



SuperCharge™

Electric Vehicle Charging System

Installation and Operation Guide

Rev. 1 10/4/01

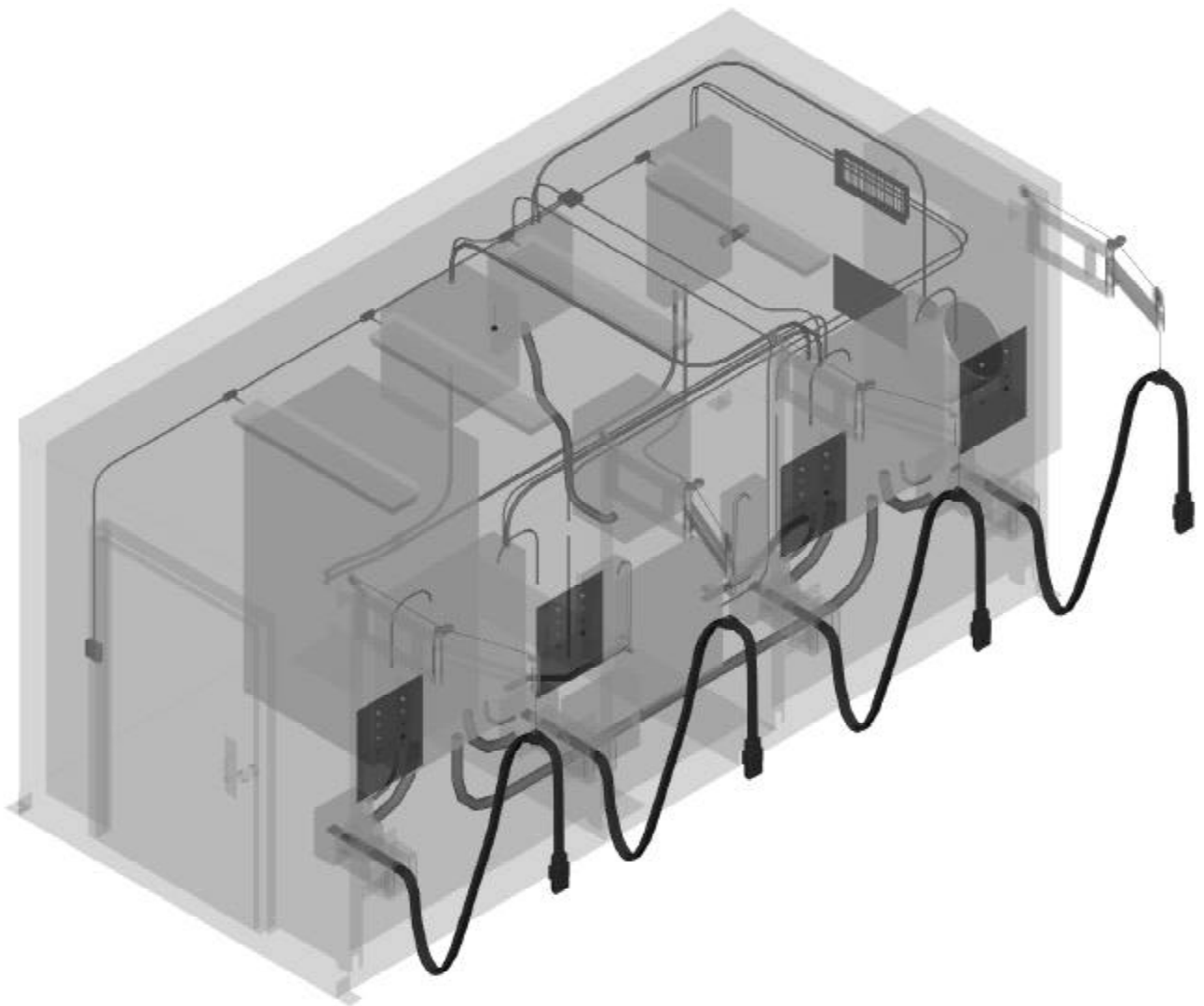


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1.0 INTRODUCTION

This guide provides all the necessary instructions for installing and operating the eTec *SuperCharge*™ vehicle charging station. Please follow these instructions in the order in which they are presented in this guide.

Special warnings and precautions are included in section 2.0 and throughout this guide. Please observe them in detail to avoid personal injury and damage to the equipment.

NOTICE: The procedures in this guide must be conducted only by personnel who are qualified to install and operate the vehicle charging equipment. Refer to section 2.0 Warnings and Precautions for specific requirements.

Technical Support

In the event that you encounter difficulties during the system installation, or during normal operation of the charging station, please contact an eTec technical representative via the information listed below.

eTec

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Ph: 888-383-2387

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2.0 WARNINGS AND PRECAUTIONS

Qualified Personnel

A “qualified person” is someone who is familiar with the installation, mounting, start-up and operation of the equipment and the hazards involved. Such personnel must meet the following qualifications:

- 1) Trained and authorized to energize, de-energize, clear, ground and tag electrical circuits and equipment in accordance with established safety procedures.
- 2) Trained in the proper care and use of protective equipment in accordance with established safety procedures.
- 3) Trained in rendering first aid.

Symbols Used in This Manual



NOTE

This symbol indicates information about the product or the respective part of the user guide that must be observed for proper equipment use or functioning.



CAUTION!

This symbol indicates that personal injury or material damage can result if the prescribed precautions are not followed.



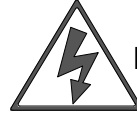
DANGER! SHOCK HAZARD

This symbol indicates death, severe personal injury or substantial property damage can result if proper shock hazard precautions are not taken. The charging circuits operate at very high amperage levels.

TO AVOID AND PREVENT SHOCK HAZARDS

Before Applying Power to the System:

Check all components for damage, and check to ensure that there are no loose or disconnected wires, cables or mechanical connections.



DANGER! SHOCK HAZARD

During Normal System Operation:

NEVER disconnect a charging cable from a vehicle during the charging process. High-current arcing may result and cause physical injury or damage to the equipment. ALWAYS press the red STOP button on the applicable interface panel to shut off power before disconnecting a vehicle from the system.

In the Event of a Malfunction:

Do not disassemble the equipment if you are not qualified to do so; call a qualified service person or an eTec technical representative when service or repair is required. Incorrect reassembly can result in a significant risk of electric shock or fire. Unauthorized servicing of the equipment may result in voiding of the product warranty.

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.1 Site Selection and Preparation

First determine a location for the *SuperCharge*[™] station that allows for proper layout of the charging equipment and adequate access space for the electric vehicles. Figure 3–1 shows the overall layout of the *SuperCharge*[™] station with dimensions. Regardless of the type of vehicles in use, it is important to allow enough area for the vehicles as well as the personnel operating them.

If the site selected for installation of the *SuperCharge*[™] station is susceptible to water runoff from adjacent areas, roof drainage or the location is not level concrete, a concrete equipment pad should be constructed. The pad must be no smaller than 19 ft. L x 8 ft. 6 in. W x 6 in. H, and designed to meet all applicable codes and standards. The pad must accommodate the *SuperCharge*[™] station such that the front edge of the station is flush with the front edge of the concrete pad, with a minimum of 6 in. of the pad extending out from beneath the other three sides, as shown in Figure 3–1.

3.2 Placing the Charge Station

Move the *SuperCharge*[™] station into place with either a crane or a forklift of adequate capacity to manage 12,000 pounds. If a crane is used, Figure 2 shows eight lifting rings mounted on the top of the *SuperCharge*[™] station. Use all eight lifting points when connecting the station to the crane. If a forklift is used, Figures 3–2 and 3–3 show forklift lifting tubes that span the bottom of the *SuperCharge*[™] station. Employ a fork lift with adequate load capacity and adequate fork length (preferably 8 ft. long).

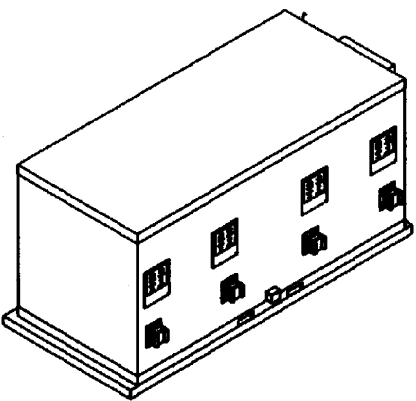
If a raised concrete pad is required, the *SuperCharge*[™] station must be placed such that the front edge of the *SuperCharge*[™] station is flush with the front edge of the concrete pad, with a minimum of 6 in. of the pad extending out from beneath the other three sides (Figure 3–2).

Securing the Charging Station in Place

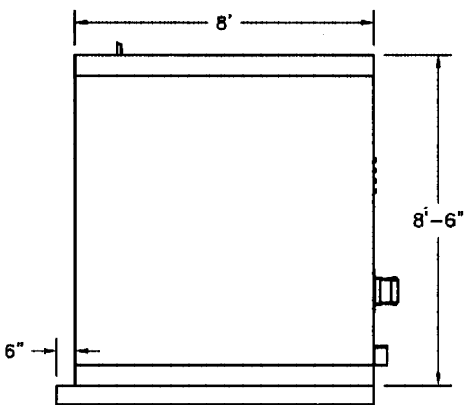
Attach the four mounting straps (angle brackets) to secure the *SuperCharge*[™] station in place using the hardware provided (Figure 3–4). It is important to use the correct mounting hardware. If replacements are needed, refer to the hardware schedule in Figure 3–5 for specifications.

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

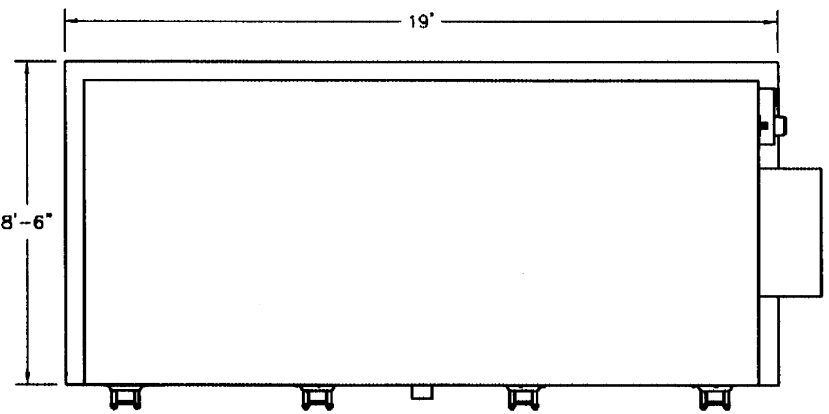
3.2 Placing the Charge Station (cont.)



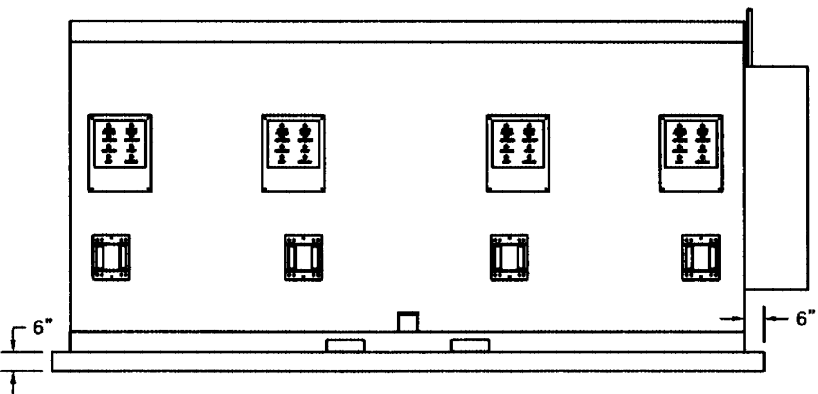
ISOMETRIC



SIDE



TOP



FRONT

Figure 3-2 - Charge Station and Equipment Pad Dimensions

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.2 Placing the Charge Station (cont.)

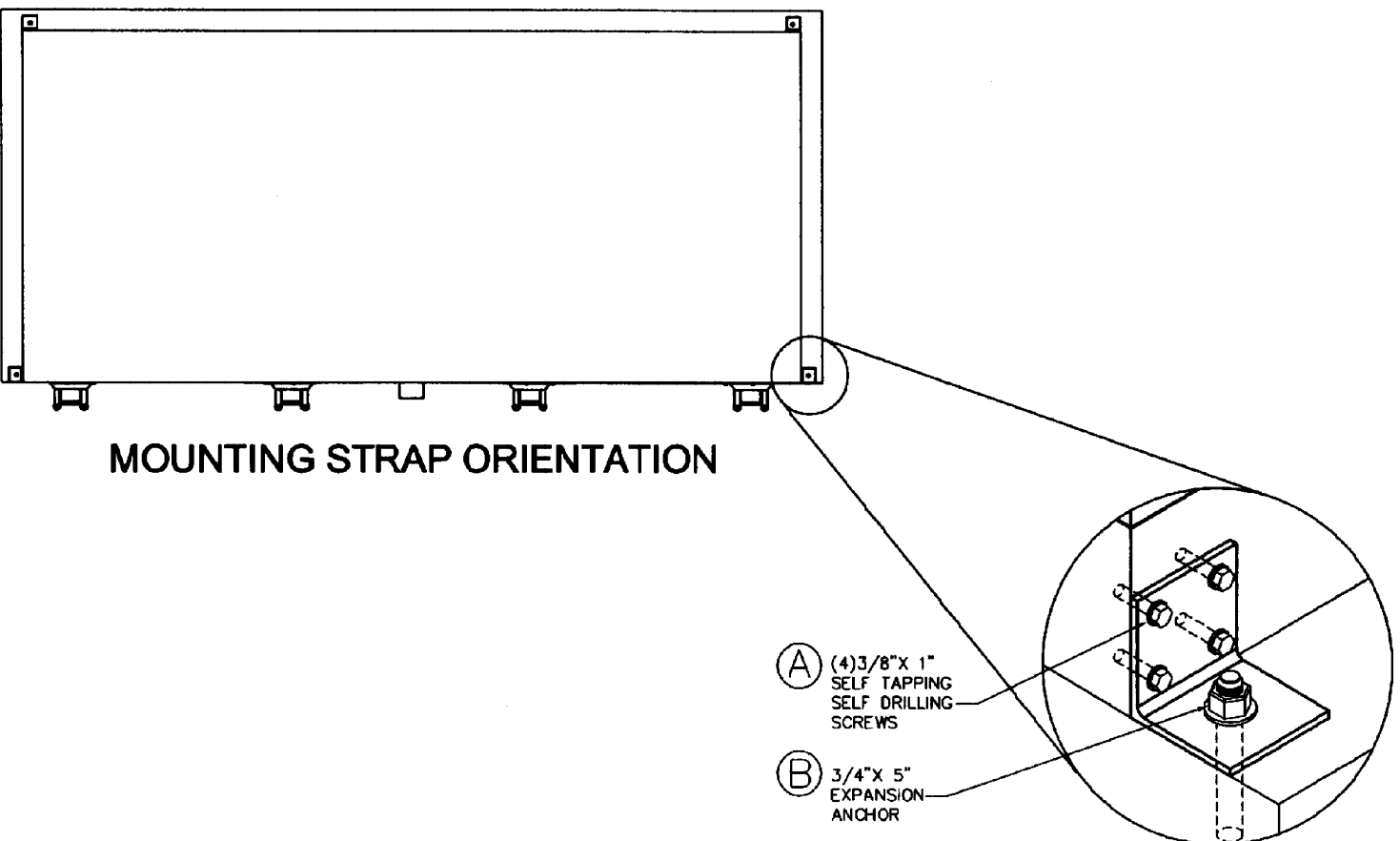


Figure 3-4 - Charge Station Mounting Strap Installation

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.2 Placing the Charge Station (cont.)

HARDWARE SCHEDULE

| LINE ITEM | LETTER CODE | QTY. | DESCRIPTION | MGF. PART NO. |
|-----------|-------------|------|---|---------------------------------|
| 1 | (A) | 16 | SCREW, 3/8" X 1". SELF-TAPPING, SELF-DRILLING | – |
| 2 | (B) | 4 | EXPANSION ANCHOR, 3/4" X 5 1/2" | HILTI KB IC 45375 |
| 3 | (C) | 6 | FITTING, MALE ADAPTOR, PVC 1" | CARLON E943F |
| 4 | (D) | 1 | CONDUIT BODY, TYPE LR, W/COVER & GASKET ALUMINUM DIE CAST, 1" THREADED | APPLETON LR100M |
| 5 | (E) | 1 | CONDUIT BODY, TYPE LL, W/COVER & GASKET ALUMINUM DIE CAST, 1" THREADED | APPLETON LL100M |
| 6 | (F) | 1 | WIRE RAMP, 5 CHANNEL, POLY PLASTIC | GLASTIC 2888 |
| 7 | (G) | 1 | CONDUIT, PVC, SCHEDULE 40, 1" | – |
| 8 | (H) | 2 | EYE BOLT, 3/4" X 12", 1 1/2" EYE | COPPERSTATE 19EBFGP 075 1200 |
| 9 | (J) | 4 | LANYARD, #6 GA. WIRE, 10" LONG | – |
| 10 | (K) | 4 | COVER, 14" X 14", HDPE PLASTIC, 3/4" THICK | M-EDS-003.2 |
| 11 | (L) | 4 | ATENNA ASSEMBLY, RFID TYPE | OMRON V700-H01 |
| 12 | (M) | 2 | BOLT, 1/4" – 20 X 1/2" | – |
| 13 | (N) | 10 | ANCHOR BOLT, 1/2" X 7" | POWER-STUD 7428 |
| 14 | (O) | 2 | CONDUIT COVER | APPLETON |
| 15 | (P) | 6 | COUPLING, PVC, 1" | CARLON E940F |
| 16 | (Q) | 4 | CONDUIT COVER SCREW | APPLETON |
| 17 | (R) | 10 | BOX CONNECTOR, PVC, 1" | CARLON E996F |

Figure 3–5 - Charge Station Hardware Schedule

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.3 Antenna and Parking Bumper Installation

1) Extend two conduits from the *SuperCharge*[™] station junction box and in the conduit chase component.

2) By proper heating methods, make 90° bends in the 1 inch PVC conduit to route them parallel to the *SuperCharge*[™] station, one in each direction, as shown in Figure 3–6.



NOTE

It is best to measure each concrete bumper and its openings to ensure a proper fit of the conduit and PVC enclosures. Make sure that the conduits and antenna boxes are oriented as shown in Figure 3–7.

3) Layout the rest of the conduit and PVC enclosures as shown in Figure 3–7.



NOTE

Install the plastic trim covers and their securing lanyards as shown in Figure 3–9 before placing the bumper units over the conduit assembly.

4) Using the lifting rings (provided), squarely place each concrete bumper over the conduit and PVC enclosures as shown in Figure 3–7. Insert the lifting rings through the bumper mounting holes and thread them into the nut embedded in the concrete bumper bottom, as shown in Figure 3–8.



CAUTION!

Do not use a hand truck or similar device for lifting the concrete bumpers. Use a properly sized forklift, the lifting rings and proper lifting procedures when installing the bumpers.

5) After final positioning of the concrete bumpers (parallel to the enclosure) has been performed, anchor the bumpers in place by using the anchor bolts provided as shown in Figure 3–10. It is important to use the correct hardware and to follow the anchor bolt installation procedures.

6) Pull the antenna cables through the conduits and into the PVC enclosures. Locate any cable slack inside the *SuperCharge*[™] station junction box. Note that two antenna cables are pulled in each conduit. Also note that the antenna cables are numbered (one through four) and must be pulled to their appropriate charge port, numbers one through four, respectively. The numbering convention is from left to the right when facing the *SuperCharge*[™] station.

7) Connect all four antenna components to each of the antenna cables.

8) Place the antennas inside the PVC enclosures orientated as shown in Figure 3–11. Secure them in place with the four screws provided.

9) Install the enclosure lid and secure it in place with the cover screws.

10) Place the trim covers on the concrete bumper openings.

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.3 Antenna and Parking Bumper Installation (cont.)

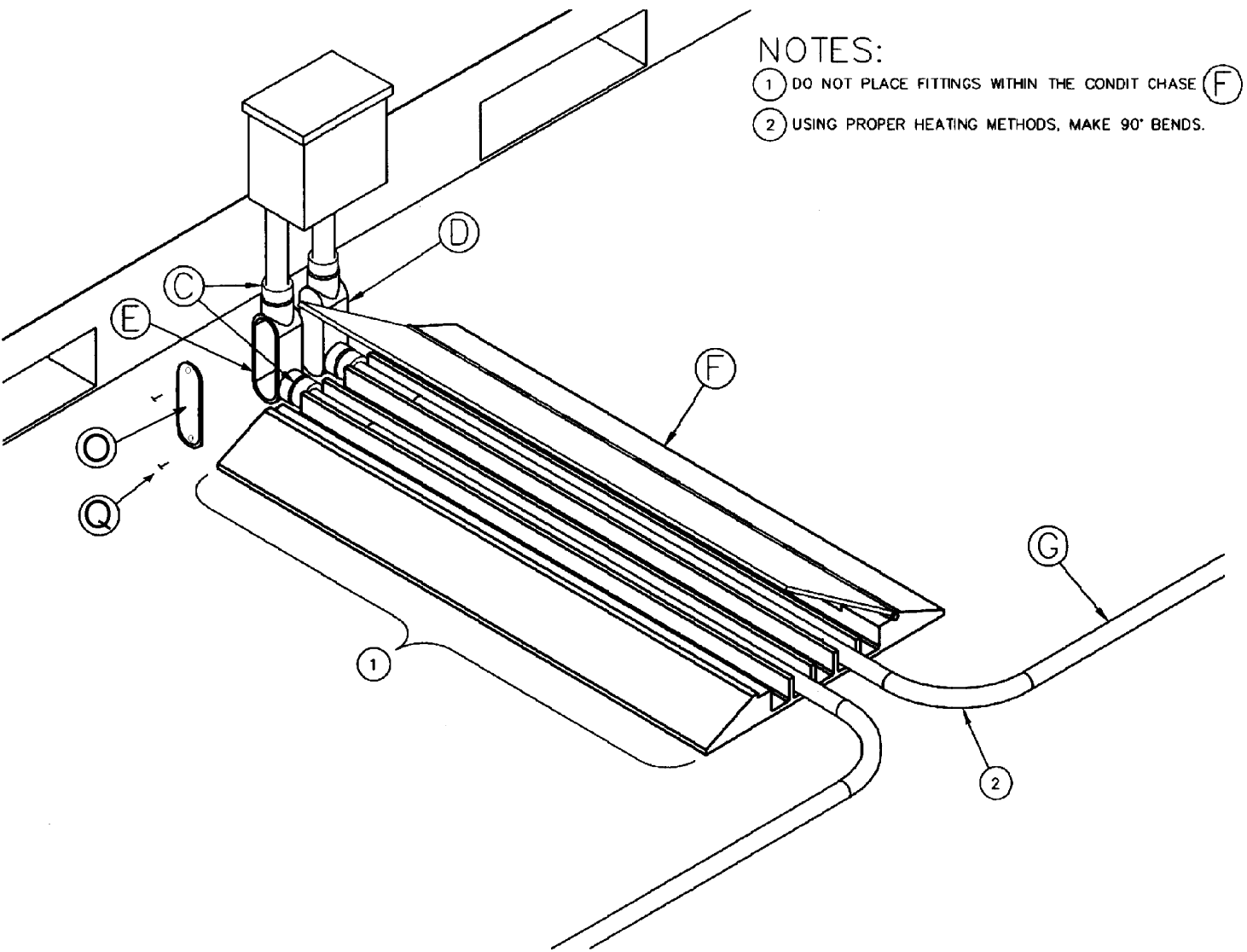


Figure 3-6 - Conduit Configuration to Parking Bumpers

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.3 Antenna and Parking Bumper Installation (cont.)

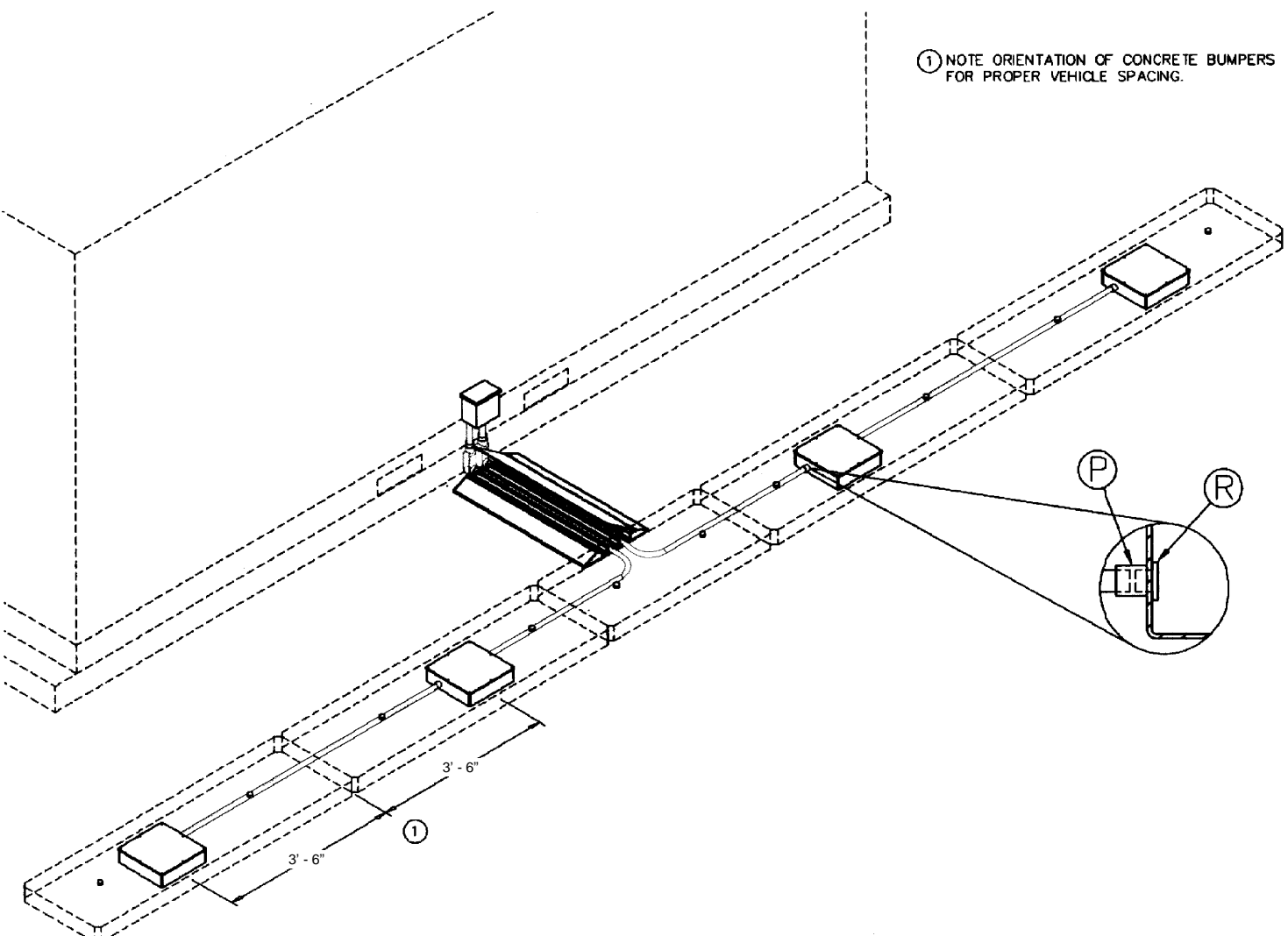
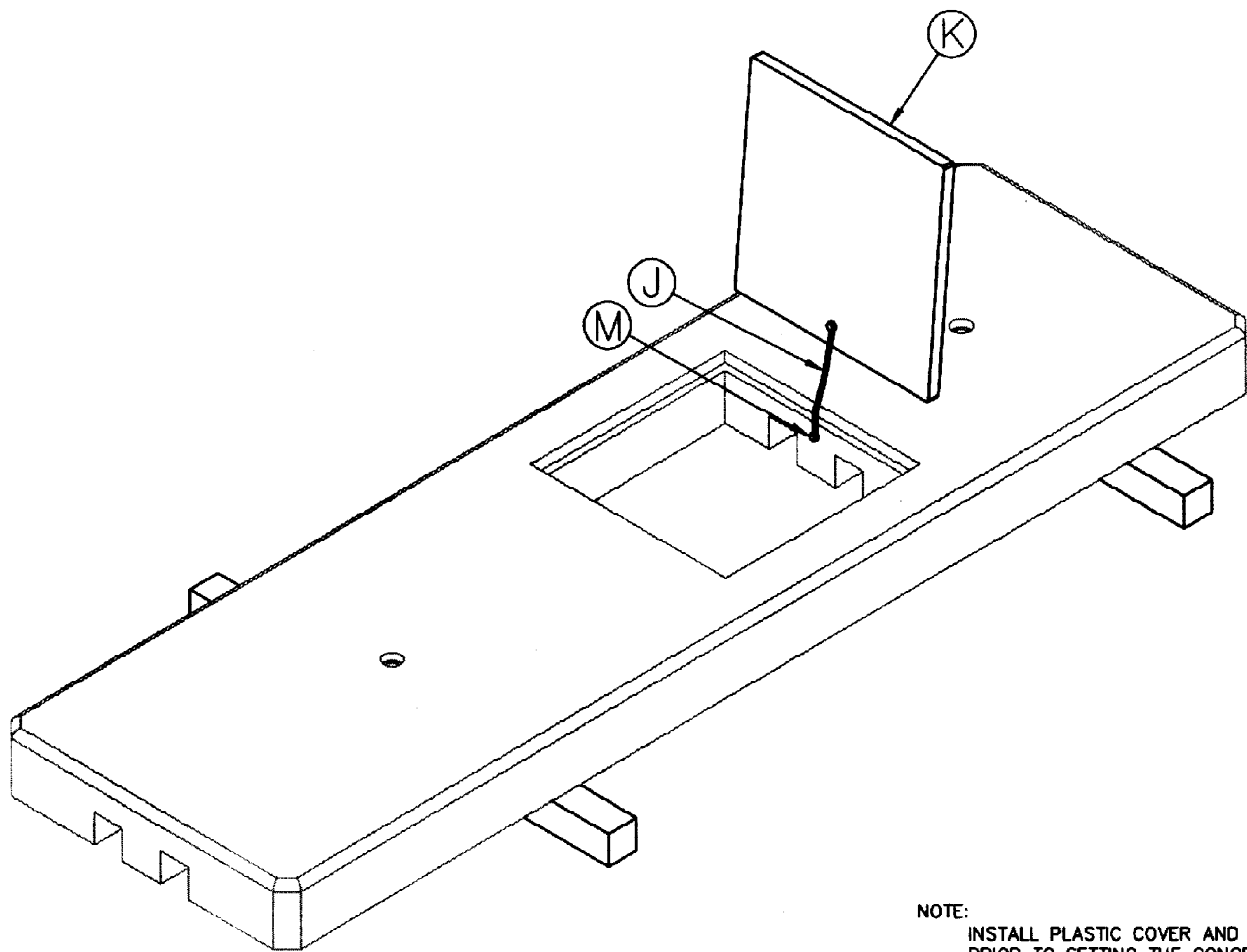


Figure 3-7 - Parking Bumper Configuration

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.3 Antenna and Parking Bumper Installation (cont.)

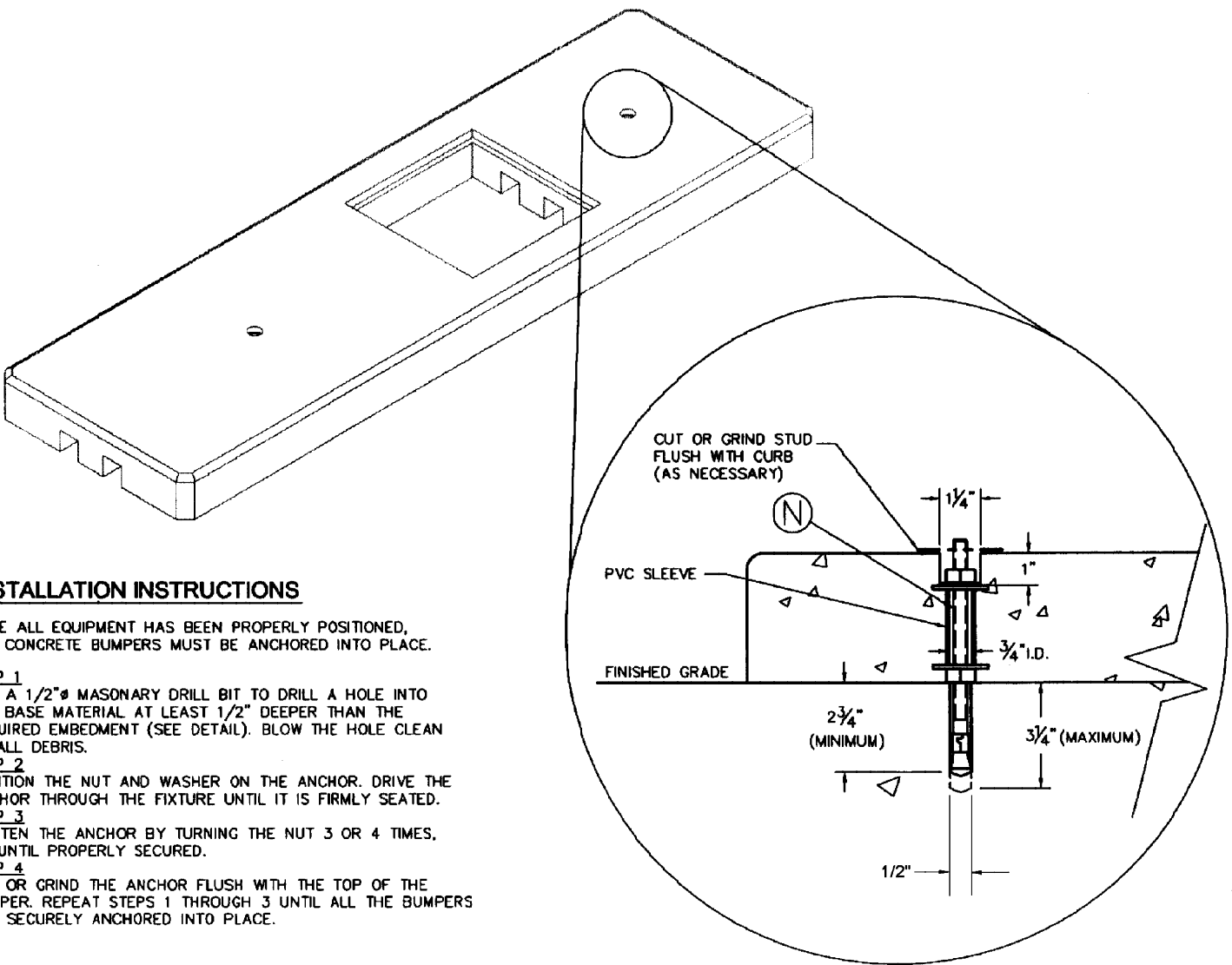


NOTE:
INSTALL PLASTIC COVER AND LANYARD
PRIOR TO SETTING THE CONCRETE BUMPER
IN PLACE.

Figure 3-9 - Installing Plastic Trim Cover in Parking Bumper

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.3 Antenna and Parking Bumper Installation (cont.)



INSTALLATION INSTRUCTIONS

ONCE ALL EQUIPMENT HAS BEEN PROPERLY POSITIONED, THE CONCRETE BUMPERS MUST BE ANCHORED INTO PLACE.

STEP 1

USE A 1/2"Ø MASONRY DRILL BIT TO DRILL A HOLE INTO THE BASE MATERIAL AT LEAST 1/2" DEEPER THAN THE REQUIRED EMBEDMENT (SEE DETAIL). BLOW THE HOLE CLEAN OF ALL DEBRIS.

STEP 2

POSITION THE NUT AND WASHER ON THE ANCHOR. DRIVE THE ANCHOR THROUGH THE FIXTURE UNTIL IT IS FIRMLY SEATED.

STEP 3

TIGHTEN THE ANCHOR BY TURNING THE NUT 3 OR 4 TIMES, OR UNTIL PROPERLY SECURED.

STEP 4

CUT OR GRIND THE ANCHOR FLUSH WITH THE TOP OF THE BUMPER. REPEAT STEPS 1 THROUGH 3 UNTIL ALL THE BUMPERS ARE SECURELY ANCHORED INTO PLACE.

Figure 3-10 - Parking Bumper Anchoring Detail

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.3 Antenna and Parking Bumper Installation (cont.)

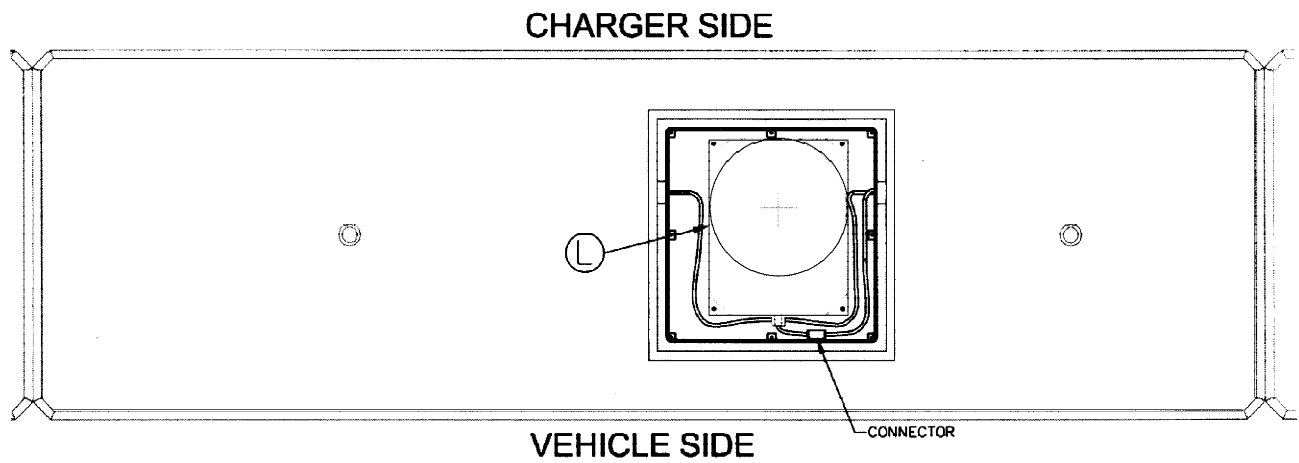


Figure 3–11 - Installing RF Antenna in Parking Bumper

3.0 CHARGE STATION INSTALLATION AND ASSEMBLY

3.4 Electrical Installation

Connect a branch circuit feeder or a new service feeder inside the meter/disconnect enclosure (Figure 3–1) to the terminals shown in Figure 3–12. The power supply enclosure can be fed from underground or overhead.

Maximum Actual Load and Voltage Rating

Amperes: 80
Voltage: 480V, 3ph, 4W

Circuit Rating

Amperes: 100
Voltage: 480V, 3ph, 4W

Minimum Branch Circuit Feeders

- (3) #2 Copper, XHHW or THHN (or equiv. 90°C rated insulation)
- (1) #8 Copper, Ground

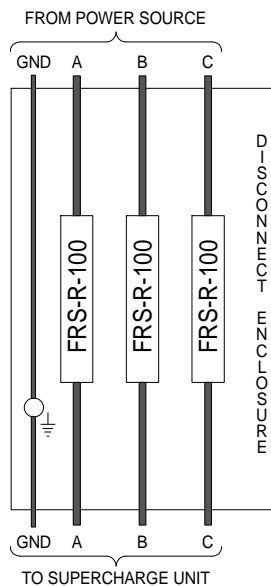


Figure 3–12 - Disconnect Switch Phase Wiring

4.0 VEHICLE PREPARATION AND CHARGE INDICATORS

4.1 RFID Tag Installation on Vehicles

Each vehicle that will undergo recharging at the *SuperCharge™* station must have a Radio Frequency Identification (RFID) tag affixed to its underside to allow electronic identification of the vehicle (Figure 4–1). This allows the charger to identify the vehicle, its battery configuration and charge cycle history stored on a semiconductor chip inside the tag. **The RFID tag must stay with the vehicle battery to which it has been assigned** since it stores information for that specific battery.



Figure 4–1 - RF Identification (RFID) Tag

i NOTE

A vehicle cannot receive recharging power if it does not have the correct RFID tag installed. The *SuperCharge™* station will not recognize the vehicle and will provide no response to it on the user interface panel.

Install the assigned RFID tags on the GSE vehicles as described below.

- 1) Choose a location (structural member) on the vehicle for mounting the RFID tag. The tag must be affixed in a location that will be situated above the RF antenna (in the parking bumper) when the vehicle is parked for recharging and no more than 13 inches above the top of the parking bumper. A typical mounting location is shown in Figure 4–2.

4.0 VEHICLE PREPARATION AND CHARGE INDICATORS

4.1 RFID Tag Installation on Vehicles (cont.)

2) Insulate the RFID tag from the metal surface of the vehicle by mounting it onto a 3/4" thick piece of plastic (nylon, EPDM or polypropylene) with a suitable adhesive.

3) Mount the tag assembly onto the vehicle structural member in a location as shown below.



NOTE

Mount the RFID tag on the vehicle in a location no more than 13 in. above the top of the parking bumper or the antenna may not detect it.

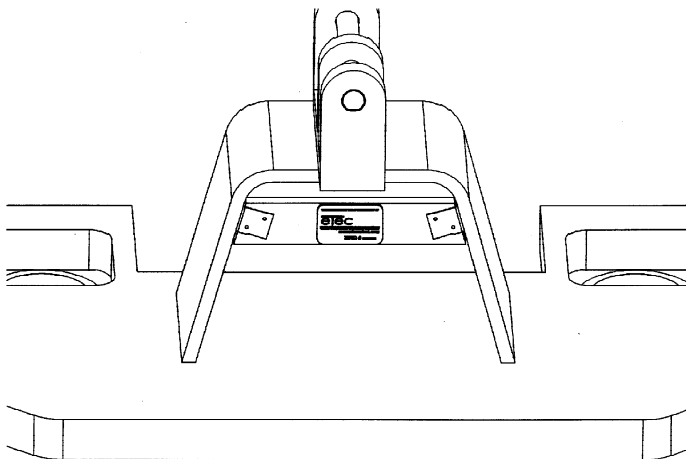


Figure 4-2 - RFID Tag Mounted on Vehicle (underside view)

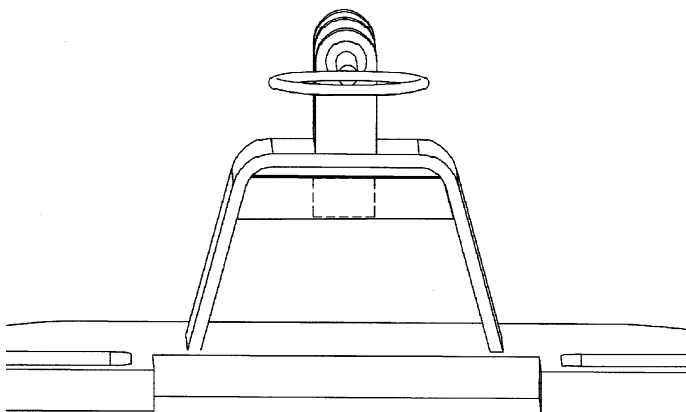


Figure 4-3 - RFID Tag (top view)

4.2 Vehicle Charge Indicators

There are three different models of the charge monitor/indicator that may be installed in the vehicle.

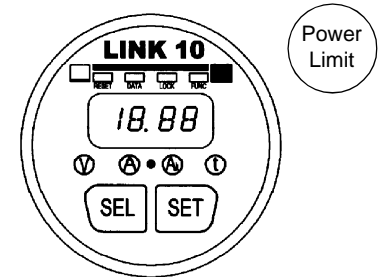


Figure 4-4 - Link 10 Charge Monitor and Power Limit Indicator

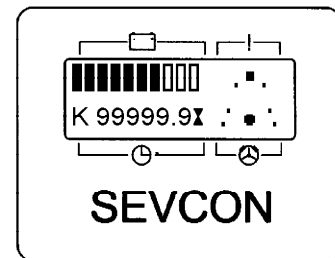


Figure 4-5 - Sevcon Charge Monitor

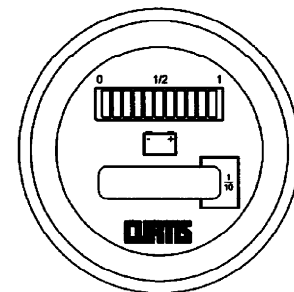


Figure 4-6 - Curtis Charge Monitor

These monitors are configured by trained technical personnel and cannot be adjusted by the GSE vehicles users. Drivers must return the vehicle to the *SuperCharge*[™] station for recharging when the monitor activates as indicated below.

- LINK 10: Red Power Limit light activates.
- CURTIS: Green charge status lights have declined to illuminated red light.
- SEVCON: LCD bar graph segments decline to predetermined low charge level.

5.0 CHARGE STATION OPERATION

These instructions describe how to properly park a vehicle at the charge station, connect it to the charger and interpret the user interface indicator lights during the recharging process.

5.1 Parking and Connecting a Vehicle for Recharging

1) Drive the vehicle into the desired parking space at the *SuperCharge*[™] station. When the RFID tag is within adequate proximity of the bumper antenna, the user interface panel (Figure 5–2) will indicate:

ACCESS APPROVED

2) Shut off the vehicle and engage the parking brake.

3) Insert the charging cable connector into the charge connector on the vehicle (see Figure 5–1). The user interface panel will indicate one of the following conditions:

CHARGING: Vehicle is receiving charge current.

STANDBY: Charge current is being applied to another vehicle. When its charging cycle is complete, the next vehicle on standby will receive charge current and the CHARGING light will illuminate.

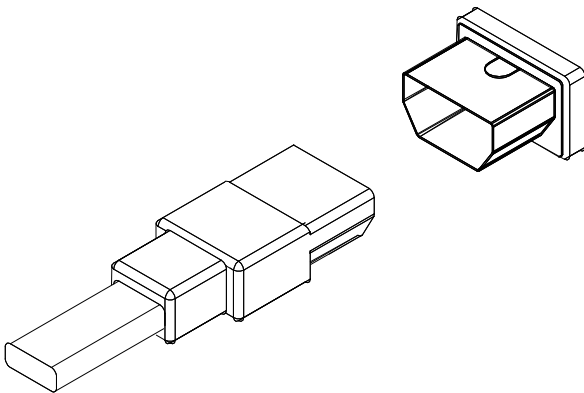
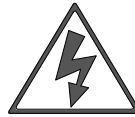


Figure 5–1 - Charge Connector Orientation

EQUALIZE: On a periodic basis, the *SuperCharge*[™] station will perform an Equalizing charge on the vehicle battery to condition it for optimal charging and service life. When this blue light is on steadily, it indicates that an Equalizing charge is required. When it is on and flashing (and the CHARGING light is also on), the Equalizing charge is in progress. Upon completion, the COMPLETE indicator will light up. Press the STOP button and disconnect the charging cable from the vehicle.



DANGER! SHOCK HAZARD

DO NOT disconnect the charging cable from a vehicle when the user interface panel indicates **CHARGING** or serious injury and equipment damage may result from electrical arcing between the charge connectors. Up to 400 amperes may be present at 36-120V d.c. which can cause electrical shock, burns, eye injury and death. If a vehicle must be disconnected from the *SuperCharge*[™] station before charging is complete, press the STOP button on the user interface panel to terminate charging, and then disconnect the charging cable.

4) Allow the vehicle to remain connected until the user interface panel indicates:

COMPLETE

5) Press the STOP button.



NOTE

If you press the STOP button while a vehicle is charging, charging will be terminated and the FAULT light will illuminate. This is normal in this circumstance. Disregard the FAULT light and disconnect the charging cable from the vehicle.

6) Disconnect the charging cable from the vehicle and move the vehicle away from the charging station.

5.0 CHARGE STATION OPERATION

5.1 Parking and Connecting a Vehicle for Recharging (cont.)

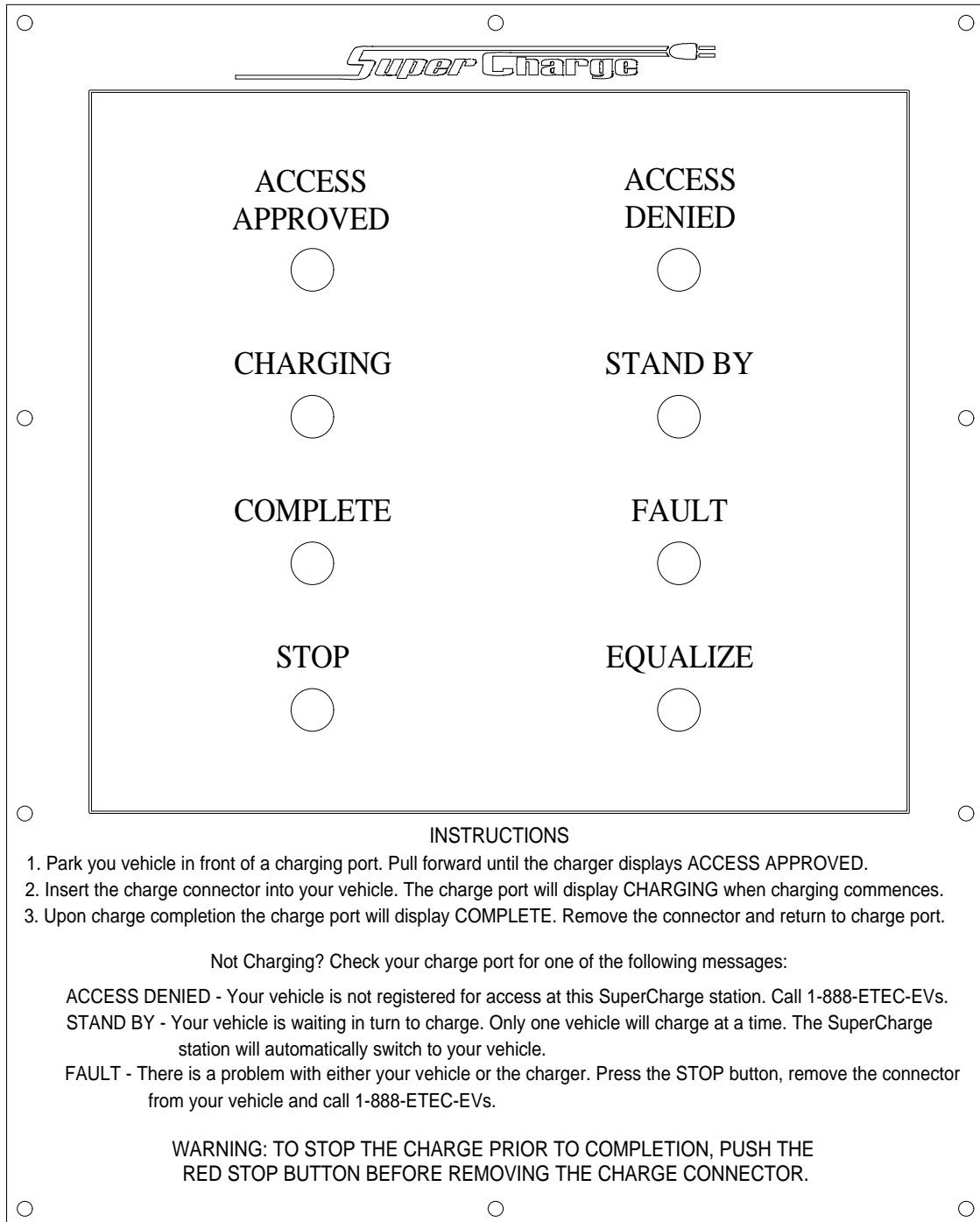


Figure 5–2 - User Interface Panel