

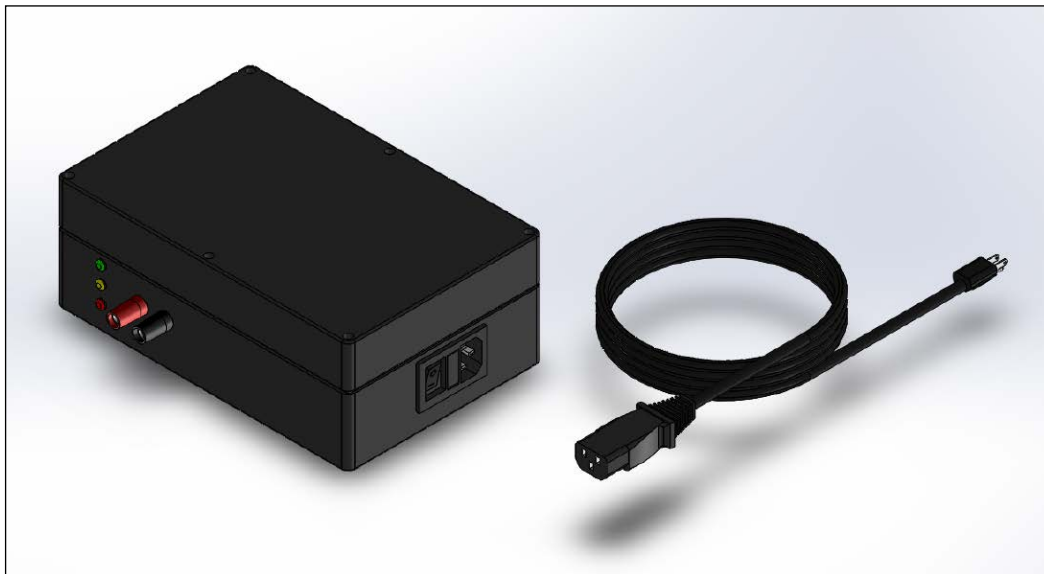


EARTHLINKED
TECHNOLOGIES

EARTH LOOP PROTECTION SYSTEM

Installation Manual for HC, HCW, HW, HWW, CC, and CWH Systems

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IMPORTANT!

This EPS System shall be applied to the HC, HCW, HW, HWW, CC and CWH EarthLinked® Systems only! Other EarthLinked® Systems are factory equipped with an EPS control internal to the compressor unit.

Disclaimer

Proper installation and servicing of the EarthLinked® Earth Loop Protection System is essential to its reliable performance. All Earth Loop Protection Systems 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 the EarthLinked® Heating and Cooling Systems and Commercial Water Heating Systems.

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Introduction

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



IMPORTANT

Locations with a pH lower than 6 must have the EarthLinked® Earth Loop Protection System installed and operating with an EarthLinked system. 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 WV-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® EPS must be properly matched with the EarthLinked® system that it is designed to protect. See Figure 1 for proper matching.

Earth Loop Protection System Models	EarthLinked® Compressor Unit Models ¹	Earth Loop Models ²
EPS-1830	-018, -024, -030	-018, -024, -030
EPS-3642	-036, -042	-036, -042
EPS-4872	-048, -054, -060, -072	-048, -060, -072
Notes: ¹ Comp. Units Models: All ² Earth Loop Models: All		

Figure 1a. EPS Models Matched to Compressor Unit & Earth Loop Models

The appropriate power cord for the EPS Control is provided separately, depending on the power source and the location of the installation, as shown in Figure 1b.

Location	Power Source	Power Cord Model
North America	120V-1-60	PC-EL
Australia	240V-1-50	PCA-EL
United Kingdom	240V-1-50	PCB-EL
International	240V-1-50	PCI-EL

Figure 1b. Power Cord Models

Inspection/Pre-Installation

Inspect the EarthLinked® EPS 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.



IMPORTANT

Each EPS Control is factory supplied with 2 spare fuses for use as replacements, if necessary. Keep these spare fuses with EPS control.

Anode Location and Installation

For (1) vertical and diagonal and (2) horizontal earth loop, the anode is located as shown in Figure 2. 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 2 also shows the general layout and placement of the EPS control, loop wire, anode wire and anode.

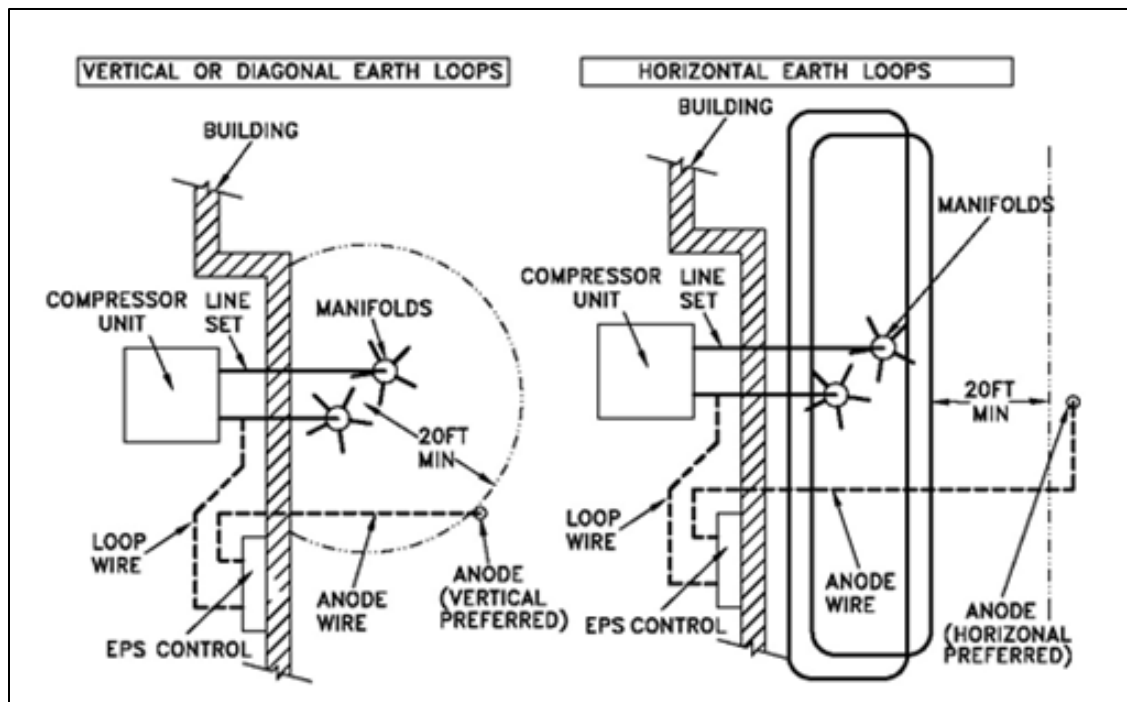


Figure 2. Typical Anode Locations

The installation details for the vertical anode are shown in Figure 3. The vertical anode installation is preferred for vertical or diagonal earth loops; however, the horizontal anode installation as shown in Figure 4 is fully acceptable.

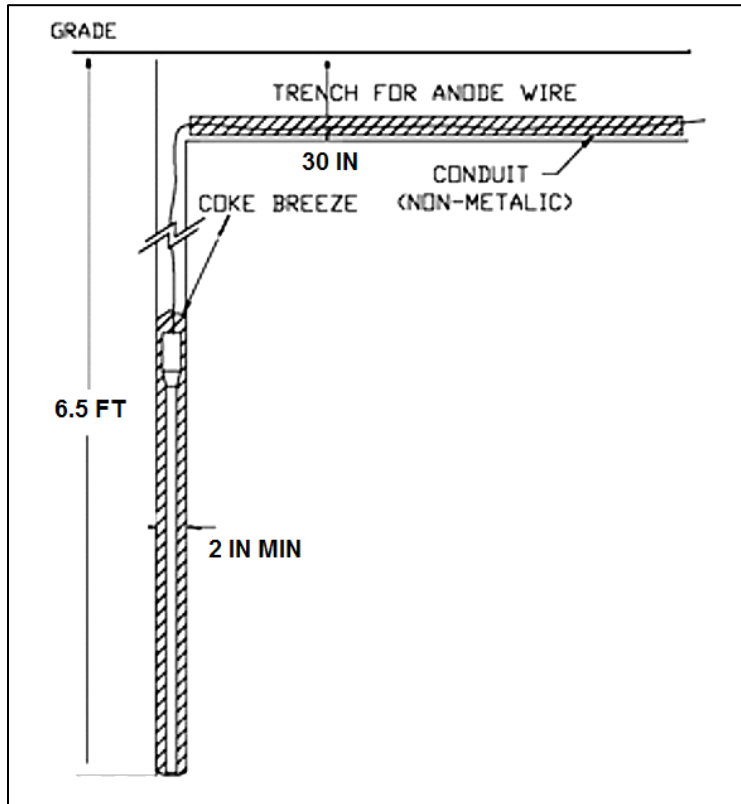


Figure 3. Vertical Anode Installation

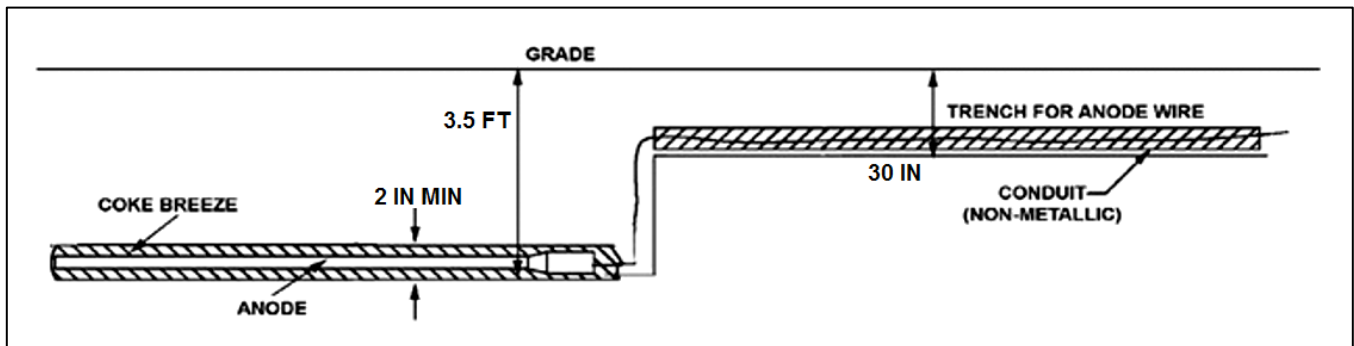


Figure 4. Horizontal Anode Installation

For horizontal earth loops, the earth loop protection system anode should be located at least 20 feet away as shown in Figure 2. No METAL pipes, wires or other objects should be between the anode and the earth loops. The horizontal anode installation as shown in Figure 4 is preferred for horizontal earth loops; however, the vertical anode installation as shown in Figure 3 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 EPS Control 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 shown in Figures 3 and 4, and described 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 5. 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 6. Make a copy of the diagram for the owner.

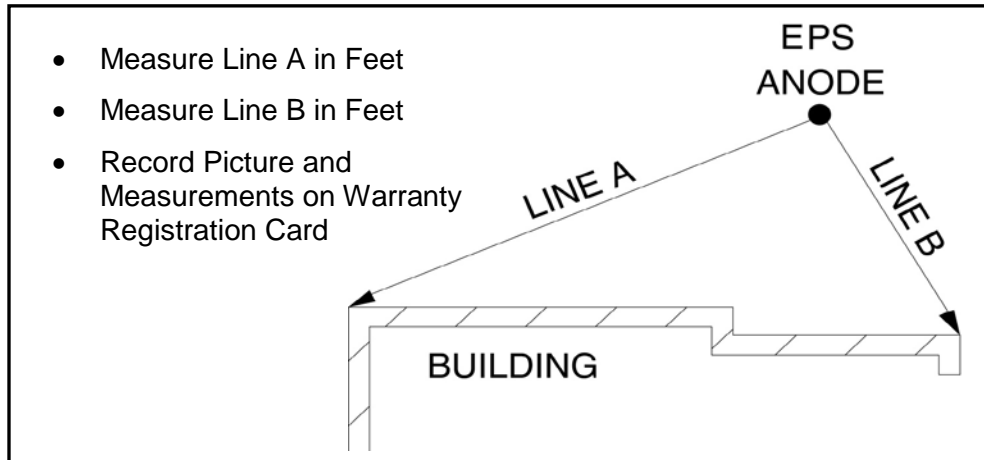


Figure 5. Anode Triangulation



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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 6. Earth Loop Warranty Registration

EPS Connections



IMPORTANT!

Place the EPS control in a dry, room temperature location where the control panel indicator light can be seen and the audible indicator can be heard.

The final connections to the EPS are to be made when the compressor unit is available.



IMPORTANT

The installation of the anode and anode wire, terminating at the specified location of the EPS Control, completes the first phase on the Earth Loop Protection System.

The second phase consists of completing all connections as shown in Figure 7a.

DO NOT CONNECT THE POWER CORD TO POWER SOURCE!



Important!

The “Anode” wire is connected to the terminal on the EPS Control marked “Anode Terminal” (red) shown in Figure 7a.

The “Vapor Line” wire is connected to the terminal on the EPS Control marked “Vapor Line Terminal” (black) shown in Figure 7a.



Warning!

DO NOT CONNECT THE “ANODE” AND “VAPOR LINE” WIRES BACKWARDS IN THE SYSTEM!

DOING SO WILL CAUSE THE EARTH LOOP SYSTEM TO CORRODE CAUSING LEAKS AND POSSIBLE SYSTEM FAILURE.

It is recommended that the vapor line wire lead be connected near the compressor unit to the earth loop vapor line of the line set connecting the compressor earth loop vapor line to the earth loop manifolds, as shown in Figure 7a. It is, however, satisfactory to connect the vapor line wire lead to the earth loop liquid line coming out of the compressor unit.

Details for installing the vapor line wire clamp to the earth loop vapor line follow, with reference to the illustration in Figure 7a.

1. Insert bolt assembly into strap hole marked “INSERT SCREW HERE.”
2. Wrap strap around tube.
3. Slide clip nut to hole closest to the tube which still allows bolt to be secured.
4. Thread bolt into clip nut. Tighten securely.
5. Loosen set screw, insert vapor line wire lead and tighten.

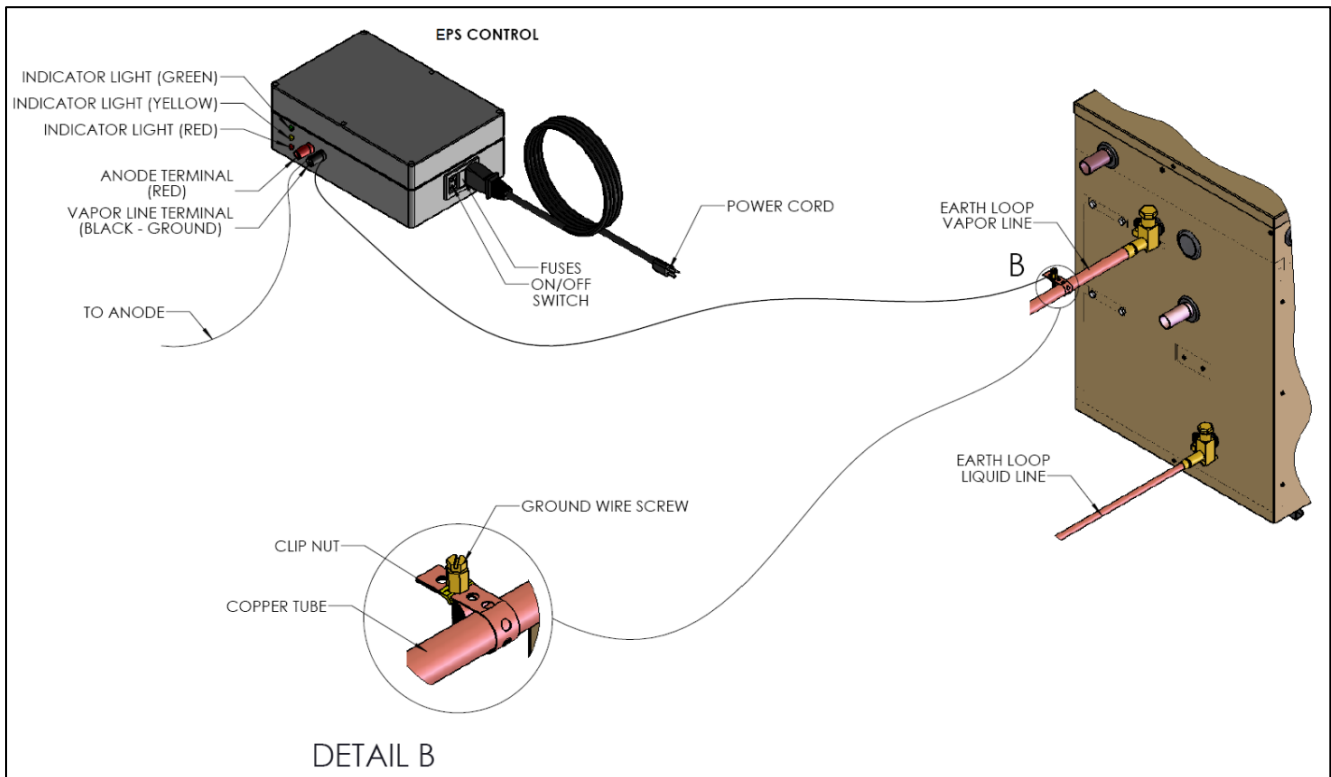


Figure 7a. EPS Control Connections

EPS Operation and Service

After the “Anode” and “Vapor Line” connections have been made at the control as shown in Figure 7a, check the power switch on the control as shown in Figure 7b, and ensure that it is “OFF”.

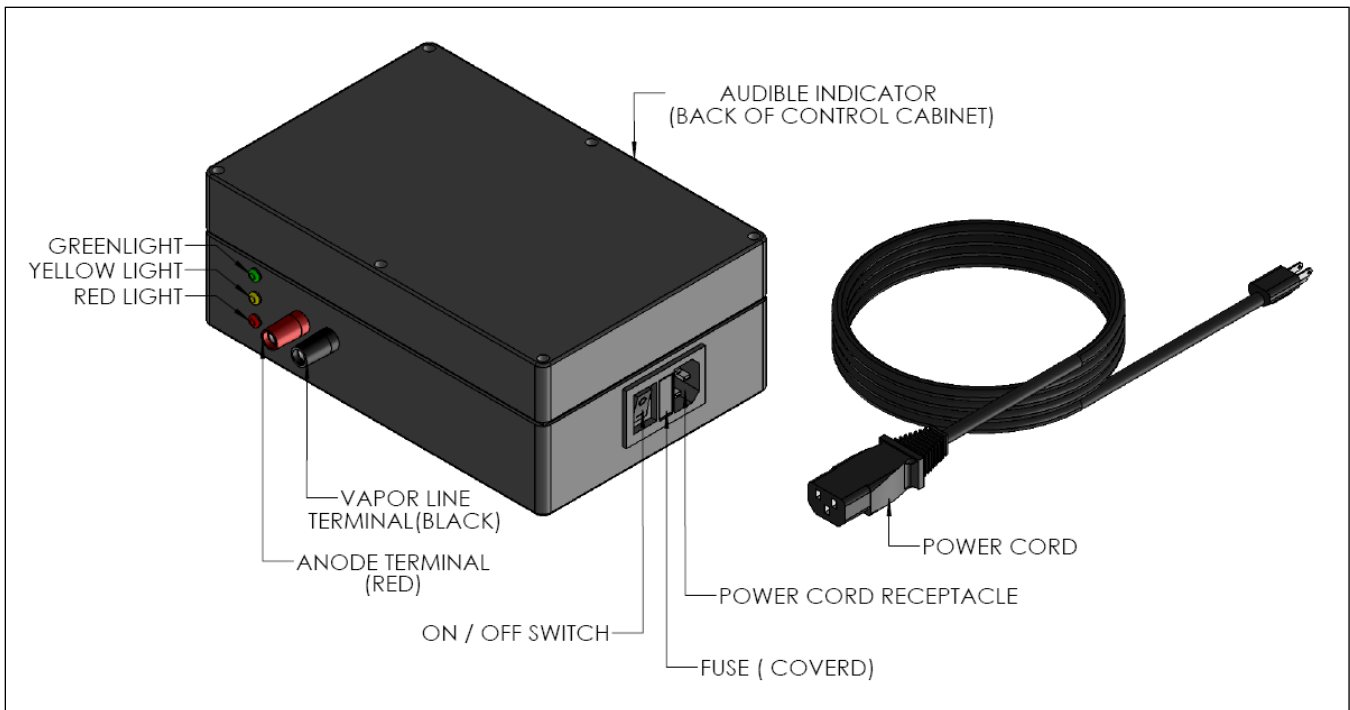


Figure 7b. EPS Control Features

Next, connect the power cord to the control and to the power supply (Figure 7b), and turn the control switch "ON". The green light on the front of the control panel (Figure 7b) will illuminate and show that the system is in operation.

If the yellow light on the control panel is illuminated, there is an opening in the earth loop electrical circuit. The audible signal will be heard. All connections from the control to the earth loop connections should be checked and adjusted to ensure good electrical contact.

If the red light on the control panel is illuminated, there is a short in the earth loop electrical circuit. The audible signal will be heard. Check all wiring and connections from the control to the earth loop connections to ensure they are not shorting.

If none of the lights on the control panel are illuminated and the control switch is "ON", the control fuses next to the power cord connection to the control are to be checked. To check these fuses, **first disconnect the power cord from the control** and remove the fuse cover as described in Figure 7c.

Two replacement fuses have been factory supplied with the EPS control. Replace the blown fuse(s) with those provided. If additional replacement fuses are required for service, they are **Littelfuse 213 Series Slo-Blo®** rated at 250 Volts, 2 Amperes, P/N 0213002.MXP (Allied Stock Number R1090710).

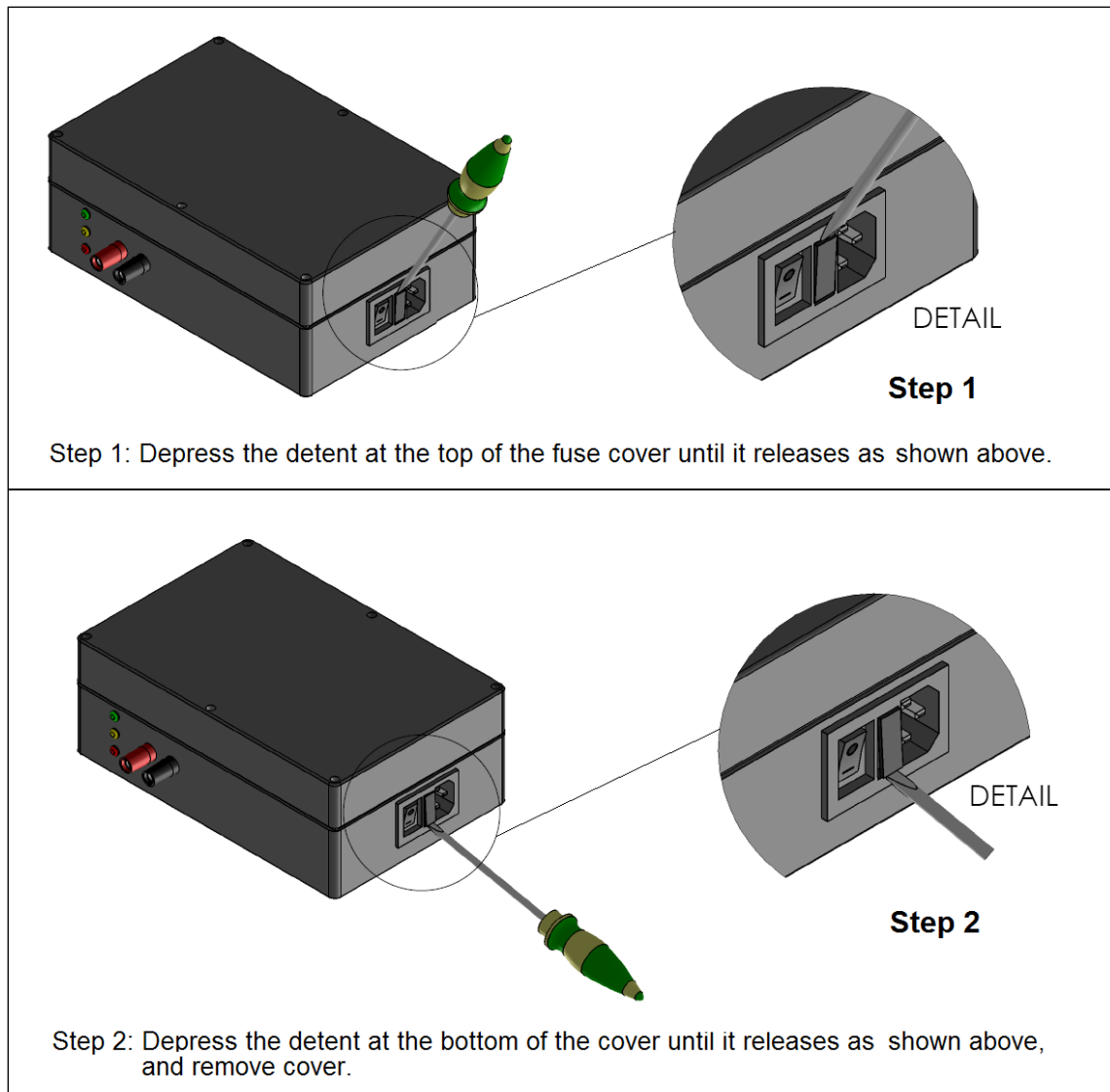


Figure 7c. Removal of Fuse Cover



Important!

DO NOT troubleshoot inside the EPS control. If the above steps do not resolve the problem call ETI for technical service assistance at 1-863-701-0096

EPS Current Verification

The three models of the EPS produce different currents suitable to protect the Earth Loops for which they are intended. They are listed in Figure 8.

EPS Model	Current Rating
EPS-1830	80 mA \pm 10%
EPS-3642	120 mA \pm 10%
EPS-4872	240 mA \pm 10%

Figure 8. EPS Current Ratings

These currents are constant regardless of the resistance in the soil. Measuring the current emitted is simple. Refer to Figures 9 and 10 and steps 1 through 4.

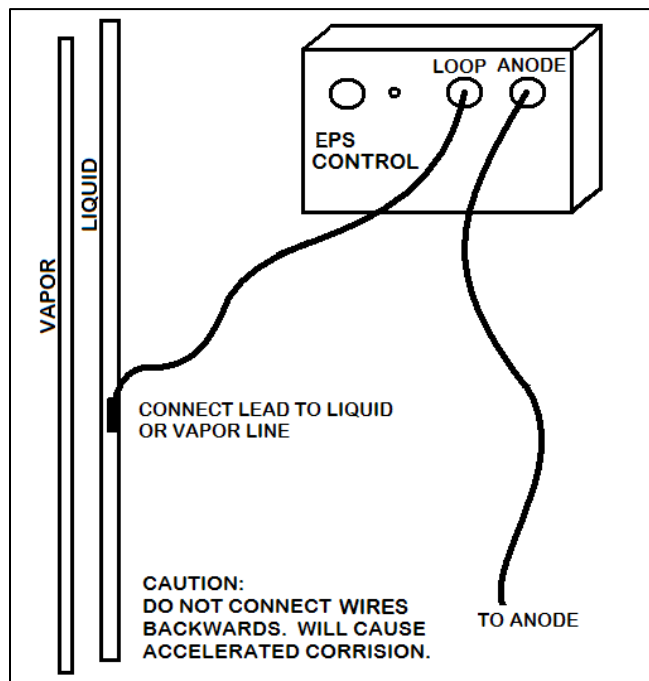


Figure 9. Cathodic Circuit Wiring

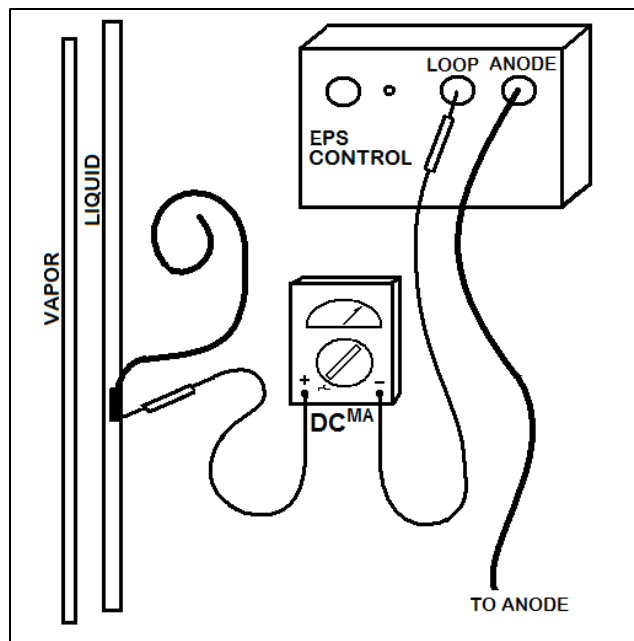


Figure 10. Test for DC Current

1. Unplug the EPS box from the 120 VAC (or 240 VAC, single phase, 50 or 60 Hz) power source.
2. Disconnect the wire leading to the copper tubing at the EPS control. (Fig. 10)
3. Install a DC ammeter in series in place of the wire. The ammeter selector dial should be set for DC milliamps and with correct polarization.
4. Plug the EPS control into a 120 VAC (or 240 VAC, single phase, 50 or 60 Hz) power source. The green light should illuminate, and the ammeter should indicate current is flowing.

The DC voltage (E) measured between the red and black terminals during operation will vary from location to location because the soil resistance (R) will vary from location to location. The DC milliamps (I) will be relatively constant.