



**EARTHLINKED**  
TECHNOLOGIES

# **EARTH LOOP PROTECTION KIT**

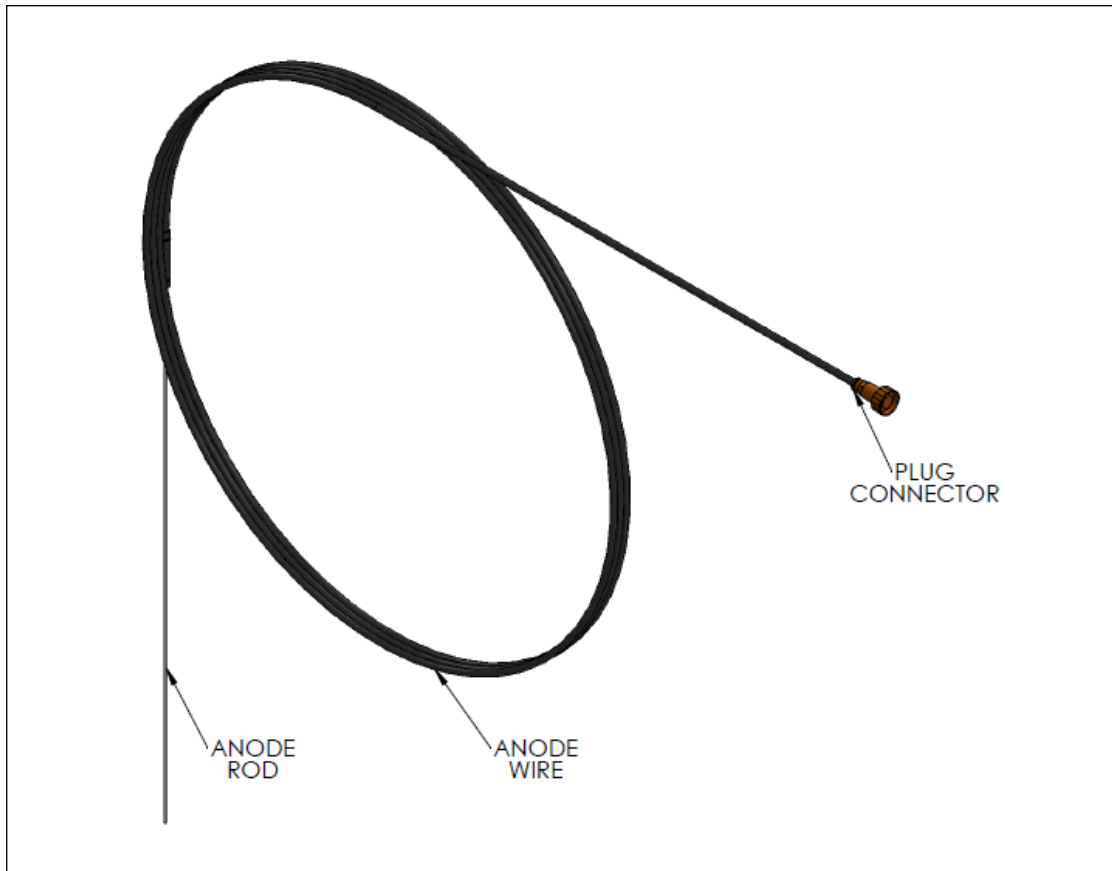
*Installation Manual*

*for*

**Classic Series Models SC, SD, SDH, SCW**

**and**

**Prime Select Series Models PS, PSD, PSDH**



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### **Disclaimer**

Proper installation and servicing of the EarthLinked® Earth Loop Protection Kit is essential to its reliable performance. All Earth Loop Protection Kits must be installed and serviced by an ETI authorized technician. Installation and service must be made in accordance with the instructions set forth in this manual. Failure to provide installation and service by an ETI authorized installer consistent with this manual will nullify the limited warranty coverage for EarthLinked® Heating and Cooling Systems.

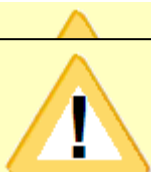
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**CSI # 22 33 00 & 23 80 00**

## Introduction

This manual addresses the installation of the EarthLinked® Earth Loop Protection System Kit (EPK-1872), which is to be applied only to EarthLinked® space heating and cooling systems. These products are manufactured by Earthlinked Technologies, Inc. (ETI).

### IMPORTANT

**EarthLinked® Systems must have the EarthLinked® Earth Loop Protection System installed and operating. Failure to do so will void the EarthLinked® System Limited Warranty.**



### IMPORTANT

The underground components of the impressed current Earth Loop Protection System (EPS) are installed at the same time as the earth loop system. **The following underground components of the EPS system are in compliance with National Electric Code (NEC) Table 300.5.**

1. **Rod Anode Assembly:** The CerAnode™ rod anode assembly is part no. **CPW-STI-125H-3FT-CXP-100FT-12AWG-HMWPE110**, manufactured by Ceranote Technologies International.
2. **Anode Cable:** The CerAnode™ cable identification on the wire jacket is **CERANODE CP CABLE #12 AWG HMWPE. 110B/C 600V RMA77-039B**, and meets ANSI/NEMA WC-70 and ICEA S-95-658 (for power cables rated at 2,000 volts or less for the distribution of electrical energy.)
3. **Coke Breeze:** The coke breeze is **Loresco SC-3**.

The EarthLinked® EPK-1872 is designed to match the EarthLinked® compressor units equipped with an internal earth loop protection control.

When planning placement of the earth loop system and the compressor unit, it is recommended that the total distance between the anode in the ground and the anode socket on the compressor cabinet not **exceed 95 feet**.

The EPS-KIT contains the following:

- Anode connected to 100 feet of anode wire
- 25# of coke breeze
- Plug connector: Bulgin Model PX0736/P-2 pin connector. It is rated at 250 VAC/VDC and 10 Amperes. It is UL Recognized/CSA/VDE.

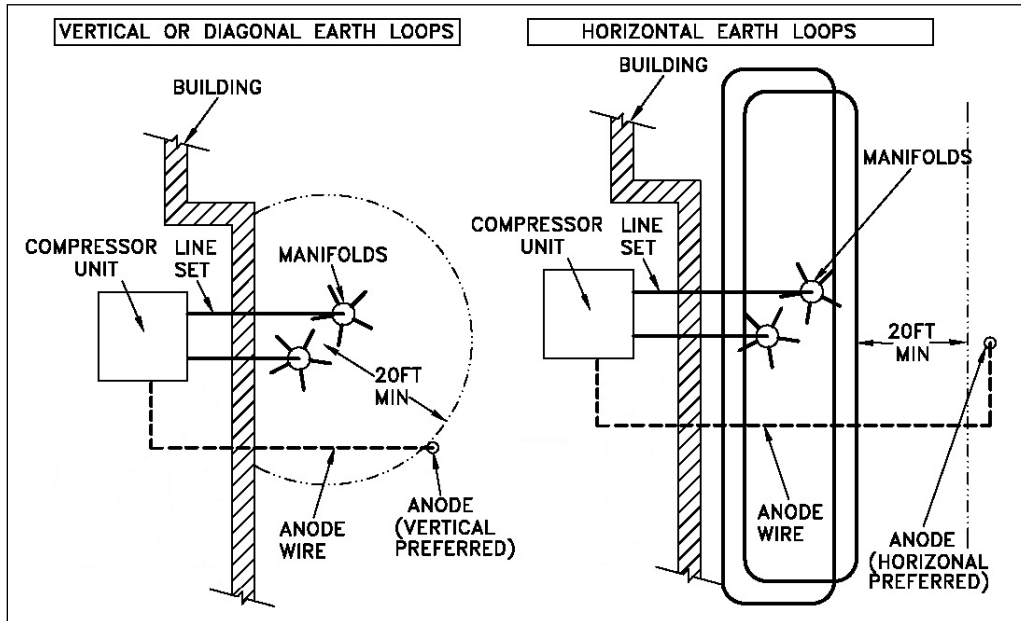
The EPS power supply, fuse and control module are located within the compressor unit electric box. For service purposes, an extra fuse is located in the compressor unit electric box.

## Inspection/Pre-Installation

Inspect the EarthLinked® EPK-1872 upon receipt for possible damage. ETI's responsibility ceases upon delivery of goods to the carrier in good condition. Any claims for damage, shortage in shipments, or non-delivery must be filed immediately against the carrier by the consignee.

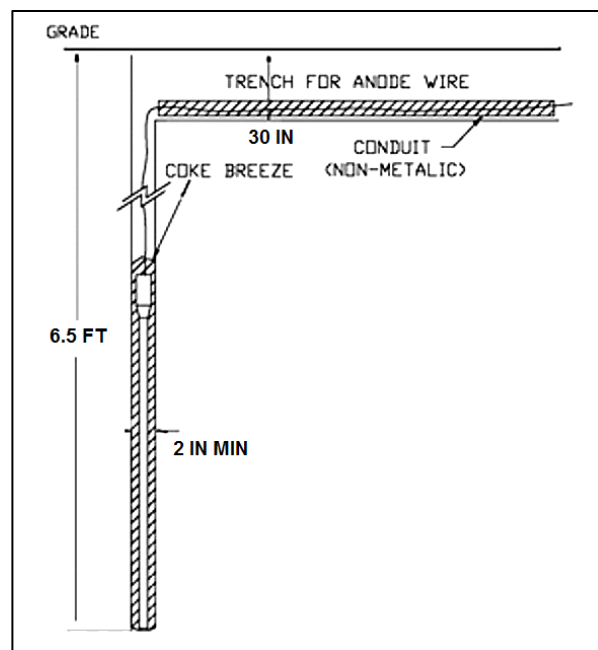
## Anode Location and Installation

For (1) vertical and diagonal and (2) horizontal earth loop installations, the anode is located as shown in Figure 1. It must be at least 20 feet away, as shown, with NO METAL pipes, wires or other objects between the anode and the earth loops. Figure 1 also shows the general layout and placement of the anode and anode wire.

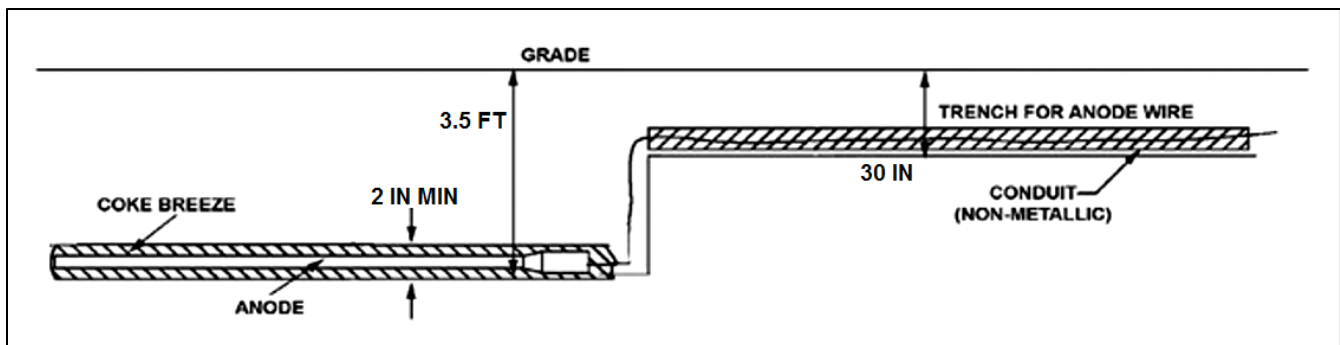


**Figure 1. Typical Anode Locations**

The installation details for the vertical anode are shown in Figure 2. The vertical anode installation is preferred for vertical or diagonal earth loops; however, the horizontal anode installation as shown in Figure 3 is fully acceptable.



**Figure 2. Vertical Anode Installation**



**Figure 3. Horizontal Anode Installation**

For horizontal earth loops, the earth loop protection system anode should be located at least 20 feet away as shown in Figure 1. No METAL pipes, wires or other objects should be between the anode and the earth loops. The horizontal anode installation as shown in Figure 3 is preferred for horizontal earth loops; however, the vertical anode installation as shown in Figure 2 is fully acceptable.



### **IMPORTANT**

The anode is to be installed in accordance with the following key factors:

1. Anode must be at least 20 feet away from any underground metal, in all directions.
2. There must not be any underground metal between the anode and any part of the earth loop system including manifolds and the manifold line set.
3. The anode wire going to the compressor unit should be run inside a protective non-metallic conduit for protection from abrasion. PVC pipe is acceptable.
4. The anode must be fully surrounded on all sides with coke breeze as follows:

#### **COKE BREEZE PREPARATION AND APPLICATION**

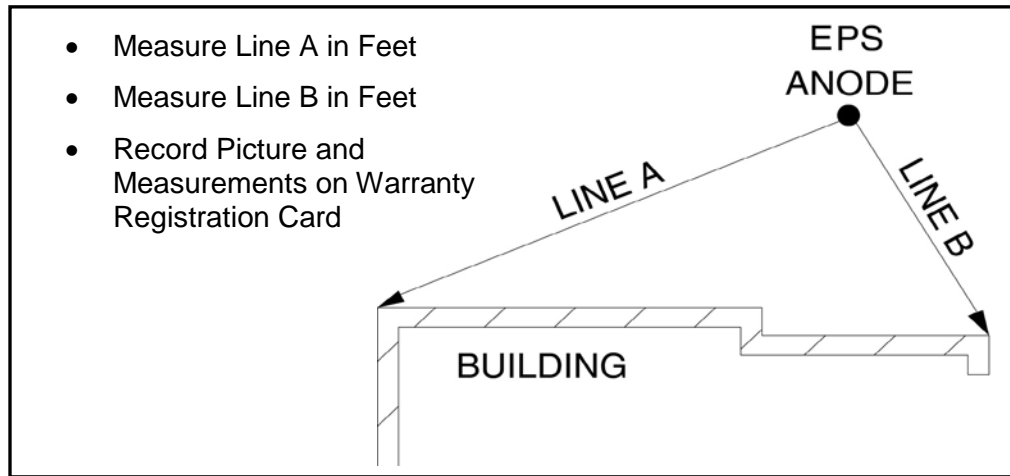
**Preparation:** Mix some of the coke breeze with water in a five gallon bucket until the mixture is soupy, but pourable.

**Vertical Application:** Place anode in center of bore hole. Pour coke breeze mixture into hole until anode is completely covered. Completely percolate water out of mixture. Back fill with soil.

**Horizontal Application:** Trench to be occupied by coke breeze mixture and anode is to be as wide as it is deep. Pour mixture to  $\frac{1}{2}$  of occupied depth. Position anode centered in trench on top of coke breeze. Pour in mixture to fully occupied depth of trench. Completely percolate water out of mixture. Back fill trench with soil.


## Anode Triangulation

The anode location is to be triangulated (measured) in accordance with Figure 4. Measure the distances A and B from a permanent structure and record the information on the Earth Loop Warranty Registration (LIT-64) as shown in Figure 5. Make a copy of the diagram for the owner.



**Figure 4. Anode Triangulation**

LIT-64



**EARTH LOOP**  
*Limited Warranty Registration*

	Earth Loop Installer	Driller or Excavator	Grout Installer	Owner
Company Name:				
Telephone:				
Address:				
City:				
State/ Zip:				

**MANIFOLDS**

Draw location of **MANIFOLDS** from permanent structure (use triangulation method per installation instructions).

**EPS ANODE**

Draw the measured location of the Earth Loop Protection System **ANODE**, if installed with Earth Loop System.

EarthLoop Model No.: \_\_\_\_\_

EPS Model No.: \_\_\_\_\_

Soil pH: \_\_\_\_\_

Earth Loop System Seal Test: 400 psig Yes No (circle one)

Start-up Date: \_\_\_\_\_

**SYSTEM COMPRESSOR UNIT**

MODEL: \_\_\_\_\_

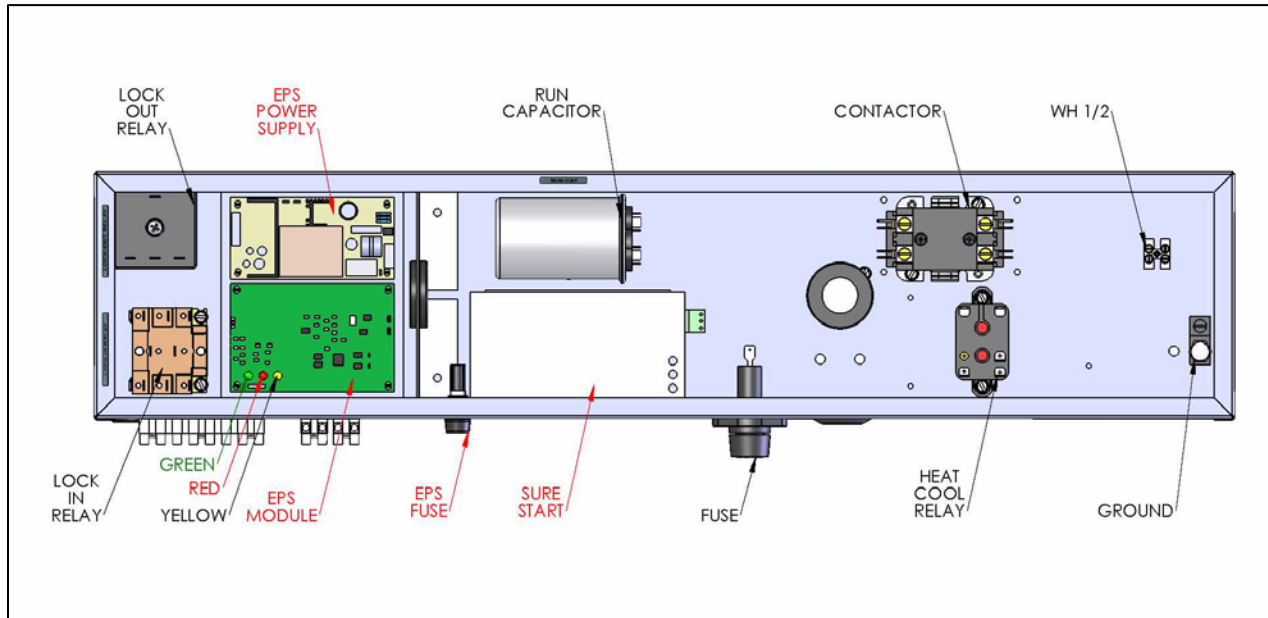
SERIAL: \_\_\_\_\_

**INSTALLER: COMPLETE AND FAX THIS FORM TO 1-863-701-7796  
OR E-MAIL TO info@earthlinked.com.**

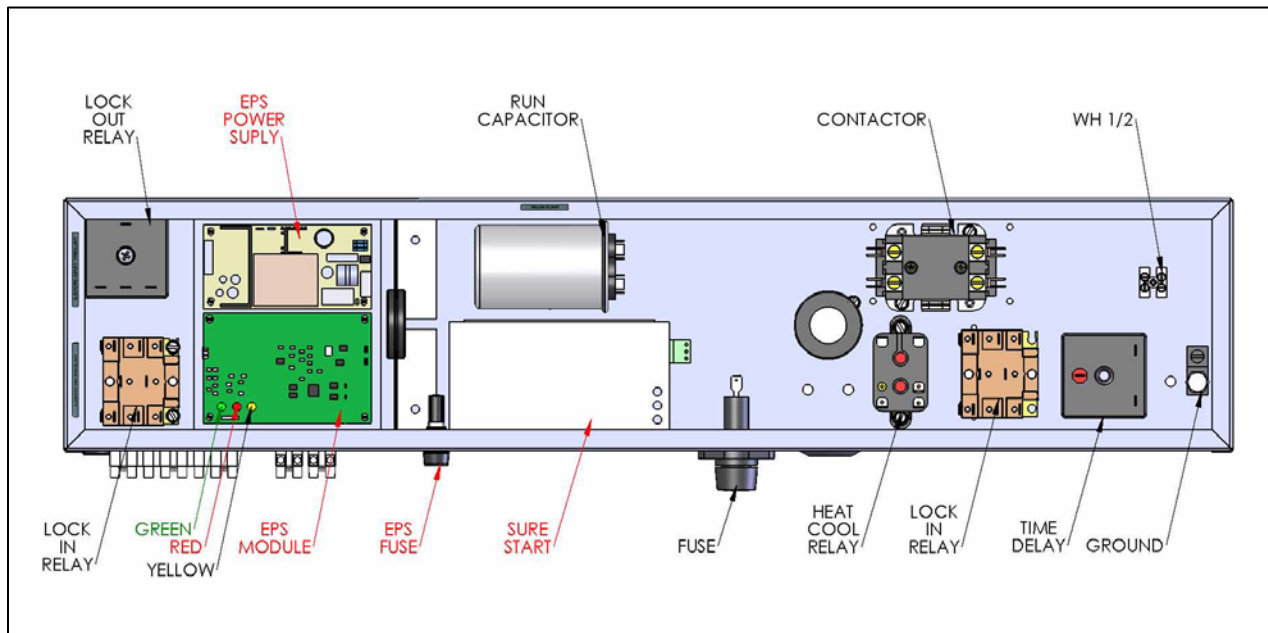
**Figure 5. Earth Loop Warranty Registration**

## Anode Wire Installation

For information purposes, the earth loop protection system power supply, fuse and control module are located in the compressor unit electric box as shown in Figure 6a and 6b. **No action is required within the compressor unit cabinet at the time of installation.**

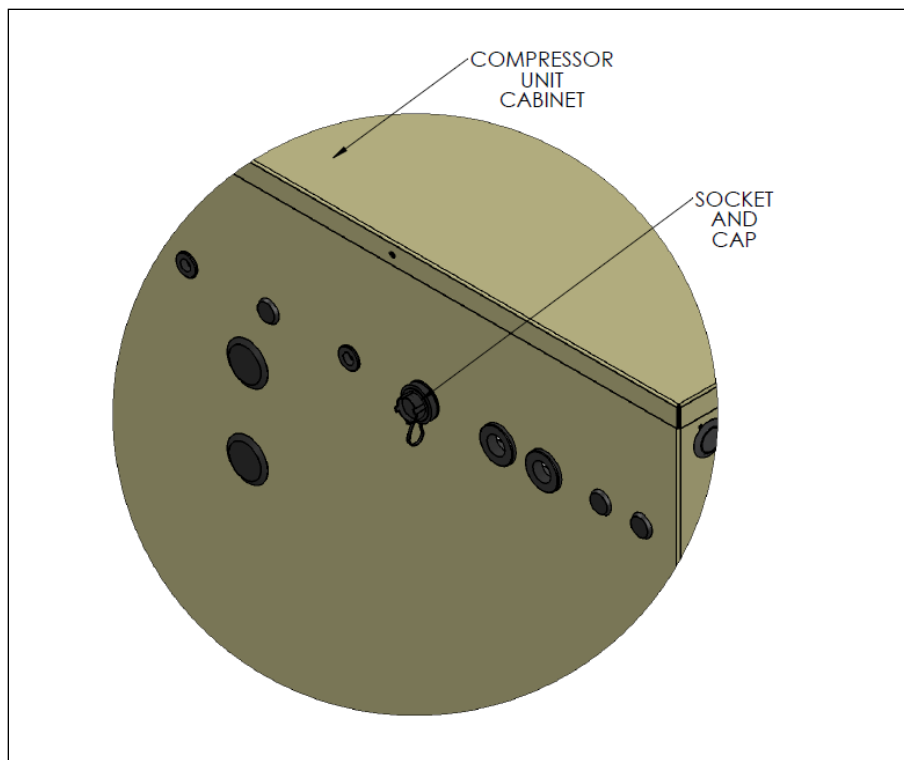


**Figure 6a. Classic Series Electric Box**



**Figure 6b. Prime Select Series Models PS and PSD Electric Box**

The earth loop protection system connection to the anode wire is on the back side of the compressor cabinet as illustrated in Figure 7, showing the electrical **socket** with the **sealing cap**.



**Figure 7. Compressor Cabinet Socket/Cap**

The EPK-1872 contains the **plug connector**, which will be field assembled and connected to the **anode wire**.



**WARNING!**

**All power of the EarthLinked® System is to be shut OFF at the disconnect while field wiring the Earth Loop Protection System. Failure to do so may result in serious injury or death, or equipment or property damage.**

The steps to install the **anode wire** to the **plug connector assembly** are as follows.

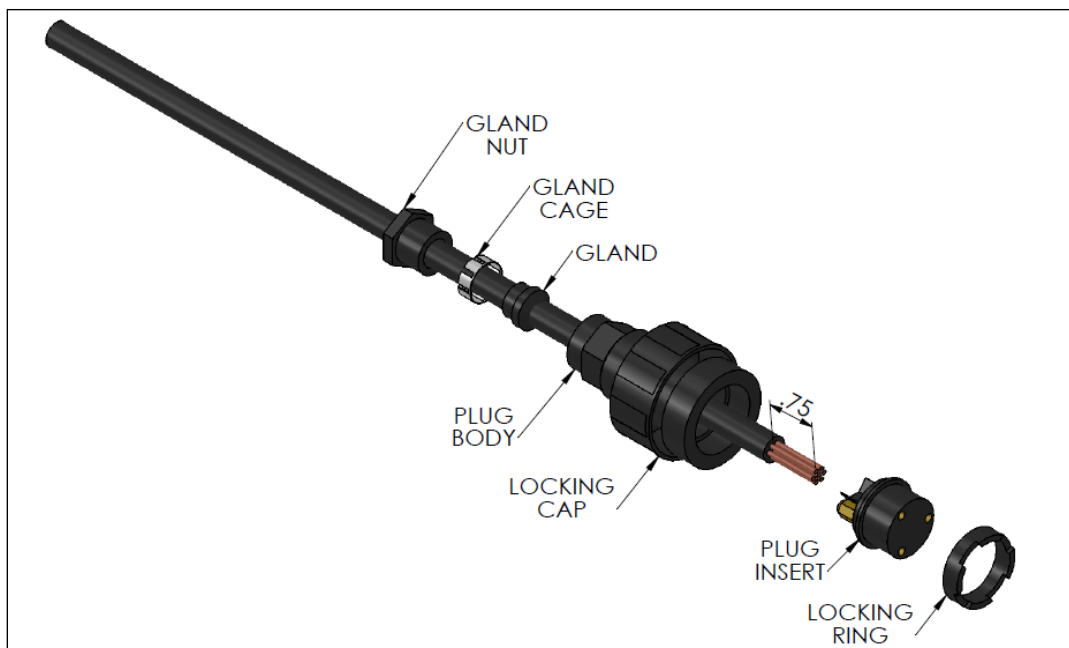
Remove the **sealing cap assembly tool** from the compressor unit cabinet shown in Figure 7. Using the **sealing cap assembly tool**, as shown in Figure 8, unscrew the **locking ring** from the **plug connector assembly** to access the **plug insert**. Then, remove the **gland nut**, **gland cage**, and **gland** from the other end of the **plug body** as shown in Figure 8.





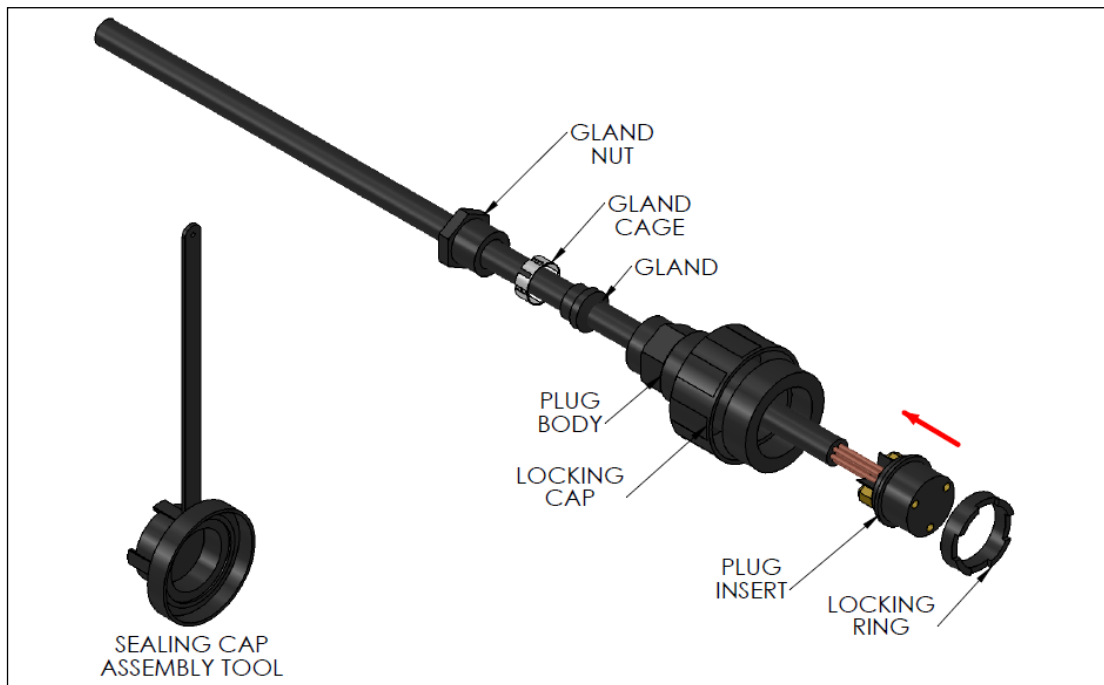
**Figure 8. Disassembled Plug Connector**

Strip the insulation from the multi-strand anode wire back approximately  $\frac{3}{4}$  inch from the end and while keeping the strands together, push the anode wire through the **gland nut, gland cage, gland and plug body** as shown in Figure 9. Loosen one of the two screw terminals on the **plug insert** to receive all of the strands of anode wire on one terminal.



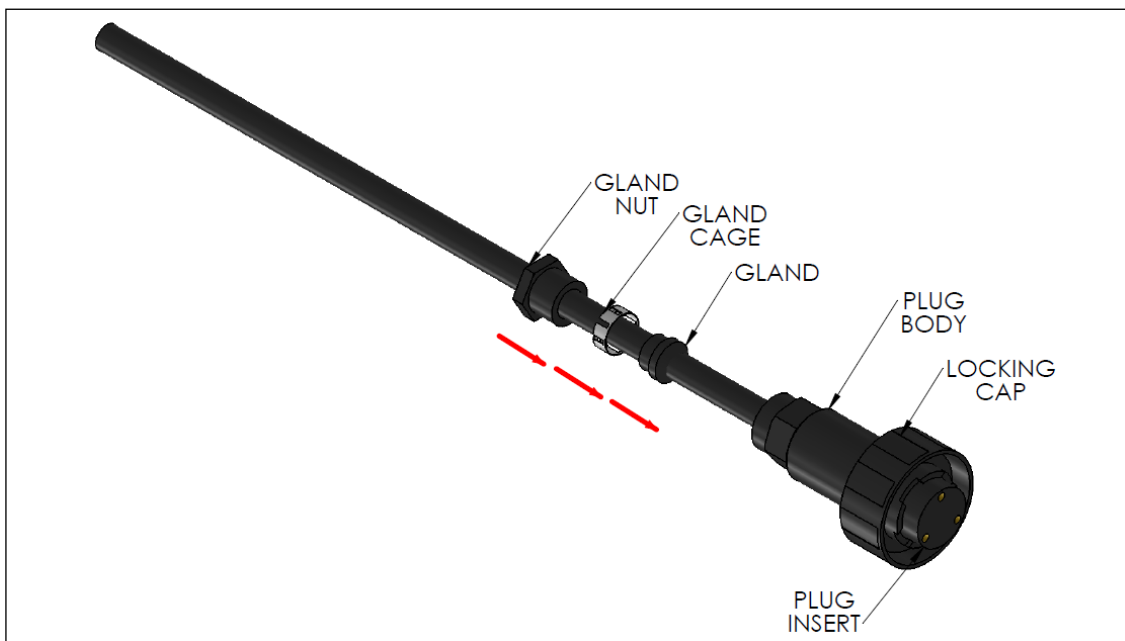
**Figure 9. Anode Wire Insertion**

After inserting all strands of the anode wire into one of the terminals on the **plug insert**, tighten the wire in place by tightening the screw on that terminal. Once tightened, push the **plug insert** back into the **plug body** as shown in Figure 10 until it is firmly seated. Engage the **locking ring** with threads in the **plug body** and turn clockwise with the **sealing cap assembly tool** until the **lock ring** is firmly seated and tight against the **plug insert**.



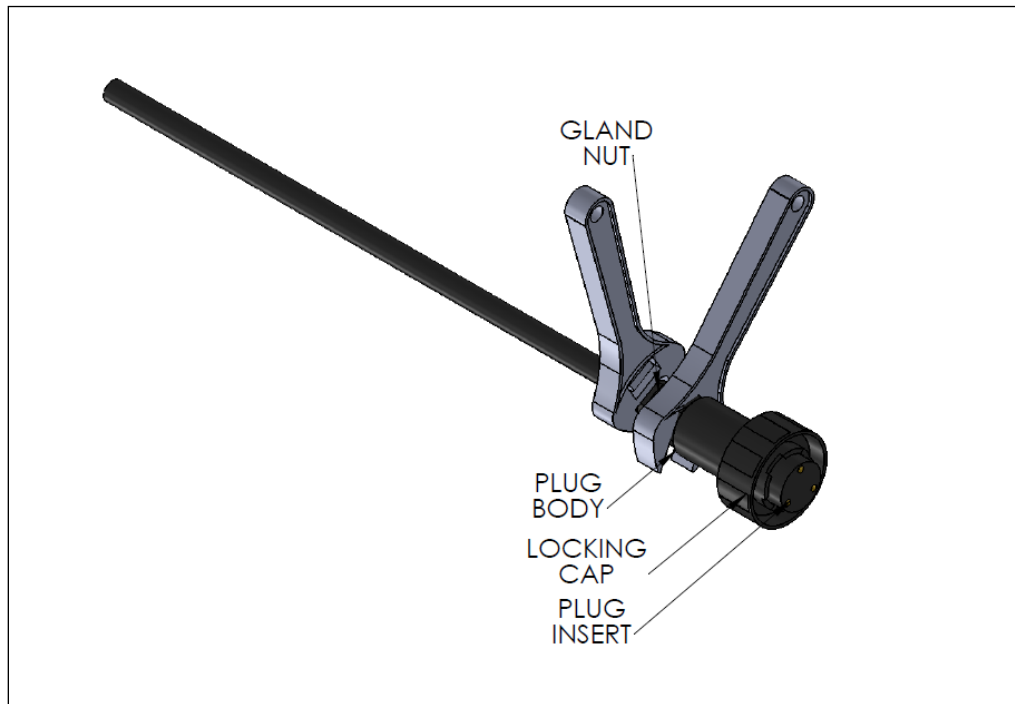
**Figure 10. Install the Plug Insert**

Slide the **gland** forward on the anode wire until it is firmly seated in the **plug body** as shown in Figure 11. Next, slide the **gland cage** over the **gland**, and slide the **gland nut** firmly against the **gland cage**, with the **gland nut** against the **plug body**. Engage the threads of the **gland nut** with those inside the **plug body** and manually thread the **gland nut** clockwise by hand.



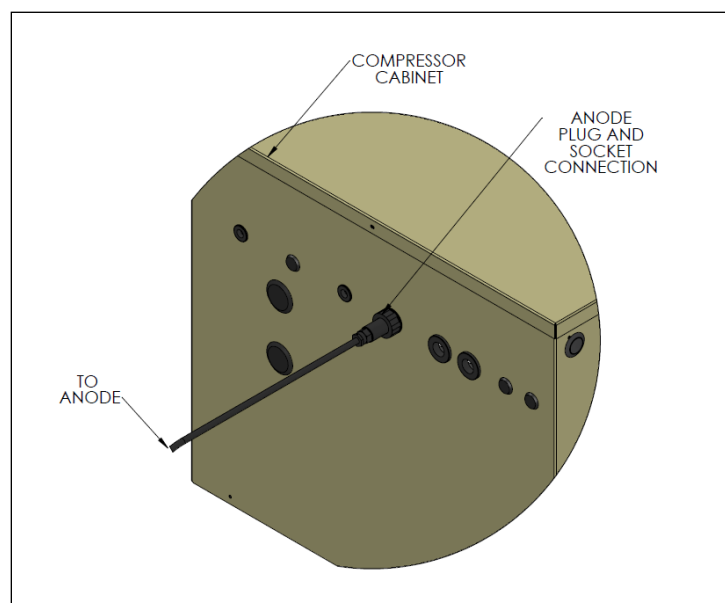
**Figure 11. Engage the Gland Nut**

Once the **gland nut** has been hand tightened into the **plug body**, use two adjustable wrenches to further tighten the **gland nut** until it is snug in the **plug body** as shown in Figure 12 and the anode wire is held firmly in the **plug body** and will not slip out. **Do not over-tighten the gland nut!**



**Figure 12. Secure the Anode Wire.**

After the **plug** and anode wire have been assembled, re-connect the **sealing cap assembly tool** to the **socket** on the compressor unit cabinet. After aligning the electrical contact pins, manually engage the threads on the **plug locking cap** with the threads on the **socket** and turn clockwise until the **plug** is firmly hand-tightened to the **socket** as shown in Figure 13. **If the anode wire rises away from the compressor cabinet**, be sure to shape a drip loop into the contour of the anode wire near the **plug** and **socket**.



**Figure 13. The Plug and Socket Joint**

After the **plug** and **socket** joint is secured, the power may be turned **ON** at the disconnect.

## EPS Operation and Service

With power **ON**, and viewing the EPS Module in the compressor unit electric box, the EPS **green light** should be illuminated, indicating there is power to the EPS system.

If the **yellow light** is illuminated, **there is an opening** in the earth loop electrical circuit. The audible signal will also be heard. After shutting power **OFF**, all electrical connections from the EPS module to the earth loop system should be checked and adjusted as appropriate to ensure good electrical contact.

If the **red light** is illuminated, **there is a short** in the earth loop electrical circuit. The audible signal will be heard. Check and correct all wiring and connection as appropriate from the EPS module to the earth loop to ensure they are not shorting.

If **none of the lights** are illuminated, check and replace, as appropriate, the fuse for the EPS Power Supply as shown in Figure 6. For service purposes, a spare fuse has been factory supplied and is located in the electrical box. The replacement fuse is **Littlefuse 213 Series Slo-Blo® rated at 250 Volts, 2 Amperes, P/N 0213002MXP**. This is also Allied Electronics Stock Number R1090710.

If it is necessary to operate the heating and cooling system while servicing the EPS, the **EPS may be temporarily disengaged** to eliminate the audible alarm, by removing the EPS Fuse shown in Figure 6. Upon completion of servicing the EPS, **replace the fuse to energize the EPS System** and maintain warranty coverage.



### IMPORTANT!

**DO NOT** troubleshoot the EPS power supply or EPS module! If the above steps do not resolve the problem, call ETI for technical service assistance at 1-863-701-0096.

## EPS Current Verification

If it is necessary to verify the current flow through the EPS system, it can be checked with a digital DC ammeter set on the Milliampere scale. The correct currents for nominal system capacities are listed in Figure 14.

Nominal System Capacity, Tons	Current Rating
1.5 thru 2.5	80 mA +/- 10%
3.0 thru 3.5	120 mA +/- 10%
4.0 thru 6.0	240 mA +/- 10%

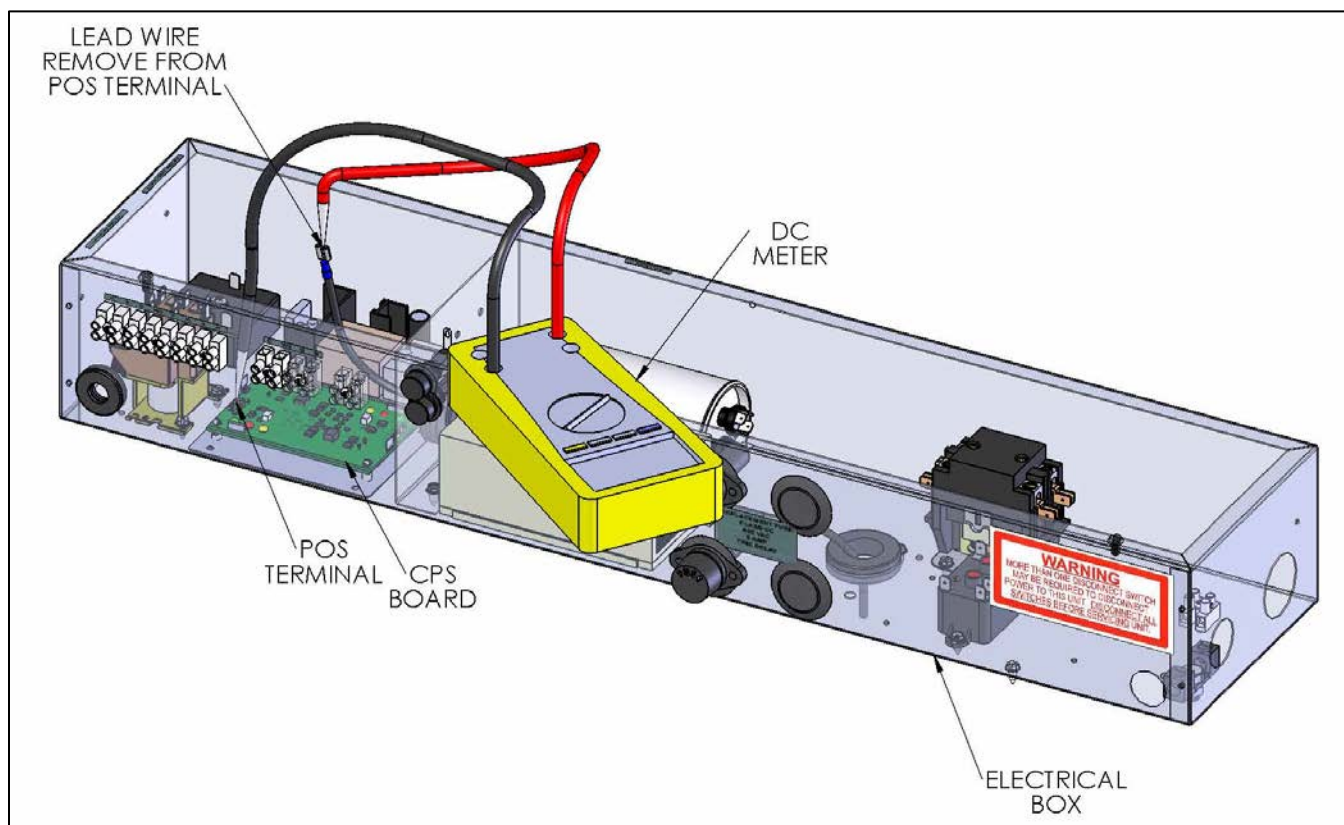
**Figure 14. EPS Current Ratings**



### WARNING!

Use extreme caution when checking current through the EPS system. Turn OFF the main disconnect to the compressor unit when setting up the Ammeter for the current measurement. Turn the power supply on only after the Ammeter is in place for the measurement and hands and body are clear of all electrical circuit conductors. Turn OFF the main disconnect after the current measurement has been taken and before attempting to disengage the Ammeter and re-connect the EPS wiring. Failure to do this, could cause personal injury or death.

To check the current, disconnect the “**Loop**” wire from the EPS module as shown in Figure 15 and connect the DC ammeter as shown to measure and verify the current flow.



**Figure 15. Test for DC Current**