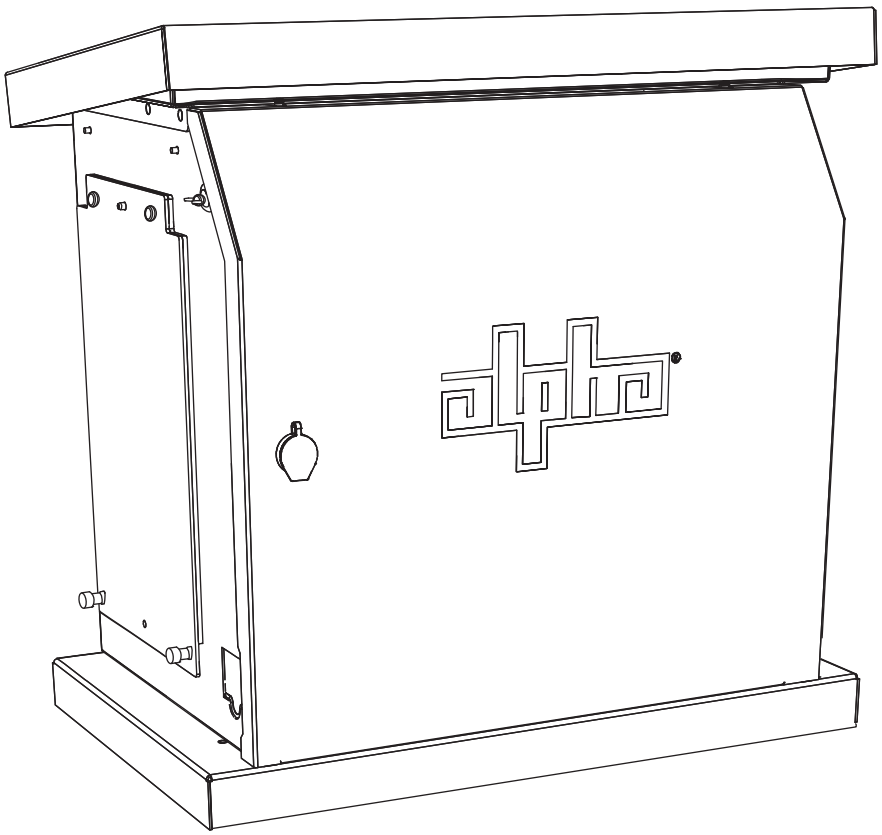
an EnerSys® company

GEM (Generator Expansion Module) Technical Manual

Effective: November 2020



Safety Notes

Review the drawings and illustrations contained in this manual before proceeding. If there are any questions regarding the safe installation or operation of the system, contact Alpha Technologies Services, Inc. or the nearest Alpha® representative. Save this document for future reference.

To reduce the risk of injury or death and to ensure the continued safe operation of this product, the following symbols have been placed throughout this manual. Where these symbols appear, use extra care and attention.

WARNING! GENERAL HAZARD

GENERAL HAZARD WARNING provides safety information to PREVENT INJURY OR DEATH to the technician or user.

WARNING! ELECTRICAL HAZARD

ELECTRICAL HAZARD WARNING provides electrical safety information to PREVENT INJURY OR DEATH to the technician or user.

WARNING! FUMES HAZARD

FUMES HAZARD WARNING provides fumes safety information to PREVENT INJURY OR DEATH to the technician or user.

WARNING! FIRE HAZARD

FIRE HAZARD WARNING provides flammability safety information to PREVENT INJURY OR DEATH to the technician or user.

There may be multiple warnings associated with the call out. Example:

WARNING! ELECTRICAL & FIRE HAZARD

This WARNING provides safety information for both Electrical AND Fire Hazards

CAUTION!

CAUTION provides safety information intended to PREVENT DAMAGE to material or equipment.

***NOTICE**:*

NOTICE provides additional information to help complete a specific task or procedure.

ATTENTION:

ATTENTION provides specific regulatory/code requirements that may affect the placement of equipment and /or installation procedures.

Generator Expansion Module

Technical Manual

031-326-B0-001, Rev. A1

Effective Date: November 2020

Disclaimer

Images contained in this manual are for illustrative purposes only. These images may not match your installation.

Operator is cautioned to review the drawings and illustrations contained in this manual before proceeding. If there are questions regarding the safe operation of this powering system, please contact Alpha Technologies Services, Inc. or your nearest Alpha® representative.

Alpha shall not be held liable for any damage or injury involving its enclosures, power supplies, generators, batteries or other hardware if used or operated in any manner or subject to any condition not consistent with its intended purpose or is installed or operated in an unapproved manner or improperly maintained.

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:
This equipment has been tested and found to comply with the limits for a Class A 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 their own expense.

Contact Information

Sales information and customer service in USA (7AM to 5PM, Pacific Time):	+1 800 322 5742
Complete technical support in USA (7AM to 5PM, Pacific Time or 24/7 emergency support):	+1 800 863 3364
Sales information and technical support in Canada:	+1 888 462 7487
Website:	www.alpha.com

Table of Contents

Figures

GEM Safety Notes

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To reduce the risk of injury or death, and to ensure the continued safe operation of this product, the following symbols have been placed throughout this manual. Where these symbols appear, use extra care and attention.

WARNING! GENERAL HAZARD

- Only authorized and trained personnel should maintain or service the enclosure.
- Always lock the enclosure after servicing.
- Read and follow all installation, equipment grounding, usage, and service instructions for this product and products used in conjunction with it.
- Use proper lifting techniques whenever handling enclosure, equipment, parts, or batteries.

WARNING! ELECTRICAL HAZARD

- Remove all conductive jewelry or personal equipment prior to servicing equipment, parts, connectors, wiring, or batteries.
- Batteries contain dangerous voltages and corrosive material. Only authorized and trained personnel should install, maintain or service the batteries.
- Always use insulated tools to install, maintain, or service batteries.
- Using a generator in wet conditions could result in electrocution. Keep the generator dry.
- Use special caution when connecting or adjusting battery cabling. An improperly connected battery cable or an unconnected battery cable can result in arcing, fire, or possible explosion.

WARNING! FUMES HAZARD

- Avoid any contact with gelled or liquid emissions from valve-regulated lead-acid (VRLA) batteries. Emissions contain dilute sulfuric acid that is harmful to the skin and eyes. Emissions are electrolytic, and are electrically conductive and are corrosive. Follow the Chemical Hazards notes if contact occurs.
- Carbon Monoxide can cause DEATH or serious injury. Never run the generator in an enclosed location.

WARNING! FIRE HAZARD

- Remove generator from enclosure before refueling.
- The exhaust system, and some generator parts, get hot enough to ignite some materials. Keep the exhaust area clear of combustible materials.
- Do not smoke or introduce sparks in the vicinity of batteries or fuel.

CAUTION!

- Always verify that ALL equipment is rated for both the input and output voltages of the current application and is in proper working condition.
- Prior to handling the batteries, touch a grounded metal object to dissipate any static charge that may have developed in your body.

ATTENTION:

- The GEM enclosure is intended for temporary deployment of a portable emergency generator.
- Prior to installation, contact local utilities, building maintenance departments, and cable/piping locator services to ensure that installation does not interfere with existing utility cables or piping.
- Installer must check local codes regarding the placement of equipment with flammable material installed on utility equipment.
- The GEM enclosure is not compatible with generators equipped with a carbon monoxide sensor due to insufficient ventilation. These types of generators will shut down after being installed in the GEM.

1.0 Introduction

The Generator Expansion Module (GEM) extends runtime for PWE-3/PWE-6 and UPE-3/UPE-6 enclosures. The GEM shelters and safeguards a lightweight portable generator. It may install to the base of a PWE enclosure, or to the top of a UPE-3/UPE-6 enclosure, or it may be mounted as a standalone unit. Once the mounting hardware is in place, the GEM can be quickly removed or re-installed from the enclosure without tools. When installed as a standalone unit, the GEM can be easily removed with a wrench.

The AC generators can be connected to the power supply using an optional Line Transfer Switch (LTS) that switches the power source from generator to line automatically on resumption of AC line power. The DC generators connect directly to the batteries.

The GEM can be deployed independently, or as a part of Alpha's Generator Expansion Module system, which includes the GEM enclosure, mounting kit, line transfer switch (LTS), and portable generator.

Key Features:

- Quick installation
- Optional Line Transfer Switch (LTS)
- Provides 3 to 10 hours of additional runtime
- Protects the generator from weather and theft
- Field-installable on existing PWE-3/PWE-6 and UPE-3/UPE-6 enclosures
- Can be left in place or easily removed after an outage

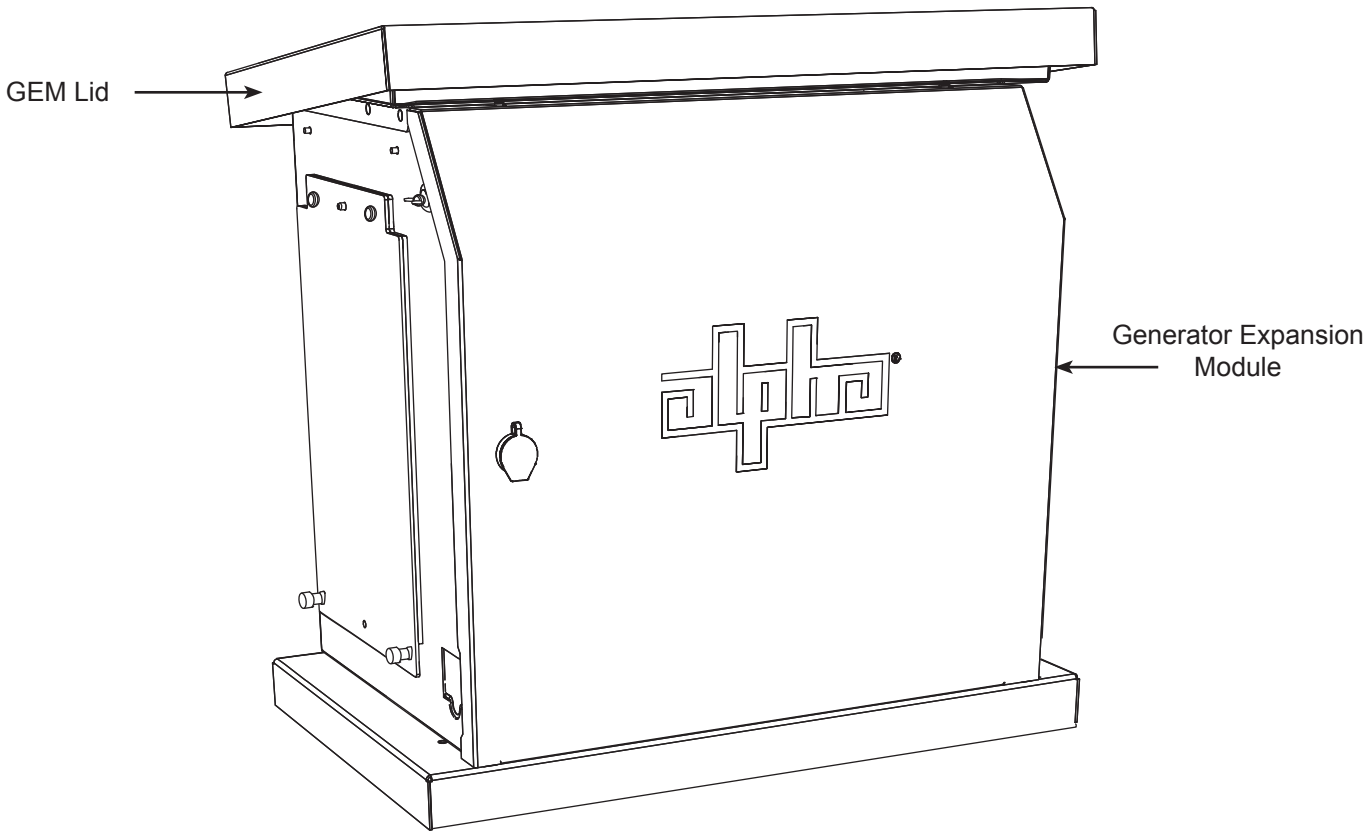


Fig. 1-1, Generator Expansion Module (GEM)

2.0 Installing the GEM Enclosure

The GEM enclosure has three different installation options: it can be mounted underneath PWE pole-mounted enclosures, on top of UPE enclosures, or as a stand-alone pole-mounted unit.

Tools and Materials:

PWE
- Drill with 3/16" and 1/4" bits
- Rivet gun

Standalone
- 7/16" open end wrench
- 2x Wood Pole Mounting Brackets (Alpha P/N 744-670-20)
- 2x Steel/Concrete Pole Mounting Brackets (Alpha P/N 591-557-20)

UPE
- Punch
- Hammer
- Phillips Screwdriver`
- 11/32" wrench (AC Version
- 3/8" Wrench (DC Version

For Some Enclosures
- Center Punch
- Tin Snips
- Tape Measure
- 2 1/2" Hole Saw

2.1 PWE Installation

1. Locate the mounting holes on the lower left and right side of the PWE enclosure.
2. Use the 1/4" drill bit to clear the powder coat from the holes. If there are no mounting holes on your enclosure, drill a 1/4" hole using the dimensions shown in Fig. 2-1.
3. Mount the GEM brackets to the PWE using these holes. Secure the brackets with the 1/4" Nylon Lock Nuts.

CAUTION!

Take great care in measuring and drilling holes (when necessary). Hole location is critical.

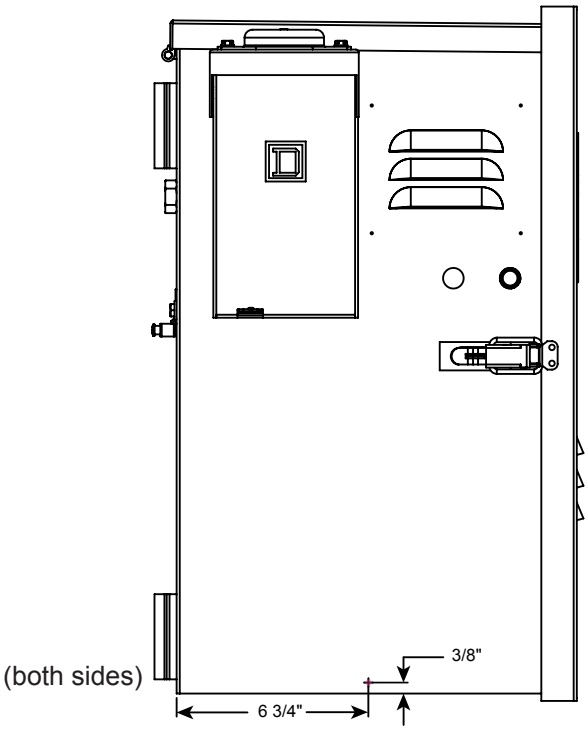
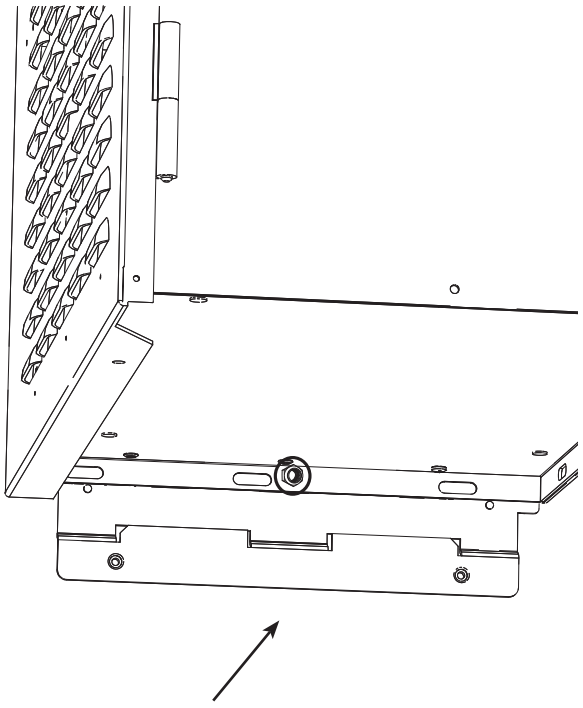


Fig. 2-1, Mounting Hole Location



NOTICE:

The half-shears should be below the enclosure's edge.

4. Position the bracket so that the bottom edge is straight and even.
5. Using the mounting bracket as a template, use a 3/16" (.188") drill bit to drill two holes in each side of the enclosure wall. Ensure that the bracket sits directly against the PWE enclosure and that there is no swarf buildup between the two parts.
6. Rivet the bracket in place using the provided .188" rivets.

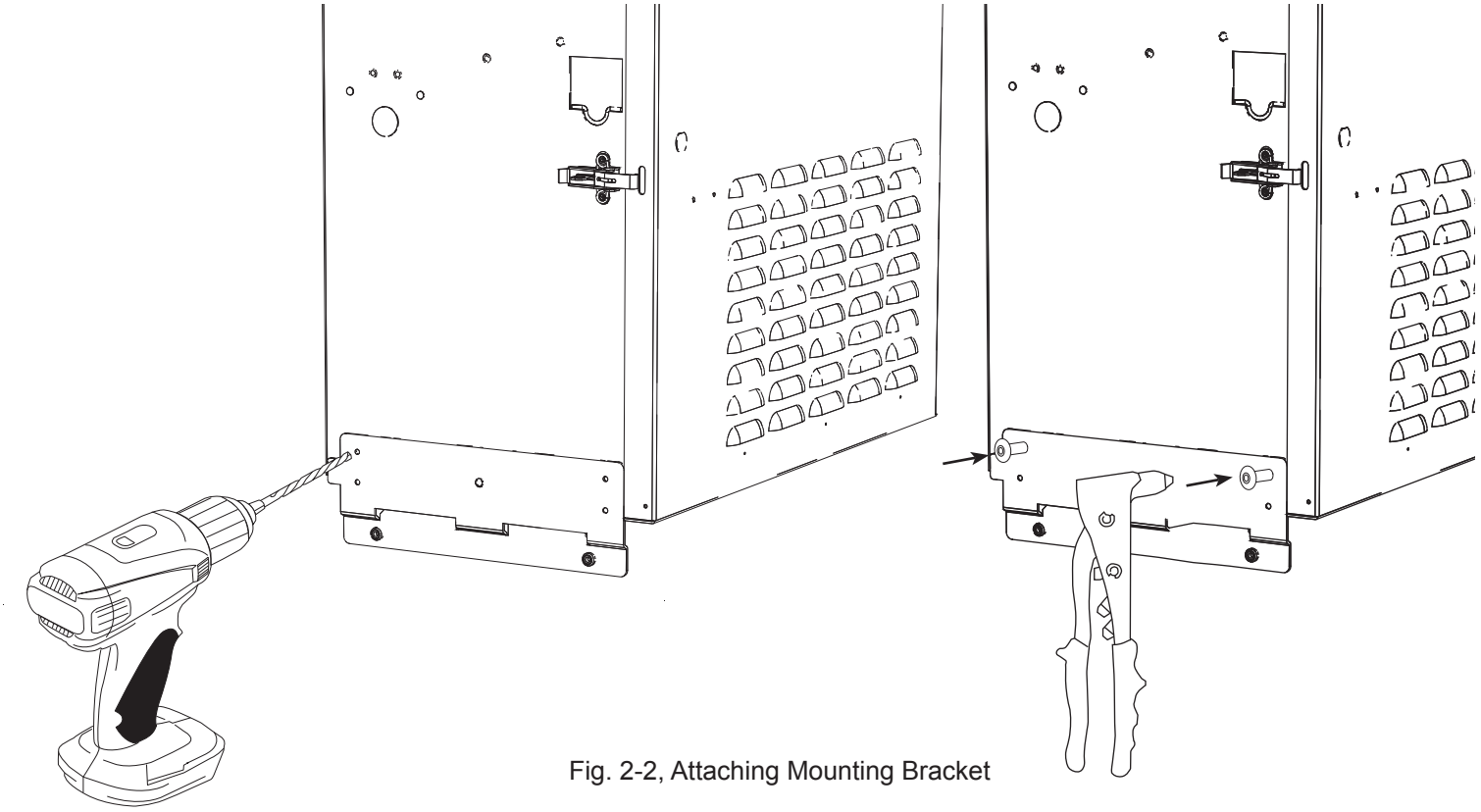


Fig. 2-2, Attaching Mounting Bracket

7. Repeat step 6 for the bracket on the opposite side of the PWE.
8. Open the PWE enclosure and secure the door open.
9. Slide the GEM into the bracket grooves.

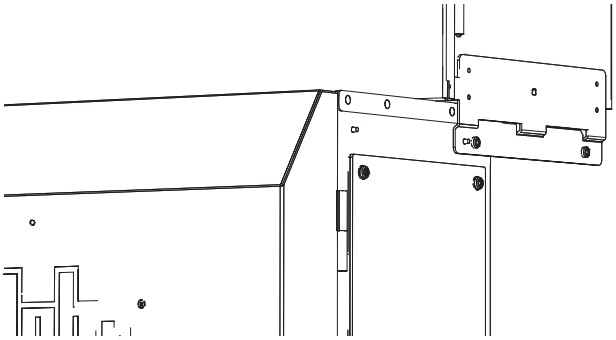


Fig. 2-3, Sliding GEM Into Bracket Grooves

NOTICE:

The first half of the bracket will slide in until hitting a stop. At that point, lift the front edge of the GEM to free the enclosure and slide it the rest of the way in.

9. Verify the brackets are correctly seated.
10. Line up the floating nuts on the left and right mounting brackets with the top thumb screws located inside the GEM.
11. Secure the (4) mounting thumbscrews.

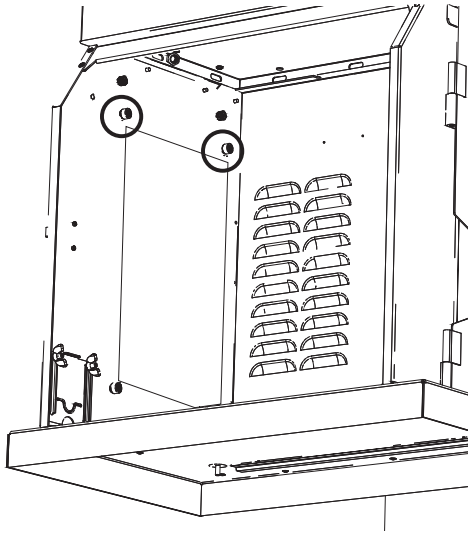


Fig. 2-4, Securing GEM Thumb Screws

CAUTION!

Verify the brackets are properly seated and the thumb screws are securely fastened. If the thumb screws do not line up with the nuts in the mounting brackets, the enclosure is not properly seated.

2.2 UPE Installation

1. Remove the lid from the UPE unit by unscrewing the two wing nuts and sliding the lid off.

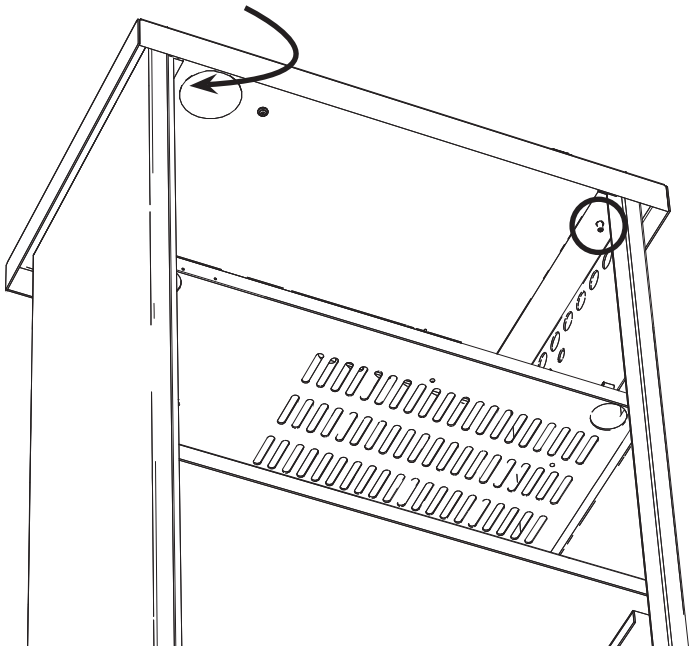


Fig. 2-5, UPE Lid Wing Nut Locations

2. Remove the wing nuts from the corresponding studs on the bottom of the GEM. Slide the GEM unit onto the UPE so that the z-bracket is engaged.
3. Fit the GEM to the UPE and secure it using the removed wing nuts.
4. Attach the UPE lid to the top of the GEM by sliding the lid on and attaching the two wing nuts. The lid has to slide backwards to engage the z-bracket.

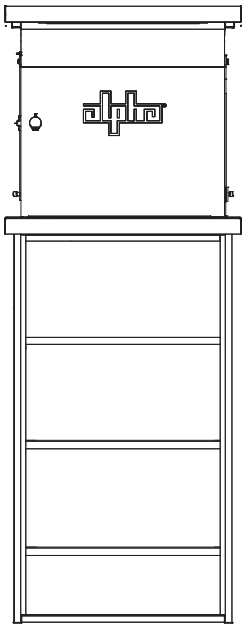


Fig. 2-6, GEM Placed On UPE

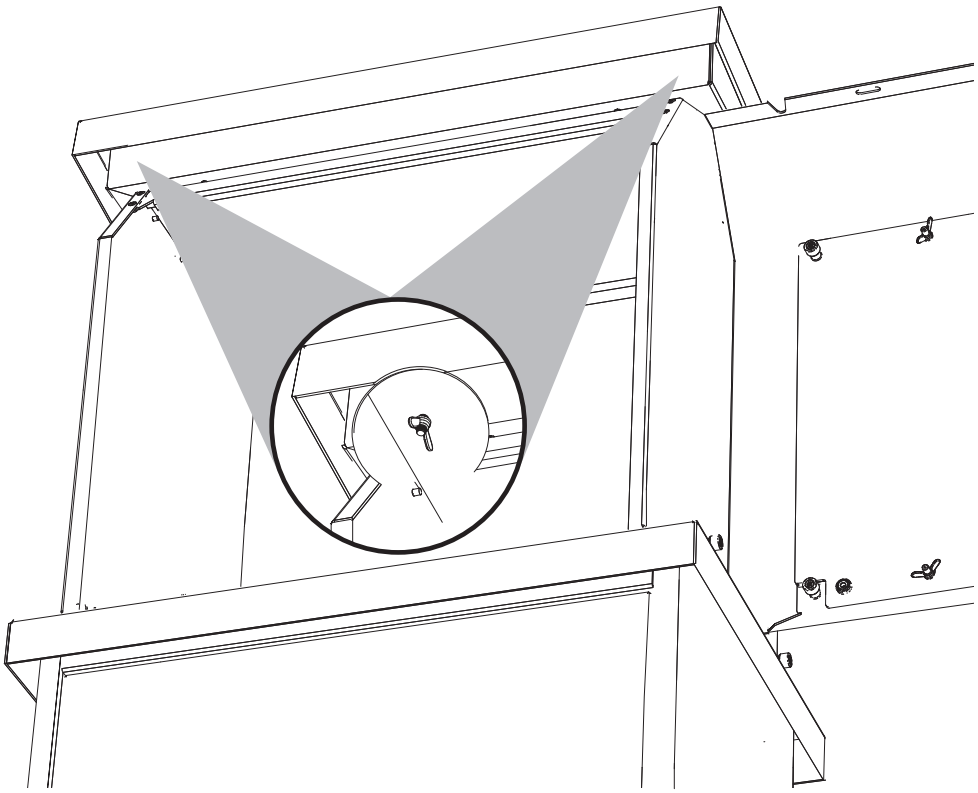


Fig. 2-7, Enclosure Lid Wingnut Locations

2.3 Standalone Pole Mounted Installation

When pole mounting the GEM, either bolts or straps may be used, depending on the type of pole. If pole mounting, mount the GEM on the pole using the pole mount bracket.

2.3.1 Pole Mount with Bolts

1. Position the bracket so that the bottom of the lower bracket is at least 6" off of the ground.
2. Secure the bracket to the pole using the two hex bolts.
3. Securely fasten the enclosure to the bracket using the four screws, lock washers, and flat washers (supplied).

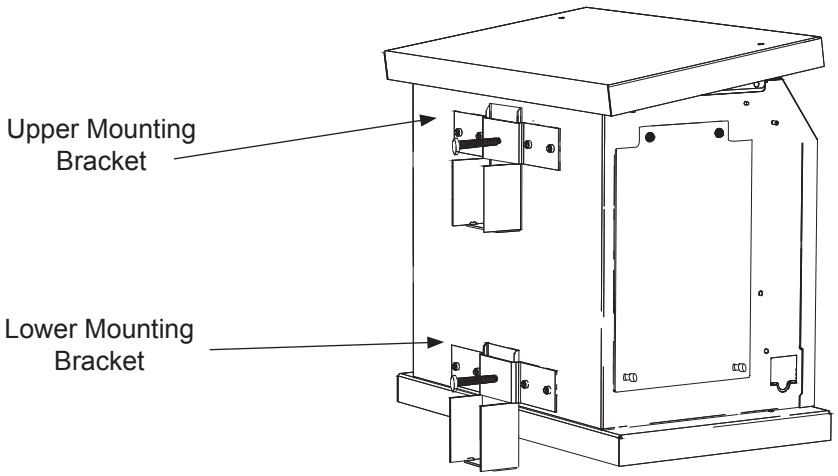


Fig. 2-8, Mounting Brackets on GEM

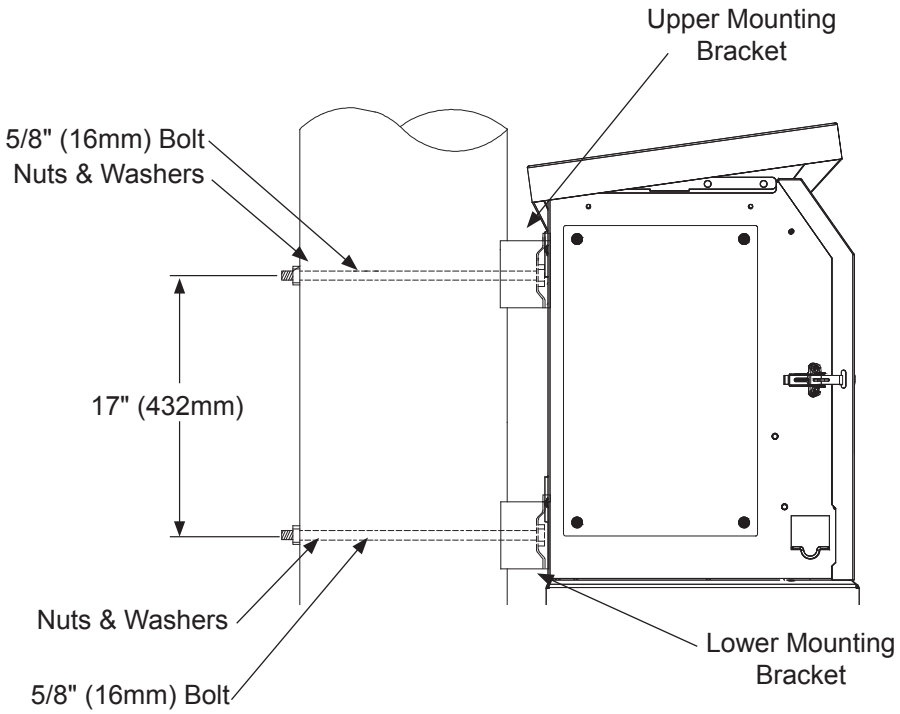


Fig. 2-9, Pole Mount with Bolts

2.3.2 Pole Mount with Straps

User Supplied Materials:

- Two pole straps to fit pole (straps must be stainless, galvanized, or equivalent)

1. Position the bracket so that the bottom of the lower bracket is at least 6" off of the ground.
2. Secure the brackets to the pole using the pole straps.
3. Secure the bracket to the pole using the two hex bolts (supplied).

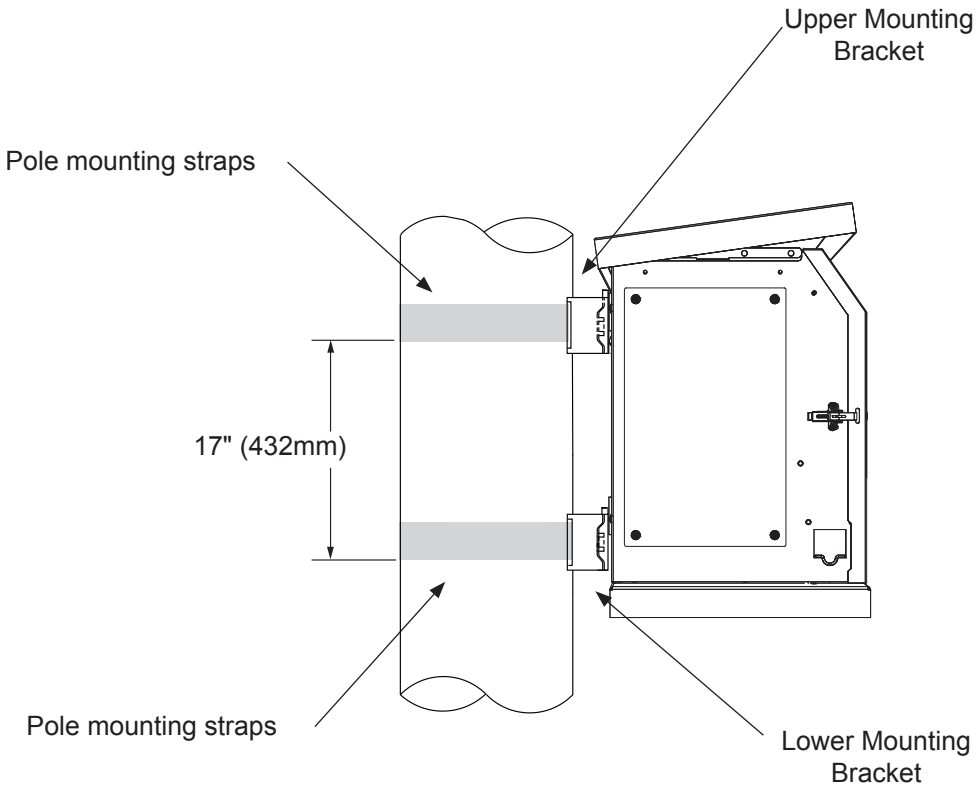


Fig. 2-10, Pole Mount with Straps

2.4 Installing the Enclosure Ground Wire

2.4.1 PWE Ground Wire Installation

1. Slide the battery slide tray out and verify the area behind the drilling location is clear of wiring or equipment. Drill a 1/4" hole in the side of the PWE enclosure and collect metal shavings.
2. Slide the battery tray back in. Install the mounting hardware and ground wire as shown below.
3. Connect the terminal end of the enclosure ground wire to the 1/4-20" stud located on the left side of the GEM enclosure and secure with the provided 1/4" nut.

CAUTION!

Before drilling, verify the area behind is free from batteries, wiring or equipment.

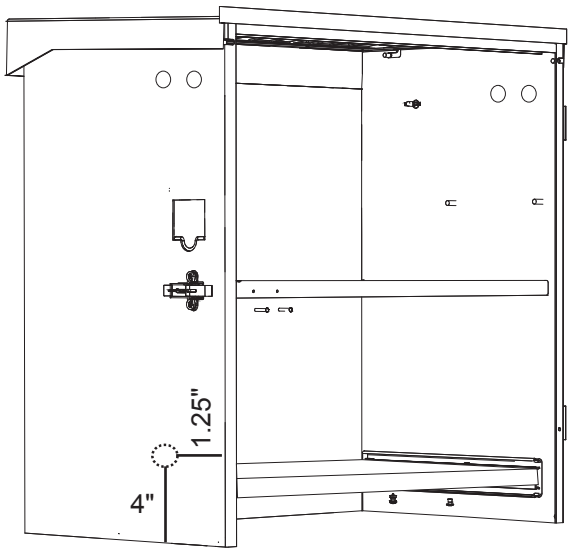


Fig. 2-11, Approximate Drilling Location

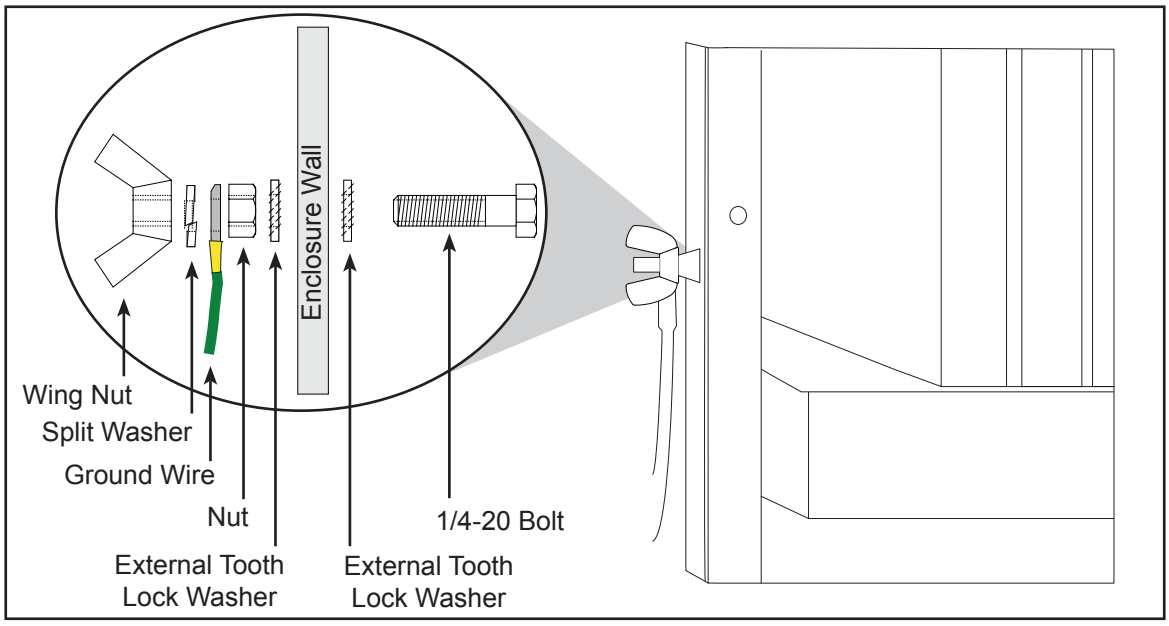


Fig. 2-12, PWE Ground Wire Hardware Installation

2.4.2 UPE Ground Wire Installation

***NOTICE**:*

If no earth stud is present, then drill a hole at this point and assemble the hardware via the PWE instructions.

1. Open the UPE door to gain access to the bottom of the GEM.
2. Connect the terminal end of the enclosure ground wire to the 1/4-20" stud located on the bottom of the GEM enclosure and secure with the provided 1/4" nut.
3. Install the mounting hardware and ground wire as shown below to the grounding stud on the wall of the UPE.

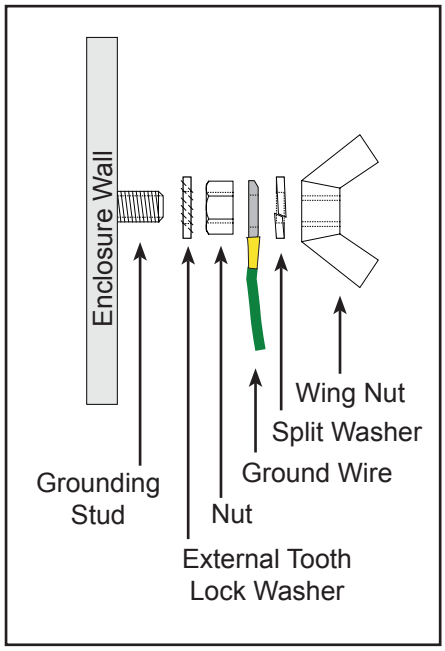


Fig. 2-13, UPE Ground Wire Hardware Installation

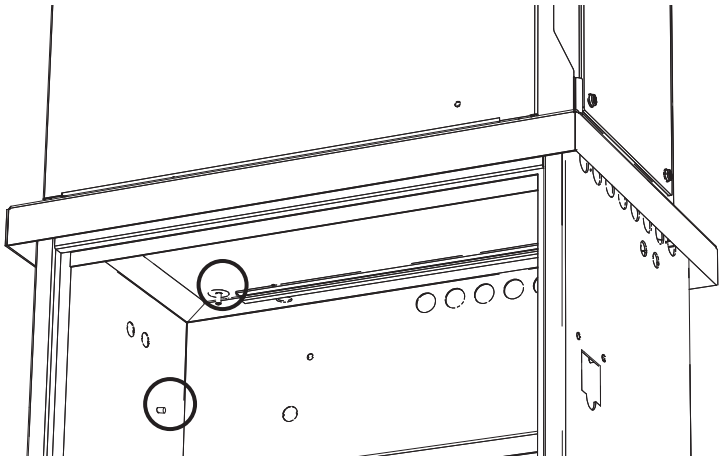


Fig. 2-14, UPE Ground Wire Connector Locations

2.5 Installing the Generator

1. Place the generator in the enclosure with its feet inside the foot recesses.
2. Secure the generator handle with the safety lanyard (provided).
3. Unscrew the (4) thumb screws, (2) on the outside and (2) on the inside, holding each side panel in place.
4. Remove both side panels, one on each side of the GEM enclosure.
5. Slide the side panels onto the available studs on the inside of the door. This is the intended storage location for the side panels. Use the wing nuts provided on the studs to secure the panels to the door.

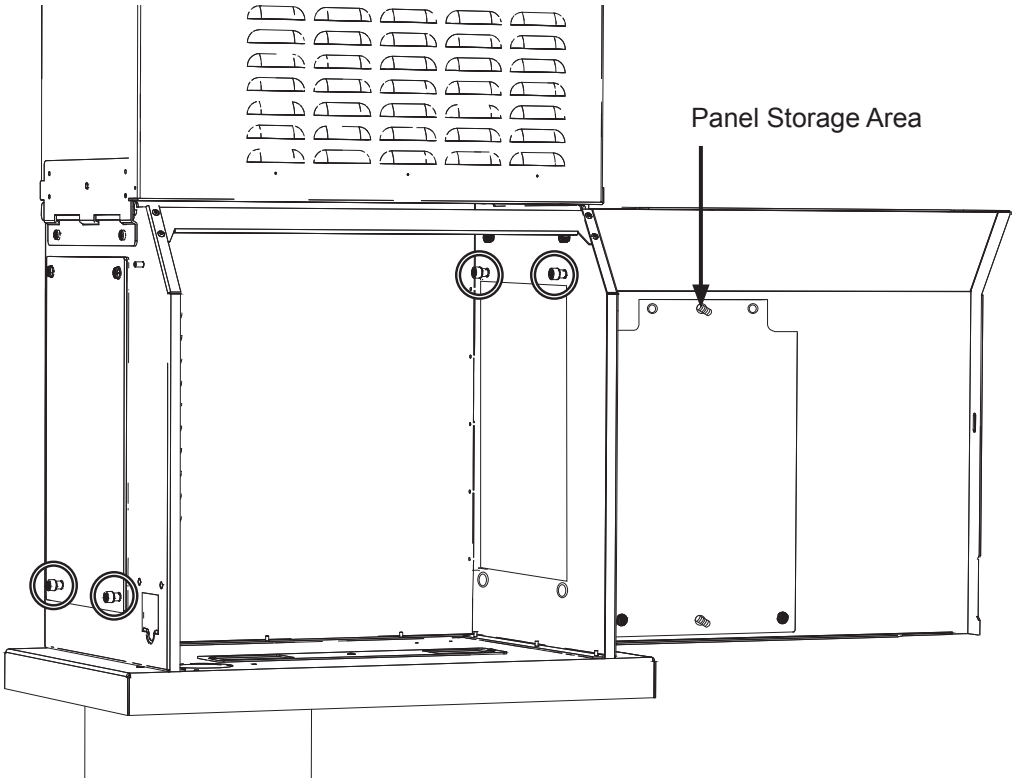


Fig. 2-15, Side Panel Removal and Storage

WARNING! ELECTRICAL HAZARD

The generator must be secured inside the enclosure with the supplied safety lanyard. Failure to do so could result in injury or death.

3.0 Operation Using the Line Transfer Switch (LTS)

DC generators do not use an LTS. See **Section 4.0, Operation Without Line Transfer Switch.**

For AC generators, Alpha's recommended configuration of the GEM enclosure uses a line transfer switch. The LTS automatically switches the power supply's power source back to AC line on resumption of utility power. In cases of intermittent power, the LTS will alternate from generator to AC line power as available.

3.1 PWE LTS Installation

1. Clean the area where the Line Transfer Switch (LTS) will be installed. Remove the adhesive backing from the LTS and install in the PWE enclosure.

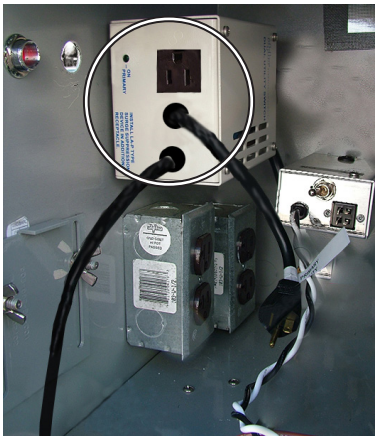


Fig. 3-1, LTS Installation

2. Route the generator cord out of the PWE enclosure through the PWE's generator access door.

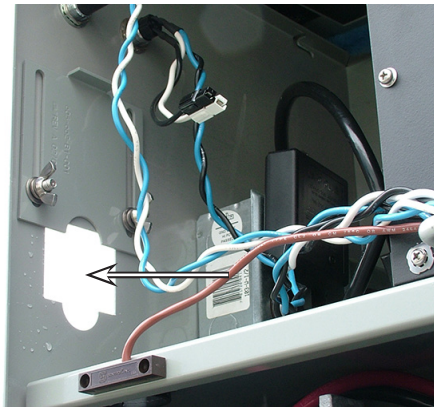


Fig. 3-2, PWE Generator Access Door

3. If the enclosure does not have a generator door, drill a 2-1/2" hole in the side of the enclosure as shown in Fig. 3-3.

CAUTION!

Before drilling, verify the area behind is free from batteries, wiring or equipment.

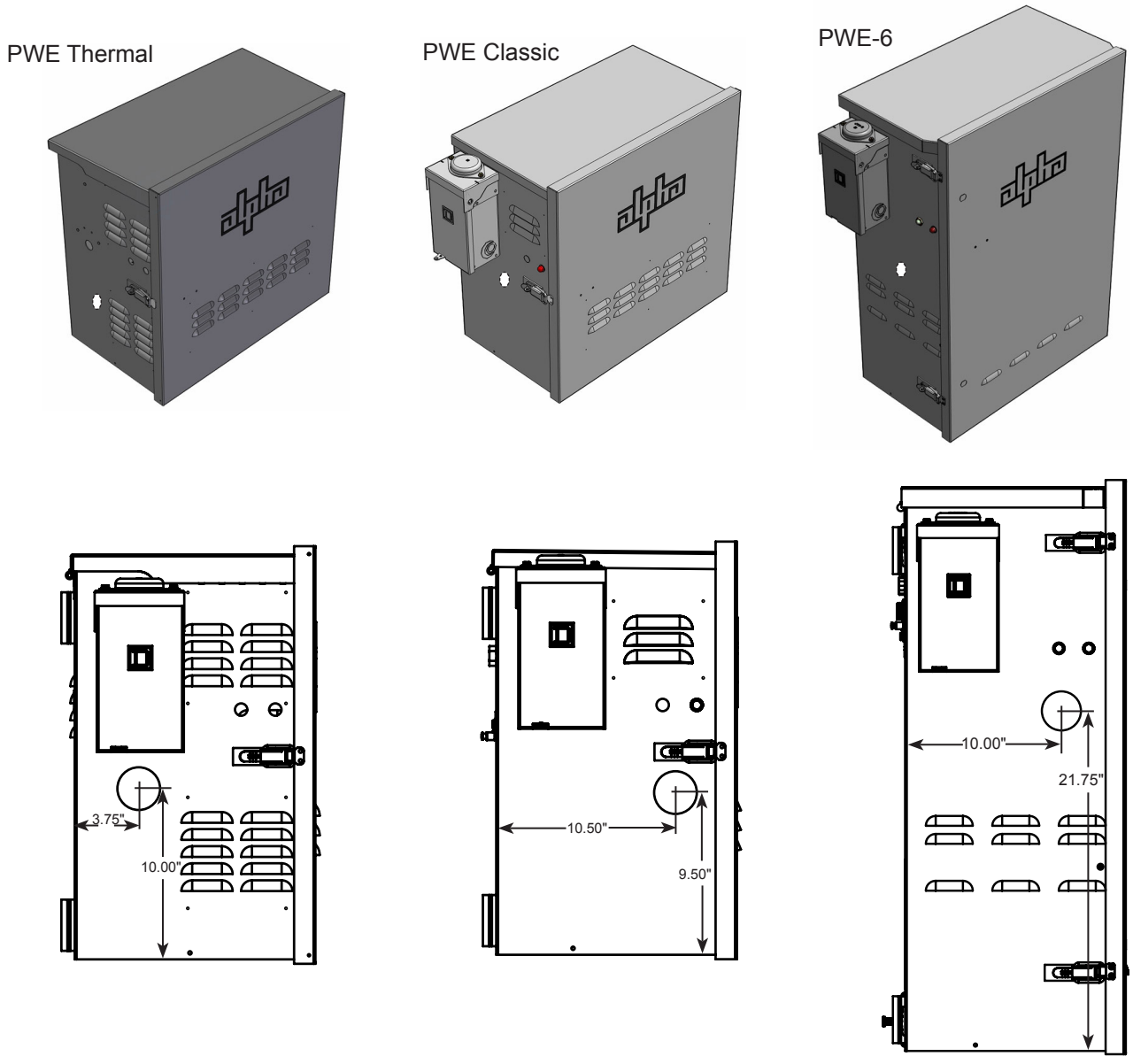


Fig. 3-3, Drilling Locations for Legacy Enclosures

4. Route the cord into the GEM enclosure through the generator access door and connect to the generator output. Secure with the rubber grommet. Connect the cord to the generator output.

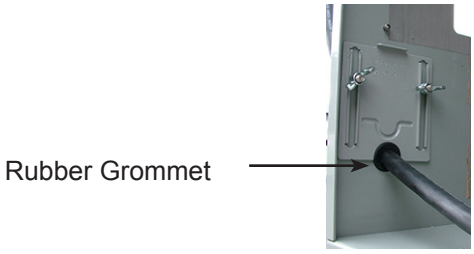


Fig. 3-4, Connecting Generator Cord to Generator

5. Connect the Primary Utility plug from the LTS into the utility outlet and plug the power supply power cord into the LTS.

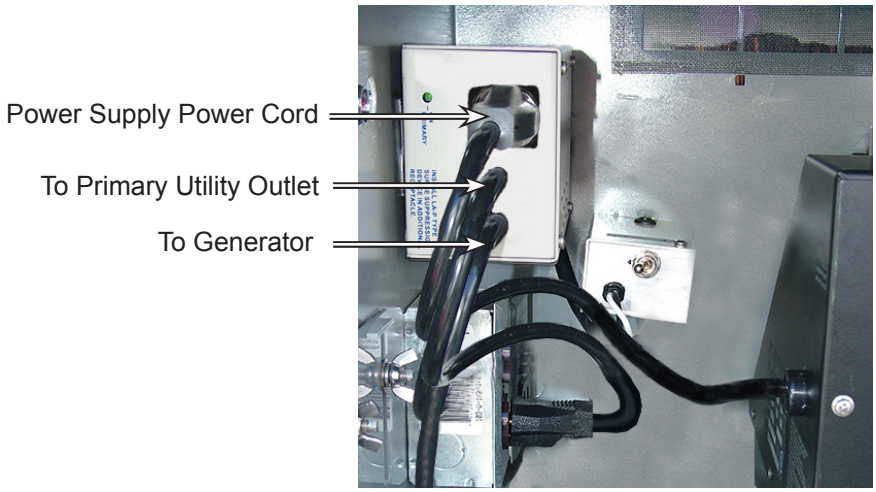


Fig. 3-5, Connecting Generator Cord to LTS

***NOTICE**:*

Configuration of components in PWE enclosures will vary. Make sure the Primary Utility Cord from the LTS reaches an open outlet prior to installing.

3.2 UPE LTS Installation

1. Clean the area where the Line Transfer Switch (LTS) will be installed. Remove the adhesive backing from the LTS and install in the UPE enclosure.
2. Knock out the 2" pass through and the (4) bolting holes in the bottom of the GEM.
3. Assemble the socket and sealing gasket (See Fig. 3-6). Mount the assembly to the base of the GEM using the screw and nuts provided.
4. Plug the LTS cable into the socket on the floor of the GEM enclosure.
5. Cable tie the boot to the cable to minimize any chance of water ingress.

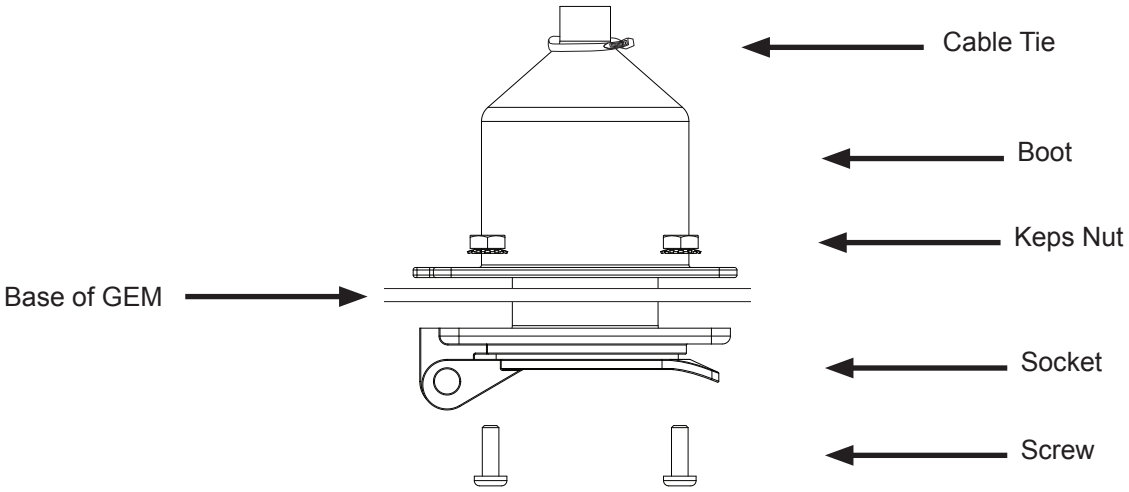


Fig. 3-6 Layout of AC Boot Assembly

6. Connect the cord to the generator output.

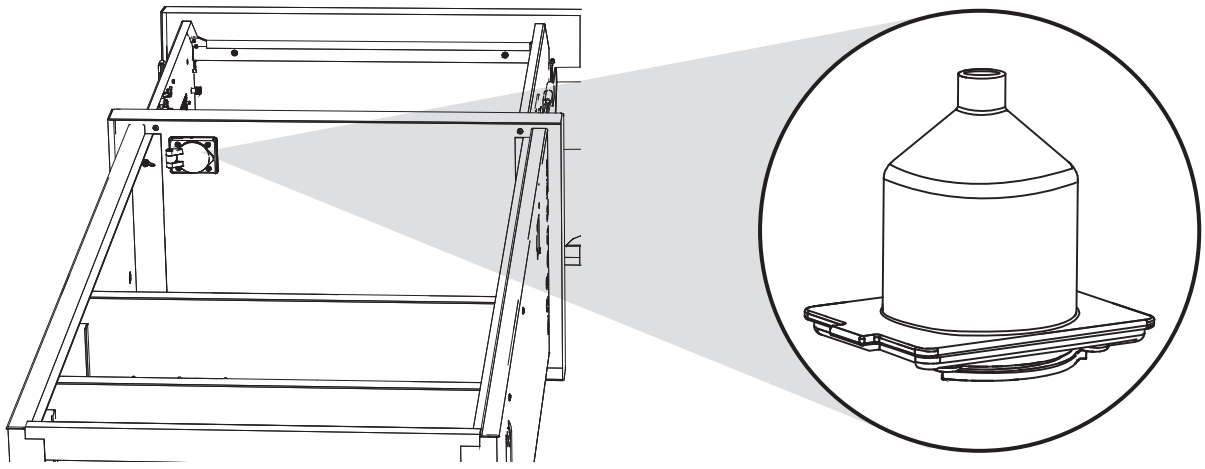


Fig. 3-7, Bottom-Up View of UPE and GEM Configuration with AC Boot
(Inset: Side View of AC Boot Installation)

7. Connect the Primary Utility plug from the LTS into the utility outlet and plug the power supply power cord into the LTS.

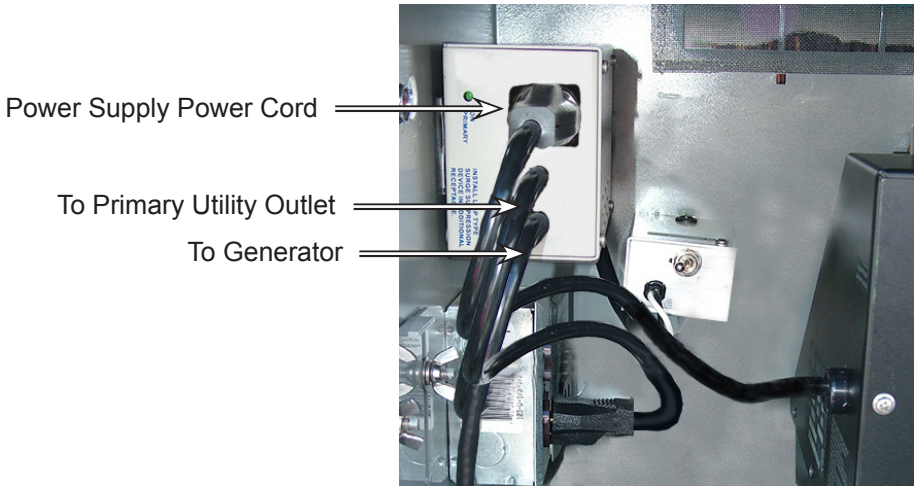


Fig. 3-8, Connecting Generator Cord to LTS

3.3 Operation

1. Refer to the generator's operation manual and start the generator.
2. Check operation of the power supply. Ensure input current to the power supply does not exceed the generator's rating.
   - AlphaGen ACX2000 = 15.8A (rated @ 1900W)
   - Honda = 13.3A (rated @ 1600W)
3. When proper operation is verified, close the PWE or UPE-3/UPE-6 enclosure, and the GEM enclosure.

CAUTION!

The Alpha XM Series power supply can draw an additional 400W during battery charging operation. If the combined load exceeds the generator's listed rating, turn the power supply DC breaker OFF to avoid an over current condition.

***NOTICE**:*

Turning off the DC breaker while the power supply is in inverter mode will cause the load to be dropped. Ensure the power supply is in normal operation before turning off the battery breaker.

4.0 Operation Without Line Transfer Switch

The following procedure is for operating a generator in the GEM enclosure without a line transfer switch. When using AC generators, Alpha recommends using an LTS for efficient operation of the powering system.

DC generators do not use an LTS.

4.1 AC Generators

1. Connect a ground wire from the generator ground screw to the closest internal ground stud near the GEM enclosure.
2. Using a 10' outdoor rated (SJW) extension cord (minimum wire gauge for 120Vac is #12 AWG), connect the generator to the power supply's input line cord.
   - For PWE enclosures, the cord is plugged in to the generator access doors located on the left side of the PWE and GEM enclosures.
   - For UPE-3/UPE-6 enclosures, the cord is plugged in to the boot on the floor of the GEM enclosure.
4. Refer to the generator's operation manual and start the generator.

CAUTION!

The Alpha XM Series power supply can draw an additional 400W during battery charging operation. If the combined load exceeds the generator's listed rating, turn the power supply DC breaker OFF to avoid an over current condition.

5. Check operation of the power supply. Ensure input current to the power supply does not exceed the generator's rating.
   - AlphaGen ACX2000 = 15.8A (rated @ 1900W)
   - Honda = 13.3A (rated @ 1600W)

6. When proper operation is verified, close the PWE or UPE-3/UPE-6 enclosure, and the GEM enclosure.

***NOTICE**:*

Turning off the DC breaker while the power supply is in inverter mode will cause the load to be dropped. Ensure the power supply is in normal operation before turning off the battery breaker.

4.2 DC Generators

1. Connect a ground wire from the generator ground screw to the left or right wall of the GEM.
2. Knock out the 2" pass through and the (4) bolting holes in the bottom of the GEM.
3. Loosen the pressure dome on the cable gland (Alpha P/N 746-553-20).
4. Pass one end through the knockout, leaving enough slack to connect to both the DCX2000 and the Portable Generator Connection in the UPE.
5. Assemble screws and sealing washers (See Fig. 4-1). Secure the screws with nuts on the opposite side of the assembly.

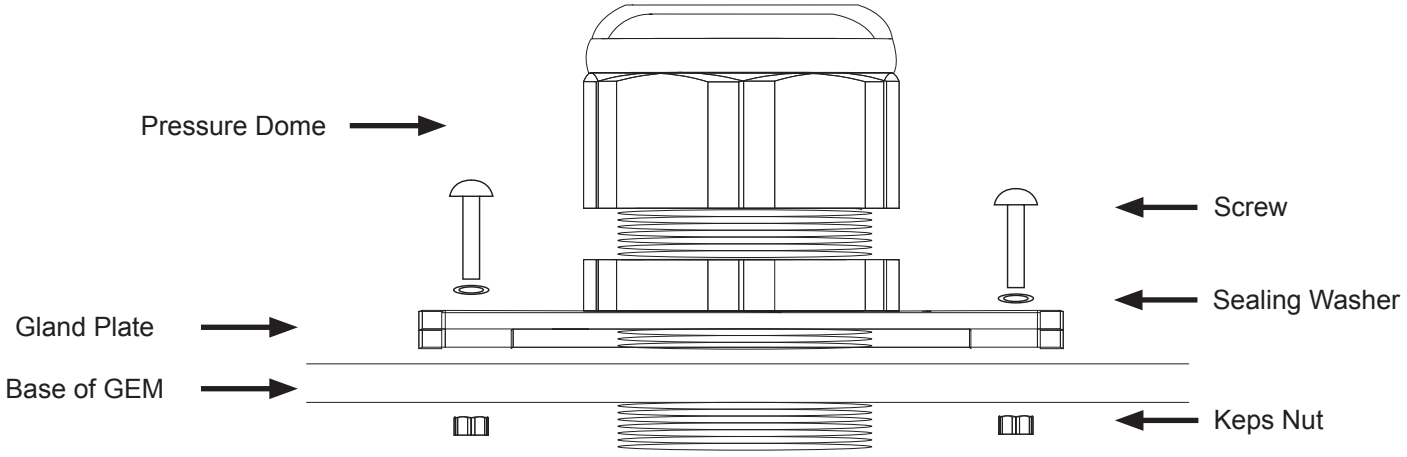


Fig. 4-1, DC Gasket Assembly

6. Tighten the water tight fitting down to make the seal on the cable.
7. Refer to the generator's operation manual and start the generator.

5.0 Enclosure Maintenance

Preventive Maintenance should be performed every three to six months. Additional maintenance may be required depending on how often the GEM is used.

Inspect the Interior of the Enclosure

Carefully inspect the interior of the enclosure. Look for signs of corrosion, debris, oil spills and grime, and clean the enclosure if it shows signs of wear. Ensure that the screens on both sides of the GEM are tight and clean.

Inspect the Mounting Brackets and Hardware

Carefully inspect the mounting bracket and mounting hardware. Look for signs of unusual wear and loose hardware. Correct all mounting hardware concerns immediately.

Inspect Grounding Hardware, Wire and Connections

Carefully inspect all grounding hardware, wires and connection points. Look for signs of corrosion and loose hardware. Tighten any loose hardware. Clean or replace corroded hardware. Correct all grounding connection concerns immediately.

Inspect the Pole-mount (If Applicable)

If the Pole-mount is being used, perform a complete inspection of the Pole-mount Enclosure. Look for signs of rust and corrosion, paying particular attention to the battery trays. Clean any rust or corrosion immediately.

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Alpha Technologies Services, Inc. | 3767 Alpha Way, Bellingham, WA 98226, USA
Tel.: Toll Free North America: +1 800 322 5742 | Outside US: +1 360 647 2360 | Technical Support: +1 800 863 3364
For more information visit our website at: www.alpha.com

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