



# PWE-6FT

Pole-mount Enclosure



## Installation and Operation Manual

PWE-6FT

*Effective: August, 2005*

Alpha Technologies

*Power* Alpha Technologies ®

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# Installation and Operation PWE-6FT

## Pole-mount Enclosure

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Effective Date: August, 2005

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### **NOTE**

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



### **NOTE**

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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 or your nearest Alpha representative.



### **NOTE**

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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.

Contacting Alpha Technologies: [www.alpha.com](http://www.alpha.com)

OR

For general product information and customer service (7 AM to 5 PM, Pacific Time), call

**1-800-863-3930,**

For complete technical support, call

**1-800-863-3364**

*7 AM to 5 PM, Pacific Time or 24/7 emergency support*

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## Important Safety Instructions!

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 or the nearest Alpha representative. Save this document for future reference.

To reduce the risk of injury or death caused by electrical shock, explosion of fuel or moving parts; 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.

## Symbols in this Manual

### **ATTENTION!**

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The use of ATTENTION is only for specific regulatory/code requirements that may affect the placement of equipment and installation procedures.



### **NOTE**

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A NOTE gives readers additional information to help them complete a specific task or procedure.



### **CAUTION!**

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A CAUTION presents safety information to PREVENT DAMAGE TO ALPHA or CUSTOMER'S EQUIPMENT. A CAUTION tells you how to correctly perform a procedure or action and what could happen if you fail to follow the the instructions.



### **WARNING!**

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A WARNING presents safety information to PREVENT INJURY OR DEATH to the technician/user. A WARNING tells you how to take specific safety precautions and then explains what may happen if those precautions are not followed.

## **ATTENTION!**

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.

## **General Safety Precautions**



### **CAUTION!**

This enclosure and its associated hardware (power supply, batteries, cabling) may contain equipment, batteries or parts which have accessible hazardous voltage or currents.

*To avoid injury:*

- This enclosure and its associated hardware must be serviced only by authorized personnel.
- Enclosure must remain locked at all times, except when authorized service personnel are present.
- Remove all conductive jewelry or personal equipment prior to servicing equipment, parts, connectors, wiring, or batteries.
- Read and follow all installation, equipment grounding, usage, and service instructions included in this manual.
- Use proper lifting techniques whenever handling enclosure, equipment, parts, or batteries.
- Batteries contain dangerous voltages, currents and corrosive material. Battery installation, maintenance, service and replacement must be performed by authorized personnel only.
- Never use uninsulated tools or other conductive materials when installing, maintaining, servicing or replacing batteries.
- Use special caution when connecting or adjusting battery cabling. An improperly connected battery cable or an unconnected battery cable can result in arcing, a fire, or possible explosion.
- A battery that shows signs of cracking, leaking or swelling must be replaced immediately by authorized personnel using a battery of identical type and rating.
- Avoid any contact with gelled or liquid emissions from a valve-regulated lead-acid (VRLA) battery. Emissions contain dilute sulfuric acid which is harmful to the skin and eyes. Emissions are electrolytic, which are electrically conductive and are corrosive. Follow the Chemical Hazards notes if contact occurs.
- Do not smoke or introduce sparks in the vicinity of a battery.
- Under certain overcharging conditions, lead-acid batteries can vent a mixture of hydrogen gas which is explosive. Proper venting of the enclosure is required.
- Follow the battery manufacturer's approved transportation and storage instructions.



## CAUTION!

Enclosure, equipment or parts may be damaged or cause damage if used or installed improperly.

*To avoid damage:*

- Prior to installation, verify that the AC input voltage to the enclosure and its equipment match with respect to voltage and frequency.
- Prior to installation, verify that the output voltage from the enclosure or its equipment match the voltage requirements of the connected equipment (load).
- Prior to installation, verify that the enclosure's utility service panel is equipped with a properly rated circuit breaker for use with the equipment inside. Refer to manufacturer's recommendations.
- Review and upgrade utility service panel circuit breaker requirements whenever the equipment within the enclosure is changed.
- Prior to installation, contact local utilities, local building maintenance departments, and cable/piping locator services to ensure that installation does not interfere with existing utility or building cables/piping.
- Do not exceed the output rating of equipment. Verify load requirements prior and during connection process.
- Prior to handling the batteries, touch a grounded metal object to dissipate any static charge that may have developed in your body.

## Battery Safety Notes



### CAUTION!

Lead-acid batteries contain dangerous voltages, currents and corrosive material. Battery installation, maintenance, service and replacement must be performed only by authorized personnel.

### Chemical Hazards

Any gelled or liquid emissions from a valve-regulated lead-acid (VRLA) battery contain dilute sulfuric acid, which is harmful to the skin and eyes. Emissions are electrolytic, which are electrically conductive and corrosive.

*To avoid injury:*

- Servicing and connection of batteries shall be performed by, or under the direct supervision of, personnel knowledgeable of batteries and the required safety precautions.
- Always wear eye protection, rubber gloves, and a protective vest when working near batteries. Remove all metallic objects from hands and neck.
- Batteries produce explosive gases. Keep all open flames and sparks away from batteries.
- Use tools with insulated handles, do not rest any tools on top of batteries.
- Batteries contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Battery post terminals and related accessories contain lead and lead compounds. Wash hands after handling (California Proposition 65).
- If any battery emission contacts the skin, wash immediately and thoroughly with water. Follow your company's approved chemical exposure procedures.

## Battery Safety Notes, cont.

- If any battery emission contacts the skin, wash immediately and thoroughly with water. Follow your company's approved chemical exposure procedures.
- Neutralize any spilled battery emission with the special solution contained in an approved spill kit or with a solution of 1 lb. Bicarbonate of soda to 1 gal of water. Report chemical spill using your company's spill reporting structure and seek medical attention if necessary.
- Always replace batteries with those of an identical type and rating. Never install old or untested batteries.
- Do not charge batteries in a sealed container. Each individual battery should have at least 0.5 inches of space between it and all surrounding surfaces to allow for convection cooling.
- All battery compartments must have adequate ventilation to prevent an accumulation of potentially dangerous gas.
- Prior to handling the batteries, touch a grounded metal object to dissipate any static charge that may have developed on your body.
- Never use uninsulated tools or other conductive materials when installing, maintaining, servicing or replacing batteries.
- Use special caution when connecting or adjusting battery cabling. An improperly connected battery cable or an unconnected battery cable can make contact with an unintended surface that can result in arcing, fire, or possible explosion.
- A battery showing signs of cracking, leaking, or swelling should be replaced immediately by Authorized Personnel using a battery of identical type and rating.
- Under extreme overcharging conditions, Lead-acid batteries can vent a mixture of Hydrogen gas which is explosive.

## Battery Maintenance Guidelines

The battery maintenance instructions listed below are for reference only. Battery manufacturer's instructions for transportation, installation, storage or maintenance take precedence over these instructions.

- To prevent damage, inspect batteries every 3 months for:
  - **Signs of battery cracking, leaking or swelling.** The battery should be replaced immediately by authorized personnel using a battery of the identical type and rating.
  - **Signs of battery cable damage.** Battery cable should be replaced immediately by Authorized Personnel using replacement parts specified by vendor.
  - **Loose battery connection hardware.** Refer to battery manufacturer's documentation for the correct torque and connection hardware for the application.
- Apply battery manufacturer's specified antioxidant compound on all exposed connections.
- Verify battery terminals and/or exposed connection hardware is not within 2 inches of a conductive surface. Reposition batteries as necessary to maintain adequate clearance.
- Clean up any electrolyte (battery emission) in accordance with all federal, state, and local regulations or codes.
- Proper venting of the enclosure is recommended. Follow the Battery Manufacturer's approved transportation and storage instructions.
- Always replace batteries with those of an identical type and rating. Never install old or untested batteries.

## Mechanical Safety

- Keep hands and tools clear of fans. Fans are thermostatically controlled and will turn on automatically.
- Power supplies can reach extreme temperatures under load.
- Use caution around sheet metal components and sharp edges.

## Electrical Safety

- Lethal voltages are present within the power supply and electrical boxes. Never assume that an electrical connection or conductor is not energized. Check the circuit with a volt meter with respect to the grounded portion of the enclosure (both AC and DC) prior to any installation or removal procedure.
- Do not work alone under hazardous conditions.
- A licensed electrician is required to install permanently wired equipment.
- Input voltages can range up to 240 VAC. Ensure that utility power is disabled before beginning installation or removal.
- Ensure no liquids or wet clothes contact internal components.
- Hazardous electrically live parts inside this unit are energized from batteries even when the AC input power is disconnected from the Mini-Bay.

## Recycling and Disposal Instructions

Spent or damaged batteries are considered environmentally unsafe. Always recycle used batteries or dispose of the batteries in accordance with all federal, state and local regulations.

- Do not charge batteries in a sealed container. Each individual battery should have at least 0.5 inches of space between it and all surrounding surfaces to allow for convection cooling.
- All battery compartments must have adequate ventilation to prevent an accumulation of potentially dangerous gas.

# 1.0 Introduction to the PWE-6FT Enclosure

## 1.1 Specifications

The PWE-6FT enclosure accommodates six front-terminal batteries for broadband powering equipment in pole-, wall-, or pedestal-mount configurations. The weight of the enclosure (empty) is 57 lbs (26kg).

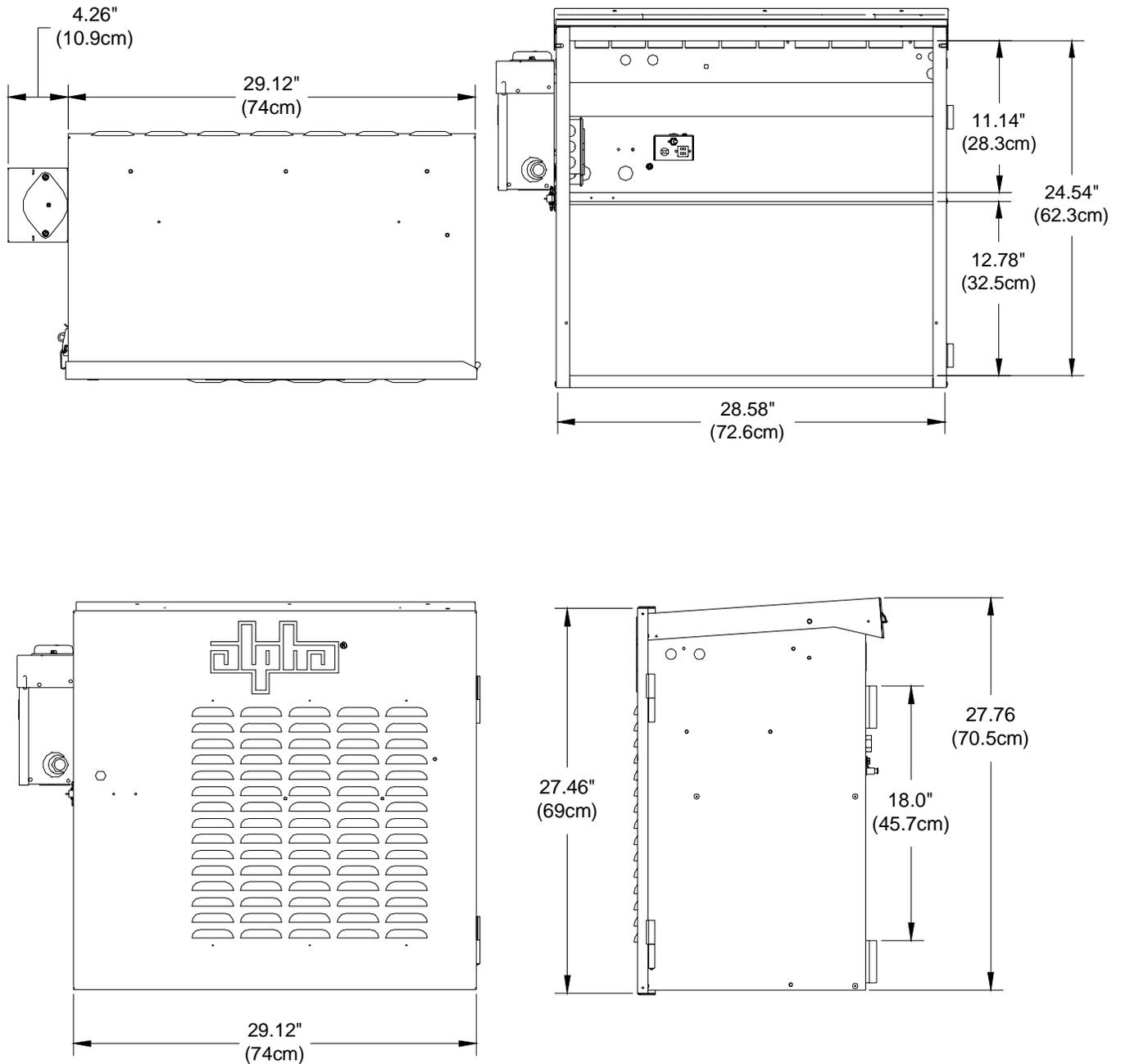


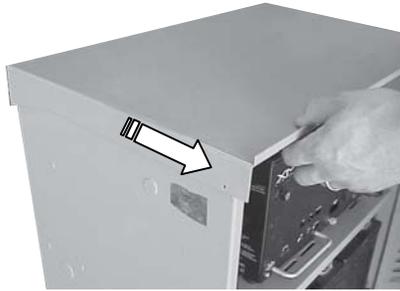
Fig. 1-1, PWE-6FT Views and Dimensions

## 1.0 Introduction to the PWE-6FT Enclosure, continued

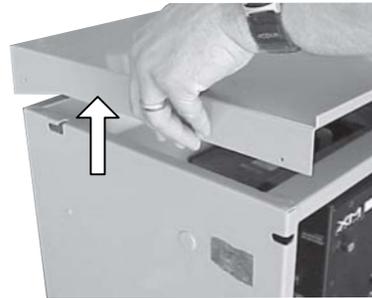
### 1.1 Specifications, continued

The PWE series of enclosures have removable lids to facilitate installation of internal components within the enclosure. The following photos are only for illustrative purposes.

#### PWE Lid Removal



1. Pull Out



2. Pull Up

Note: Lid can be completely removed by releasing the provided wing nut .



Lid Retention Strap helps prevent enclosure lid from damage while servicing the system.

Fig. 1-2, PWE Enclosure Lid Removal

## 1.0 Introduction to the PWE-6FT Enclosure, continued

### 1.2 Optional Features

Options can be factory installed. Many of these options can be easily installed in the field by the operator.

#### **ACI (AC Indicator)**

The AC Indicator (green lamp) is located next to the LRI lamp on the outside of the PWE/PME Series enclosures. As long as there is voltage present at the output, the ACI lamp remains ON. The ACI is a simple form of status monitoring which allows the operational status of the power supply to be verified from the ground. The ACI-LL, long life LED is recommended, since it provides much longer life than the original incandescent light bulb design. Models for 60V and 90V are available.

#### **BHM (Battery Heater Mat)**

The Battery Heater Mat is an AC line operated 150W heater mat which turns on at 40°F to increase battery capacity in cold environments. BHM are available in 120VAC and 240VAC versions.

#### **ECF (Enclosure Cooling Fan)**

The Enclosure Cooling Fan is a standby powered, thermostat controlled cooling fan system for maintaining a cooler environment within the PWE Series enclosures. Alpha recommends the enclosure cooling fan option for installations in extremely high temperature environments. The fan is thermostatically controlled to turn on at 140°F/60°C, and off at 110°F/43°C. Replace the fan fuse with a 1/4" X 1-1/4", 5 Amp, 250 Volt fuse only (Alpha P/N 460-025-10).

#### **LA-P+ (Lightning Arrester)**

The LA-P+ Lightning Arrester consists of three Metal Oxide Varistors (MOV) and is plugged directly into the enclosure's convenience outlet, to provide additional protection from voltage spikes caused by lightning and other power disturbances. The LA-P+ eliminates the need for hard-wired MOVs, and no additional wiring is necessary. The LA-P+ 120 is used in 120VAC applications, and the LA-PE+ 240 is used in 240VAC applications.

#### **LRI (Local Remote Indicator)**

The LRI lamp (red) is located on the outside of the PWE/PME Series enclosure. During normal AC line operation, the lamp remains OFF. The lamp comes ON only when the power supply is running in Standby Mode. In the event that a major alarm is detected, the lamp flashes to indicate service is required. The LRI is a simple form of status monitoring which allows the operational status of the power supply to be verified from the ground.

#### **MRC (Module Retaining Cable)**

The Module Retaining Cable provides added security for the XM Series 2 power supply. It attaches the unit to the PWE Series enclosure wall to prevent it from being inadvertently knocked off of its shelf.

#### **SPI (15A Service Power Inserter) and SPI-25 (25A Service Power Inserter)**

The Service Power Inserter is required in all enclosures. The primary function of the SPI is to provide a connection point between the Alpha power supply and the cable load. Additionally the SPI can be used to bypass the power supply with a Service Power Supply. The SPI is rated for 15 amps output and is standard on the PWE/PME Series enclosures. The SPI-25 is the same as the SPI but rated for 25 amps for use with higher output current power supplies.

## **1.0 Introduction to the PWE-6FT Enclosure, continued**

### **1.2 Optional Features, continued**

#### **STH (Storm Hood Kit)**

Enclosures equipped with the optional Storm Hood Kit offer additional protection from possible dirt and snow ingress. If the enclosure is equipped with Storm Hoods, Alpha recommends the use of the ECF (Enclosure Cooling Fan).

#### **TMPR SW (Tamper Switch)**

The Tamper Switch provides a magnetic door switch which plugs into the USM option for XM power supplies and the USM2 for XM Series 2 power supplies. Most status monitoring systems provide an alarm if the enclosure door is opened. Tamper Switches are available either as normally open (NO) or normally closed (NC).

## 2.0 Installation

The PWE-6FT can be mounted on wooden, concrete or steel utility poles. Most codes require the base of the enclosure to be located a minimum height from the ground. Always verify height restrictions before proceeding.

### 2.1 Wooden Pole Installation



#### **WARNING!**

Never transport the unit with batteries installed. Batteries must **ONLY** be installed after the unit is installed. Transporting the unit with installed batteries may cause injury to installer and/or damage to enclosure and installed equipment.



#### **NOTE**

Alpha recommends positioning enclosure on the opposite side of the pole from oncoming traffic. This can reduce the danger caused by falling equipment in the event that a pole is struck by an automobile.



#### **NOTE**

Mounting bolts must go completely through the wooden pole and be secured from the back with a large washer and nut.

#### **ATTENTION!**

The majority of poles are the property of the local utility company. Before installing an enclosure, the location and method of mounting must be approved by the utility company.

#### **Materials required:** (customer supplied)

- Two 5/8" diameter machine bolts (UNC thread); SAE (Grade 5 or better), length to suit pole
- Two 5/8" diameter zinc-plated flat washers
- Two 5/8" diameter hex nuts (UNC thread)

#### **Tools required:** (customer supplied)

- Auger or drill for boring 3/4" diameter holes in the wooden pole
- Mallet or hammer
- Assorted sockets or wrenches

#### **Procedure:**

1. Unpack the enclosure and galvanized brackets; turn the enclosure facedown on a soft surface.
2. Slide one bracket up through the lower mounting straps on the rear of the enclosure. The bracket's flanges face away from the enclosure. Secure the lower mounting brackets using the 3/8" x 3/4" hex bolt.
3. Mark the position for the upper mounting bracket on the utility pole. Drill a 3/4" hole completely through the pole. Secure the bracket with a 5/8" machine bolt, washer and nut. Do not fully tighten the bolt at this time.
4. Position the enclosure on the upper mounting bracket. It may be necessary to slightly rock the enclosure and pull downward to properly seat it on the bracket. Center the enclosure on the pole.

## 2.0 Installation, continued

### 2.1 Wooden Pole Installation, continued

5. Mark the hole for the lower mounting brackets. Lift the enclosure off the top bracket and drill the lower hole. Spacing between holes for enclosures is as follows:

PWE-6FT      18.0" on center

6. Slide the enclosure back into place over the top bracket. Align the lower bracket with the hole and secure it with a 5/8" machine bolt, washer and nut. Tighten both brackets until the flanges seat into the wood.

The enclosure is now ready for the utility connection, power module and batteries.

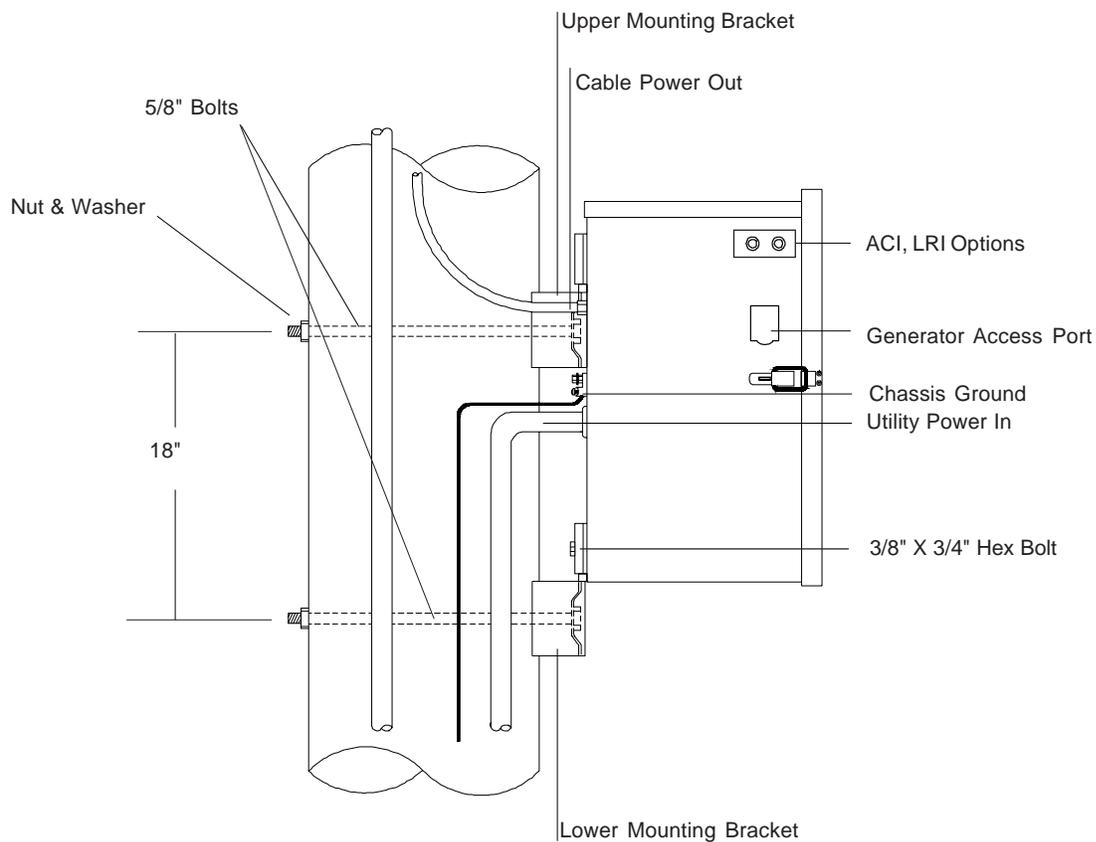


Fig. 2-1, PWE Series Pole-mount Enclosures (Wooden Poles)

## 2.0 Installation, continued

### 2.2 Steel/Concrete Pole Installation



#### **WARNING!**

Never transport the unit with batteries installed. Batteries must **ONLY** be installed after the unit is installed. Transporting the unit with batteries installed may cause injury to installer and/or damage to enclosure and installed equipment.



#### **NOTE**

Alpha recommends positioning enclosure on the opposite side of the pole from oncoming traffic. This can reduce the danger caused by falling equipment in the event that a pole is struck by an automobile.

#### **ATTENTION!**

The majority of poles are the property of the local Utility. Before installing an enclosure, the location and method of mounting must be approved by the Utility.

#### **Materials required:** (customer supplied)

Two (2) pole straps to fit pole (straps must be stainless, galvanized or equivalent).

#### **Tools required:** (customer supplied)

Assorted sockets or wrenches

#### **Procedure:**

1. Unpack the enclosure and galvanized brackets; turn the enclosure facedown on a soft surface.
2. Slide a bracket up through the enclosure's lower mounting strap(s). The bracket's flanges must face away from the enclosure. Secure the lower mounting bracket(s) using the 3/8" x 3/4" hex bolt included.
3. Position the upper mounting bracket on the pole and secure using a pole strap.
4. Lift the enclosure onto the upper mounting bracket and pull downward to properly seat it. Center the enclosure on the pole.
5. Secure the lower mounting brackets on the pole using a pole strap. Spacing between mounting straps for enclosure is as follows:

PWE-6FT

18.0" on center

The enclosure is now ready for the utility connection, power module and batteries (see following page).

## 2.0 Installation, continued

### 2.2 Steel/Concrete Pole Installation, continued

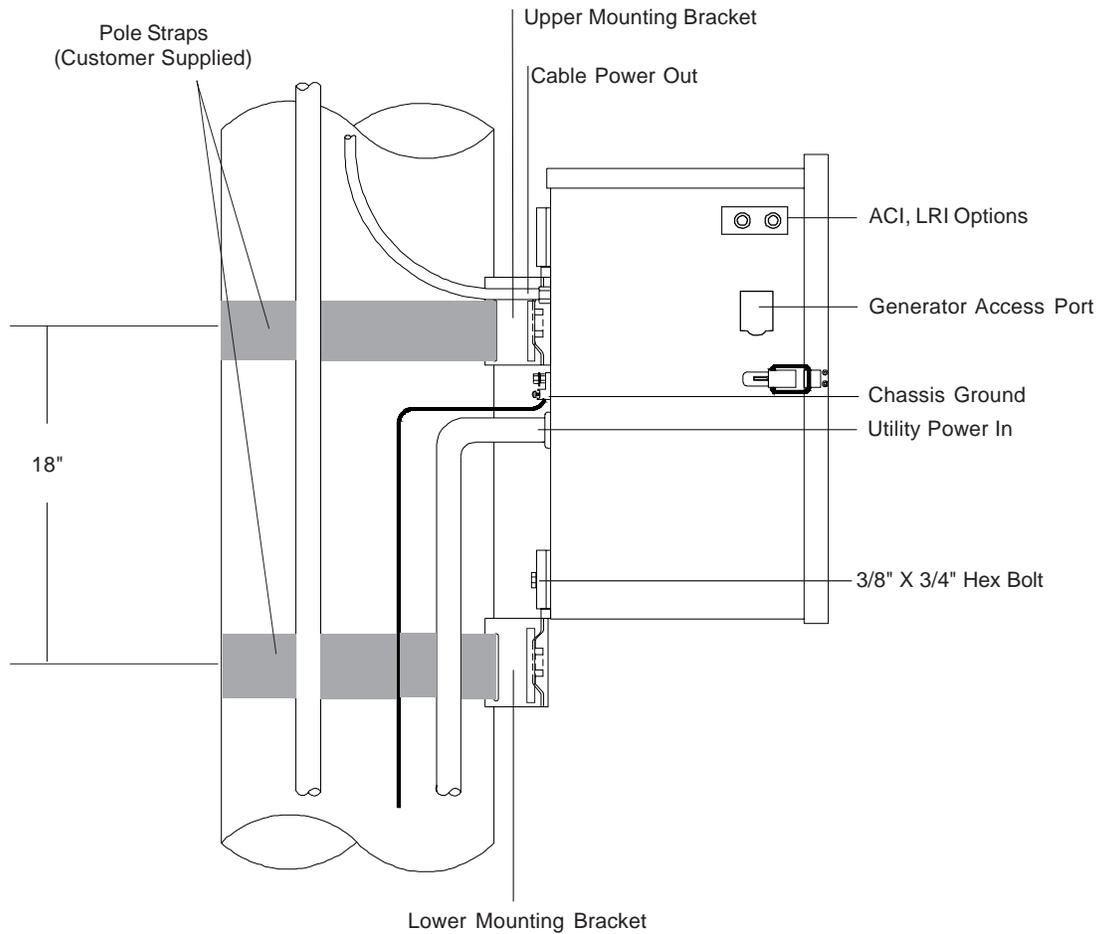


Fig. 2-2, PWE Series Pole-mount Enclosures (Concrete and Steel Poles)  
(Configurations may vary.)

## 2.0 Installation, continued

### 2.3 Pedestal and Enclosure Installation

A concrete pad must be in place prior to installing the pedestal. The installer must supply the following materials to install the pedestal (P/N 745-677-20):

- Four (4) 1/2" anchor bolts (Hilti style-P/N 745-592-21)
- Four (4) 1/2" stainless steel washers

Required tools:

- Hammer drill
- 1/2" drill bit
- 1/2" wrench
- Metal punch
- Mallet or hammer
- Torque wrench



#### CAUTION!

The following are general considerations to make prior to installing a ground-mounted enclosure:

- Do not install enclosure within 10 feet of a water sprinkler to prevent water from entering enclosure.
- Ensure the enclosure is outside flood plain boundaries.
- Position the enclosure to prevent wind-driven snow and drifts from blocking the vents.
- In hot climates, position the enclosure to maximize afternoon shade.

#### 2.3.1 Pedestal-mount Considerations

Alpha Technologies, Inc. cannot anticipate all of the ways a vehicle may potentially threaten an installed system or the specific type of protection that is appropriate for a particular location. Determining the threat to the equipment and the means of protection are the responsibility of the end user of the equipment and the authority having jurisdiction. The following installation drawing for Alpha's Standby Power systems are general recommendations and not intended to be a specific guideline for protecting the equipment. The numbers of Bollard posts (or other protection devices) depend upon equipment locations, site surveys, traffic patterns and local codes.

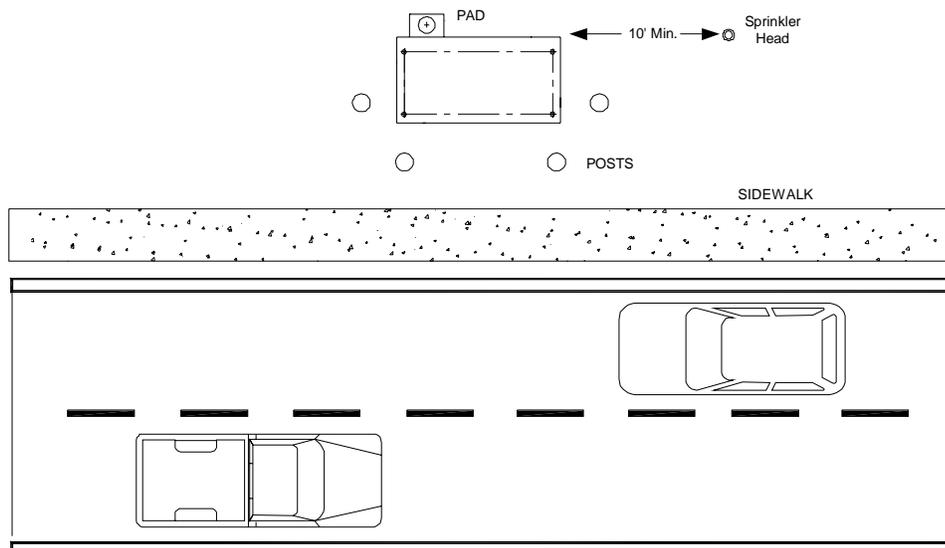


Fig. 2-3, Bollard Post Placement

## 2.0 Installation, continued

### 2.3.2 Pedestal Installation

1. Place vapor barrier material on pad. The vapor barrier material (such as 30lb felt, neoprene pond liner, or a heavy grade tar paper) should initially extend six (6) inches beyond the perimeter of the pedestal. It can be trimmed closer to the pedestal after installation.
2. Using the pedestal as template, mark the location for installing the 1/2" anchor bolts.
3. Position pedestal over mounting holes and insert anchor bolts.
4. Torque anchor bolts to bolt manufacturer's specifications. If using Hilti bolts, torque until heads pop.
5. Trim vapor barrier material.

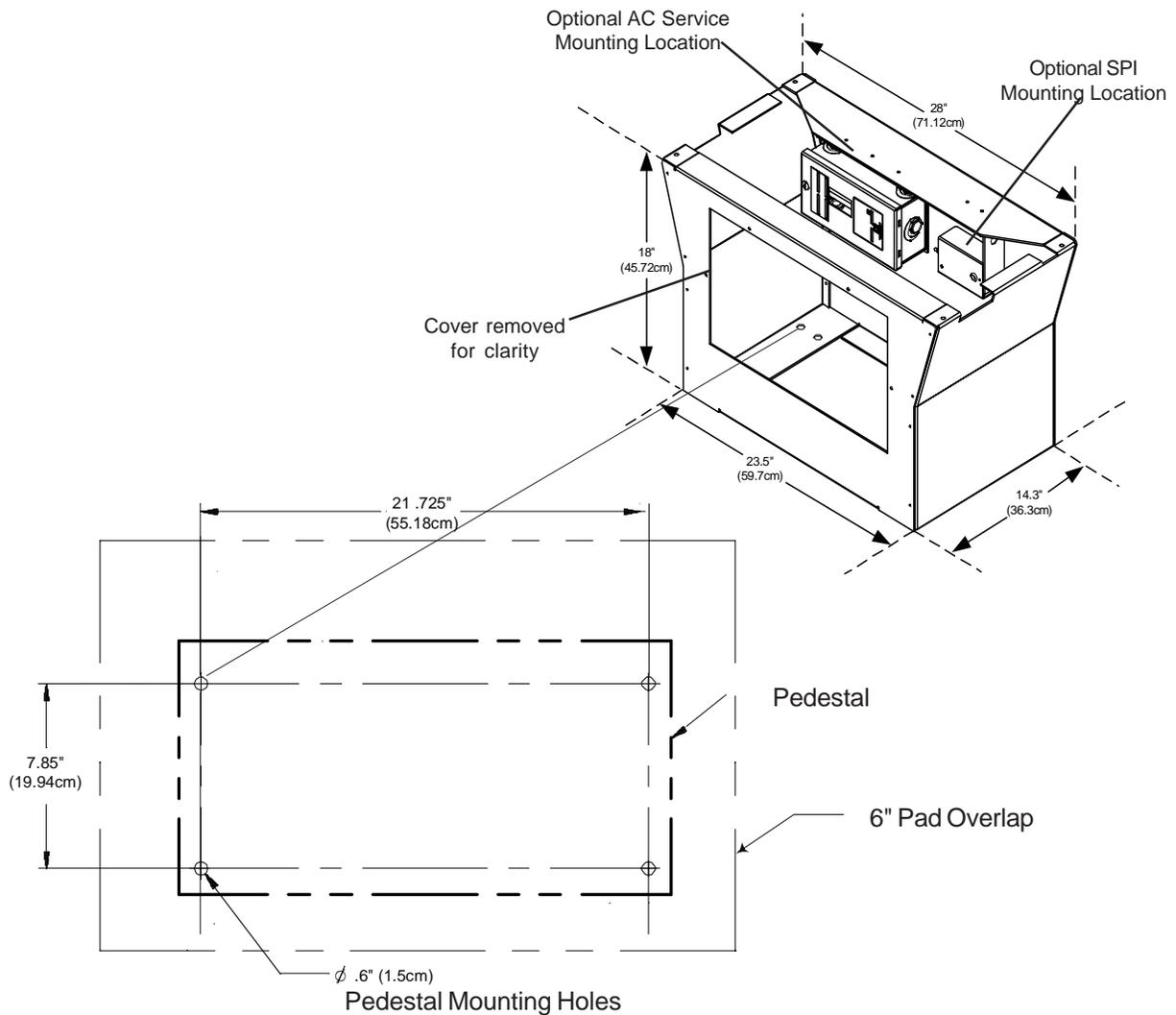


Fig. 2-4, Pedestal Installation

## 2.0 Installation, continued

### 2.3.3 Installing Enclosure on the Pedestal

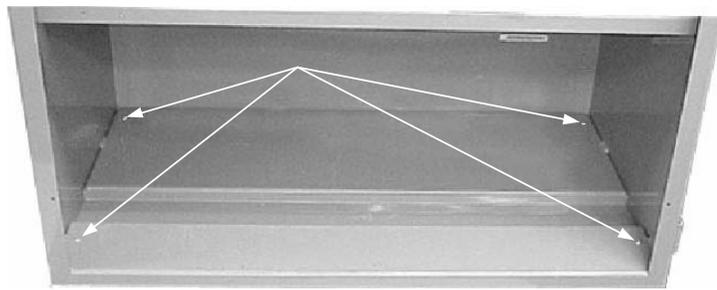


#### CAUTION!

Never transport or move the pedestal or enclosure with batteries installed. Batteries must **ONLY** be installed after pedestal/enclosure installation. Transporting with batteries installed may cause injury to installer and/or damage to enclosure and installed equipment.

Before bolting the PWE-6FT enclosure to the top of the pedestal:

1. Locate and remove the four knockouts located at the bottom of the PWE-6FT enclosure.



2. Place the empty enclosure on top of the pedestal and align the knockouts with the bolt holes on the top of the pedestal.
3. Insert the four (included) 1/4" stainless steel bolts and washers and tighten.

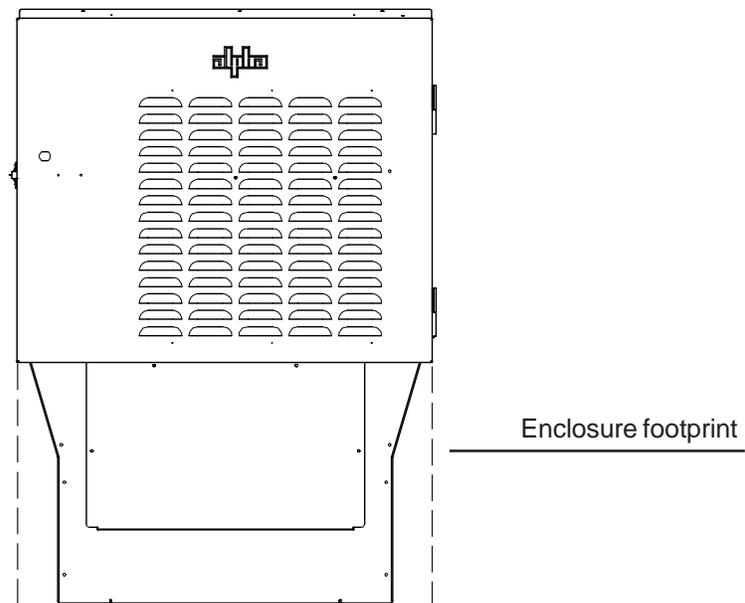


Fig. 2-5, PWE-6FT Enclosure Mounted to Pedestal

## 2.0 Installation, continued

### 2.4 Enclosure Grounding

#### 2.4.1 Enclosure Grounding for Pole-mount Configurations



#### **NOTE**

Alpha Technologies recommends using the grounding method illustrated below. The grounding method for a particular site will be dependent upon available space, local codes, NEC (National Electric Code), and other site-specific characteristics.

#### **ATTENTION!**

Alpha Technologies assumes no responsibility or liability for failure of the installer to comply with the requirements of all applicable local and national codes.

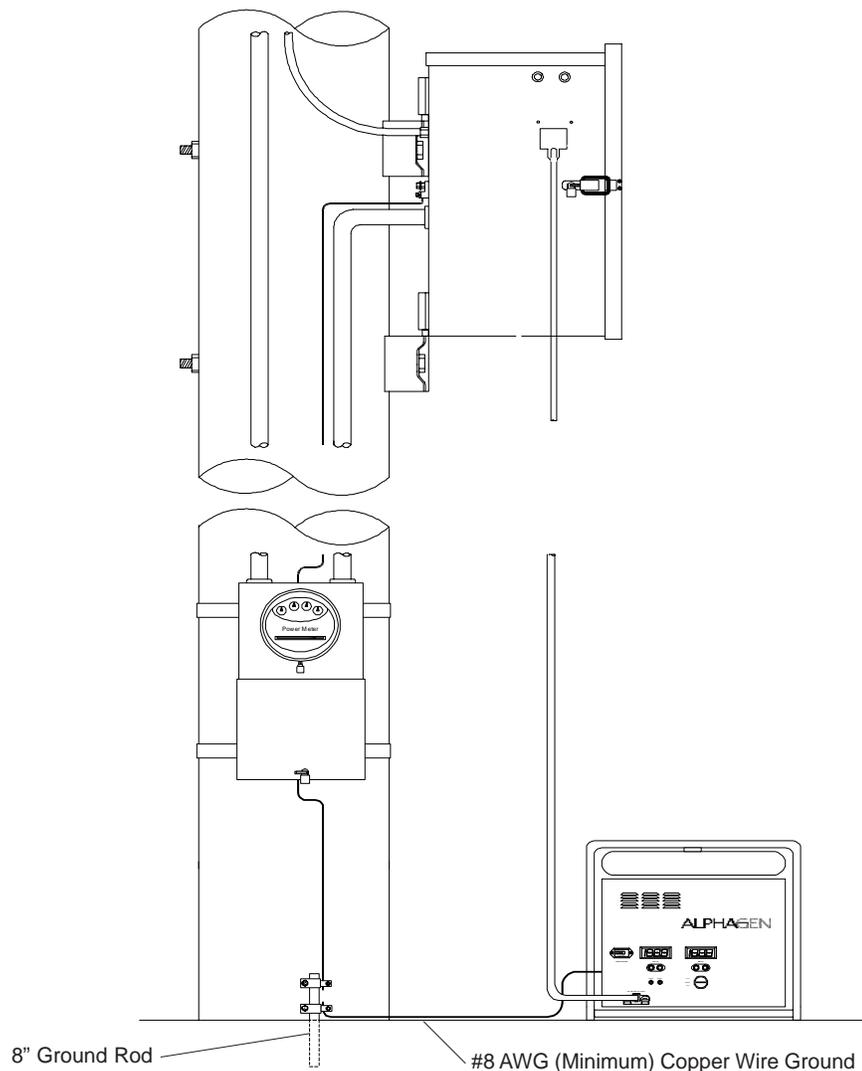


Fig. 2-6, Enclosure Grounding for Pole-mount Configuration

## 2.0 Installation, continued

### 2.4 Enclosure Grounding, continued

#### 2.4.2 Enclosure Grounding for Pedestal-mount Configurations

##### NOTE

Alpha Technologies recommends using the grounding method illustrated below. The grounding method for a particular site will be dependent upon soil type, available space, local codes, NEC (National Electric Code), and other site-specific characteristics.

##### NOTE

Alpha Technologies recommends 5 ohms maximum ground resistance between enclosure and ground rods, in accordance with IEEE 1100-1999 Powering and Grounding Electronic Equipment.

##### ATTENTION!

Alpha Technologies assumes no responsibility or liability for failure of the installer to comply with the requirements of all applicable local and national codes. Where allowed, exothermic welding may be used as an alternative to Burndy clamps and connectors.

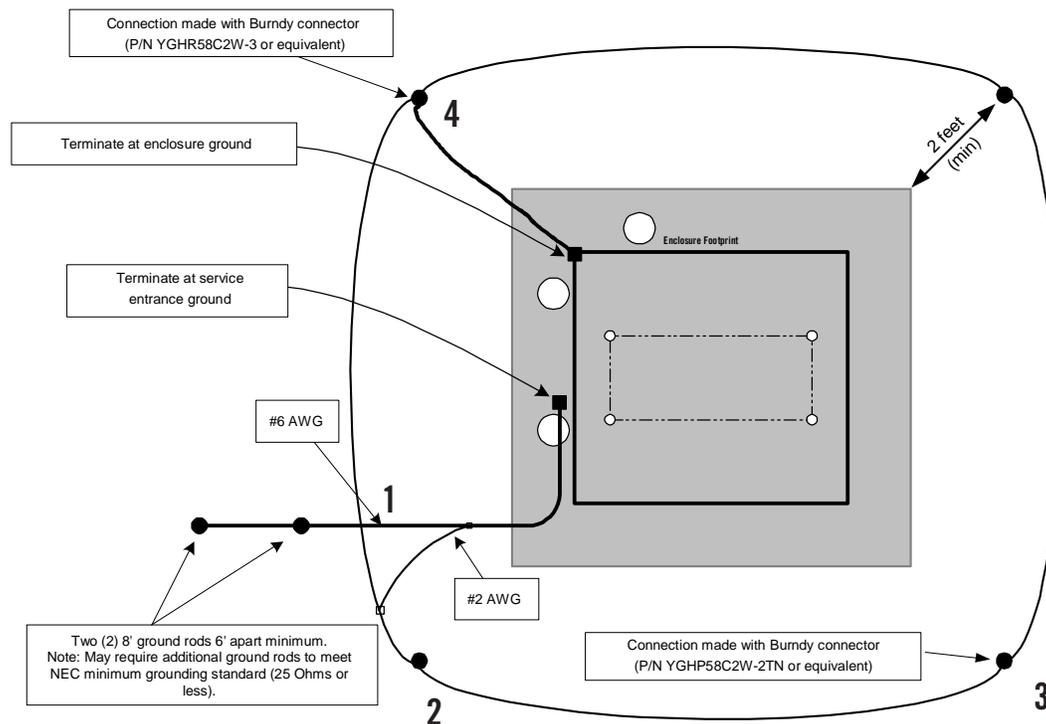


Fig. 2-7, Enclosure Grounding for Pedestal-mount Configurations

##### Service Grounding (required)

- 1 #6 bare copper wire from Service Neutral/Ground Bar with 2 ground rods located 6' apart.

##### Lightning Protection (optional)

- 2 1/2" x 8' copper ground rod, four places, driven about 2 feet (typical) from the corners of the pad.
- 3 #6 bare copper wire loop terminated to each ground rod and buried below grade 30 inches min. Corrosion-proof connections (25+ year life-span) and hardware suitable for direct burial MUST be used.
- 4 #6 bare copper wire from loop to the enclosure.

## 2.0 Installation, continued

### 2.5 Connecting the Utility Power

#### **ATTENTION!**

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



#### **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.

#### 2.5.1 Wiring the Utility Service

Utility power enters the enclosure through a 1-1/8" opening at the bottom or rear of the PWE series, or through an optional breaker box. The enclosures accept a standard electrical fitting.



#### **NOTE**

A "high-magnetic" trip circuit breaker must be used in order to accommodate the high-inrush currents normally associated with the start-up of ferroresonant transformers (400 Amp, no-trip, first-half cycle). Do not replace this circuit breaker with a conventional service entrance circuit breaker. Alpha recommends Square D circuit breakers for 120V installations, and HACR breakers for 240V installations .

Alpha Technologies offers a high-magnetic Square D circuit breaker and a BBX option (a UL Listed service entrance). Contact your local sales representative for more information.

Description	Alpha Part Number	Square D Part Number
240V Installation — HACR (15A)	470-224-10	QO215
120V Installation — High-magnetic (20A)	470-017-10	QO120HM
120V Installation — High-Magnetic (15A)	470-013-10	QO115HM
BBX — External Service Disconnect	020-085-10	QO2-4L70RB
BBX — External Service Disconnect	020-141-10	QO8-16L100RB

Table 2-1, Service Entrance Circuit Breaker Requirements

## 2.0 Installation, continued

### 2.5 Connecting the Utility Power, continued

#### 2.5.2 Wiring From Duplex Receptacle to Service Disconnect

In most cases, the following configurations (see next page) qualify for service entrance use, however, other codes may apply. Always contact your local utility to verify that the wiring conforms to applicable codes.

**240VAC Service** (XM Series 2 915-240 Power Supply) Enclosures used with the XM Series 2 915-240 are equipped with a 240VAC duplex receptacle to provide power to the power supply and peripheral equipment. The receptacle, NEMA 6-15R, is protected by a single, 2-pole, common trip 15 Amp circuit breaker located inside the service entrance. Wiring is typically 14AWG per NEC code, a grounding clamp, located on the enclosure, facilitates dedicated grounding.

**120VAC 20A Service** (XM Series 2 915-120 Power Supply):

Enclosures used with the XM Series 2 915-120 are equipped with a 120VAC duplex receptacle to provide power to the power supply and peripheral equipment. The receptacle, NEMA 5-20R, is protected by a single, 1-pole, 20 Amp circuit breaker located inside the service entrance. Wiring is typically 12AWG per NEC code, a grounding clamp, located on the enclosure, facilitates dedicated grounding.

**120VAC 15A Service** (XM Series 2 615 Power Supply):

Enclosures used with the XM Series 2 615 are equipped with a 120VAC duplex receptacle to provide power to the power supply and peripheral equipment. The receptacle, NEMA 5-15R, is protected by a single-pole, 15 Amp High Magnetic circuit breaker located inside the service entrance. Wiring is typically 14AWG per NEC code,

#### ✓ NOTE

Alpha recommends wiring with 12AWG, in the event that the enclosure will be upgraded to use 90V power supplies.

#### ✓ NOTE

When required to bond the box to the neutral plate, use the long green bonding screw provided with the box: Alpha P/N 523-011-10 or Square D P/N 40283-371-50.

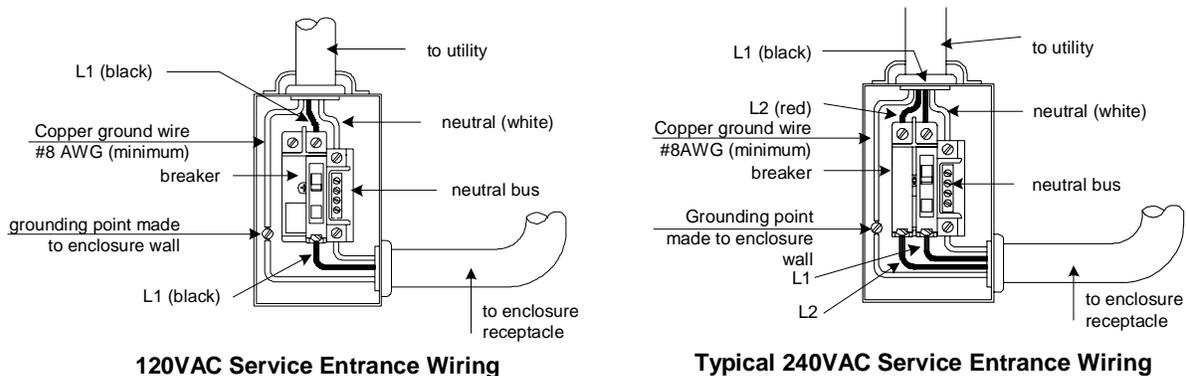


Fig. 2-8, Typical Service Entrance Wiring

2.0 Installation, continued

2.5.2 Wiring From Duplex Receptacle to Service Disconnect, continued

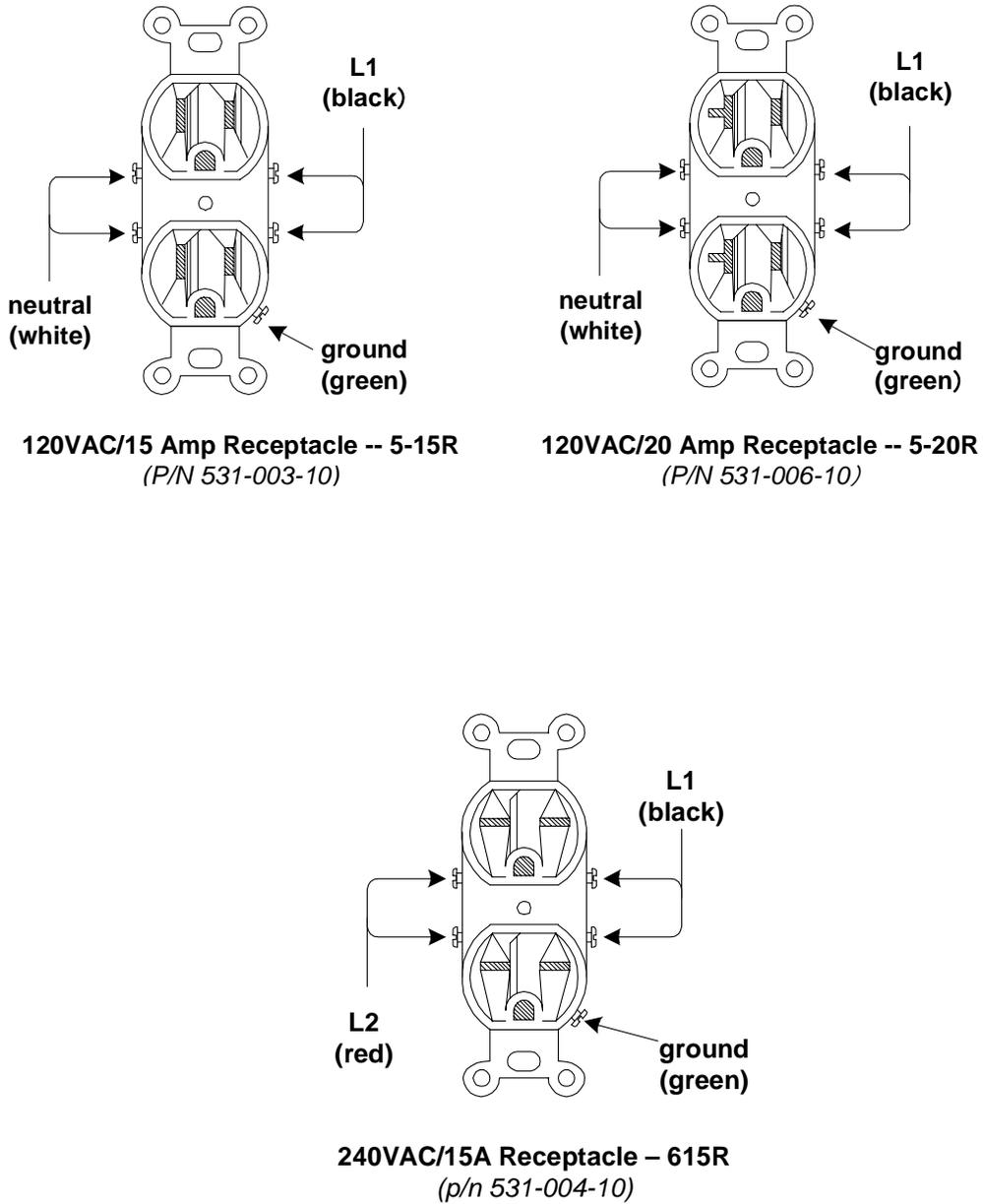
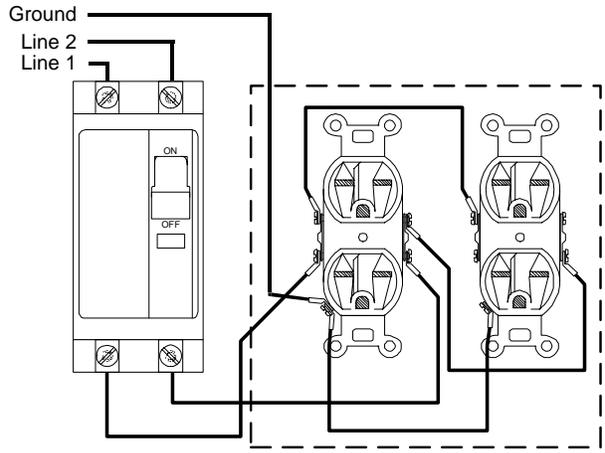


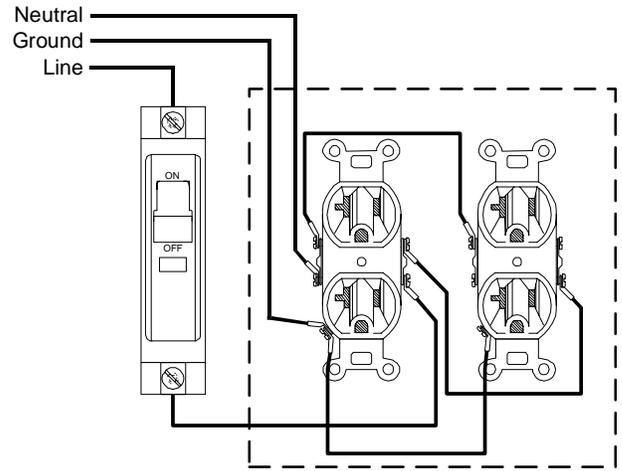
Fig. 2-9, Typical Receptacle Wiring

2.0 Installation, continued

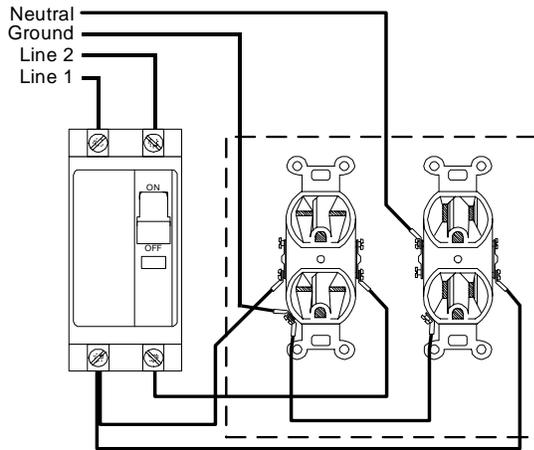
2.5.2 Wiring From Duplex Receptacle to Service Disconnect, continued



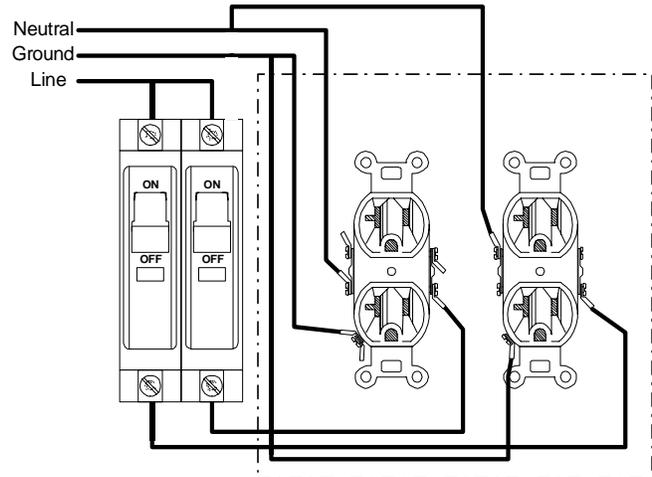
BQO 240V, 15A



BQO 120V, 20A



BQO 240V, 120V



BQO 120V, 20A  
Dual Receptacle,  
Dual Breaker

Fig. 2-10, Typical BQO (Breaker Quad Option) Receptacle Wiring

## 2.0 Installation, continued

### 2.5.2 Wiring From Duplex Receptacle to Service Disconnect, continued

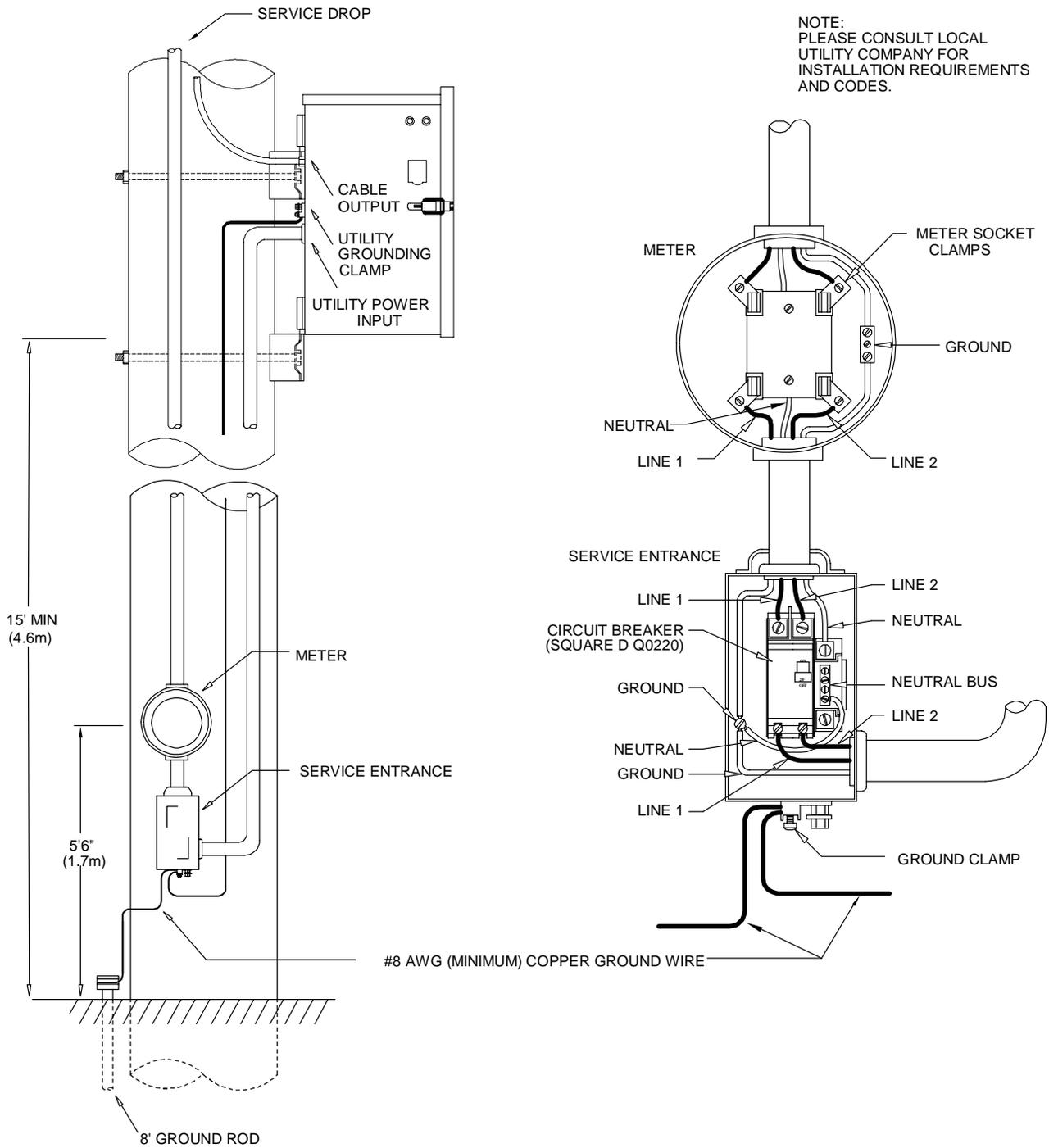


Fig. 2-11, PWE Pole-mount, 240VAC UL Wiring

## 2.0 Installation, continued

### 2.5.2 Wiring From Duplex Receptacle to Service Disconnect, continued

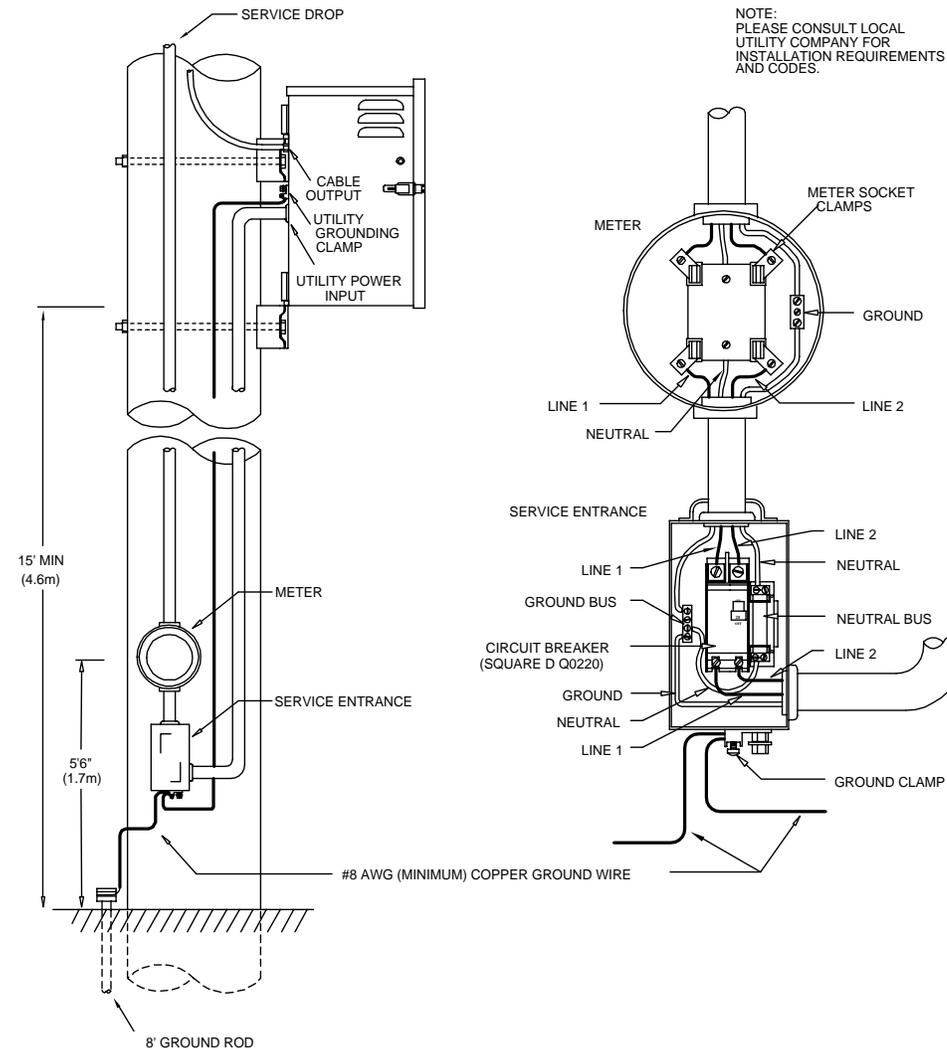


Fig. 2-12, PWE Pole-mount, 240VAC CSA Wiring

## ✓ NOTE

Alpha offers a *Meter Convenience Assembly (MCA)* as a cost-effective alternative to building an assembly on-site. The MCA is a factory configured pole mount meter and service disconnect with integral bracket. It also provides consistent installations for metered pole mount power systems.

To order the MCA with an alternate meter (e.g., universal meter base) please contact your Alpha representative.

#### Product Description:

Meter assembly with mounting plate, Euserc meter base

- FBX (20 Amp fuse kit included)
- 100 Amp BBX
- 70 Amp BBX

#### Part Number:

745-126-20  
745-126-21  
745-126-22



## 2.0 Installation, continued

### 2.5 Connecting the Utility Power, continued

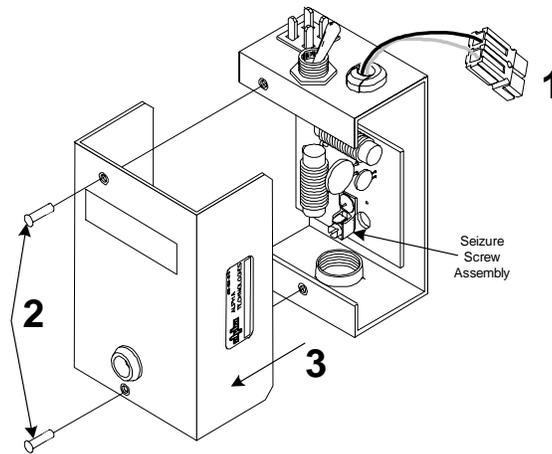
#### 2.5.3 Connecting Coaxial Cable



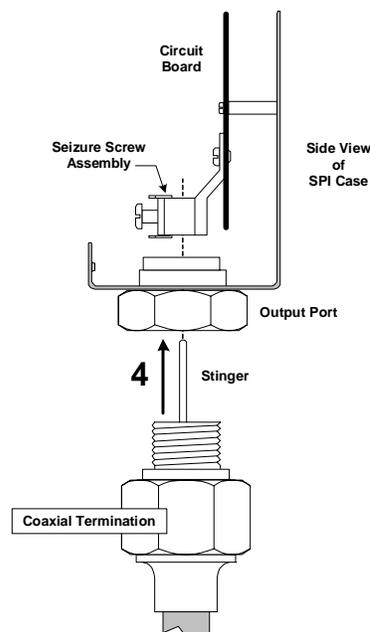
### WARNING!

To prevent injury, DO NOT remove SPI cover until all sources of power have been removed.

1. Verify SPI IS NOT connected to power supply.
2. Remove the two screws holding cover onto SPI chassis.
3. Remove SPI cover, exposing circuit board and seizure screw assembly.



4. Insert Coaxial Termination into Output Port on bottom of SPI.

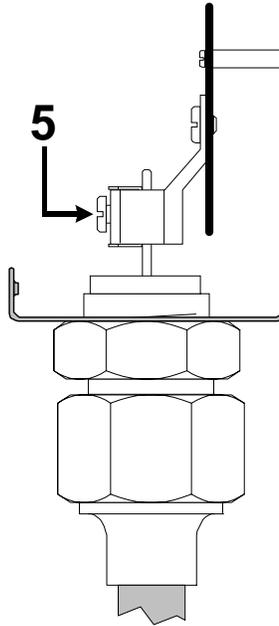


## 2.0 Installation, continued

### 2.5 Connecting the Utility Power, continued

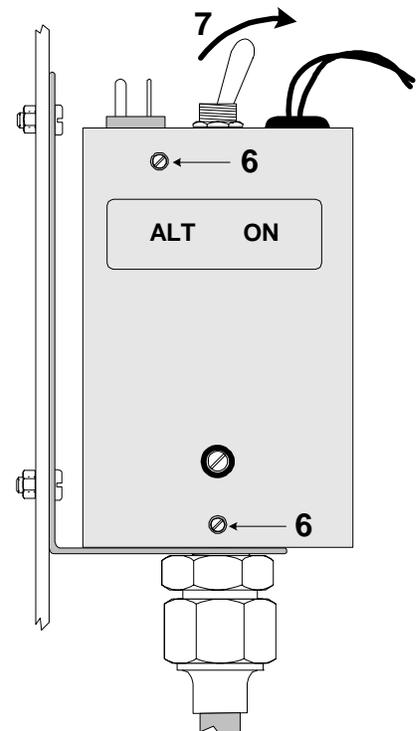
#### 2.5.3 Connecting Coaxial Cable, continued

5. Insert coaxial termination fully inside Seizure Screw assembly and tighten Seizure Screws to 35 Inch-Pounds to prevent arcing and failure of unit.



6. Replace SPI cover and reinstall the screws.

7. Verify switch on top of SPI is in the ON position.



## 2.0 Installation, continued

### 2.6 Battery Installation

#### 2.6.1 Battery Terminal Assembly Procedure

This illustration shows the typical battery terminal assembly for front terminal battery posts. Torque rating for all terminals is 60 in-lbs (6.5nM).

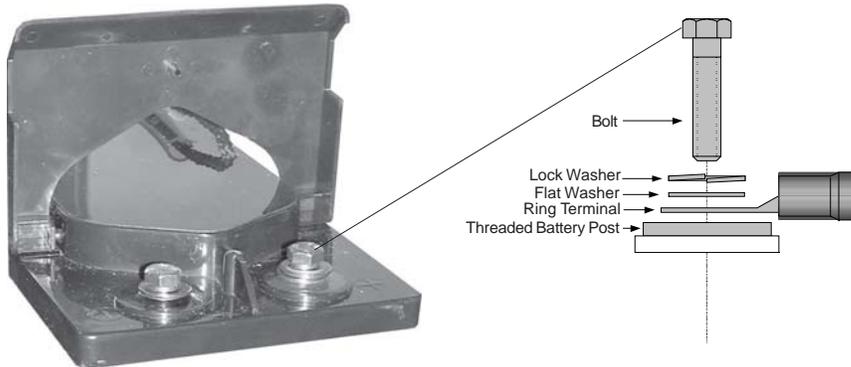


Fig. 2-13, Typical Ring Lug Assembly for Front Terminal Batteries, Single Lug

#### 2.6.2 Battery Installation Procedure

1. Place the batteries, with the terminals oriented toward the front of the enclosure on the battery shelf (see Fig. 2-15). Use the battery manufacturers' recommended spacing between batteries for maximum ventilation space.
2. For ease of identification and future record keeping, number batteries using labels or masking tape. Record each battery's number and date code in the power supply maintenance log
3. Connect the batteries in series to achieve 36VDC. You must install the battery-mounted fuse in either single or dual 36VDC series (see Fig. 2-15).

#### ✓ NOTE

Verify battery polarity and install battery jumper bars after attaching all terminals to respective terminal posts

4. Use a voltmeter to verify polarity and DC voltage at the module's battery connector.
5. The power supply battery charger utilizes a Remote Temperature Sensor (RTS) to provide precise battery temperature compensation information. Using high strength tape, attach the sensor to the center of the middle battery about 2/3 of the way up from the base of the battery. Route the RTS connector into the power supply compartment. DO NOT connect the RTS to the power supply at this time.
6. Route the battery cable connector into the power supply compartment.

#### ✓ NOTE

The cables are marked with a RED sleeve to indicate the (+) positive battery terminal.

#### ✓ NOTE

The In-line Fuse is required for single or dual battery string installation. See Fig. 2-14.

## 2.0 Installation, continued

### 2.6 Battery Installation, continued



#### CAUTION!

Never allow live battery cables to contact the chassis whenever making or breaking battery connections. If necessary, wrap the lugs with electrical tape to prevent arcing and temporarily disconnect one of the leads from the center battery. Ensure the battery string voltage and polarity are correct before proceeding.



#### CAUTION!

Recheck the battery string voltages and polarity at the connectors leading into the power supply.



#### CAUTION!

DO NOT connect the batteries to the power supply at this time!

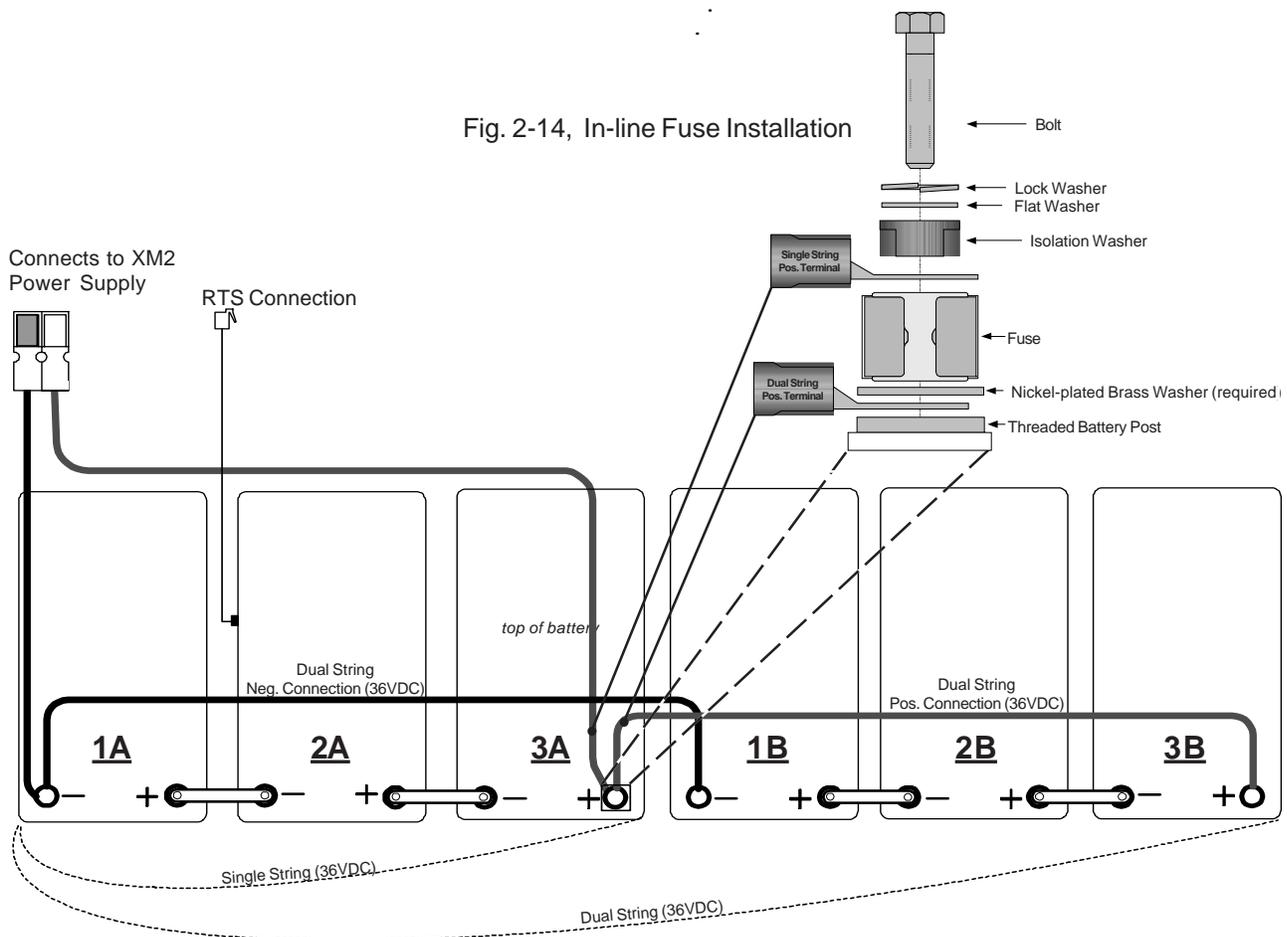


Fig. 2-15, Battery Wiring Diagrams (viewed from the top)  
Battery Cable Kit P/N 745-759-21 (shown)

## 2.7 Power Supply Installation

### ✓ NOTE

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These instructions are included only as reference.

1. Before installation; inspect the power supply for damage, loose connectors, or other potential failures. Correct discrepancies before proceeding.
2. Place the XM Series 2 Power Supply on the appropriate enclosure mounting shelf. For the PWE-6FT, it is the upper-right compartment of the enclosure.
3. Switch the BATTERY BREAKER to OFF. This will prevent the inverter from starting when the batteries are first connected to the XM Series 2 power supply.
4. Batteries are an important part of the XM Series 2 Power Supply. It is mandatory to properly install and test all batteries, battery connections, and battery cables before connecting to the power supply. For complete battery installation procedures, see Section 2.6.2 "Battery Installation Procedure," of this manual.
5. After the batteries, battery connections, and battery cables have been verified to be in good working order, plug the quick connects from the battery cable into the power supply's BATTERY INPUT connector. The connector is keyed and color-coded to fit in one direction only.
6. Plug the Remote Temperature Sensor into the TEMP PROBE connector located on the Inverter Module assembly. Route the sensor end of the cable into the battery compartment.
7. If the optional LRI lamp (Local / Remote Indicator) is included, plug the LRI cable into the LRI connector.
8. If status monitoring is used, plug the tamper switch into the 2-pin TMPR connector, and plug the transponder cable into the connection on the transponder.
9. Plug the connector from the SPI(s) into the module's "OUTPUT 1" and (optional) "OUTPUT 2" connector(s). Make sure that the SPI's "ALT/ON" switch is in the ON position.

### ✓ NOTE

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If the installation includes an ACI lamp option, plug the lamp's connector into the module's "AC OUTPUT"; then plug the SPI into the second connector on the ACI.

### ✓ NOTE

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If the installation includes a Module Retaining Cable option, attach end of cable at hole provided in top rear center of enclosure; then thread strap through XM Series 2 handle and clip strap back on itself.

10. Installation is complete. DO NOT switch ON the Inverter Module's BATTERY BREAKER, or apply AC power to the power supply. Refer to the power supply Operator's Manual for Start-up and Test procedures.

## 2.8 Cooling Fan Installation



### CAUTION!

To prevent the possibility of injury to service or emergency personnel, always follow the next procedure to safely shutdown the power supply.

To shut down the power supply:

1. Turn the battery breaker to OFF.
2. Unplug the AC Input Line Cord from the service entrance.
3. Unplug both the Output 1 and Output 2 connections. If applicable, unplug the N+1 connections at this time.



### NOTE

This procedure will require a service power supply (for example, an APP 9015S or APP 9022S) to maintain power to the cable plant. Connect via the SPI and output switch.

**Tools Required:** Phillips Screwdriver

#### Installation Procedure:

1. Identify enclosure fan installation location at upper rear of enclosure. Locate two holes designated for fan assembly.
2. Attach fan assembly to enclosure using the two #6-32 x 3/8" Phillips screws provided.
3. Plug one end of Y cable into SPI wire.
4. Plug other end of Y cable into power supply output connection.
5. Position thermostat away from power supply, as shown.

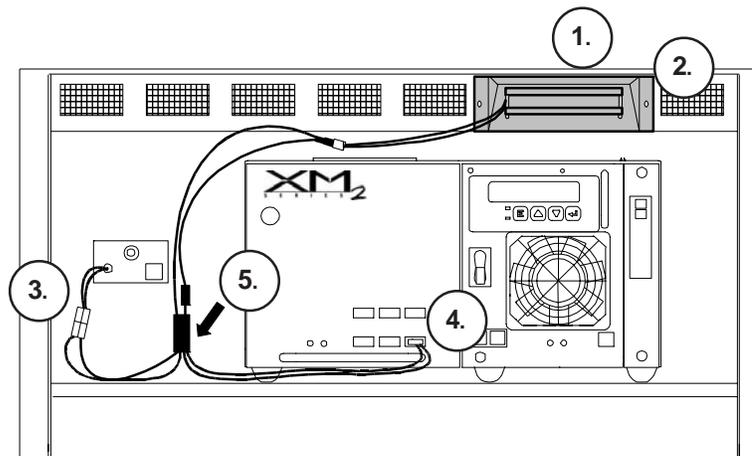


Fig. 2-16, Cooling Fan Kit Installed



### NOTE

This kit does not fit PWE models manufactured before April 2002.

## 3.0 Pole-mount Enclosure Maintenance

Preventive Maintenance must be performed every three to six months. By establishing a routine maintenance program and following the guidelines contained in this manual, the Pole-mount Enclosure will continue to provide years of trouble free operation.

### Inspect the Pole Mount Enclosure

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.

### Inspect the Mounting Brackets and Hardware

Carefully inspect the Pole-mount Enclosure's Mounting Bracket and mounting hardware. Look for signs of unusual wear and loose hardware. Correct all mounting hardware failures immediately.

### Check Battery Terminals and Connecting Wires

Care of the batteries is a critical step in any maintenance program. In addition to voltage checks, visually inspect the batteries for signs of cracking, leaking, or swelling. To aid in quick identification and tracking of voltages in the maintenance log, number the batteries inside the enclosure using labels or masking tape, etc. Batteries are temperature sensitive and susceptible to overcharging and under-charging. Since batteries behave differently in the winter than in the summer, Alpha's battery chargers automatically compensate for changes in temperature by adjusting float and accept charge voltages. See the power supply Operator's and Technical Manual for complete Power Supply Preventive Maintenance instructions.

Check each battery terminal and connection. Verify the posts are clean and the crimped connectors are tight. Terminal connectors must be torqued to 60 in-lbs ( $\pm 3\%$ ) / 6.77Nm ( $\pm 3\%$ ) at installation. If there is an "in-line" or battery-mounted fuse in the battery cable, check the fuse holder and fuse. Verify the terminals are properly greased with an approved battery terminal corrosion inhibitor such as NCP-2. Record date of maintenance in the maintenance log.

### Check Battery Open Circuit Voltage

Switch the power supply's BATTERY BREAKER to the OFF position. Disconnect the battery connector from the Inverter Module and measure the individual voltage across each battery. The difference between any battery in the string must not be greater than 0.3 VDC. Defective or marginal batteries must be replaced with an identical type of battery. Record the unloaded battery voltages in the maintenance log.



### NOTE

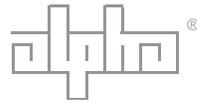
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Whenever the power supply's BATTERY BREAKER is turned OFF or the batteries are not connected, the power supply will not operate in Inverter Mode in the event of a utility power failure.



# Power

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