Novus XT 2000 Series Enclosures

Outdoor UPS System

Installation Manual

Effective: September, 2001

Novus XT 2000
Outdoor UPS System

Site Preparation and Installation Manual

031-160-B0-001, Rev A

September, 2001

Notice of FCC Compliance

Per FCC 47 CFR 15.21:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Per FCC 47 CFR 15.105:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Note: Alpha Technologies' products are subject to change through continual improvement processes. Therefore, specifications and/or design layouts may vary slightly from descriptions included in this manual. Updates to the manual will be issued when changes affect form, fit or function.

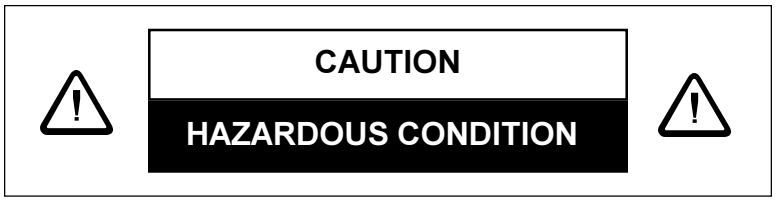
Note: Photographs contained in this manual are for illustrative purposes only. These photographs may vary depending upon your particular enclosure configuration.

Contact Alpha

General product information
and customer service
7:00 AM to 5:00 PM Pacific Time
1-800-863-3930

To obtain complete technical support
7:00 AM to 5:00 PM Pacific Time
or
For after-hours *emergency* support
7 days per week, 24 hours a day
1-800-863-3364

Safety Symbols Used in this Manual



To reduce the risk of electrical shock, injury or death caused by moving parts or the explosion of fuel, and to ensure the safe operation of this unit, the following symbols have been placed throughout this manual. Where these symbols appear, servicing must only be performed by qualified personnel.

Dangerous Voltage
This symbol indicates that a "dangerous voltage" exists in this area of the product. Use caution whenever working in the area to prevent electrical shock.

Attention
This symbol indicates important installation, operation or maintenance instructions. Always follow these instructions closely.

Safety Precautions

- The NOVUS XT 2000 enclosure must be serviced by qualified personnel only.
- Verify the voltage requirements of the equipment to be protected (load), the AC input voltage to the power supply (line), and the output voltage of the system prior to installation.
- The utility service panel must be equipped with a circuit breaker that is properly rated for use with the power supply.
- When connecting a load to the power supply, do not exceed the output rating of the system.
- Use proper lifting techniques whenever handling the units, modules or batteries.
- Alpha Uninterruptible Power Supplies can contain more than one live circuit. Even though AC voltage is not present at the input, voltage may be present at the output.

Battery Safety:

- The battery pack, used to provide backup power, contains dangerous voltages. Battery inspection and replacement must be performed by qualified personnel.
- Always wear protective clothing, insulated gloves and eye protection, such as safety glasses or a face shield whenever working with batteries.
- Do not allow live battery wires to contact the enclosure chassis. Shorting battery wires can result in a fire or possible explosion.
- Batteries must be inspected every three to six months for signs of cracking, leaking or swelling.
- Always replace batteries with those of an identical type and rating. Never install old or untested batteries.
- Avoid using uninsulated tools or other conductive materials when handling batteries or working inside the enclosure.
- Spent or damaged batteries are considered environmentally unsafe. Always recycle used batteries.
- If batteries are being stored prior to installation, they must be charged at least once every three months to ensure optimum performance and maximum battery service life.

Unpacking and Inspection Procedure:

Verify that the following items have been included in the shipping container:

- Novus XT 2000 enclosure
- Any ordered options. (For example: Battery heater mats; UPS; power distribution unit; etc.)

NOTE: Batteries are shipped separately.

Inspect the contents. If items are damaged or missing, contact Alpha Technologies and the shipping company. Most shipping companies have a limited claim period, so it is important to report damage immediately.

Save the original shipping container.

In the event that a unit must be returned for service, Alpha requests that it be packaged in its original shipping container. If the original container is not available, make sure the unit is packed with at least three inches of shock absorbing material to prevent shipping damage.

NOTE: *Do not* use popcorn-type material. Alpha Technologies is not responsible for damage caused by improper packing on returned units.

Return Procedure:

Returns for Repair: Alpha products may be returned by either method listed below:

- Download the necessary forms directly from Alpha's Web site, under "Customer Service": **www.alpha.com**
- Or call (800) 322-5742 for assistance.

Returns for Credit: Call: (800) 322-5742.

1.1 Introduction

The Novus XT Power System

The Novus XT Power System has been specially designed to provide critical power protection and clean reliable AC backup to outside plant communication applications, such as cellular, microcell, and picocell stations. Both four and eight battery systems are available, as well as generator options for extended run time applications. The Novus XT also works to protect equipment from surges and spikes present in normal utility power. Temperature-compensated charging maximizes battery life in potentially harsh, outside environments. Flexible power, run time and voltage configurations make the Novus XT appropriate for communication applications around the world.

The Novus XT 2000 Enclosure

The Novus XT 2000 Enclosure provides a safe, secure, and clean working environment for the Novus XT powering system. The all-aluminum construction with removable, lockable doors makes for easy access to internal components. A durable powder coat finish gives the enclosure superior corrosion resistance and a long service life. Built-in cooling fans and heater mats improve battery performance by extending battery life.

1.2 Features

The Novus XT 2000 enclosure comes with a number of standard and optional features.

1.2.1 Standard Features

- Durable outdoor design (NEMA 3R certified)
- Bellcore/Telcordia earthquake Zone 4 tested and approved
- Bellcore/Telcordia operational salt fog tested and approved
- Battery Retention System to keep batteries in place in the event of seismic activity
- Extended temperature Range -40°C to +46°C with full solar load
- Generator Access Door
- Sliding Battery Trays that lock in the closed position
- Bellcore/Telcordia GR-487 rated Door Restraint
- Internal Relay Rack to lower onsite installation times
- Removable Enclosure Fan Assembly
- Two-Hole Ground with Pre-Installed 6 Awg Lug for easier site grounding
- Dimensions: 37″ H x 31″ W x 17″ D
- Total weight: 765 lbs*
  (*May vary based on type of batteries used)

1.2.2 Optional Features

- DC Generator Power Cord
- Battery Heater Mats for improved battery performance at lower temperatures
- Multiple levels of surge suppression
- Mounting options:
  - Pole
    - -Wood
    - -Concrete
    - -Steel
  - Wall
  - Ground

1.3 Component Arrangement in the XT 2000

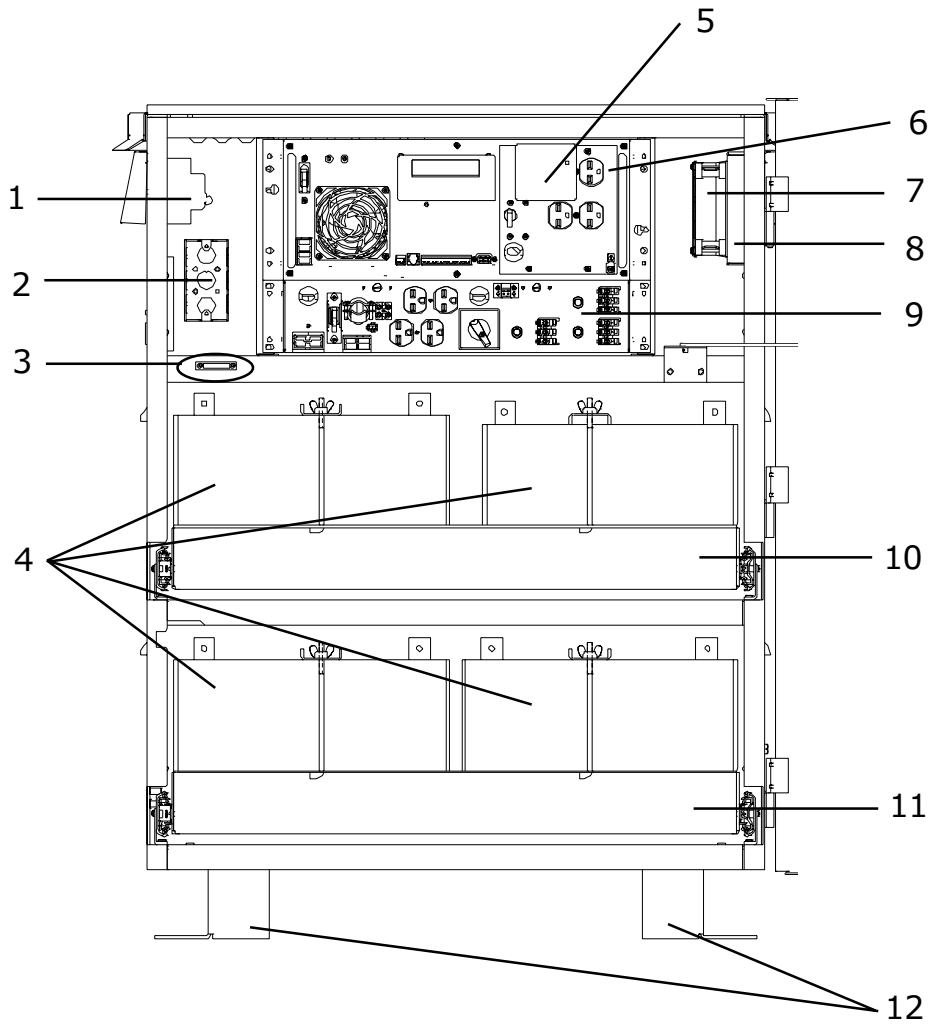


Figure 1-1;
Component arrangement in the Novus XT 2000 Enclosure

1. Input Power Disconnect
2. Input Power Receptacles
3. Tamper Switch
4. Batteries
5. LAP-Plus (Option)
6. Novus UPS
7. X2 Cooling Fans
8. Fan filter
9. Novus Power Distribution Unit
10. Upper sliding tray
11. Lower sliding tray
12. Ground Mount Adapters (Option)

1.4 Novus UPS and Novus PDU

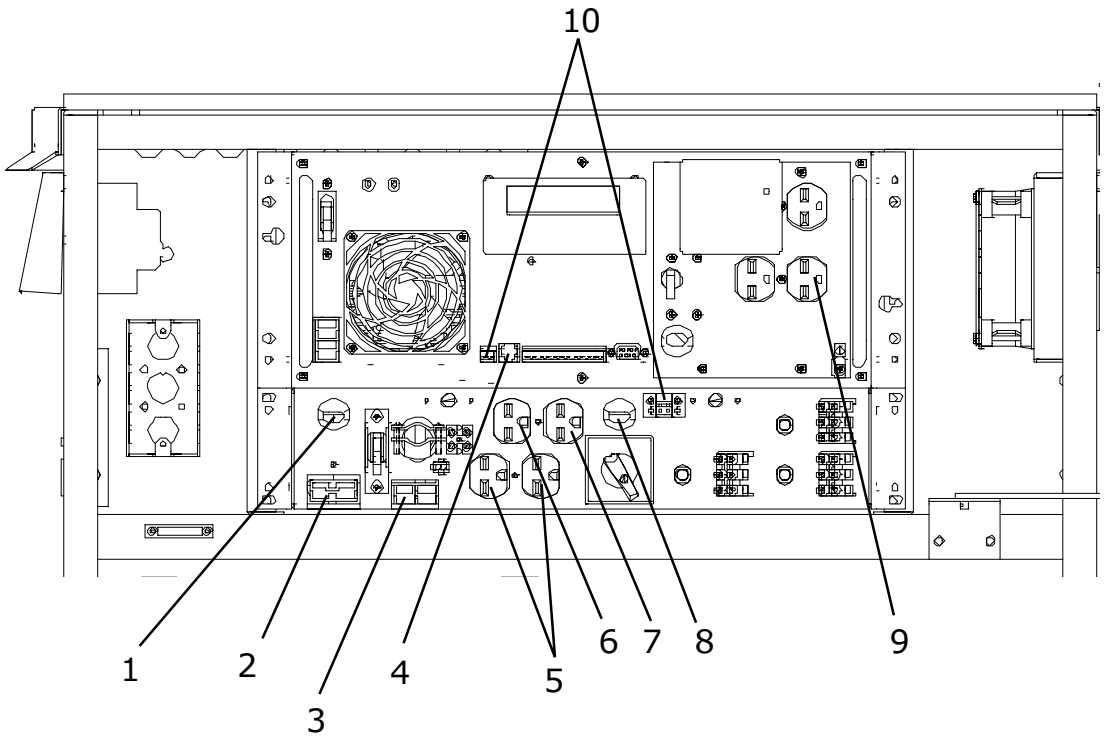


Figure 1-2;
Connection Points Between Novus Uninterruptible Power Supply (UPS) and Novus Power Distribution Unit (PDU)

1. From PDU to Utility Power Distribution
2. External Generator
3. From PDU to UPS battery
4. Battery Temperature Sensor
5. Battery Heating Pads
6. Convenience Outlet
7. XTI Input Power
8. From PDU to UPS Output Receptacle
9. Output to Loads
10. Enclosure Fan Connectors/System Bypass Alarm
    (This feature varies with model configuration.)

2.1 Pre-installation

When installing the Novus XT 2000, the site must be planned so that the enclosure will receive adequate air flow. In areas of extreme heat, the enclosure must be positioned so that it will be shaded from the afternoon sun. In areas of prevailing wind, the enclosure must be placed so that the wind strikes the side of the cabinet and not the door. This will greatly reduce the buildup of sand or snow against enclosure air vents.

The enclosure produces a small amount of noise during normal operation. Where possible, place the right side of the enclosure facing the street. This will reduce the overall noise toward residential areas. The fans are thermostatically controlled and do not operate continuously.

The enclosure must be placed where it will be free of obstructions, allowing easy access to the doors for service or equipment access. For ventilation and maintenance, allow a minimum space of 36 inches between the enclosure and other solid structures.

Place the enclosure well away from ground level sources of forced water, such as underground sprinkler systems and direct roadway splash.

Warning: **Never transport the unit with batteries installed**. Batteries must be installed ONLY after unit is transported to site and secured to pole, wall or pedestal. Transporting unit with batteries installed may cause a short circuit, fire, explosion, and/or damage to equipment. Warranty does not cover damage resulting from transporting unit with batteries installed.

2.2 Enclosure Installation

The Novus XT 2000 enclosure is designed to be used with optional adapters for ground, wall or pole mounting. The ground mount is bolted to a concrete pad; the wall mount is bolted to a suitable vertical surface; and the pole mount bracket can be used with a wooden, concrete or steel pole. It can either be secured using bolts that run through the pole, or with mounting straps. If bolted, the bolts *must* go completely through the pole and be secured from the back with a large washer and nut. Verify local minimum and maximum height mounting requirements. (Local codes may vary.)

2.2.1 Pole Mount with Bolts (for wooden poles)

Materials Supplied by Alpha*
One (1) Enclosure "I" Bracket
One (1) Pole Mount Bracket
Four (4) Load Spreader Bars
Five (5) 1/2" x 6-1/2" Galvanized Bolts
Ten (10) 1/2" Stainless Steel Flat Washers
Ten (10) 1/2" Stainless Steel Split Washers
Five (5) 1/2" Galvanized Nuts
Ten (10) 3/8" x 1-1/4" Stainless Steel Bolts
Ten (10) 3/8" Stainless Steel Flat Washers
Ten (10) 3/8" Stainless Steel Split Washers
* Extra hardware has been provided in case any is lost during installation

Materials Required *(To be supplied by installer)*
Two (2) 5/8" Diameter Machine Bolts (UNC thread) SAE (Grade 5 or better), length to suit pole
Two (2) 5/8" Diameter Zinc-Plated Flat Washers
Two (2) 5/8" Diameter Hex Nuts (UNC thread)

Tools Required:
Auger or Drill, for boring 3/4" diameter holes in the wooden pole
Mallet or Hammer
Assorted Sockets or Wrenches

1. Unpack and inspect enclosure and mounting brackets. Inspect for possible damage that may have occurred during shipping. Verify that all hardware is included.

2. Turn enclosure face down on a soft, non-abrasive surface. Remove the eight knock-outs on rear of enclosure using a hammer and a metal punch.

Note: The discarded metal from knock-outs must be removed from enclosure before installing batteries or electronics.

3. Open enclosure and remove wing nuts, lock washers and flat washers securing fan panel. Pull fan panel out half way.

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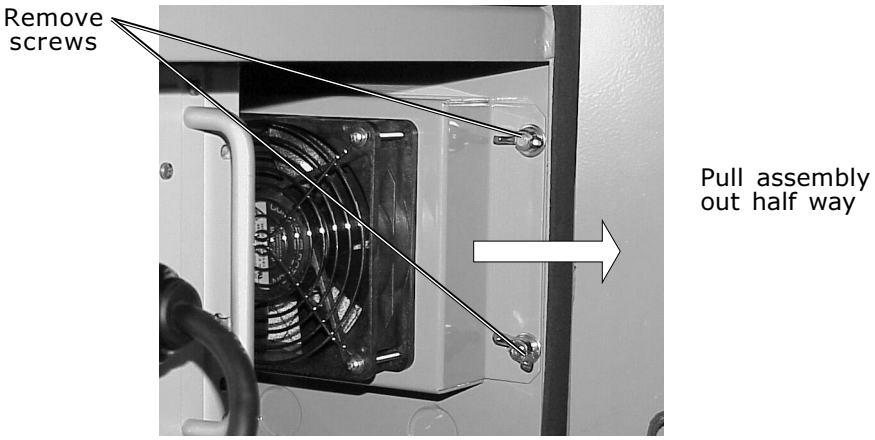
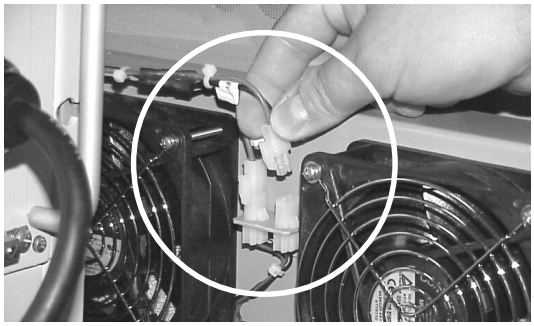
2.2.1 Pole Mount with Bolts (for wooden poles), *continued*

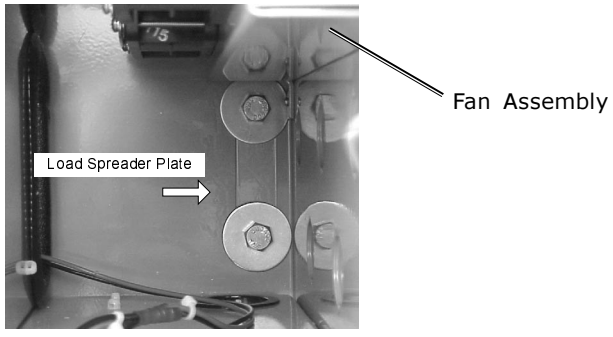


4. Disconnect fan wires from fan assembly, and completely remove assembly.



5. With bracket hook facing up (See figure 2-1), secure mounting bracket to enclosure using bolts provided. Insert bolts from inside enclosure and tighten to 20 ft/lbs.

Note: Each side of bracket requires use of load spreader plate (included with kit).



6. Reinstall fan assembly half way, and reconnect fan wires.

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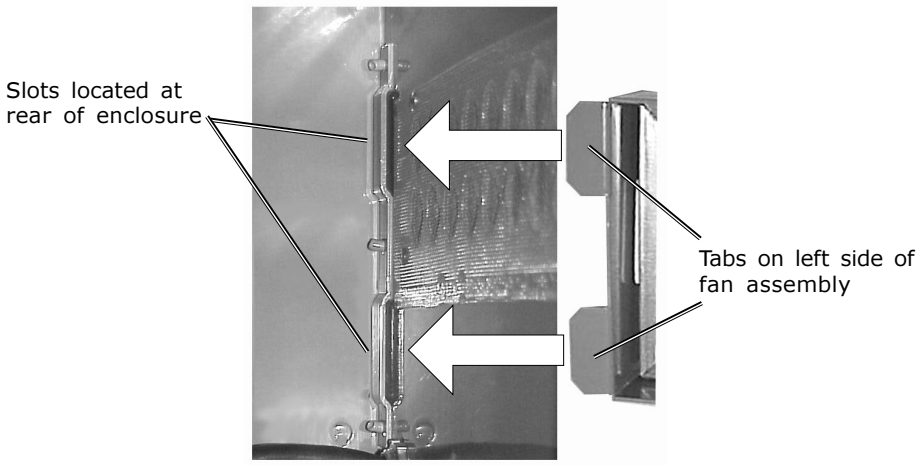
2.2.1 Pole Mount with Bolts (for wooden poles), *continued*

7. Slide tabs on left side of fan assembly into slots at rear of enclosure.

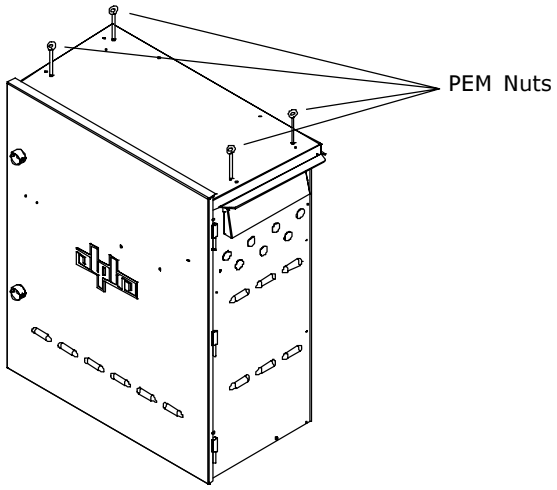


8. Reinstall wing nuts, lock washers and flat washers in fan panel.
9. Position pole mount bracket on pole and mark location of upper hole.
10. Drill a ¾" hole completely through pole.
11. Position bracket on pole, and put bolt through both bracket and pole.
12. Mark the location of the lower hole of the bracket.
13. Remove bracket, and drill a ¾" hole for the lower bolt.
14. Replace bracket. Put both bolts through bracket
15. Place large washer, lock washer and nut on each bolt, and tighten to 57 ft/lbs.
16. Lift enclosure onto pole mount bracket. *This procedure will require two people.*

(Continued on next page.)

2.2.1 Pole Mount with Bolts (for wooden poles), *continued*

Note: There are four 1/4”-20 blind PEM nuts located in enclosure lid, provided to facilitate lifting enclosure with a crane or other lifting device. ***Note: Do Not*** install batteries before lifting enclosure.



Note: Enclosure bracket has a lip on the back to help hold enclosure in place while bolting brackets together.

17. Bolt the two brackets together using the through bolts (supplied), and tighten to 57 ft/lbs.

18. The enclosure is now ready for the utility power, batteries and electronics.

2.2.1 Pole Mount with Bolts (for wooden poles), *continued*

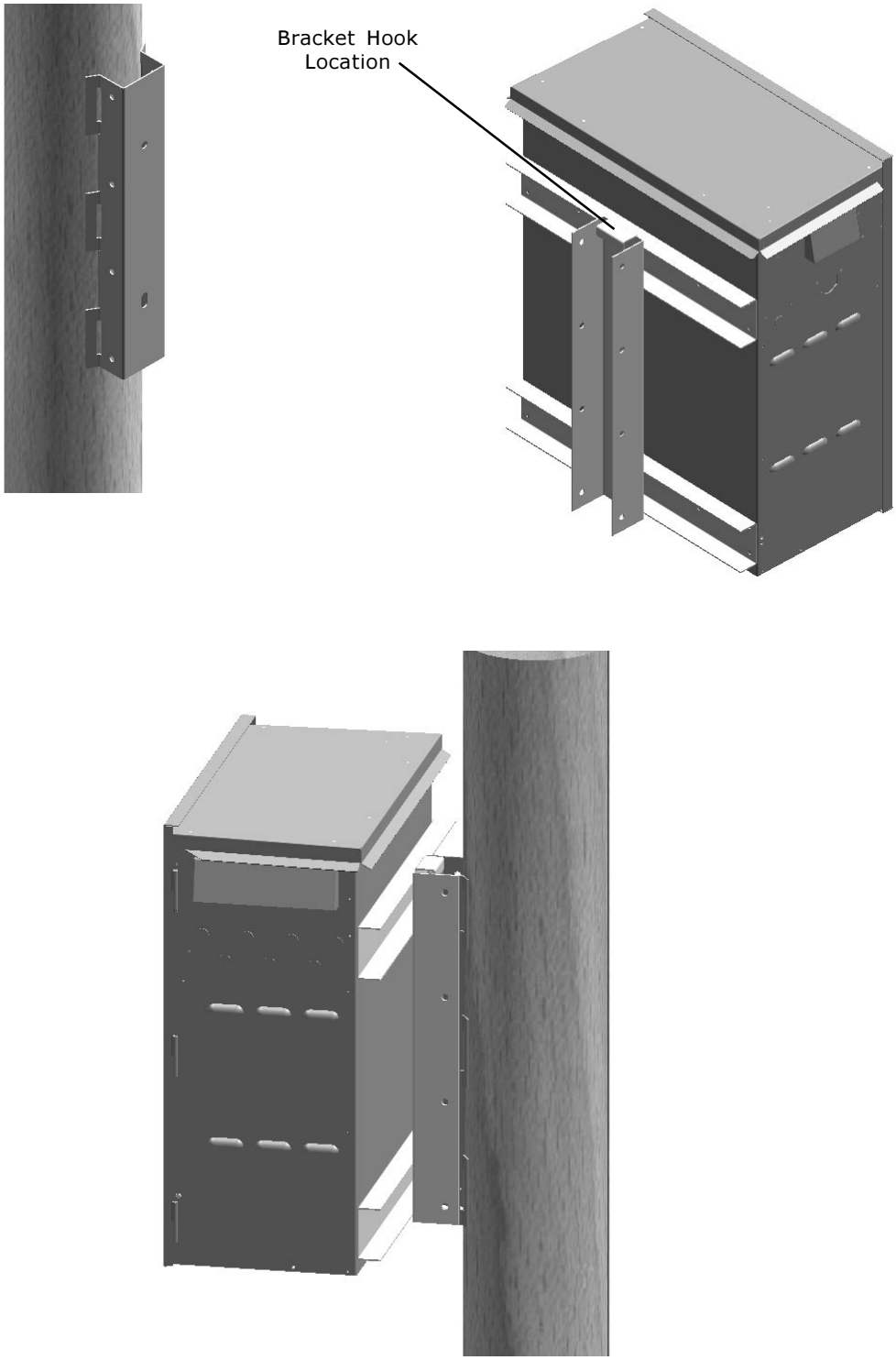


Figure 2-1; Novus XT 2000 Mounting Arrangement for Wooden Poles

2.2.2 Pole Mount with Straps (for wooden, steel or concrete poles)

Materials Supplied by Alpha*
One (1) Enclosure "I" Bracket
One (1) Pole Mount Bracket
Four (4) Load Spreader Bars
Five (5) 1/2" x 6-1/2" Galvanized Bolts
Ten (10) 1/2" Stainless Steel Flat Washers
Ten (10) 1/2" Stainless Steel Split Washers
Five (5) 1/2" Galvanized Nuts
Ten (10) 3/8" x 1-1/4" Stainless Steel Bolts
Ten (10) 3/8" Stainless Steel Flat Washers
Ten (10) 3/8" Stainless Steel Split Washers
* Extra hardware has been provided in case any is lost during installation

Materials Required *(To be supplied by installer)*
Three (3) Pole Straps, to fit pole (straps must be stainless, galvanized or equivalent)

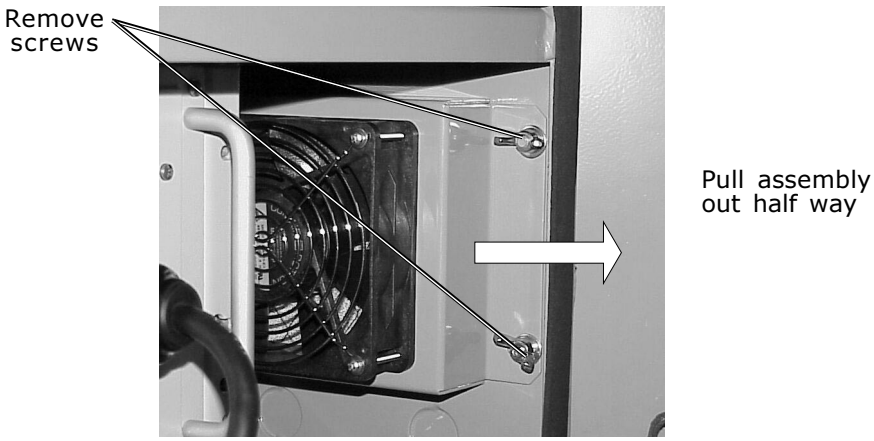
Tools Required:
Assorted Sockets or Wrenches

1. Unpack and inspect enclosure and mounting brackets. Inspect for possible damage that may have occurred during shipping. Verify that all hardware is included.

2. Turn enclosure face down on a soft, non-abrasive surface. Remove the eight knock-outs on rear of enclosure using a hammer and a metal punch.

Note: The discarded metal from knock-outs must be removed from enclosure before installing batteries or electronics.

3. Open enclosure and remove wing nuts, lock washers and flat washers securing fan panel. Pull fan panel out half way.



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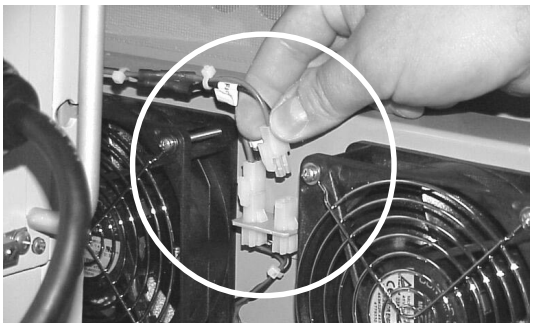
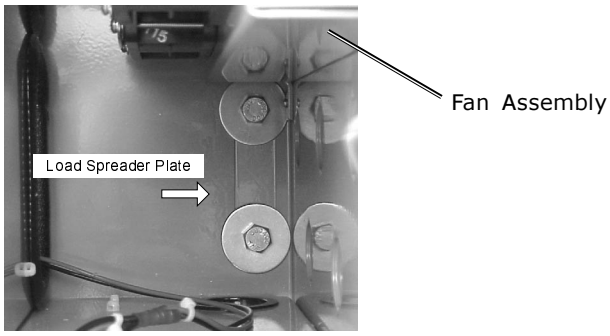
2.2.2 Pole Mount with Straps (for wooden, steel or concrete poles), *continued*

4. Disconnect fan wires from fan assembly, and completely remove assembly.



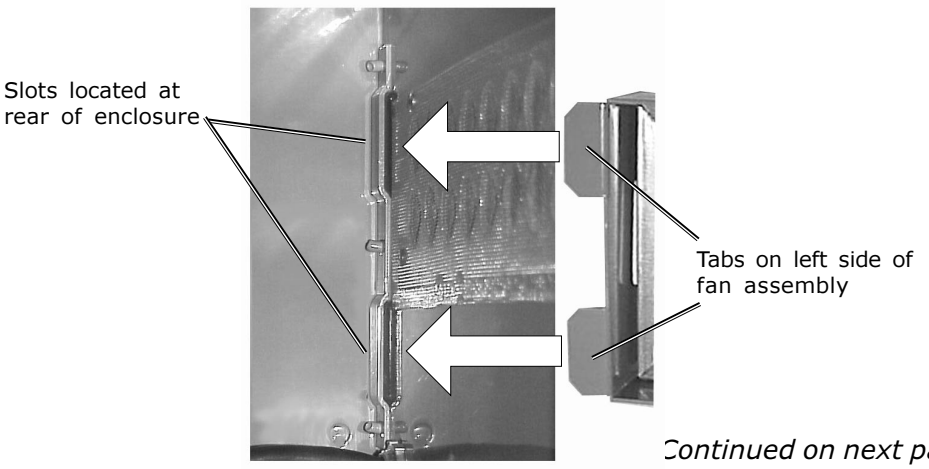
5. With bracket hook facing up (See figure 2-1), secure mounting bracket to enclosure using bolts provided. Insert bolts from inside enclosure and tighten to 20 ft/lbs.

Note: Each side of bracket requires use of load spreader plate (included with kit).



6. Reinstall fan assembly half way, and reconnect fan wires.

7. Slide tabs on left side of fan assembly into slots at rear of enclosure.



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2.2.2 Pole Mount with Straps (for wooden, steel or concrete poles), *continued*

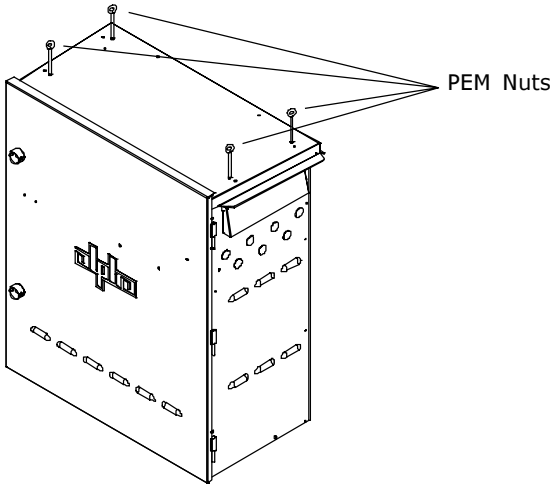
8. Reinstall wing nuts, lock washers and flat washers in fan panel.

9. Position pole mount bracket on pole, and install upper strap per strap manufacturer instructions.

10. Install remaining two straps per strap manufacturer instructions.

11. Lift enclosure over onto pole mount bracket. *This procedure will require two people.*

Note: There are four 1/4”-20 blind PEM nuts located in enclosure lid, provided to facilitate lifting enclosure with a crane or other lifting device. ***Note: Do Not*** install batteries before lifting enclosure.



Note: Enclosure bracket has a lip on the back to help hold enclosure in place while bolting brackets together.

12. Bolt the two brackets together using the through bolts (supplied), and tighten to 57 ft/lbs.

13. The enclosure is now ready for the utility power, batteries and electronics.

(Continued on next page.)

2.2.3 Wall Mount

Materials Supplied by Alpha*
One (1) Enclosure "I" Bracket
One (1) Wall Mount Bracket
Four (4) Load Spreader Bars
Five (5) 1/2" x 6-1/2" Galvanized Bolts
Ten (10) 1/2" Stainless Steel Flat Washers
Ten (10) 1/2" Stainless Steel Split Washers
Five (5) 1/2" Galvanized Nuts
Ten (10) 3/8" x 1-1/4" Stainless Steel Bolts
Ten (10) 3/8" Stainless Steel Flat Washers
Ten (10) 3/8" Stainless Steel Split Washers
* Extra hardware has been provided in case any is lost during installation

Materials Required *(To be supplied by installer)*
Six (6) 5/8" Diameter Machine Bolts (UNC thread) SAE (Grade 5 or better), length to suitwall location
Six (6) 5/8" Diameter Zinc-Plated Flat Washers
Six (6) 5/8" Diameter Wall Anchors

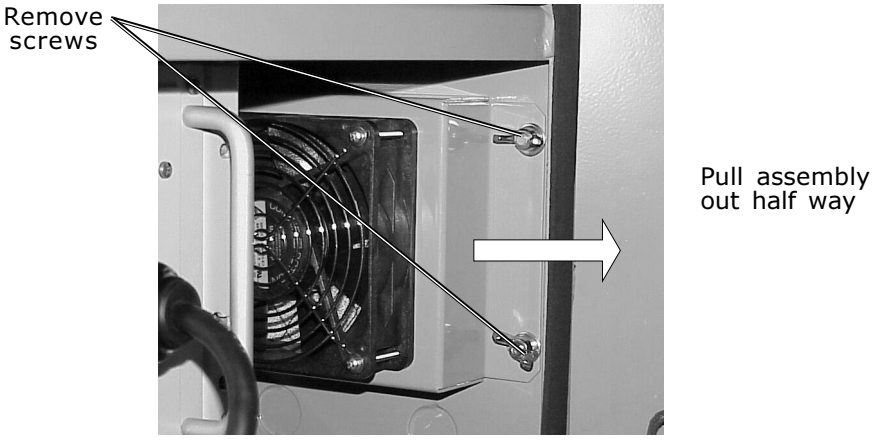
Tools Required:
Auger or Drill, for boring holes in wall
Mallet or Hammer
Assorted Sockets or Wrenches

1. Unpack and inspect enclosure and mounting brackets. Inspect for possible damage that may have occurred during shipping. Verify that all hardware is included.

2. Turn enclosure face down on a soft, non-abrasive surface. Remove the eight knock-outs on rear of enclosure using a hammer and a metal punch.

Note: Discarded metal from knock-outs must be removed from enclosure before installing batteries or electronics.

3. Open enclosure and remove wing nuts, lock washers and flat washers securing fan panel. Pull fan panel out half way.



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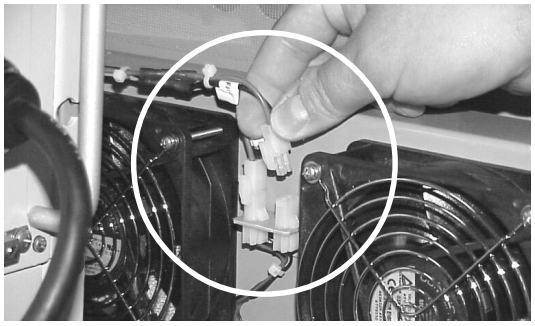
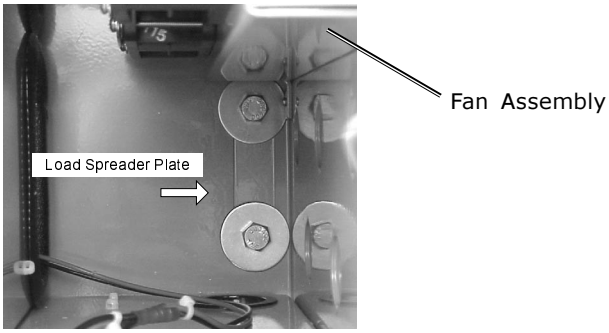
2.2.3 Wall Mount, *continued*

4. Disconnect fan wires from fan assembly, and completely remove assembly.



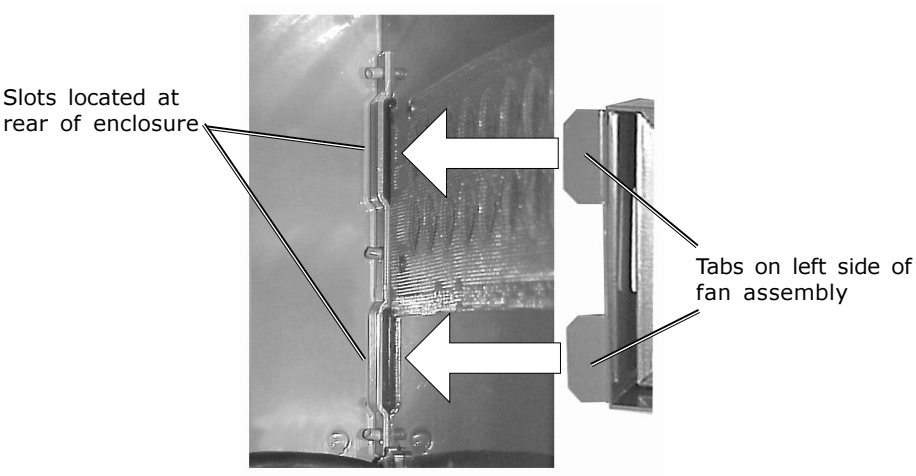
5. Secure mounting bracket to enclosure using bolts provided. Insert bolts from inside enclosure and tighten to 20 ft/lbs.

Note: Each side of bracket requires use of load spreader plate (included with kit).



6. Reinstall fan assembly half way, and reconnect fan wires.

7. Slide tabs on left side of fan assembly into slots at rear of enclosure.



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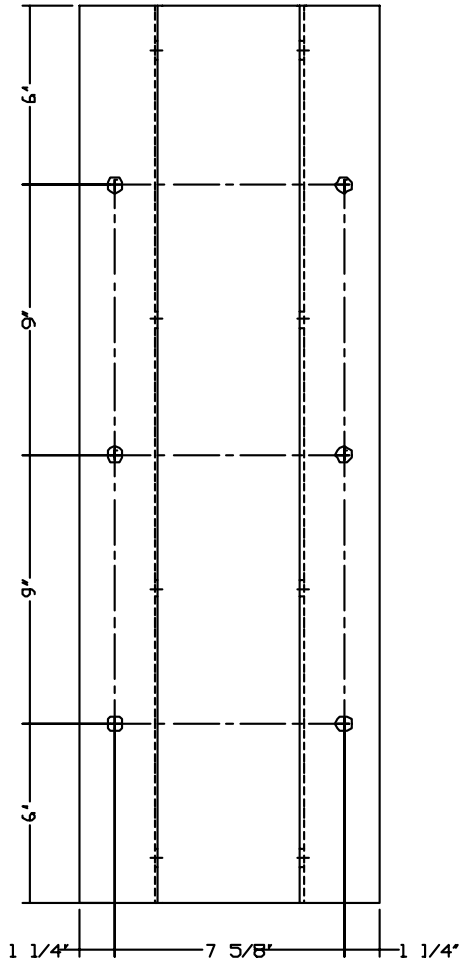
2.2.3 Wall Mount, *continued*

8. Reinstall wing nuts, lock washers and flat washers in fan panel.
9. Position wall mount bracket on wall and mark location of upper hole.

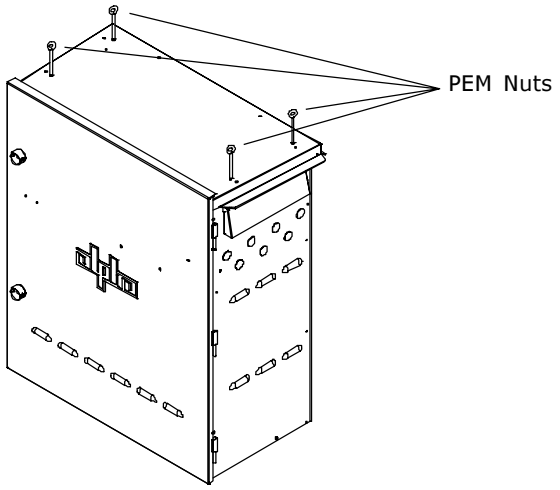


10. Drill top two holes into wall.
11. Position bracket on wall, and put bolt through both bracket and hole.
12. Mark location of lower holes of bracket.
13. Remove bracket, and drill holes for lower bolts.
14. Replace bracket. Put both bolts through bracket
15. Place a large washer, lock washer and nut on each bolt, and tighten.
16. Lift enclosure over onto pole mount bracket. *This procedure will require two people.*

(Continued on next page.)

2.2.3 Wall Mount, *continued*

Note: There are four 1/4”-20 blind PEM nuts located in enclosure lid, provided to facilitate lifting enclosure with a crane or other lifting device. ***Note: Do Not*** install batteries before lifting enclosure.



Note: Enclosure bracket has a lip on the back to help hold enclosure in place while bolting brackets together.

17. Bolt the two brackets together using through bolts (supplied) to 57 ft/lbs.

18. The enclosure is now ready for the utility power, batteries and electronics.

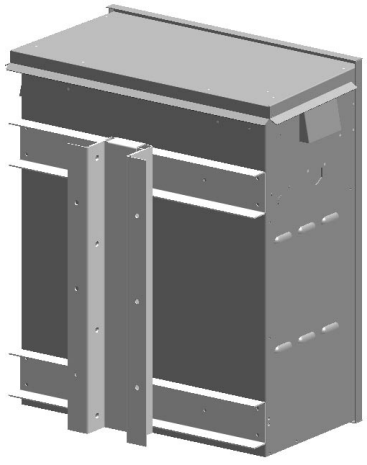


Figure 2-2; Novus XT 2000 with Wall Mounting Brackets

2.2.4 Ground Mount

Materials Supplied by Alpha*
Two (2) Ground Mount Brackets
Eight (8) 3/8" x 1-1/4" Stainless Steel Bolts
Eight (8) 3/8" Stainless Steel Flat Washers
Eight (8) 3/8" Stainless Steel Split Washers
* Extra hardware has been provided in case any is lost during installation

Materials Required *(To be supplied by installer)*
Four (4) 1/2" Anchor Bolts (Hilti style recommended)
Four (4) 1/2" Stainless Steel Washers

Tools Required:
Hammer Drill
Appropriately Sized Drill Bit
Appropriately Sized Wrench
Mallet or Hammer
Tape Measure

1. Unpack and inspect enclosure and mounting brackets. Inspect for possible damage that may have occurred during shipping. Verify that all hardware is included.

2. Turn enclosure face down on a soft, non-abrasive surface. Remove the six knock-outs on bottom of enclosure using a hammer and a metal punch.

   Note: Discarded metal from knock-outs must be removed from enclosure before installing batteries or electronics.

3. Secure mounting bracket to enclosure (there are six locations) using bolts provided. Insert bolts from inside enclosure and tighten to 20 ft/lbs.

   Note: To install front two bolts on each side of enclosure, use hole in battery tray to access these (4) bolt locations.

4. Using enclosure with mounting brackets installed as a template, mark the location at which the 1/2” anchor bolts will be installed. (Refer to Figure 2-4)

5. Install enclosure over mounting holes and insert anchor bolts.

6. Torque anchor bolts to bolt manufacturer specifications. If “Hilti” style bolts are used, torque until head pops.

7. The enclosure is now ready for utility power, batteries and electronics.

(Continued on next page.)

2.2.4 Ground Mount, *continued*

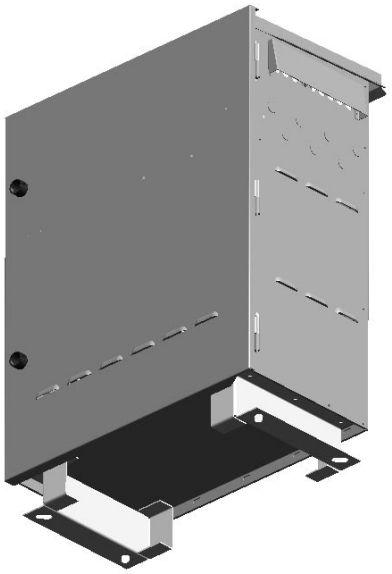


Figure 2-3; Novus XT 2000 with Ground Mounting Brackets

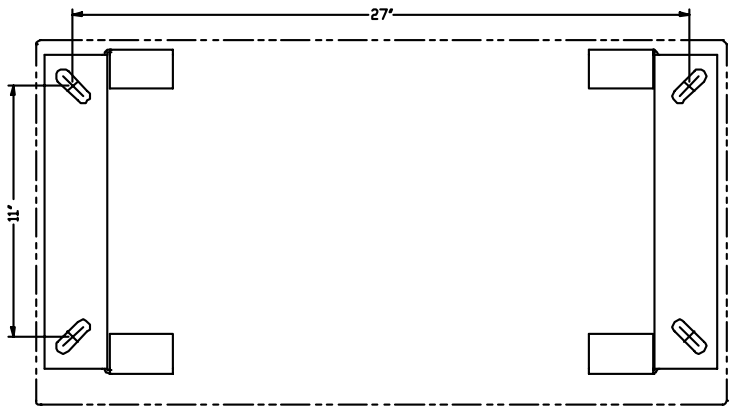


Figure 2-4; Novus XT 2000 Ground Mount Footprint

2.3 Connecting Utility Power

Caution: Connecting to the utility power must be performed **only** by qualified service personnel and in compliance with local electrical codes and common safety practices. Connection to utility power must be approved by local utility before installing the power supply.

2.3.1 Wiring Enclosure Utility Power:

Utility power enters the Novus XT 2000 enclosure through a 3/4" electrical conduit opening on the left or right side of the unit. The enclosure accepts a standard electrical fitting. Enclosures are equipped with a circuit breaker assembly, located in enclosure module compartment. In most cases the following configurations qualify for service entrance use, however, other codes may apply.

2.3.2 Connection Procedure for BBX-70A Service Disconnect (option):

Note: UL and NEC require that a service disconnect switch (UL listed) be provided by the installer and be connected between the power source and the Alpha power supply. Connection to the power supply must include an appropriate service entrance weather head.

1. Locate service entrance panel on enclosure exterior. Remove cover to access circuit breaker assembly. If service panel is to be used as the primary service entrance, Neutral must be bonded to Ground by installing green ground screw (provided) in hole in neutral bus.
2. Remove knockout located at base of service entrance.
3. Install the conduit nipple into the service entrance via the knockout, and secure with the appropriate threaded conduit locknut.
4. Locate screw terminals (L1 and L2) on top of input circuit breaker.
5. Connect one of the incoming Black #6 AWG wires to L1 (left terminal). Connect the remaining Black (or Red) #6 AWG wire to L2 (right terminal). NOTE: If the wire at L2 is Black, mark with red tape (or label).
6. Connect #6 AWG White wire to the neutral (N) bus lug located to top right of circuit breaker assembly.
7. Connect #6 Bare solid or stranded for Grounding Electrode Conductor (Earth Ground) to ground and neutral bus located to right of circuit breaker assembly.
8. Notify electrical inspector to approve service entrance wiring. Once approved, contact local power utility for electrical service.

(Continued on next page.)

2.3.2 Connection Procedure for the BBX-70A, *continued*

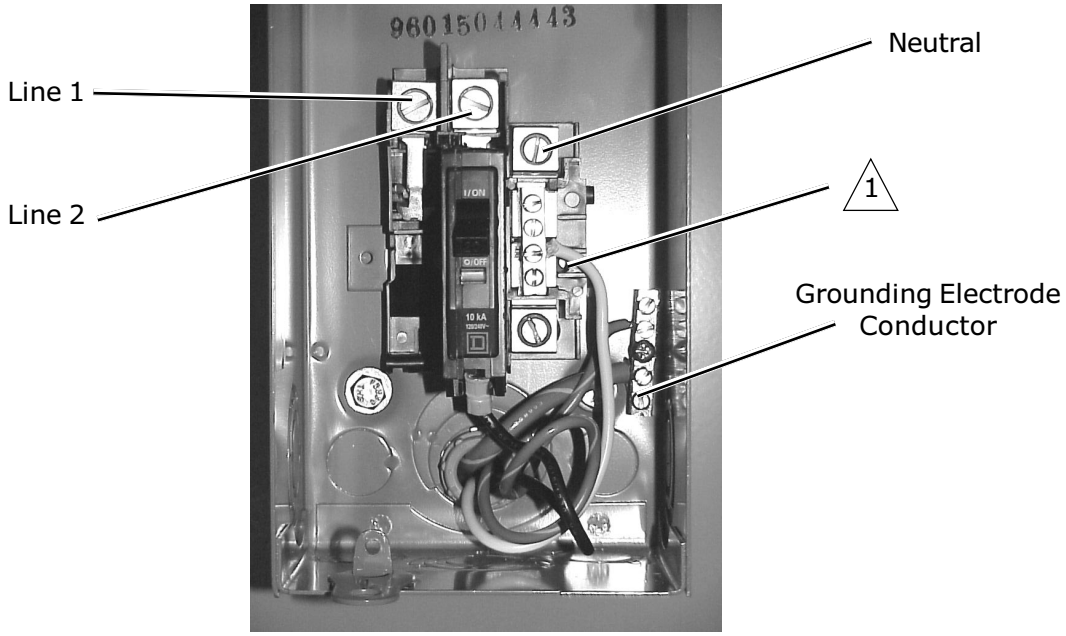


Figure 2-5; BBX-70A Service Disconnect

1 Bond made by bonding screw only if no other service panel is used. (Must be installed on site only if this is the primary service entrance.)

2.3.3 Connection Procedure for Internal Power Disconnect (IPD)

Note: This unit does not require the use of Neutral for domestic US applications. When used on 230 VAC 50 Hz, the L2/N designation is used for Neutral on single-end grounded systems.

Note: UL and NEC require that a service disconnect switch (UL listed) be provided by the installer and be connected between the power source and the Alpha power supply. Connection to the power supply must include an appropriate service entrance weather head.

1. Remove either knockout on left side of unit, or knockout on right side of unit.
2. Install conduit nipple in the selected knockout, and secure with appropriate threaded conduit locknut or elbow.

   Note: The NEC requires liquid-tight connections in top 1/3 of a NEMA 3R-rated enclosure.

3. Locate Input Power Disconnect breaker.
4. Connect L1 and L2/N to breaker.
5. Connect ground to stud located just below breaker.

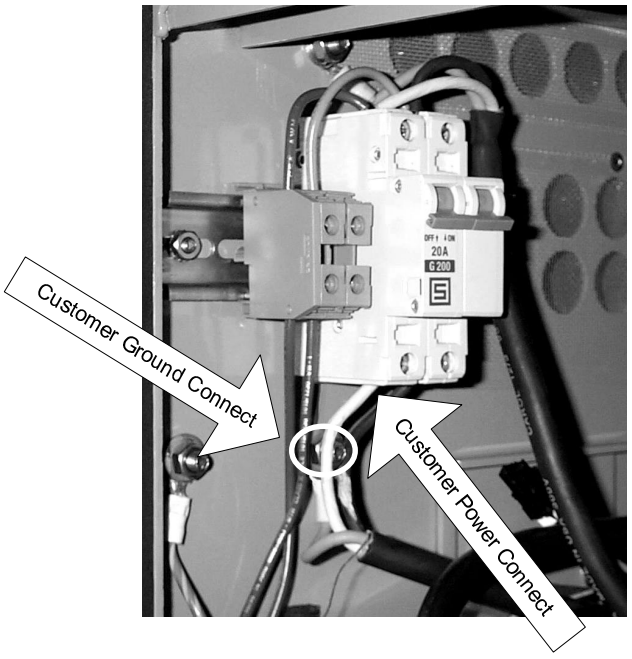


Figure 2-6; Internal Power Disconnect

2.4 Power Supply/Power Distribution Unit Installation

When installing the Novus XT Powering system, it is easier to install the Uninterruptible Power Supply (UPS) and Power Distribution Unit (PDU) before installing the batteries.

Tools required:

- Phillips Head Screwdriver
- Small Flat Blade Screwdriver
- Wire Stripper
- Wire Cutters

1. Place PDU on top shelf, so that mounting ears line up with bottom set of nuts on rack system. Secure PDU with supplied hardware.

2. Place UPS on top of PDU and line up with nuts on rack system. Secure with supplied hardware.

3. If PDU is equipped with DC output option, connect supplied wires from UPS DC Out terminal block to the DC Out mate connector on PDU.

4a. *For PDU model with Bypass Alarm:*
Connect supplied fan wires to DC Out terminal block on UPS. Red wire lines up with the (+) on UPS, and black wire lines up with the (-).

4b. *For PDU model with DC Output option:*
Connect fan wires to DC Out Terminal Block located on the PDU just to the right and above the Maintenance Bypass Switch. Red wire goes to (+), and black wire goes to (-).

5. If system is equipped with an enclosure Over Temp Alarm, follow these instructions for wire installation:

   a. *For PDU model with Bypass Alarm:*
   Install wires in Bypass Alarm terminal block, located just to the right and above the Maintenance Bypass Switch.

   b. *For PDU model with DC Output option:*
   Install wires into Service Alarm Pos (#1 and 2) on UPS status terminal block.

6. Plug UPS AC Input cable into UPS AC Input located on PDU.

7. Plug UPS AC Output plug on the PDU into Output Receptacle on UPS.

8. Verify that Input Power Breaker is off, then plug PDU Utility Input into receptacle at rear left of enclosure.

(Continued on next page.)

2.4 Power Supply/Power Distribution Unit Installation, *continued*

9. Plug UPS Battery Connector on PDU into Battery Connector on UPS.

10. Install Battery Temperature Probe in PDU. (Once batteries have been installed, Battery Temp Probe will be connected to battery #4. This procedure is covered in section 2.5.5, "Battery Installation Procedure.")

11. Plug black and red battery "Y" cable into PDU battery connection.

12. Verify that all circuit breakers in Novus XT 2000 enclosure are off.

13. Proceed to next section, "Battery Installation."

2.5 Battery Installation

2.5.1 Battery Safety Notes

NOTE: *Please read the following section before proceeding.*

Electrical Hazards

Battery systems represent a risk of electrical shock and high short circuit currents. The following precautions must be observed when maintaining batteries:

- Remove all personal metal objects (watches, rings, etc.)
- Use insulated tools.
- Wear eye protection and rubber gloves.
- Observe circuit polarities.
- Do not make or break live circuits.
- Do not lay metal tools and hardware on top of batteries.

Battery is enclosed in cabinets with limited access. Extreme caution must be exercised when maintaining and collecting date on battery system.

Disposal

- Recycle lead acid batteries. Batteries contain lead and dilute sulfuric acid. Dispose of in accordance with Federal, State, and local regulations. Do not dispose of in a landfill, lake or other unauthorized location.

Chemical Hazards

- Any gelled or liquid emissions from battery is electrolyte. Electrolyte contains dilute sulfuric acid which is harmful to the skin and eyes. It is also electrically conductive, and corrosive.

- If electrolyte contacts skin, wash immediately and thoroughly with water. If electrolyte enters eyes, wash thoroughly for 10 minutes with clean water or a special neutralizing eye wash solution and seek immediate medical attention.

- Neutralize spilled electrolyte with the special solutions contained in a "spill kit" or with solution of 1 lb. bicarbonate of soda to 1 gallon of water.

Fire, Explosion, and Heat hazards

- Lead acid batteries can contain an explosive mixture of hydrogen gas which can vent under overcharging conditions.

- Do not smoke or introduce sparks in vicinity of battery.

- Always switch the inverter battery circuit breaker off before connecting or disconnecting the battery pack. This greatly reduces chance of spark.

- Do not charge batteries in a sealed container. Individual batteries must have 0.5 inches of space between them to allow for convection cooling. If contained, assure container or cabinet and room have adequate ventilation to prevent accumulation of potentially vented gas.

- Do not allow live battery wires to contact the enclosure chassis.

2.5.2 Battery Identification

Each battery contains a date code usually located near the positive (+) terminal of the battery. This date code must be recorded in the maintenance log. If batteries other than those installed by Alpha are used, consult battery manufacturer documentation for date code type and placement.

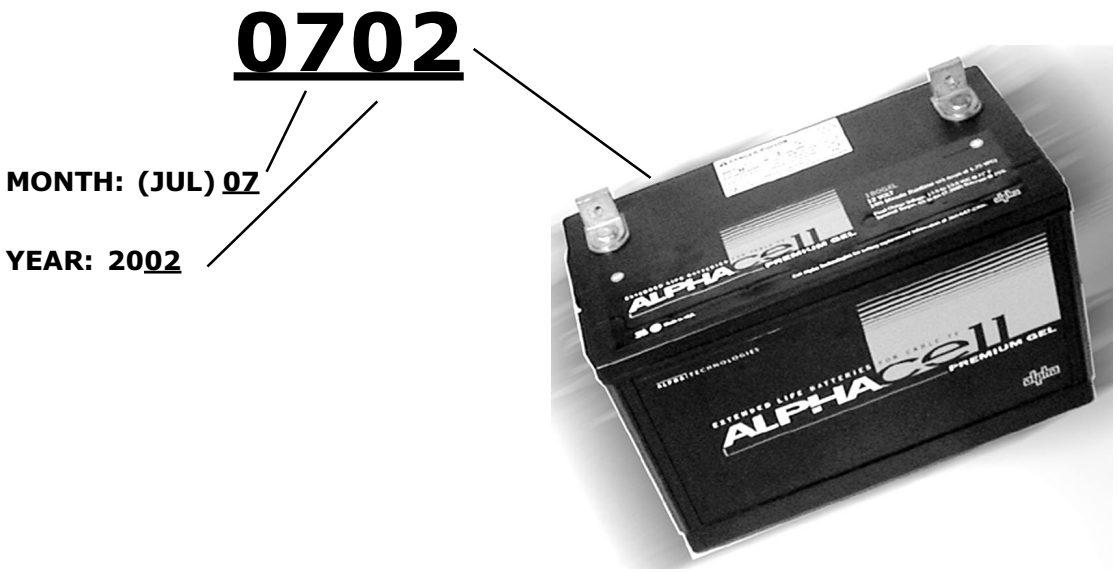


Figure 2-7; Alpha Cell Battery Date Code

2.5.3 Battery Terminal Connections

Figure 2-7 is for illustrative purposes only. Various types of batteries with different mounting styles and hardware may be shipped with the system. Always refer to the battery manufacturer specifications for correct mounting hardware and torque requirements. During maintenance procedures, refer to the manufacturer specifications for the maintenance torque requirements.

Mounting hardware requirements may vary with battery manufacturer. Use only hardware recommended by manufacturer of battery in use.

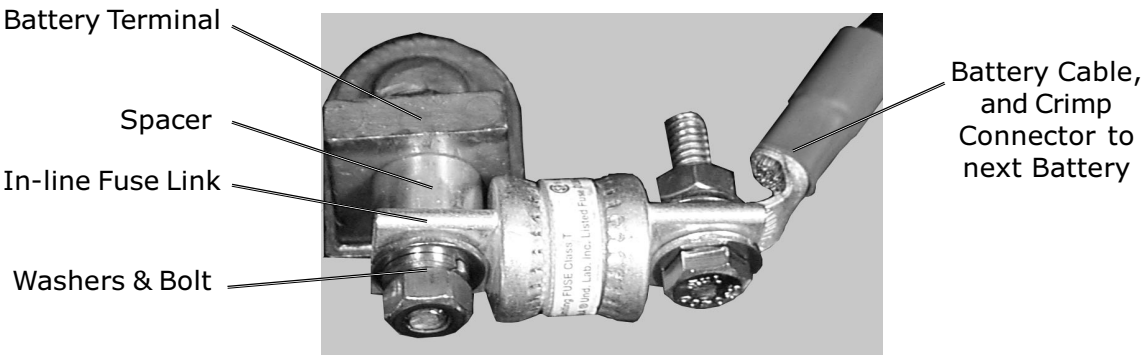


Figure 2-8; In-Line Fuse Link Mounting (optional)

2.5.4 Battery Terminal Assembly Procedure

Figure 2-8 shows Battery Terminal assembly for vertically mounted battery posts. Refer to battery manufacturer specifications for tightening torque.

Note: Apply suitable oxidation inhibitor to battery terminal.

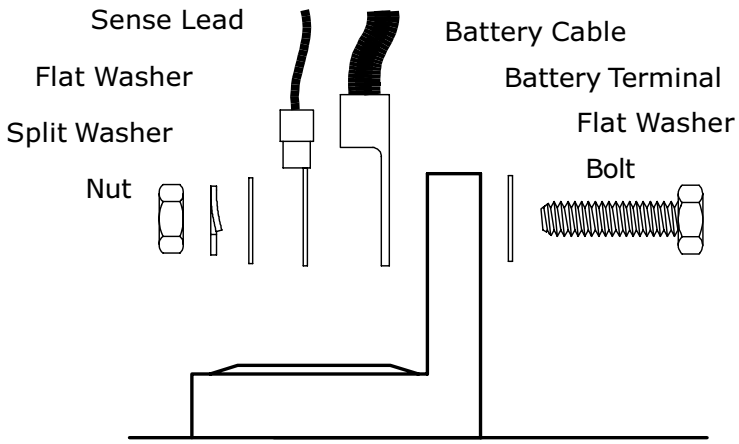
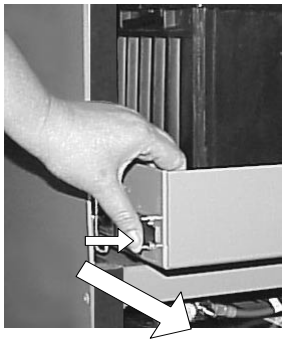


Figure 2-9; Vertically Mounted Battery Post

2.5.5 Battery Installation Procedure

Note: Battery shelves are equipped with position locks on both sides of tray. To open, press sides towards tray and pull tray out:



1. Install Battery Heater Mats (one per shelf). Verify thermostat assembly faces rear of enclosure.

2. Route Battery Heater Mat wiring harness through shelf and connect to PDU.

3. Place batteries on respective shelves. (See Figure 2-9.)

4. If using AlphaCell 165 GXL or 160 AGM, install foam block (included with battery Cable Kit) between batteries at center of shelf. Foam block is not required for use with other battery types.

5. Install Battery Retention Kit (hardware is supplied with kit):

Note: Battery Retention System is required to meet seismic requirements.

Note: For 180 GXL battery, flat side of bar faces toward battery. For 165 GXL and 160 AGM batteries, flat side of bar faces away from battery. Each battery tray requires two supports.

   a. Place Battery Retention Kit bar over batteries, with ground hole facing rear of enclosure, and positioned over rear support arm. Pull bar forward until it stops.

   b. Position front support arm up trough tray and into front hole on bar. Place a flat washer, split ring over bar and tighten with wingnut.

6. Repeat step 4 as necessary.

2.5.5 Battery Installation Procedure, *continued*

Note: Apply suitable oxidation inhibitor to battery terminal.

7. Connect the four batteries in series (negative to positive) to achieve 48 VDC (refer to diagram on enclosure door). Route battery cables inside vertical rail for connection to the Power Distribution Unit. Terminal connectors must be torqued to approximately 75 in/lbs at installation and then re-torqued to 50 in/lbs during routine maintenance. Each battery terminal should be protected with a correctly placed terminal boot.

Note: Cables are marked with a red sleeve to indicate the (+) positive battery terminal.

8. Use a voltmeter to verify polarity and DC voltage at module battery connector.

Caution: Whenever making or breaking battery connections, never allow live battery cables to contact the chassis. If necessary, wrap lugs with electrical tape to prevent arcing and temporarily disconnect a lead from center battery. Check battery voltages at connectors leading into XM power supply.

Note: Verify that voltage and polarity are correct before proceeding.

9. Mate battery connectors to their designated sockets on battery "Y" cable, located in each battery compartment.

10. Number the batteries 1, 2, 3 and 4 using labels or masking tape. Record number for each battery and include date code in UPS maintenance log.

11. Attach Temp Probe from PDU to side of battery #4.

12. Repeat steps above for second battery shelf.

2.5.6 Battery Cable Kit, Novus XT 2000

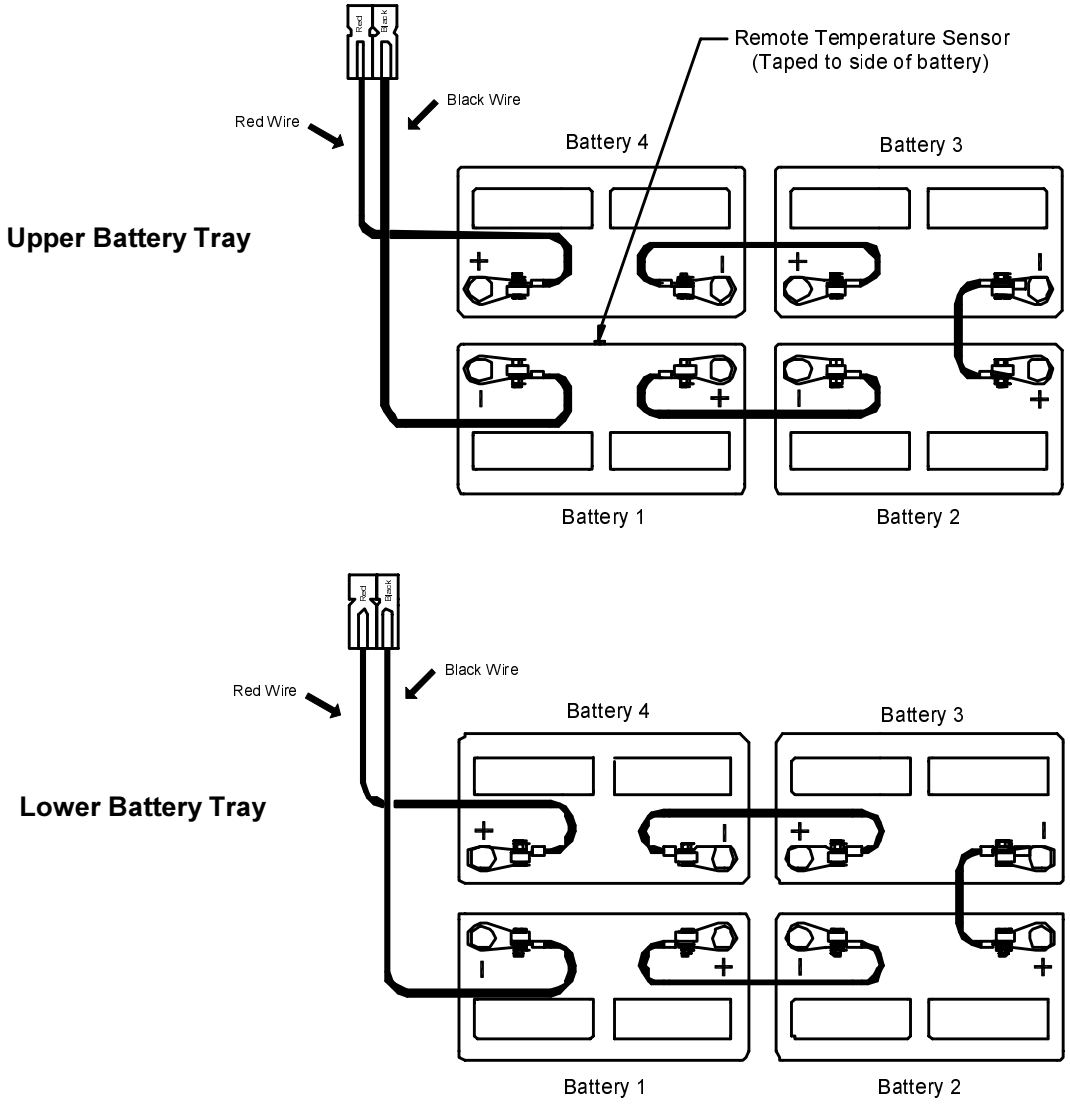


Figure 2-10; Battery Cable Kit, Novus XT 2000

3.1 Start-up and Test

For complete start-up and test procedure, please refer to the:

Novus UPS Manual (Alpha P/N 017-156-B0).

Novus Power Distribution Unit Manual (Alpha P/N 017-157-B0).

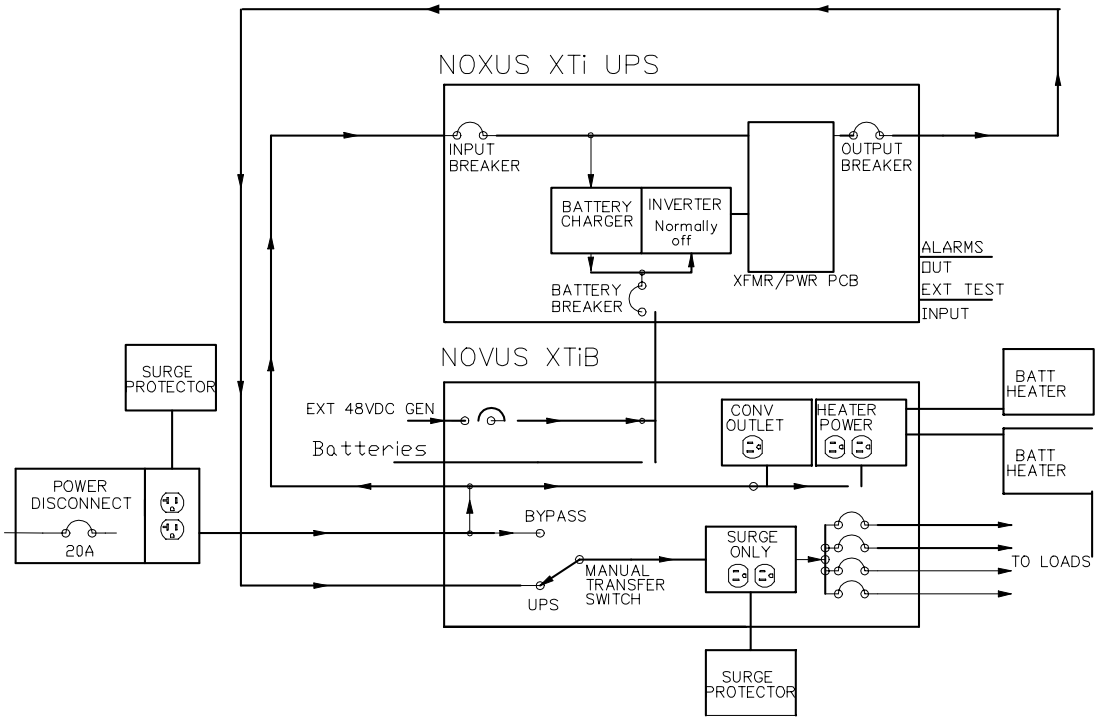


Figure 3-1; Simplified Block Diagram, Novus XT Power System

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