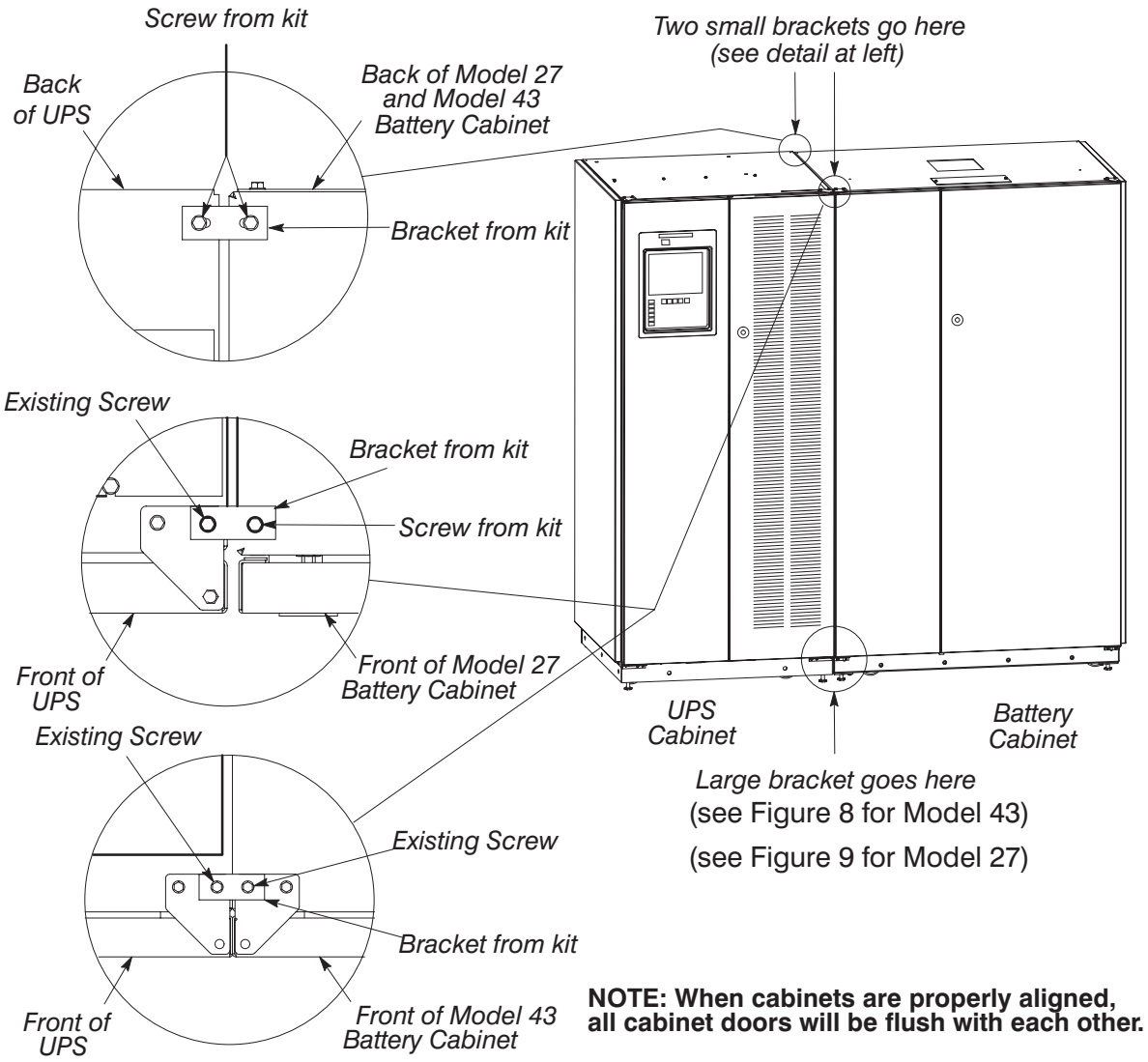


Figure 7. Placement of Attaching Brackets, UPS to Battery Cabinet

NOTE: Perform steps 10 through 13 for the Model 43 Battery Cabinet.
Perform steps 14 through 18 for the Model 27 Battery Cabinet.

10. Locate the large flat bracket from the field kit. Place one end of the bracket over the stud on the bottom side of the UPS cabinet lower right-hand hinge, and the other end over the stud on the bottom side of the lower right-hand hinge on the Model 43 Battery Cabinet (see Figure 8).

11. Attach the bracket to the hinges with two M8 self-locking nuts from the field kit.

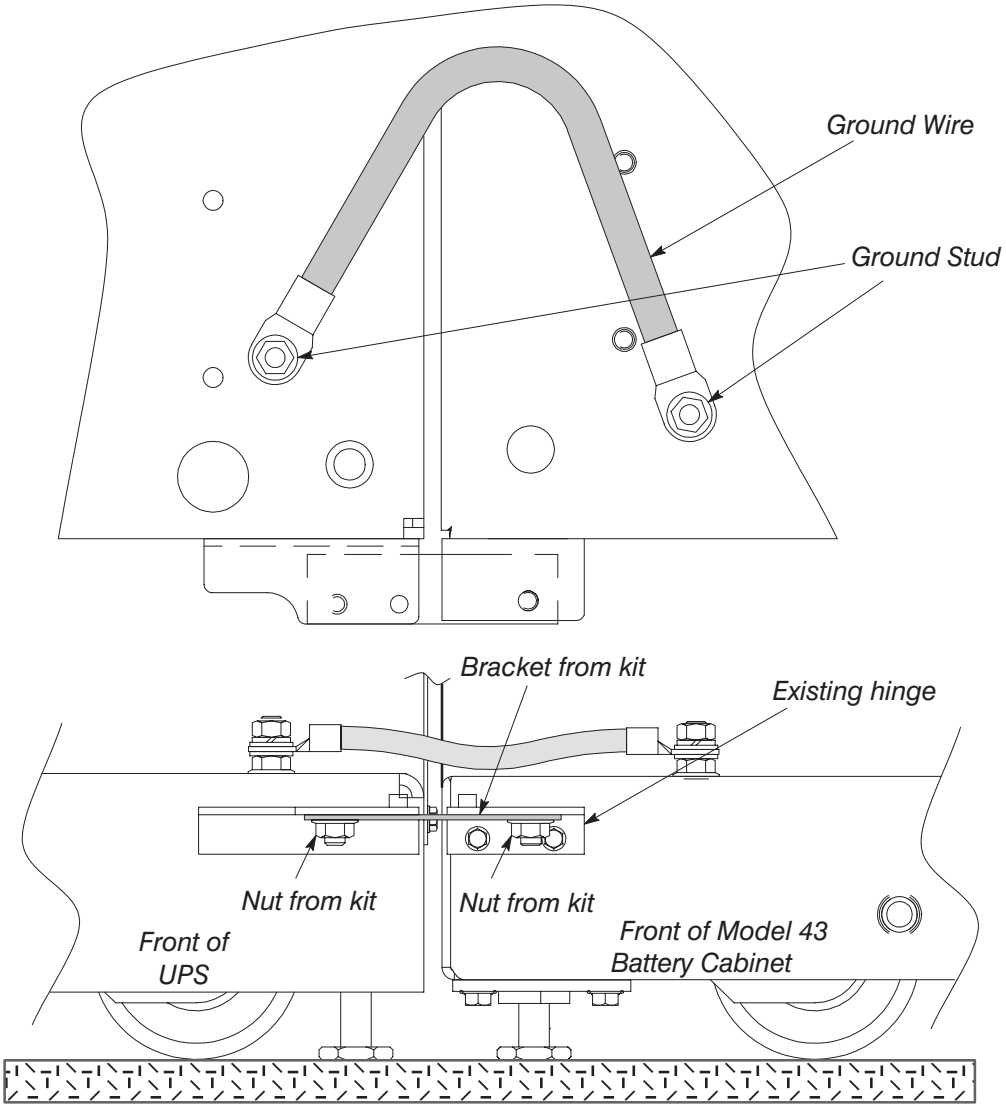


Figure 8. Attaching UPS Base to Model 43 Base

12. Route the ground wire (from the field kit) from the customer ground stud in the battery cabinet, under the lower right-hand battery tray, through the access hole in the side panel of the UPS, and attach to customer ground stud in the UPS cabinet. Hardware is provided on each ground stud.

13. Repeat steps 2 through 12 to attach additional Model 43 Battery Cabinets to the other side of the first battery cabinet. Level the cabinets with the leveling screws.

14. Locate the cabinet connecting bracket from the field kit. Attach the bracket to the lower right-hand side of the Model 27 base using 2 M4 screws.

15. Locate the large flat bracket from the field kit. Place one end of the bracket over the stud on the bottom side of the UPS cabinet lower right-hand hinge, and the other end over the stud on the bottom side of the lower right-hand hinge on the Model 27 Battery Cabinet (see Figure 9).

16. Attach the bracket to the hinges with two M8 self-locking nuts from the field kit.

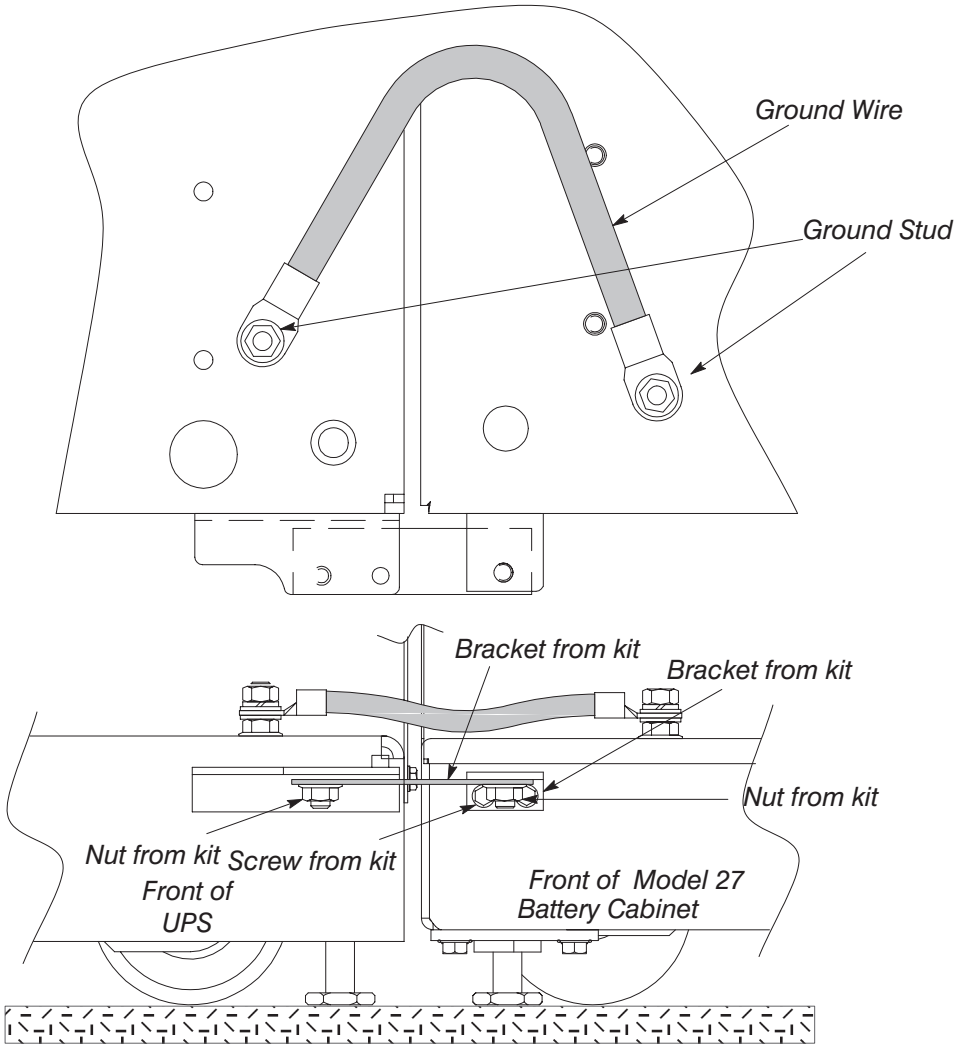


Figure 9. Attaching UPS Base to Model 27 Base

17. Locate the ground wire from the field kit. Route the ground wire from the customer ground stud in the battery cabinet, under the lower right-hand battery tray, through the access hole in the side panel of the UPS, and attach to customer ground stud in the UPS cabinet. Hardware is provided on each ground stud.

18. Repeat steps 2 through 17 to attach additional Model 27 Battery Cabinets to the other side of the first battery cabinet. Level the cabinets with the leveling screws.

To Electrically Connect Integral battery cabinets Together and to the UPS:

1. All battery cabinets will arrive at your site with each battery connection string electrically disconnected. If you are installing more than one battery cabinet, perform steps 2 through 6 for each cabinet. The battery cabinet adjacent to the UPS will be the only cabinet directly connected to the UPS.

WARNING:
LETHAL VOLTAGE WILL BE PRESENT WHEN PERFORMING THE REMAINING STEPS IN THIS SECTION AND SUBSEQUENT SECTIONS.

2. After making sure that all battery breakers are in the OFF position, connect the string of battery trays together by mating the loose red connector from each tray to the fixed black connector mounted on the front edge of the tray above it (see Figure 10 for Model 27 and Figure 12 for Model 43).
3. Find the 2-pole connector under the bottom tray in the right-hand battery cabinet. Route this connector into the cabinet to the immediate left and mate with the matching connector in the bottom of that cabinet. Connect all battery cabinets together this way.
4. A UPS-to-battery cabinet power connector is supplied inside the UPS cabinet. It is connected to terminals E4 (+) and E5 (−) of the battery contactor. This connector will mate with the matching connector in the bottom of the battery cabinet to the immediate right.
5. Remove the cable tie securing the battery breaker sensing cable.
6. Locate the battery breaker sensing cable in the right-hand battery cabinet. Route this connector into the cabinet to the immediate left and mate with the matching connector in the bottom of that cabinet. Connect all battery cabinets together this way.
7. Repeat steps 2 through 6 for each battery cabinet to be joined.
8. Mount the side panel to the side of the right-hand battery cabinet:
   a. Mount the hanger brackets to the top side of the right-hand battery cabinet using M4 screws (see Figure 11).
   b. Hang the side panel on the hanger brackets and align with the front and rear of the battery cabinet.
   c. Secure the side panel at the bottom using M4 hex head screws.
9. Secure all battery cabinets by closing and latching the doors.
10. Secure the UPS by reinstalling safety shields and closing and latching the doors.

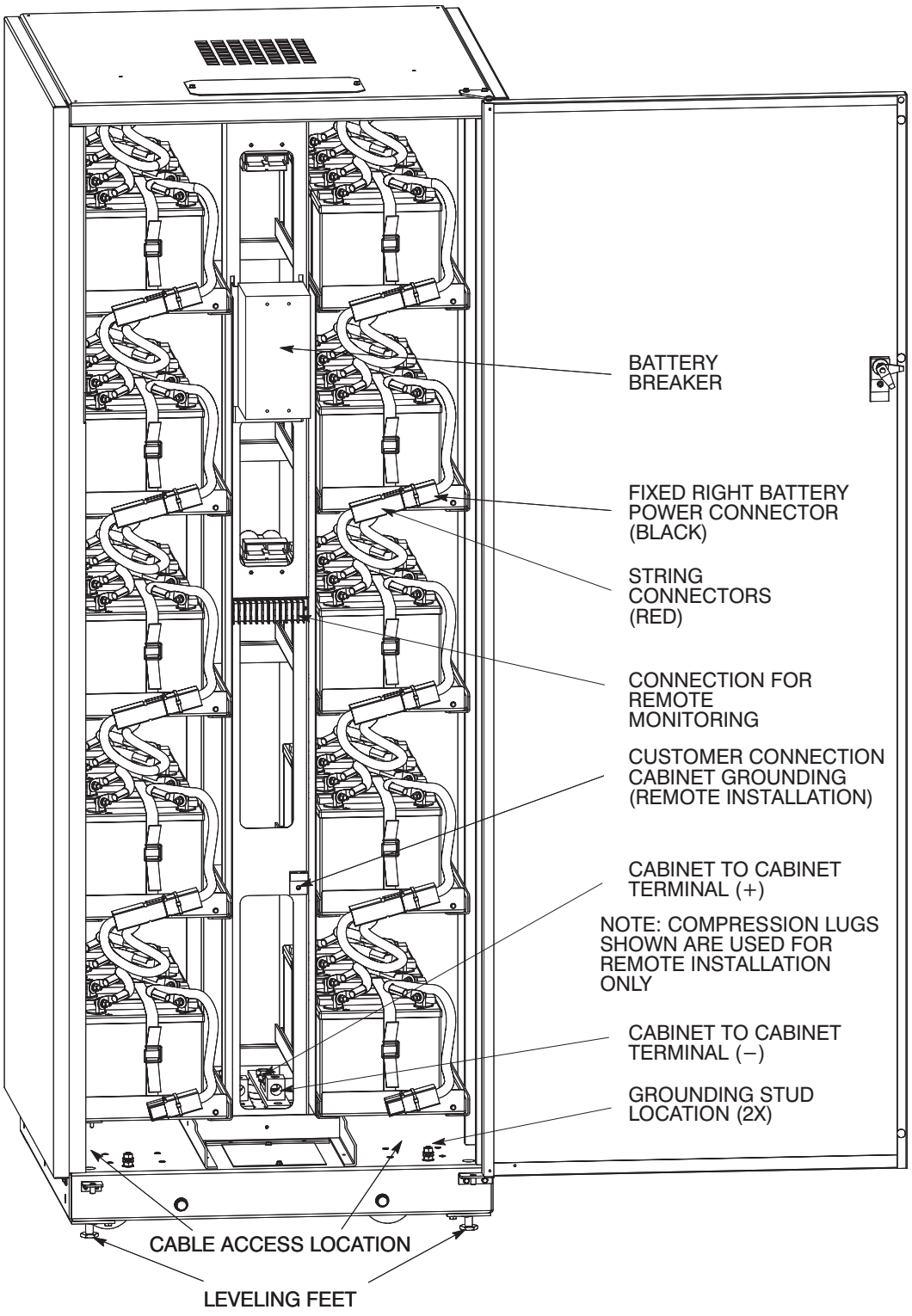


Figure 10. Wiring Model 27 Battery Cabinets

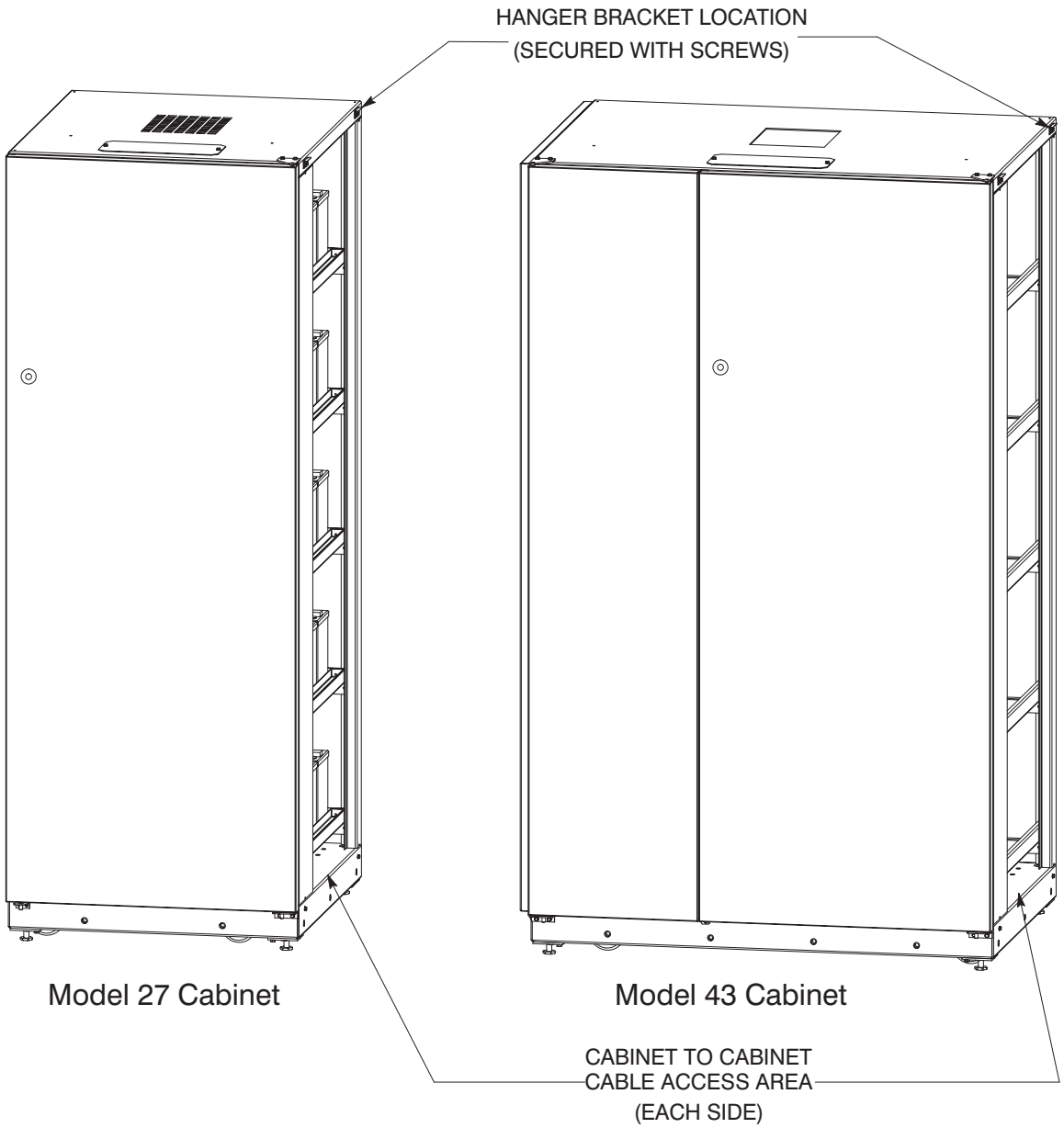


Figure 11. Model 27 and 43 Battery Cabinet Hanger Brackets

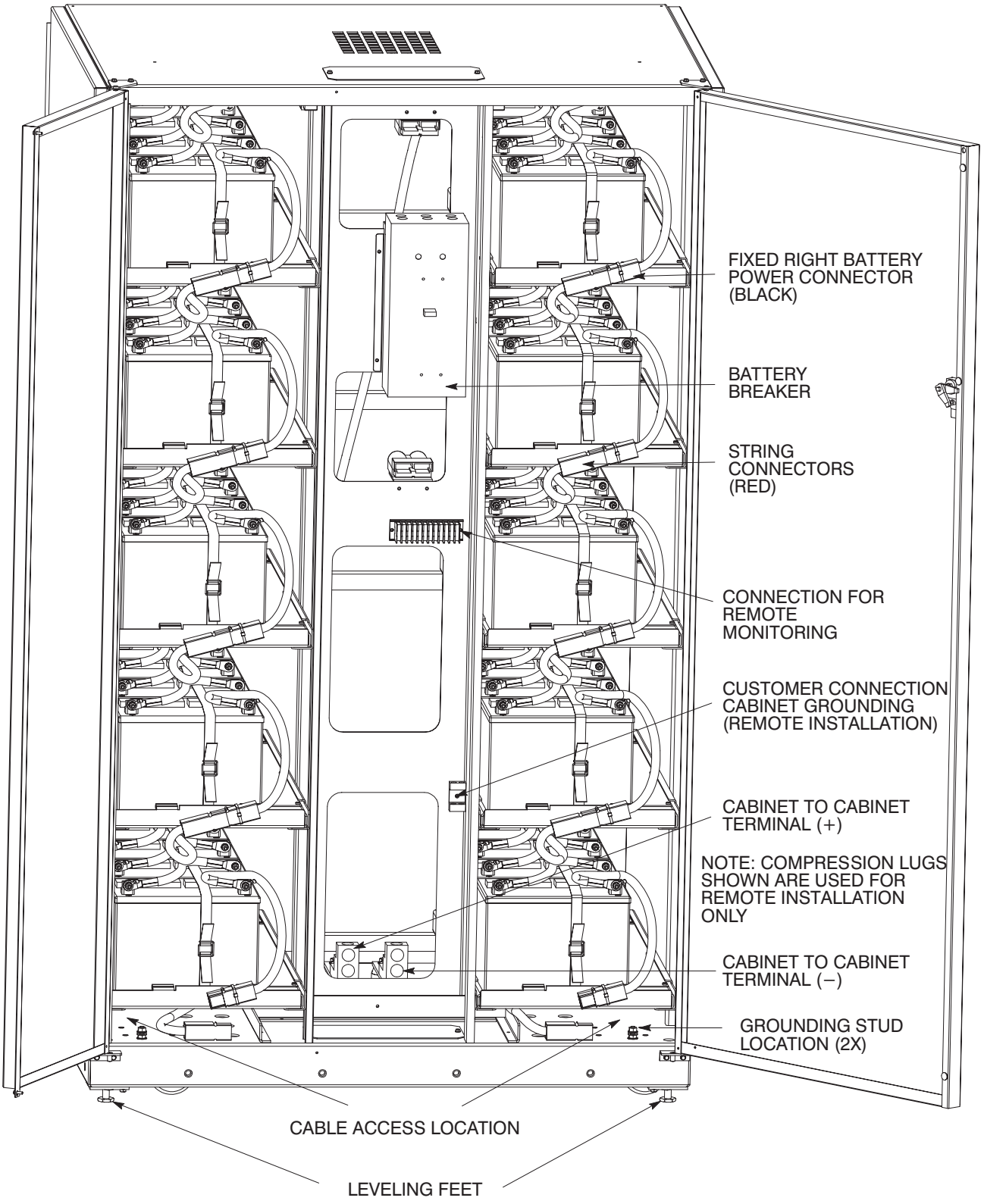


Figure 12. Wiring Model 43 Battery Cabinets

The Balanced Power UPS with Remote Battery Cabinets

Use this procedure to wire a remotely located Model 27 or Model 43 Battery Cabinet to any Balanced Power UPS cabinet (see Figure 13).

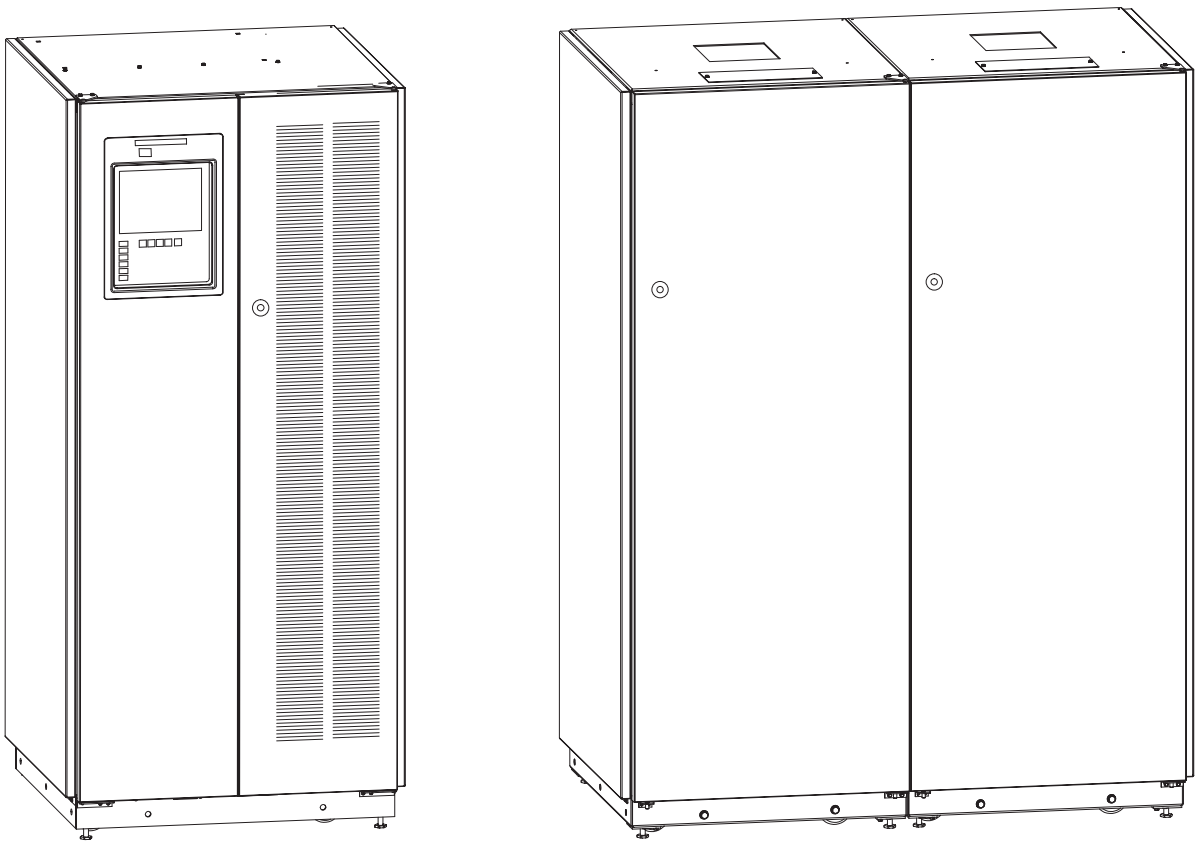
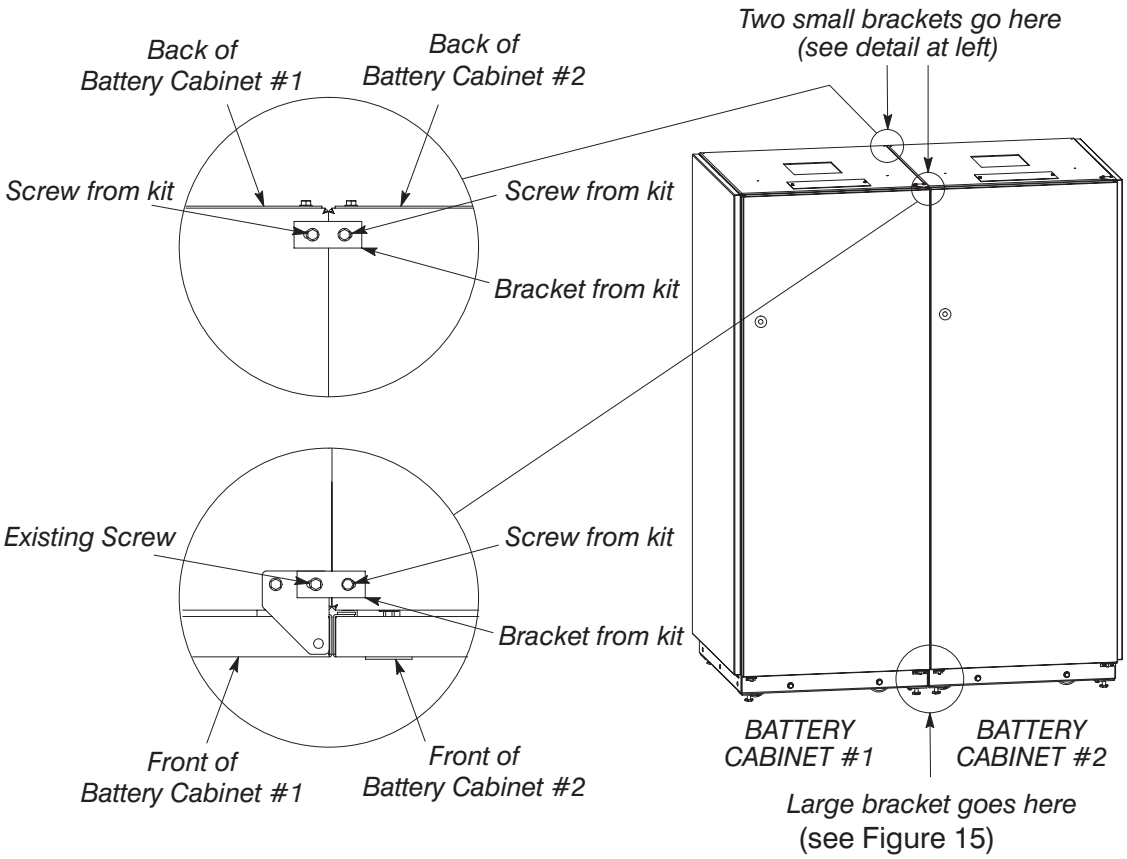


Figure 13. UPS with Remotely Located Battery Cabinets



NOTE: When cabinets are properly aligned, all cabinet doors will be flush with each other.

Figure 14. Placement of Joining Brackets (Two or More Model 27 Battery Cabinets)

Remote Installation of Model 27 Battery Cabinets

1. Remove the right-hand screw from the top door hinge of battery cabinet #1. Align the hole in one flat bracket over this screw hole, and the other hole over the hole in the top of battery cabinet #2. Replace the screw in the hinge, and attach the other end of the bracket by using an M4 × 10 hex screw from the field kit (see Figure 14).
2. Align the holes in the other small flat bracket with the two holes in the top rear of battery cabinets #1 and #2. Attach each end to its mating hole using an M4 × 10 hex screw from the field kit (see Figure 14).

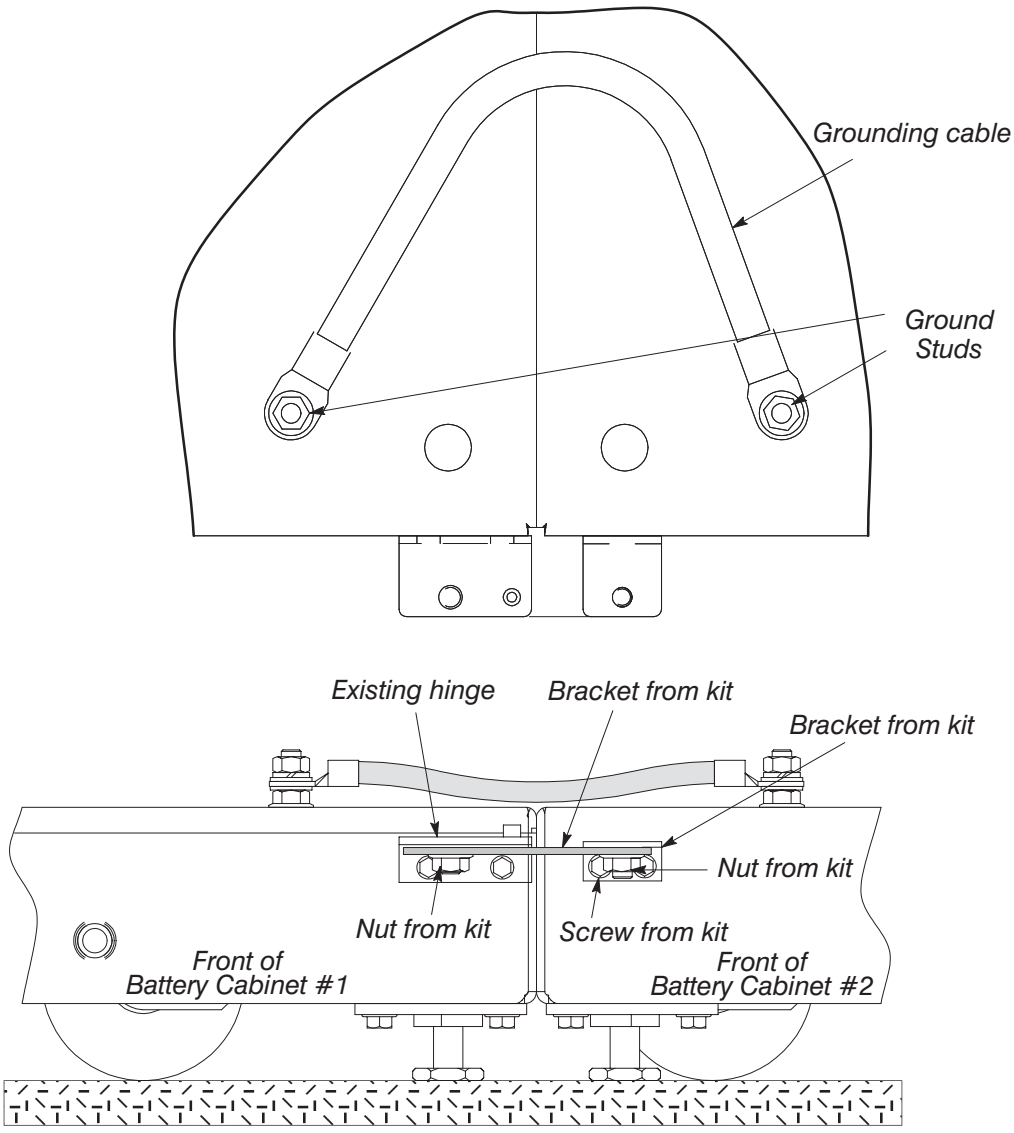


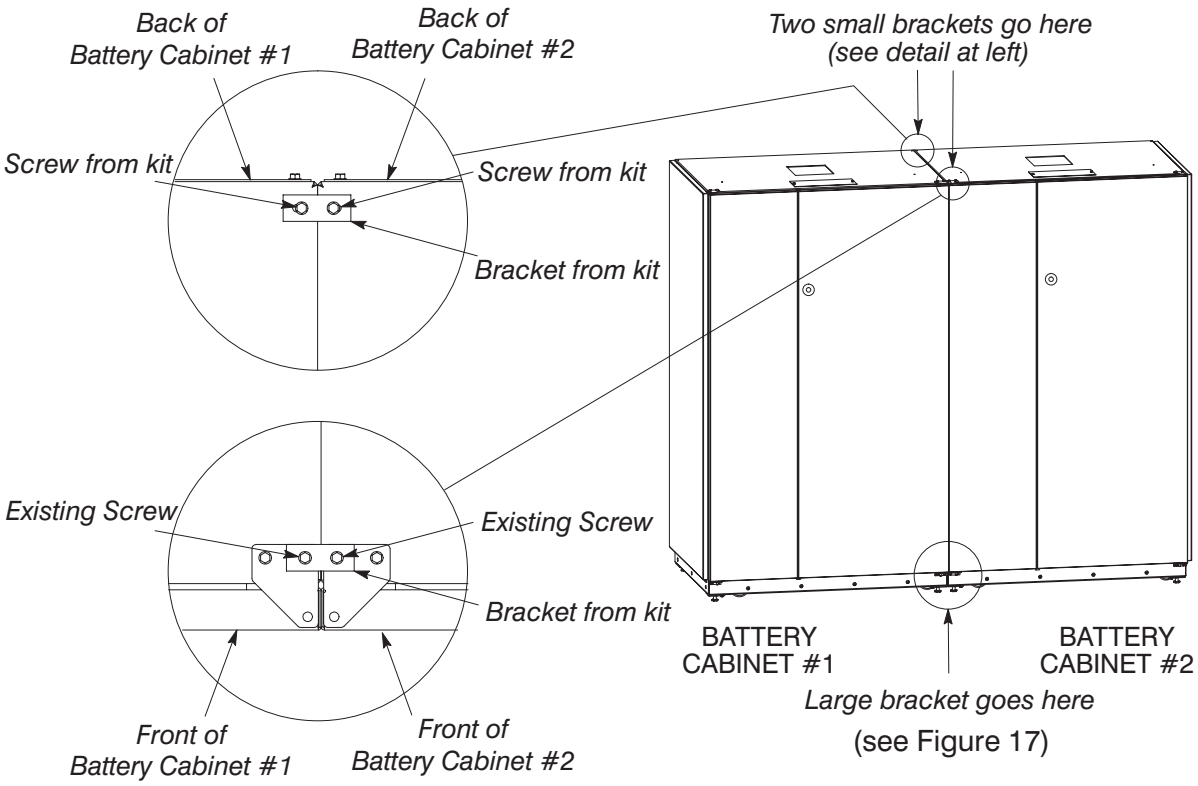
Figure 15. Connecting Two Model 27 Bases

3. Locate the cabinet connecting bracket and two M4 × 10 hex head screws from the field kit. Attach the bracket to the lower right-hand side of battery cabinet #2 using the two screws (see Figure 15).

4. Locate the large flat bracket from the field kit. Place the bracket over the stud on the bottom side of battery cabinet #1 lower hinge, and over the stud on the bottom side of the cabinet connecting bracket on battery cabinet #2. Attach the bracket with two M8 self-locking nuts from the field kit (see Figure 15).

5. Locate the ground wire from the field kit. Route the ground wire from the customer ground stud in battery cabinet #1, under the lower right-hand battery tray, into the cable access area in battery cabinet #2, and attach to customer ground stud. Hardware is provided on each ground stud.

6. Repeat steps 1 through 5 to join additional Model 27 Battery Cabinets together.



NOTE: When cabinets are properly aligned, all cabinet doors will be flush with each other.

Figure 16. Placement of Joining Brackets (Two or More Model 43 Battery Cabinets)

Remote Installation of Model 43 Battery Cabinets

1. Remove the right-hand screw from the top door hinge of battery cabinet #1. Align the hole in one flat bracket over this screw hole, and the other hole over the hole in the top of battery cabinet #2. Replace the screw in the hinge, and attach the other end of the bracket by using an M4 × 10 hex screw from the field kit (see Figure 16).
2. Align the holes in the other small flat bracket with the two holes in the top rear of battery cabinets #1 and #2. Attach each end to its mating hole using an M4 × 10 hex screw from the field kit (see Figure 16).

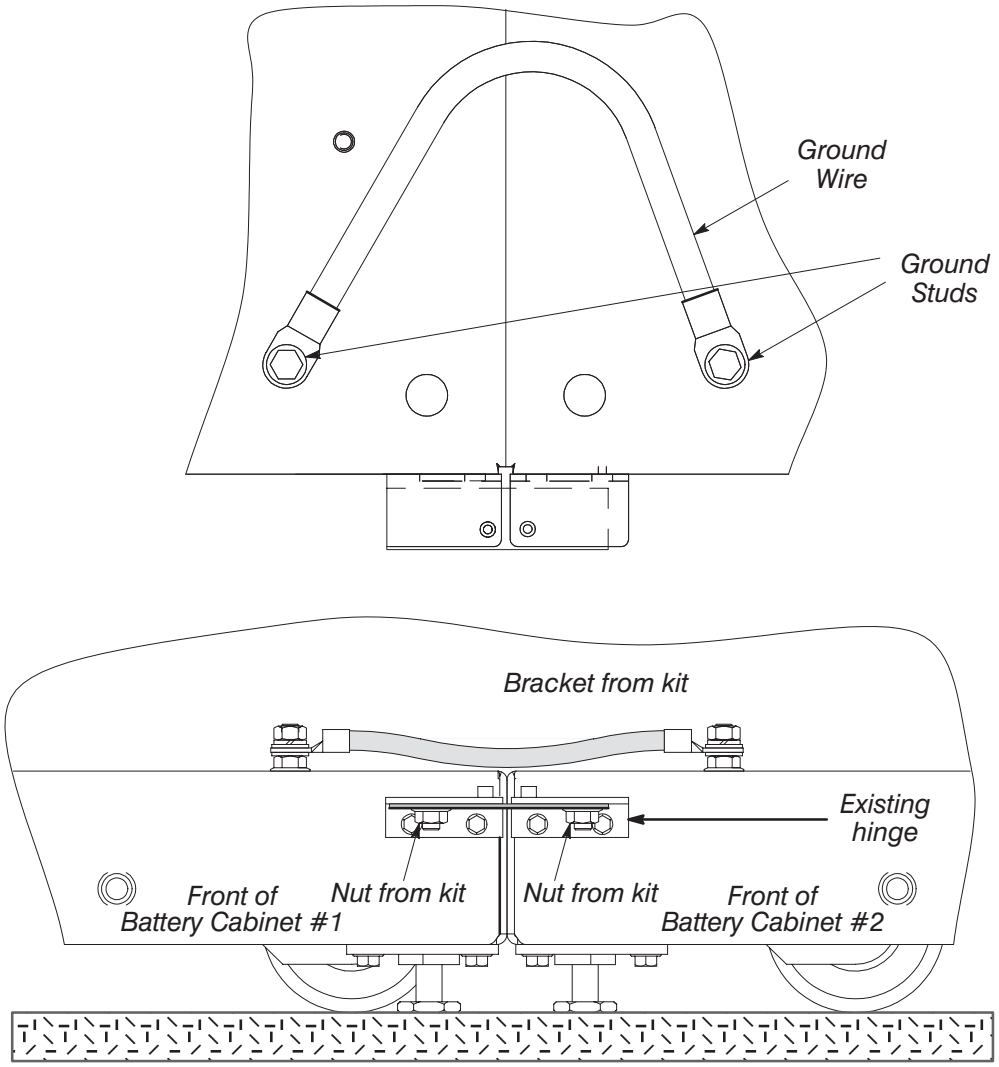


Figure 17. Connecting Two Model 43 Bases

3. Locate the large flat bracket from the field kit. Place the bracket over the stud on the bottom side of battery cabinet #1 lower hinge, and over the stud on the bottom side of battery cabinet #1 lower hinge. Attach the bracket with two M8 self-locking nuts from the field kit (see Figure 17).

4. Locate the ground wire from the field kit. Route the ground wire from the customer ground stud in battery cabinet #1, under the lower right-hand battery tray, into the cable access area in battery cabinet #2, and attach to customer ground stud. Hardware is provided on each ground stud.

5. Repeat steps 1 through 4 to join additional Model 43 Battery Cabinets together.

To Electrically Connect Remotely Integral Battery Cabinets to the UPS:

1. All battery cabinets will arrive at your site with each battery connection string electrically disconnected. If you are installing more than one battery cabinet, perform steps 2 through 6 for each cabinet. Battery cabinet #1 (the left-hand cabinet) will be the only cabinet directly connected to the UPS.

WARNING:
LETHAL VOLTAGE WILL BE PRESENT WHEN PERFORMING THE REMAINING STEPS IN THIS SECTION AND SUBSEQUENT SECTIONS.

2. After making sure that all battery breakers are in the OFF position, connect the string of battery trays together by mating the loose red connector from each tray to the fixed black connector mounted on the front edge of the tray above it (see Figure 10 for Model 27 and Figure 12 for Model 43 for location of all items discussed in this section).
3. Find the 2-pole connector under the bottom tray in the right-hand battery cabinet. Route this connector into the cabinet to the immediate left and mate with the matching connector in the bottom of that cabinet. Connect all battery cabinets together this way.
4. Remove the cable tie securing the battery breaker sensing cable.
5. Locate the battery breaker sensing cable in the right-hand battery cabinet. Route this connector into the cabinet to the immediate left and mate with the matching connector in the bottom of that cabinet. Connect all battery cabinets together this way.
6. Repeat steps 2 through 5 for each battery cabinet to be joined.
7. A UPS-to-battery cabinet power connector may be supplied inside your UPS cabinet. It will be connected to terminals E4 (+) and E5 (−) of the battery contactor. This cable and integral connector should be removed to allow wiring from the battery cabinets to be connected to the battery contactor.
   a. Refer to Appendix A, Table C to size wire for connecting the battery cabinets to the remotely located UPS cabinet.
   b. See Drawing 164201017−2 in Appendix A for Model 27 Battery Cabinet top or bottom conduit landing locations.
   c. See Drawing 164201017−4 in Appendix A for Model 43 Battery Cabinet top or bottom conduit landing locations.
   d. See Installation Manual 164201014 for Balanced Power 30−80 kVA top or bottom conduit landing locations.
   e. See Installation Manual 164201015 for Balanced Power 100−160 kVA top or bottom conduit landing locations. The conduit landing plates are removable to add conduit landing holes as required. The conduit landing plates should be removed when holes are added to keep metal particles from falling inside the battery cabinet.
   f. Refer to Chapter 4, Table C for remote battery disconnect circuit breaker information.
8. Route cables from positive (+) and negative (−) terminals in the bottom of battery cabinet #1 through conduit (top or bottom entry) to terminals E4 and E5 of the UPS cabinet. See Figure 10 or Figure 12 for location of positive (+) and negative (−) terminals.

9. Mount the side panels to the sides of the first and last battery cabinets:
   a. Mount the hanger brackets to the top side of the battery cabinets using M4 screws (see Figure 11).
   b. Hang the side panel on the hanger brackets and align it with the front and rear of the battery cabinet.
   c. Secure the side panel at the bottom using M4 hex head screws.
10. Secure all battery cabinets by closing and latching the doors.
11. Secure the UPS by reinstalling safety shields and closing and latching the doors.

Completing the Installation Checklist

The final step in installing your battery cabinet is to complete the Installation Checklist. This checklist ensures that you have installed all hardware, cables, and other equipment. Completing all items on the checklist will ensure a smooth installation. Make a copy of the Installation Checklist before filling it out, and retain the original.

After completing your installation, a service representative will be able to verify the operation of your battery cabinet, and commission it to support your critical load. The service representative cannot perform any installation tasks other than verifying that the battery cabinet has been correctly installed. Service personnel may request a copy of the completed Installation Checklist to be sure you have completed all applicable equipment installation requirements.

NOTE:
The Installation Checklist MUST be completed prior to starting up the UPS system for the first time.

Installation Checklist for Balanced Power 40 through 160

All packing materials and restraints have been removed from each cabinet.

Each cabinet in the battery system is placed in its correct location.

All cabinets are bolted together.

A ground wire is installed between all cabinets that are bolted together.

All conduits and cables are properly routed to the battery cabinets.

A ground conductor is properly installed.

Battery cables and harness are terminated on the K2 battery contactor E4 and E5 in the UPS cabinet.

Internal battery cabinet connections have been completed (bus bars, plugs, etc.)

Air conditioning equipment is installed and operating correctly.

The area around the installed battery system is clean and dust-free.
(It is recommended that the battery cabinet be installed on a sealed concrete pad on a sealed concrete floor.)

Adequate working area exists around the battery cabinet and other cabinets.

Adequate lighting is provided around all battery cabinet equipment.

A remote battery disconnect control is mounted in its installed location and its wiring is terminated inside the battery cabinet (OPTIONAL).

This Page Intentionally Left Blank.

The remote battery disconnect is crated separately for shipping. It is enclosed in a box and is designed to be wall mounted on a surface that can support the weight and bolt pattern described in this chapter. You can install a remote battery disconnect anywhere between the remote DC supply and the UPS, according to national and local codes. Figure 18 shows the remote battery disconnect enclosure.

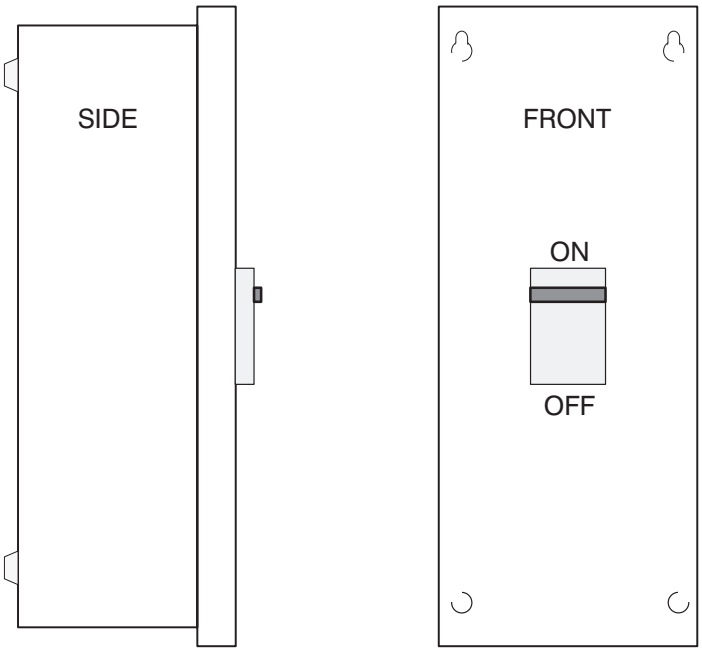


Figure 18. Remote Battery Disconnect Enclosure

The breaker switch on the remote battery disconnect should be set to ON for normal UPS operation when DC power is available at the UPS. When service personnel are performing maintenance on the UPS or battery cabinet, the switch should be OFF.

You should read and understand these general notes before beginning installation:

- The material and labor for external wiring requirements is to be supplied by others.
- Power cables and control wiring must be installed in separate conduit.
- The ground conductor is to be sized per NEC Article 250 and local electrical code requirements.
- The maximum current listed is at the minimum DC operating voltage.
- Nominal voltages listed in this chapter are for a lead-acid battery plant rated per NEC at 2.00 VDC per cell.
- Battery cabinets must be installed in accordance with all applicable codes and regulations, including the National Electrical Code (NEC), Article 480.
- The UPS to battery cable should be sized for a total maximum voltage drop of 1% nominal DC link voltage at maximum current.
- The external wiring specifications are outlined in Table C of Appendix A. Tables A and B in this chapter detail the power cable terminations.
- The remote battery disconnect weighs approximately 11.4 kg (25 lb) and has an ampere interrupting capacity of 10,000 at 500 VDC.
- Tightening Torque: 28.7 – 31.1 N-M (255–275 lb-in.)
  Internal Drive Hex Size: 5/16 in.
- The knockout pattern for conduit is shown in Figure 19. If a larger size conduit is required, the contractor may enlarge knockouts at your site during installation.

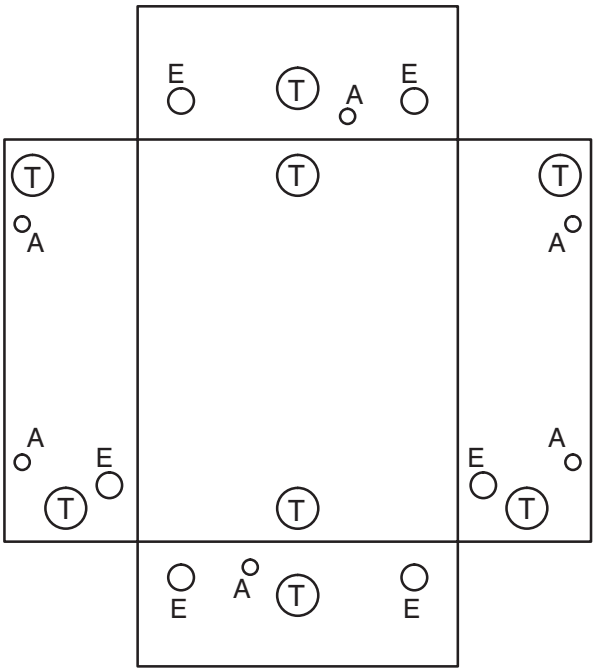


Figure 19. Knockout Pattern for Remote Battery Disconnect

aCde 0. 7ee i oe 1 aoels 4 anCi hheCo6i r el ele ahaoi hn		
Terminal	*Size of Pressure Termination*	*Terminal Function*
E4 (+)	1 – #8–3/0	UPS Battery Contactor K2 (+)
E5 (–)	1 – #8–3/0	UPS Battery Contactor K2 (–)
Breaker (+)	1 – #4–300 kcmil	Battery Disconnect (+)
Breaker (–)	1 – #4–300 kcmil	Battery Disconnect (–)
Breaker (jumper)	1 – #4–300 kcmil	Battery Disconnect (jumper)
Battery Cabinet (+)	See Table C (Appendix A)	Stand–alone battery cabinet (+)
Battery Cabinet (–)	See Table C (Appendix A)	Stand–alone battery cabinet (–)

aCde 1. 1 aoels 2 aCaheo ele ahaoi hn	
Battery Cabinet	*Size of Pressure Termination*
Model 27 Battery Cabinet	(1) #2–1/0 kcmil [Breaker (+) & (–)]
Model 43 Battery Cabinet	(1) 3/0–250 kcmil [Breaker (+) & (–)]

aCde 2. 7ee i oe 1 aoels 4 anCi hheCo2 aOpao1 leaceI 7 aohUn		
UPS Model	*Circuit Breaker Rating*	*DC Voltage*
40	125	420
50	125	480
65	175	420
80	200	480
130	350	420
160	350	480

This Page Intentionally Left Blank.

d t ri d c i o t n o o io

The information in the appendix will help you plan for and install your battery system. The appendix contains these drawings:

164201017–1 Model 27 Battery Cabinet (elevation)

164201017–2 Model 27 Battery Cabinet (plan)

164201017–3 Model 43 Battery Cabinet (elevation)

164201017–4 Model 43 Battery Cabinet (plan)

164201017–5 Remote Interface Connections

164201017–6 Model 27 / Model 43 Configurations

NOTE: *Outline diagrams and oneline diagrams for the various UPS models are available in their respective manuals. See these manuals for more information.*

164201014 Balanced Power 30–80 kVA UPS Installation

164201015 Balanced Power 100–160 kVA UPS Installation

164201016 Balanced Power 30–160 kVA UPS Operation

1. The output of the UPS is a separately derived source. Output neutral is bonded to equipment ground through the main bonding jumper. Refer to NEC Article 250 and local codes for proper grounding practices.

2. Your battery cabinet operating environment must meet the size and weight requirements shown in Table A:

Table A. Equipment Weight and Point Loading (on casters) (4 leveling feet are provided)

Component	*Weight Kg (lb)*	*Point Loading Kg (lb)*
Model 27-J14	869 (1915)	4 at 217 (479)
Model 27-J17	1111 (2450)	4 at 278 (613)
Model 43-J27	1429 (3150)	8 at 179 (394)
Model 43-J31	1588 (3500)	8 at 199 (438)
Model 43-J37	1708 (3765)	8 at 214 (471)
Model 43-J47	2178 (4800)	8 at 272 (600)

3. The basic environmental requirements for operation of the battery system are:

   Ambient Temperature Range: 10−40˚ C (50 − 104˚ F)

   Recommended Operating Range: 20−25˚ C (68 − 77˚ F)

   Maximum Relative Humidity: 95%

4. Use Class 1 wiring methods (as defined by the NEC) for control wiring. Install the control wiring in separate conduit from the power wiring. The wire should be rated at 24 volts, 1 amp minimum.

5. Battery voltage is computed at 2 volts per cell as defined by Article 480 of the NEC. Rated battery current is computed at 1.8 volts per cell.

6. The battery wiring used between the battery and the UPS should not allow a voltage drop of more than 1% of nominal DC voltage at rated battery current.

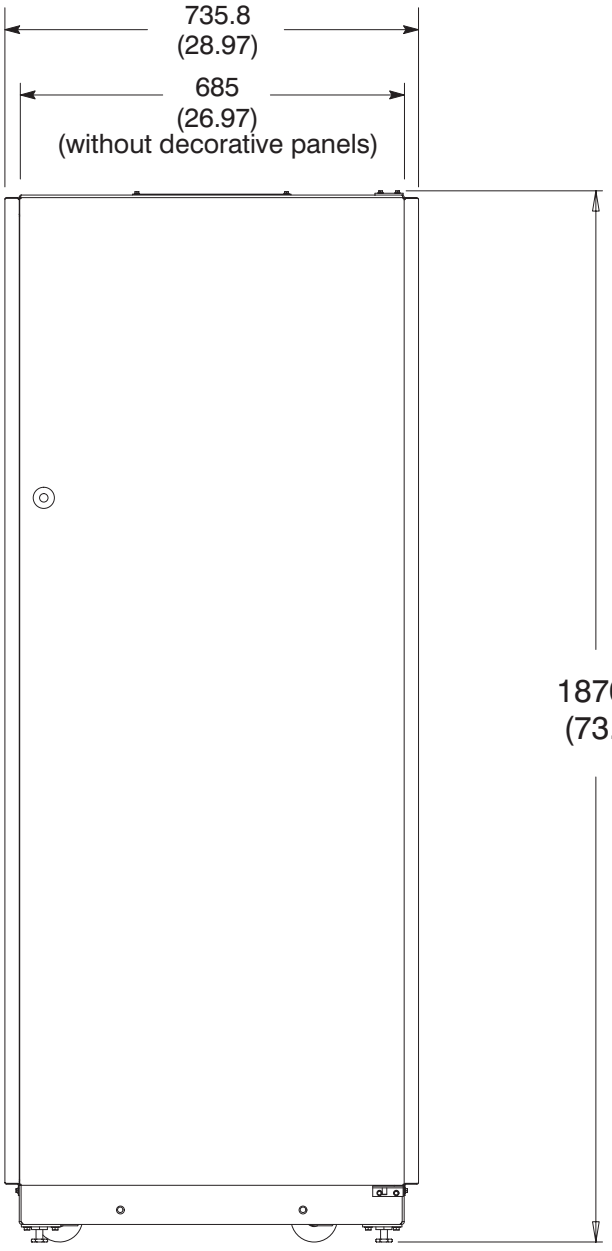
7. A battery disconnect switch is recommended, and may be required by NEC or local codes when batteries are separately located. The battery disconnect switch may be supplied as an accessory, and should be installed between the battery and the UPS.

8. If the conductors used for DC input from the battery cabinet(s) to the UPS are those provided by the UPS manufacturer, and the UPS and battery cabinet are manufactured by the same supplier, then it is acceptable if they do not meet the noted minimum conductor sizes.

Table B: External Ground Wire Requirements for Battery Cabinets							
UPS Model	Battery Model	Battery Type	# of Cabinets	Integral or Separate Battery	Wire Size Battery	Tool Size Battery Cabinet	Torque N-M (lb-in)
all	27 or 43	all	all	all	1/0	7/16®slot	5.6 (50)

Table C: External Wiring Requirements (UPS-to-Battery or Remote Disconnect to Battery)									
NOTE: All specified wire sizes are 75 C rated minimum						Battery Cabinet		UPS Cabinet	
UPS Model	Battery Model	Battery Type	# of Cabinets	Integral or Separate Battery	Wire Size UPS to Battery	Tool Size	Torque N-M (lb-in)	Tool Size	Torque N-M (lb-in)
40	27	J14,J17	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	1/4®hex	22.6 (200)
40	43	J27,J31 J37,J47	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	1/4®hex	42.4 (375)
40	27	J14,J17	1,2,3, or 4	Separate	2/0	3/8®hex	42.4 (375)	1/4®hex	22.6 (200)
40	43	J27,J31 J37,J47	1,2,3, or 4	Separate	2/0	3/8®hex	42.4 (375)	1/4®hex	42.4 (375)
50	27	J14,J17	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	1/4®hex	22.6 (200)
50	43	J27,J31 J37,J47	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	1/4®hex	42.4 (375)
50	27	J14,J17	1,2,3, or 4	Separate	2/0	3/8®hex	42.4 (375)	1/4®hex	22.6 (200)
50	43	J27,J31 J37,J47	1,2,3, or 4	Separate	2/0	3/8®hex	42.4 (375)	1/4®hex	42.4 (375)
80	27	J14,J17	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	1/4®hex	22.6 (200)
80	43	J27,J31 J37,J47	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	1/4®hex	42.4 (375)
80	27	J14,J17	1,2,3, or 4	Separate	2/0	3/8®hex	42.4 (375)	1/4®hex	22.6 (200)
80	43	J27,J31 J37,J47	1,2,3, or 4	Separate	2/0	3/8®hex	42.4 (375)	1/4®hex	42.4 (375)
130	43	J27,J31 J37,J47	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	3/8®hex	42.4 (375)
130	43	J27,J31 J37,J47	1,2,3, or 4	Separate	350 kcmil	3/8®hex	42.4 (375)	3/8®hex	42.4 (375)
160	43	J27,J31 J37,J47	1,2,3, or 4	Integral	supplied	3/8®hex	42.4 (375)	3/8®hex	42.4 (375)
160	43	J27,J31 J37,J47	1,2,3, or 4	Separate	350 kcmil	3/8®hex	42.4 (375)	3/8®hex	42.4 (375)

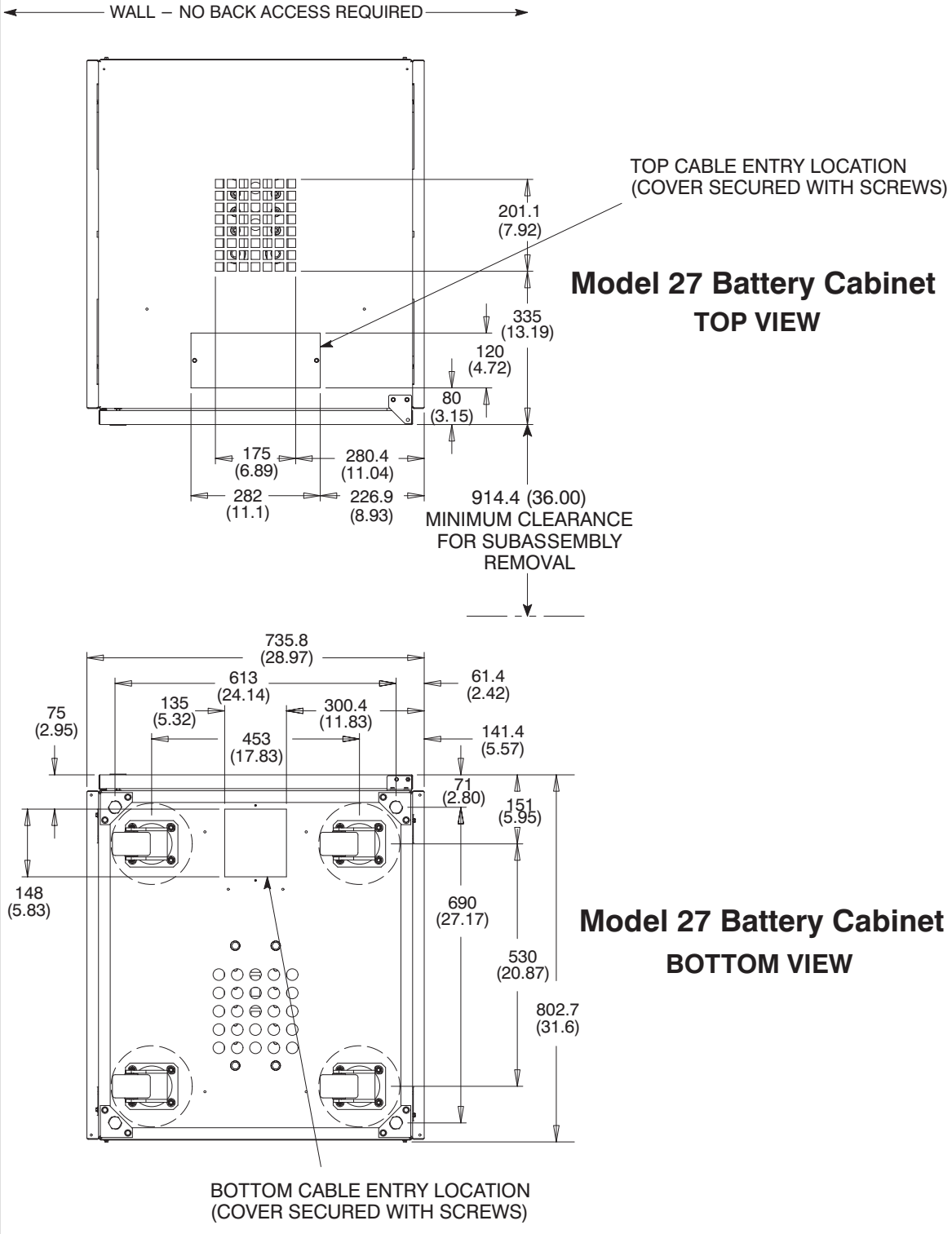
NOTE: *The term "separate" refers to battery cabinets that are located close to the UPS, wired with contractor wiring, and use the UPS battery switch as the battery isolation disconnect. ("Close" is typically defined as being within the same room and within line of sight.)*
The term "remote" refers to battery cabinets that require a single protection and disconnect device located near the batteries.
Refer to applicable national or local code requirements for your installation.



Model 27 Battery Cabinet

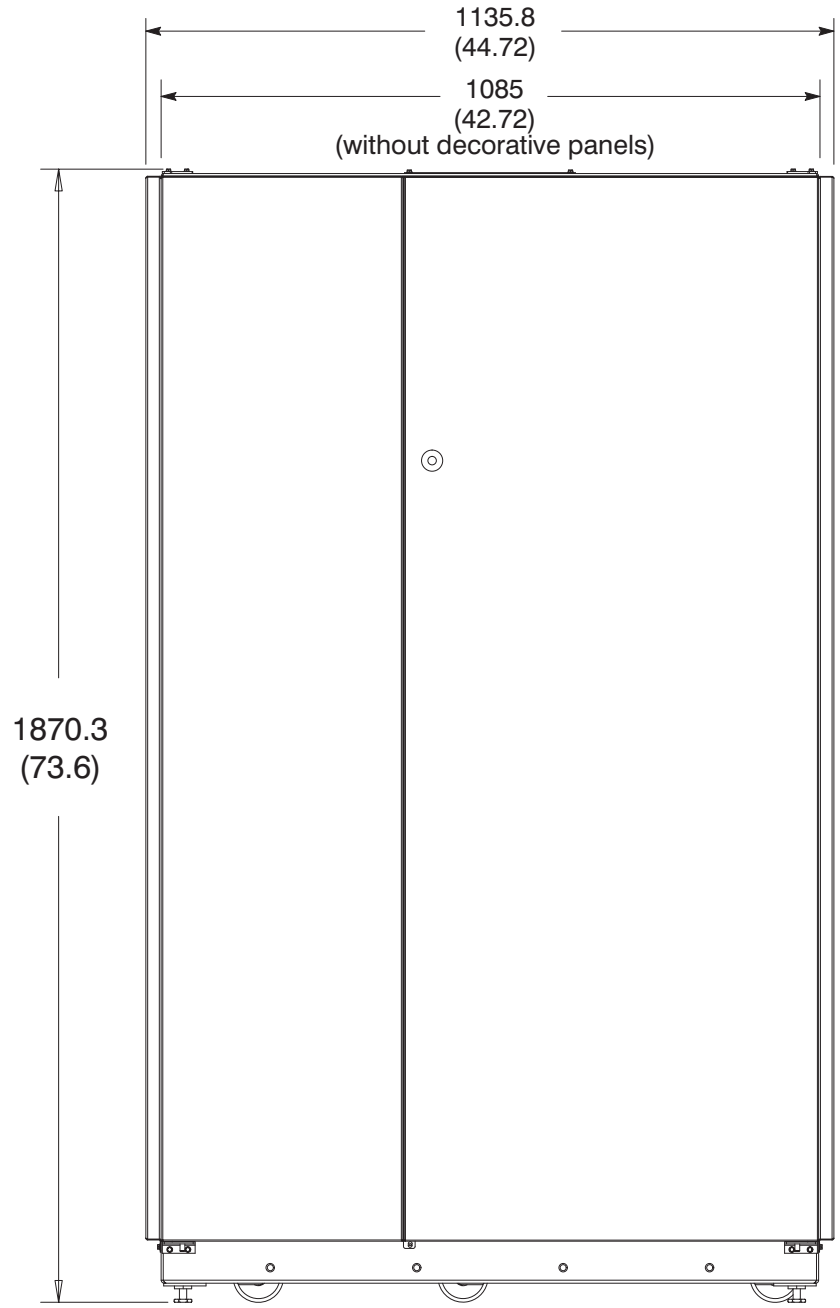
Dimensions are in millimeters (inches)

DESCRIPTION:	**Model 27 Battery Cabinet (elevation)**		
DRAWING NO:	**164201017–1**	*SHEET:*	1 of 1
REVISION:	A	*DATE:*	081596



Dimensions are in millimeters (inches)

DESCRIPTION:	**Model 27 Battery Cabinet (plan)**		
DRAWING NO:	**164201017–2**	*SHEET:*	1 of 1
REVISION:	A	*DATE:*	081596

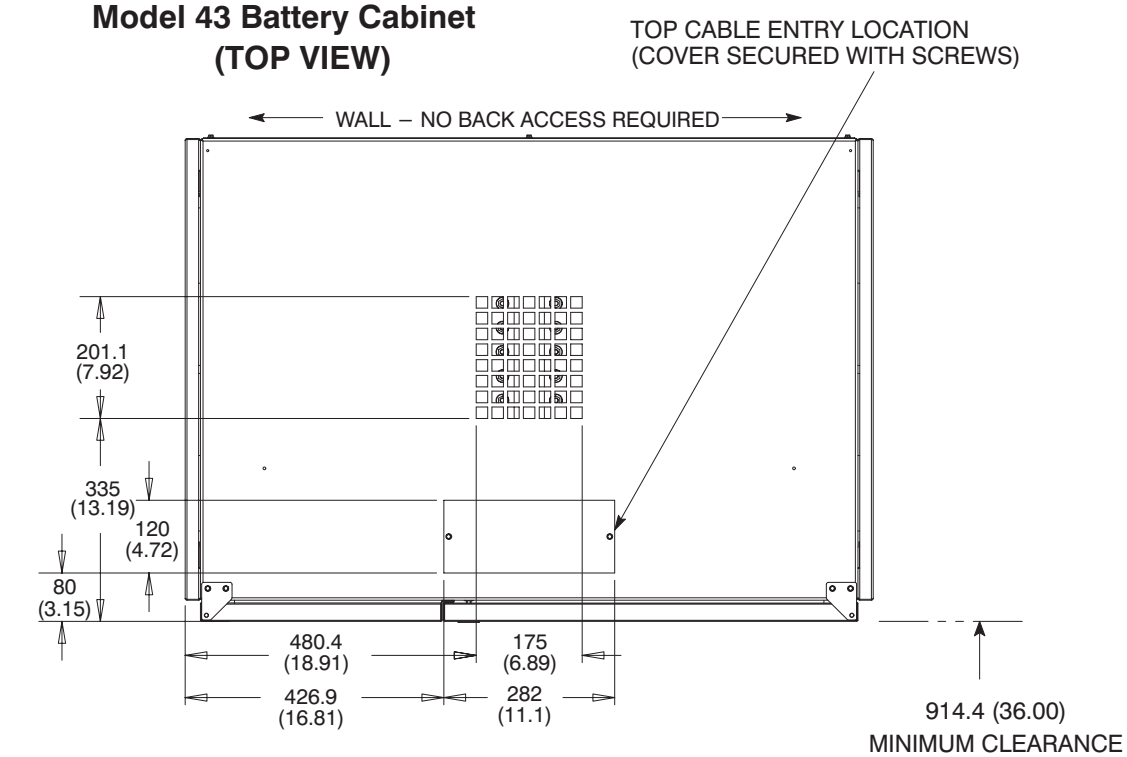


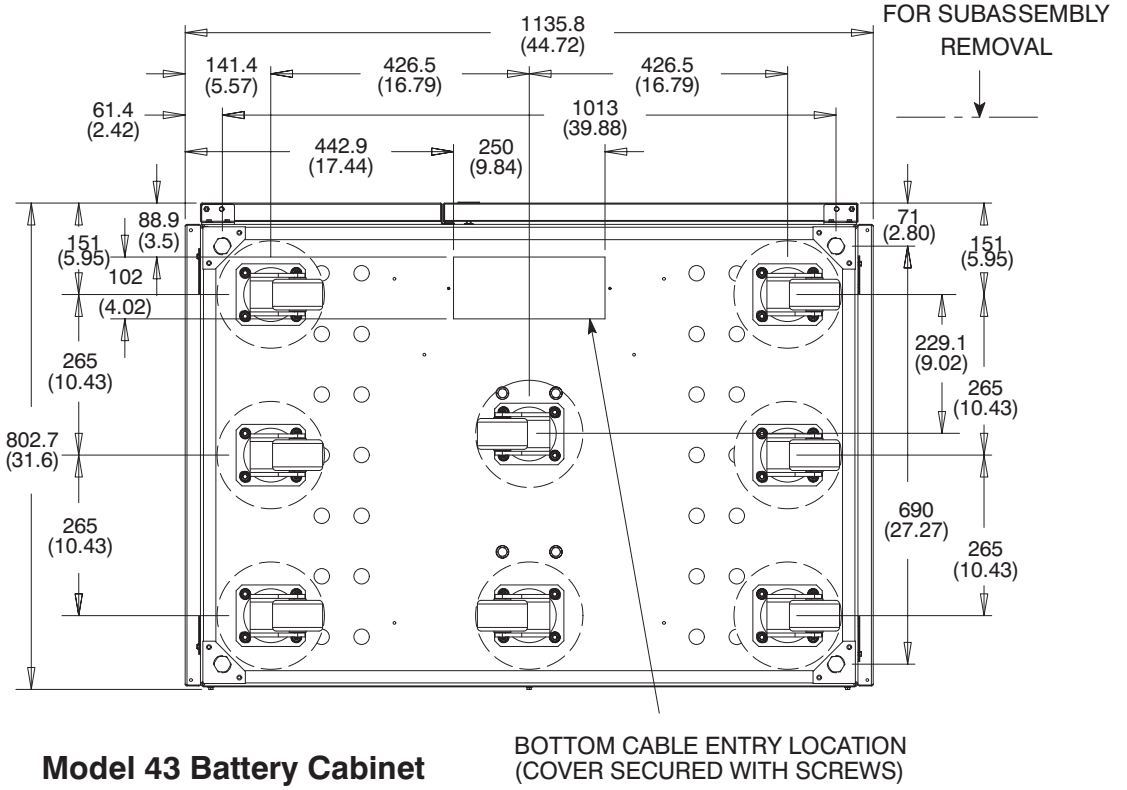
Model 43 Battery Cabinet

Dimensions are in millimeters (inches)

DESCRIPTION: **Model 43 Battery Cabinet (elevation)**		
DRAWING NO: **164201017–3**		*SHEET:* 1 of 1
REVISION: A	*DATE:* 081596	

Model 43 Battery Cabinet (TOP VIEW)

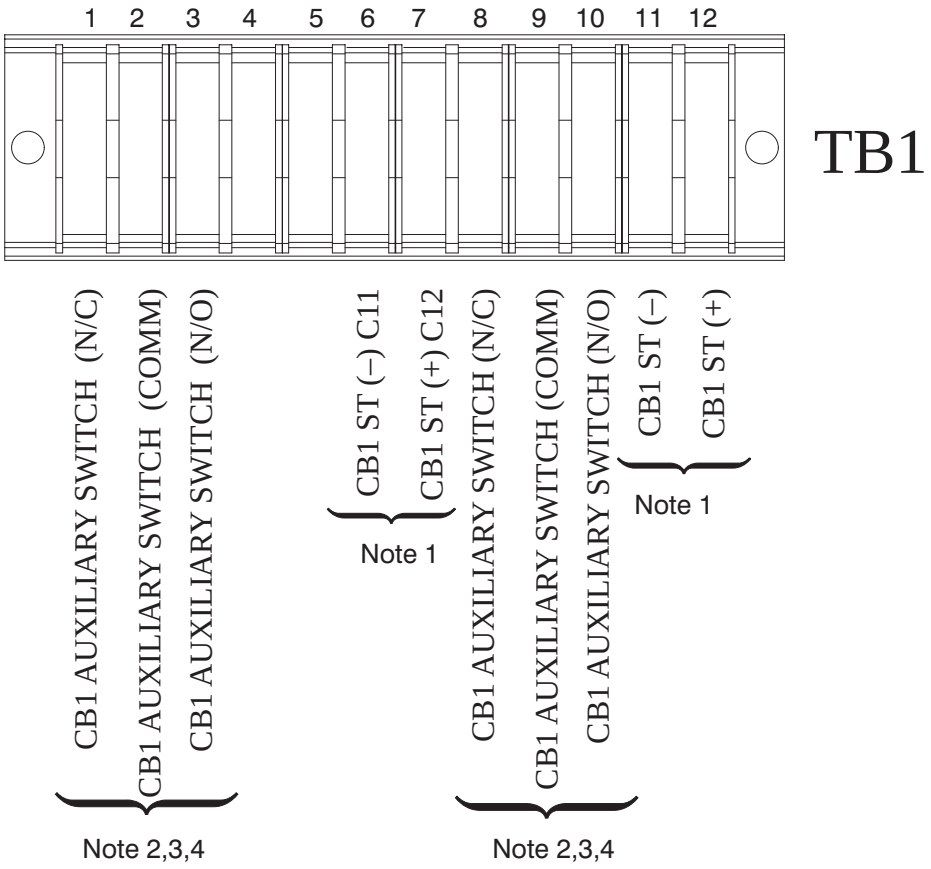




Model 43 Battery Cabinet (BOTTOM VIEW)

Dimensions are in millimeters (inches)

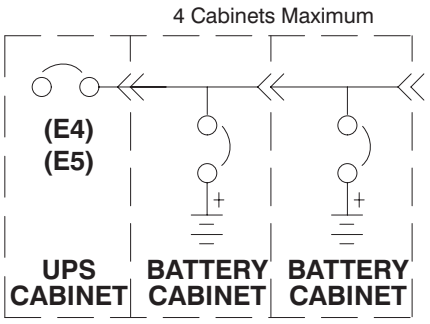
DESCRIPTION:	**Model 43 Battery Cabinet (plan)**		
DRAWING NO:	**164201017–4**	*SHEET:*	1 of 1
REVISION:	A	*DATE:*	081596



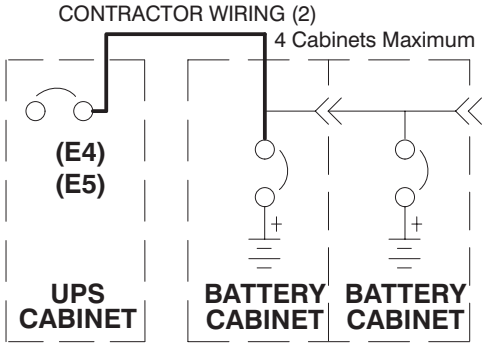
Notes:

1. Shunt trip requires 24V (150 VA instantaneous) to activate (supplied by user).
2. Auxiliary switches are rated as follows:
   240 VAC @ 15A
   125 VDC @ 0.3A
   250 VDC @ 0.15A
3. Wiring shall be suitable for Class 1, 600V wiring methods.
   All wiring shall be #10-22 AWG, 75 deg. C minimum.
4. Torque screw terminals to 20 in.-lb.

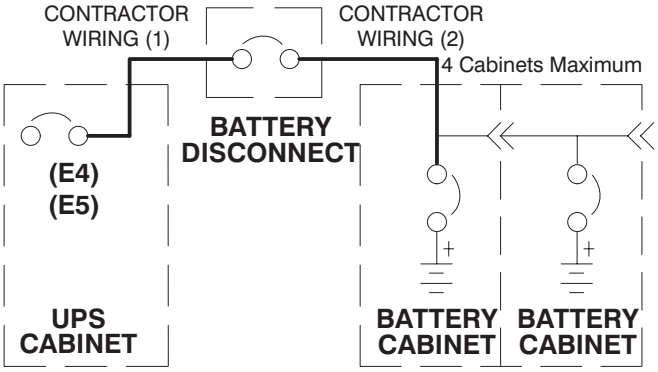
DESCRIPTION: **Remote Interface Connections**		
DRAWING NO: **164201017–5**		*SHEET:* 1 of 1
REVISION: A	*DATE:* 081596	



Balanced Power 40 through 160
Battery Cabinets bolted to UPS
and connected using Manufacturer's supplied wiring



Balanced Power 40 through 160
Battery Cabinets located separate
from the UPS



Balanced Power 40 through 160
Battery Cabinets located remotely
from the UPS

NOTE: *The term "separate" refers to battery cabinets that are located close to the UPS, wired with contractor wiring, and use the UPS battery switch as the battery isolation disconnect. ("Close" is typically defined as being within the same room and within line of sight.)*
The term "remote" refers to battery cabinets that require a single protection and disconnect device located near the batteries.
Refer to applicable national or local code requirements for your installation.

Contactor Wiring (1): Refer to UPS manual to size wiring

Contractor Wiring (2): See Table C of Appendix A to size Contractor Supplied wiring

DESCRIPTION:	**Model 27 / 43 Configurations**		
DRAWING NO:	**164201017–6**	*SHEET:*	1 of 1
REVISION: A		*DATE:* 081596	

NOTES: