



## **Battery Cabinet**

Installation Manual

About This Manual

## **Purpose**

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This manual contains information on Atlantic Battery Systems battery cabinets. The information in this manual is intended for Qualified Installers, Equipment Engineers, and Field Support Personnel.

## **Reissue Information**

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When this manual is reissued, the reasons for reissue will be given in this section.

## **Product Safety**

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This manual contains **IMPORTANT SAFETY INSTRUCTIONS**

**SAVE THESE INSTRUCTIONS: This manual contains important instructions that should be followed during installation and maintenance of this product.**

## Safety Label Definitions

This manual contains safety labels in the form of DANGER, WARNING, and CAUTION. These safety labels have the following definitions.



*Warning indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.*



*Caution indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided. The caution is also used for property-damage-only accidents. This includes equipment damage, loss of software, or service interruption.*



*Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.*

The Safety Alert symbol  is used on product labels and in this manual to alert the user to important operating and maintenance instructions.

The Electrical Hazard symbol  is used on product labels and in this manual to alert the user of hazardous situations which, if not avoided, will result in death or serious injury.

### Inspection

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Upon receipt of the cabinet, examine the packaging for any signs of mishandling. Report any damage to the factory and/or the shipping carrier.

## Safety Instructions

- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
  
- When replacing batteries, replace with the same type and number of batteries or battery packs.  
**Note:** Atlantic Battery uses several battery manufacturers. Contact Atlantic Battery when uncertain about which battery model number is to be used in the system(s).
  
-  **CAUTION:** Risk of Energy Hazard, 0 – 700 Vdc (Volts Direct Current), 0 – 400 Ampere-hour battery or higher. Before replacing batteries, remove conductive jewelry such as chains, wrist watches, and rings. High energy through conductive materials could cause severe burns.
  
-  **CAUTION:** Do not dispose of batteries in a fire. The batteries may explode.
  
-  **CAUTION:** Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
  
-  **CAUTION:** A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:
  - a) Remove watches, rings, or other metal objects.
  - b) Use tools with insulated handles.
  - c) Wear rubber gloves and boots.
  - d) Do not lay tools or metal parts on top of batteries.
  - e) Confirm that the charging source prior to connecting or disconnecting battery terminals has been disconnected or off line.
  - f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).



## **Equipment and Materials Required**

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The equipment and materials required to install a Battery Cabinet and prepare the communication cables are as follows:

- Pallet jack
- Insulated Socket wrench set
- Insulated Screwdriver set, Allen wrench
- Anchor hardware (if required)
- Insulated Torque wrench
- Cabinet System Drawing



## **Cabinet Handling**

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Ensure that the proper equipment is available to unload the delivery truck and transport the cabinet to the installation site. The shipping weight is indicated on the outside of the shipping carton and on the bill of lading.

The cabinet is shipped from the factory bolted to a shipping pallet with either protective cardboard packaging or plastic wrap. The cabinet may also be secured to the pallet with plastic/metal shipping straps.



## **Cabinet and Battery Storage**

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Observe the following conditions when storing the cabinet and/or batteries:

- Keep packaging material in place to facilitate future handling.
- Set pallet(s) on a firm, level surface.
- Protect from moisture, conductive contaminants, flammable liquids or gasses and corrosive substances.
- Storing the cabinet or batteries outdoors may invalidate the warranty.
- Store in environment which is kept within the temperature range of 59 to 77 °F (15 to 25 °C) to maximize the life and performance of the batteries.

**NOTE:** \*\*\* Batteries may be stored for up to six months before requiring a recharge. After six months, the batteries **MUST** be recharged before use! \*\*\*

## A. Planning & Engineering

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### Overview

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Install the Battery Cabinet following local building requirements and applicable codes. Plan the location of the Battery Cabinet site ahead of time, taking into consideration the requirements described in this chapter.

### Physical Space

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A level floor is required for the cabinet. Floor space requirements include working space in front of the cabinet and, for seismic locations, clearance between the cabinet and adjacent equipment. See Figure 1. The recommended working space should be per National Electrical Code ANSI/NFPA-70 Section 110.26 or other applicable standard. The requirements of NEC Section 110.26 are summarized as follows.

**Minimum depth of working space:** 3 ft (914 mm)

Exceptions:

3 ft 6 in. (1.07 m) required for systems of over 150 V in front of grounded parts or un-insulated walls.

4 ft (1.22 m) required for systems of over 150 V in front of other live equipment.

**Minimum width of working space:** The width of the battery cabinet or 30 in. (750 mm), whichever is greater

**Minimum spacing between cabinet and rear wall:** 2 inches (50.8 mm)

Floor loading considerations (see below) may dictate greater space around the cabinet than the above minimum requirements.

### Cabinet Weight

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The weight of the battery cabinet is indicated on the outside of the packing carton or packing slip.

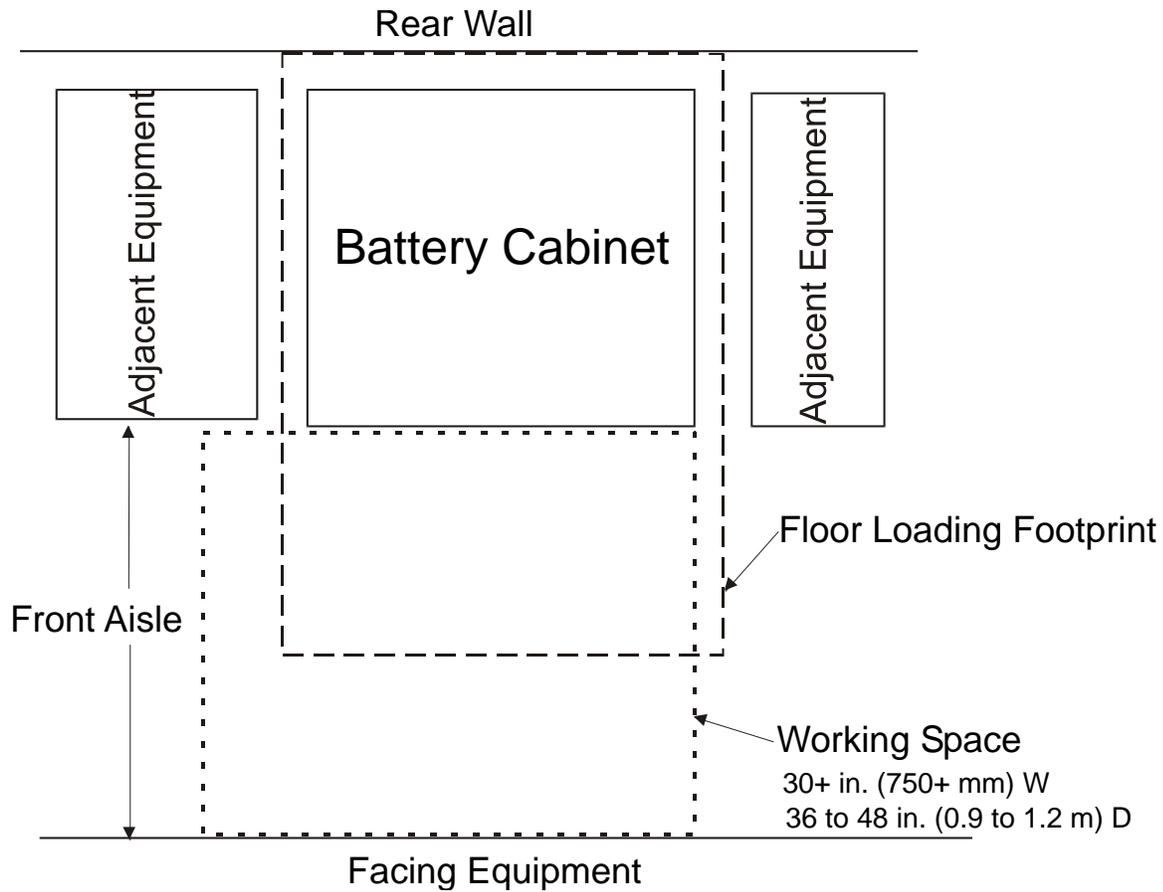
### Floor Loading

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To calculate the floor loading, divide the total cabinet weight by the associated footprint. The total footprint (see Figure 1) is a sum of the following areas:

- The actual cabinet footprint **W x D**
- The space between each side of the cabinet and a wall
- One half of the space between an inaccessible side of the cabinet and adjacent equipment, typically 3 in (75 mm) minimum
- One half of the aisle on each accessible side of the cabinet, typically 1.5 to 2 ft (450 to 600 mm).

If the floor loading calculated using the above minimum clearances exceeds the average floor loading capability of the facility, additional clearance may be necessary.



**Figure 1 Battery Cabinet Clearance Requirements**

### **Floor Mounting Considerations**

The cabinet must be fastened in place to meet the requirements of UL 1778. To meet the requirements of the Uniform Building Code in seismic zones, the cabinet must be fastened to a concrete floor using anchors and bolts as per the Uniform Building Code in seismic zones.

## Environment

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### Temperature

The thermal environment for the battery cabinet should not exceed 77°F (25°C). Higher temperatures will reduce battery life permanently. At temperatures below 50°F (10°C), battery capacity is temporarily reduced and will recover when temperature increases to the recommended level of 77°F (25°C). Environments below 32°F (0°C) are not recommended.

### Ventilation

Typically batteries are valve-regulated lead-acid type, in which hydrogen gas is a by-product of the charging process. The well-ventilated Battery Cabinet provides a housing for batteries that does not allow hydrogen to build up to a dangerous level inside the enclosure. Adequate ventilation must be provided outside the cabinet however to ensure that hydrogen gas does not accumulate in the room.

### Contaminants

The environment in which the cabinet will be stored or installed must be free of any of the following:

- *Conductive, air-borne contaminants, such as carbon soot, salt fog or hygroscopic dust*
- *Condensing water vapor*
- *Flammable vapors*
- *Chemical fumes*
- *Corrosive gases and liquids*

## B. Cabinet Installation

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### Overview

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This chapter describes the Battery Cabinet installation operations that are required before proceeding with the cable termination and equipment turn-up. The following information is intended as a guide for the safe installation of the cabinet and does not cover the installation or replacement of batteries.

Atlantic Battery Systems believes that, with the safety features built into the cabinets, qualified experienced personnel should not be exposed to undue electrical hazards by (1) following these instructions in a step-by-step manner, (2) adopting normal safety precautions for electrical installations, and (3) paying particular attention to the safety precautions emphasized in this manual.

## Safety Precautions

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The following precautions must be observed when performing the various tasks outlined in this document:



*When installing this product, basic safety precautions should always be followed to reduce the risk of fire, explosion, electric shock, and injury to persons, including the following:*

- *Follow all instructions provided with this unit*
- *Installation and maintenance procedures must be followed and performed by qualified installer / certified electrician or trained personnel only.*
- *For continued protection against risk of fire, all fuses used in this product must be replaced only with same type and rating*
- *Never install in wet locations*
- *Never touch un-insulated wiring or terminals, which are not grounded nor leave this wiring exposed.*
- *Connect this product only to the types of AC and DC power sources indicated on the cabinet nameplate*
- *Provide a readily accessible disconnect device as part of the building installation if a disconnect is not provided as part of the battery cabinet*
- *Never push objects of any kind into this product through slots in the enclosure as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquids of any kind on the product*
- *Slots and openings in this product are provided for ventilation of hydrogen gas. To reduce the risk of explosion, these openings must not be blocked or covered. Product should not be placed in a built-in installation unless proper ventilation is provided.*

## Cabinet Placement

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Review the site considerations listed in Section A to confirm that the planned site is adequate for the cabinet installation and operation.

Mounting holes are provided on the cabinet for securing the cabinet to the floor. Mounting holes are generally accessible without the removal of side panels. For compliance to the UBC in seismic areas, the cabinet must be anchored to a concrete floor as per the UBC requirements.

## System Connections

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Proper procedures must be followed for connecting DC and AC power as well as any alarm and control interfaces.

## Safety Precautions

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*Read this section and review the system drawing thoroughly before attempting to install wiring to the cabinet. Be sure that the cabinet is not connected to any AC utility power before installing any wiring to the cabinet. Wiring should be installed by a qualified/certified electrician.*



*Use extreme caution when making connections. Do not allow the end of any cable to contact anything except the intended connection point. Do not rest tools or cables on batteries.*



*Follow safety precautions from section **B. Cabinet Installation** when inspecting batteries.*

## Equipment and Materials Required

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The equipment and materials required to install a Battery Cabinet and prepare the communication cables are as follows:

- Insulated Socket wrench set
- Insulated Screwdriver set, Allen wrench
- Insulated Torque wrench
- Electrical conduit and fittings
- External Battery Disconnect Switch (if cabinet is not equipped with circuit breaker)
- Digital multi-meter
- Cable ties
- Cabinet System Drawing
- Fuse Mounting Drawing (if applicable)
- Cartridge-type fuses (if applicable) Selected inter-battery cables and associated hardware to be installed on site per System Drawing

## Preparation

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In general, conductors to the cabinet are run in conduit or raceway. Where permitted under the NEC, flexible cord may be used.

### **WARNING**

*Prior to installing DC load cables to the battery cabinet, verify that DC power from the UPS is OFF by one or more of the following means:*

- *The UPS is OFF*
- *Any external Battery Disconnect Switch between the UPS and Battery Cabinet is in the OFF or OPEN position, and/or*
- *Any DC Circuit Breaker in the UPS system is in the OFF or OPEN position.*

### **WARNING**

*Prior to installing AC wiring (if required for battery charger), turn off AC power to the branch circuit.*

Install the conduit or raceway between the cabinet(s) and battery disconnect and/or junction box. For multi-cabinet systems, refer to the system drawing(s).

The minimum load wire size recommendations on the System Drawing are based on NEC Table 310-16 with 75°C copper wire in 30°C environment. De-rate appropriately for hotter operating environments or long cable runs.

## AC Power Requirements

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If the cabinet is equipped with a battery charger, AC power must be provided. The battery cabinet may be equipped with a pre-terminated AC power cord, an inlet socket for a molded cord or a terminal block for an AC branch circuit.

## Grounding

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### **CAUTION**

The cabinet chassis must be properly grounded for safety. A ¼-20 ground stud is provided on the cabinet for this purpose. For low-voltage telecommunications applications, grounding of the DC circuit via the central office ground system may be necessary for noise immunity and EMC purposes. The National Electric Code ANSI/NFPA-70 must be followed. In addition, ANSI T1.313 covers telecommunication and central offices, and ANSI/EIA/TIA-607 covers commercial buildings, either of which may be applicable.

## **Check Battery String Isolation from Ground**

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For a UPS system that does not ground the DC/Battery Circuit, isolation should be maintained between the chassis and any point in the battery circuit, to reduce the risk of electric shock during cabinet and battery installation and maintenance.

To check for inadvertent grounding of the battery, use a digital multi-meter set to the DC Volts scale to measure the voltage between any battery terminal and either the cabinet framework or AC neutral. If a non-zero DC voltage is detected at any point in the battery circuit, find and remove the source of ground.

## **Connect Any disconnected Inter-Battery Cables**

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1. Selected inter-battery cables are typically disconnected at the factory to reduce the hazards associated with installing DC load cabling (unless otherwise requested by the customer). Note any disconnected inter-battery cables on the System Drawing. Verify that the cables are packed separately.
2. Locate the necessary hardware that may be packed in a separate box or screwed into the battery terminals.



Before connecting inter-battery cables, perform the following steps



1. Confirm that the DC Battery cabinet breaker is in the OPEN/OFF position!
2. With a Digital Multi-meter set to DC volts, check the voltage between the terminals of one pair of adjacent, disconnected batteries. Note that a non-zero voltage may be present initially, due to static charge, but this voltage should fall to zero shortly after contact with the voltmeter.
3. Check all connections for proper polarity and wiring. Check for inadvertent ground of the battery string.
4. After the checks have been verified, install the cables and hardware as shown on the system drawing, observing the torque requirements indicated on the battery nameplate.



*Do not connect the cable if the voltage does not fall to less than 1 volt.*

## DC Load Connections

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A battery cabinet to be connected to a UPS system is factory-configured for the DC load connections with either

- a. Factory-terminated
- b. Customer-provided cable assembly, terminal block, circuit breaker or fuse-holders.



Before connecting battery cabinet Load Cables to the UPS, perform the following steps



1. Confirm that the DC Battery cabinet breaker is in the CLOSED/ON position!
2. With a DMM set to DC Volts, verify that the voltage at the load terminals of the cabinet is within 10% of the “Nominal DC Volts” indicated on the cabinet nameplate.
3. After the voltage in Step 2 has been verified return the breaker to the OPEN/OFF position. Then refer to the UPS manufacturer’s documentation for installation and turn-up of UPS.

## Alarm & Control Connections

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Locate any alarm and control circuits on the system drawing provided with the cabinet. The installer must wire these circuits from the cabinet to the UPS or Alarm Reporting system. Follow NEC wiring methods, using wire that is appropriately sized and rated for these connections.

## System Turn-Up

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For installation and turn-up of UPS, refer to the UPS manufacturer’s documentation.



*For maximum safety, do not handle the batteries during their initial 24-hour charging period.*



*Wiring should be installed by a qualified installer / certified electrician.*

## C. Maintenance and Troubleshooting

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### Battery Maintenance

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Batteries have life expectancies that are shorter than that for the cabinet structure and wiring and will need periodic maintenance/replacement for continued trouble-free system functioning.



**DANGER**



**WARNING**

*Placing circuit breaker in **OFF** position does not provide sufficient protection for working on batteries. Follow safety precautions from section **B. Cabinet Installation** when inspecting batteries.*

Periodic monitoring of battery condition is necessary to ensure sufficient reserve capacity in an emergency situation. It is recommended that individual battery condition and capacity be monitored or tested every six months.

If replacement of a battery is necessary in a string that is more than 4 – 5 years old, replace the entire string. Defective batteries in a string that is less than 6 months or 1 -2 years old may be replaced on an individual battery basis.

### Retightening Connections

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Retighten any connections indicated on System Drawing annually. Follow torque levels indicated on the battery.

### Charger Troubleshooting

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**NOTE:** This only pertains to a charger(s) installed into the cabinet(s) by Atlantic Battery Systems Inc. If uncertain about the charger contact Atlantic Battery Systems inc. for further assistance.

Before assuming that the charger is not working, one should become aware of the normal charger operation. The charger will charge the batteries to a maximum of 2.3 VDC/cell +/- 1% when the batteries are fully charged. The voltage will remain at approximately 2.3 VDC/cell until the current output of the charger reaches its rated value, after which time the voltage and current will decrease gradually to float voltage of approximately 2.27 VDC/cell. Under abnormal conditions, the charger will deliver up to twice its rate current into a short circuit, but this will not cause its output fuses to blow (open). The purpose of the output fusing is to protect the unit from excessive battery current that could feed into the charger due to an internal short circuit.

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**Information**

**Online Availability**

To find out more about Atlantic Battery Systems, Inc. products, visit us on the web at: [atlanticbatterysystems.com](http://atlanticbatterysystems.com)

**Customer Services**

For technical assistance regarding Atlantic Battery Systems cabinets or to report any missing or damaged parts, call us at 973-523-5151