

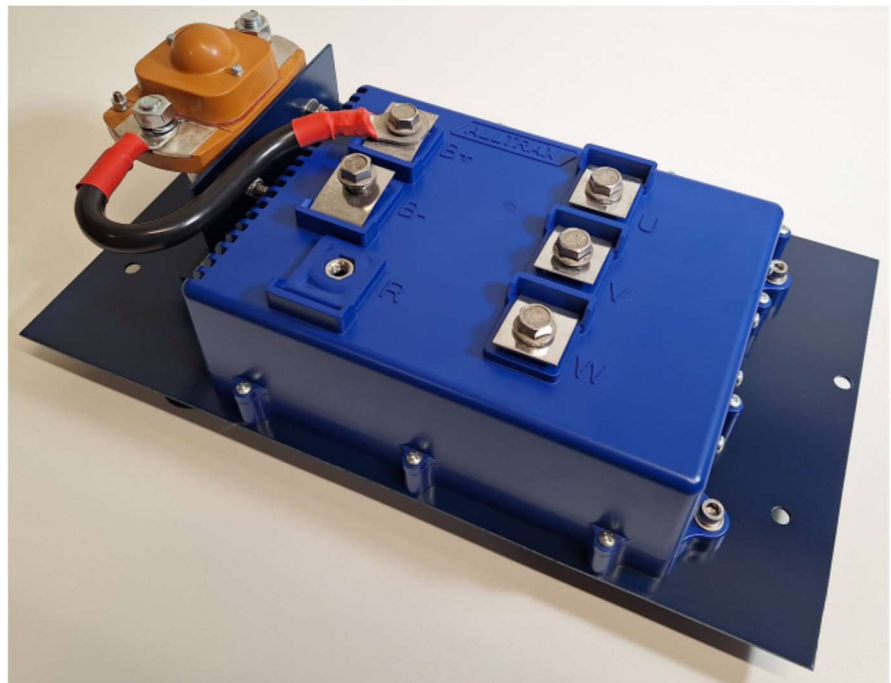
## ICON-AC 35-PIN ALLTRAX AC1 CONVERSION

### LVTONG 35-pin AC Motor Controller Replacement



#### COMPLETE KIT:

- >Controller AC1-ICON-35
- >Panel & Hardware
- >AC Motor Ground wire
- >Batt cable to Solenoid
- >Batt cable to BATT POS
- >USB Extension cable  
(Solenoid not included)
- ....(Fuse not included)  
(Fuse holder not included)





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## 1. Document Scope

**WARNING: Follow all safety and warning recommendations in the GENERAL WARNINGS SECTION in the AC1 Operators Manual.**

**It is the installers responsibility to utilize proper safety glasses and other PPE safety gear using tools, equipment, or working on or around batteries and energy sources.**

## 2. Document History

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- 12/05/2023, REV A, Initial release AC1 for LVTONG 35pin Controller, EC-12/17/2023

## 3. Tools Required:

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A suggested list of tools to install this kit. Not all tools may be listed.

- Socket set 3/8" drive (Metric and SAE)
- Socket set 1/4" drive with 4" extension
- SAE Allen wrench set
- Box wrench set
- Phillips screwdriver
- Flat blade screw driver
- Power Drill (if used for installing self tap screw into USB extension mount)
- Safety glasses and PPE working on and around lead acid batteries, drilling, etc.

### 3.1. Parts Required (not supplied)

The conversion requires other components to complete the project, the items are not supplied but required:

- NEW SOLENOID – See AC1 Operators manual CONTACTORS (SOLENOIDS) Section for ratings and type.
- BATTERY FUSE, see AC1 operators manual FUSE section for ratings
- BATTERY CABLES, see AC1 operators manual WIRING section for gauge and type

## 4. ICON LVTONG AC 35-pin Models:

The ICON Factory AC option, 2017+

### 4.1. LVTONG 35 PIN AC Controller Conversion:

Two versions of ICON controllers, the NEOS and the LVTONG. The NEOS is a 23PIN and the LVTONG is a 35PIN. The pictures in the installation show the ICON-35 ALLTRAX AC1 motor controller.

ICON is copyright of the  
ICON Electric Vehicles of Florida

35 PIN LVTONG MOTOR  
CONTROLLER



NEOS M-Type is the copyright of the  
Toyota Industries Corporation

23 PIN NEOS CONTROLLER  
(Early ICON models)

**CHECK YOUR VEHICLE WHICH  
CONTROLLER YOU MAY HAVE**



## 5. Conversion Procedures:

The conversion requires removing the entire panel and Solenoid. A new properly rated solenoid is required to maintain the ALLTRAX warranty. See AC1 Operators manual for more information.

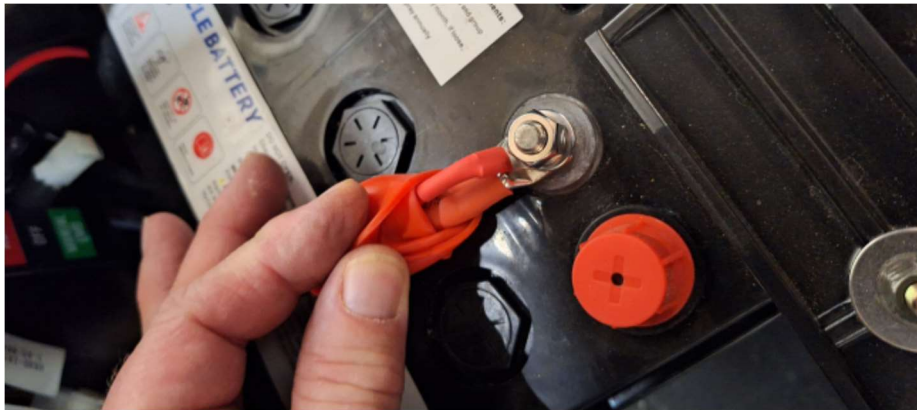
### 5.1. LVTONG-TYPE mounting panel removal:

The LVTONG motor controller aluminum heatsink panel shown below, this entire panel will be removed.

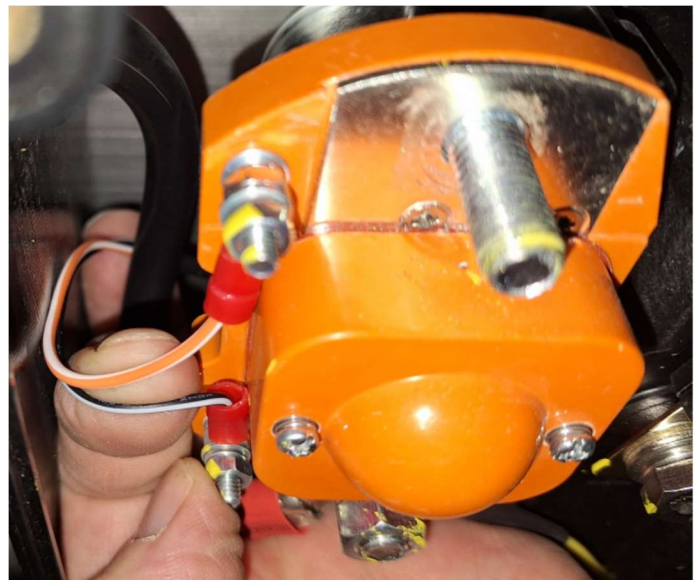
**1. SET KEY-SWITCH AND TOW/RUN SWITCH TO OFF**

**2. DISCONNECT THE POSITIVE BATTERY CABLE**

- a. The B-POS cable will be replaced with a new cable with 3/8" terminal to the new 400A solenoid. Remove the 12AWG RED wire and red boot.



3. Remove Solenoid wires from the solenoid, note the YELLOW 18AWG wire assembly to the INPUT battery cable to the solenoid on the bottom terminal. It will be replaced onto the new solenoid. The coil wires ORN/WHT is positive and BLU/WHT is negative.

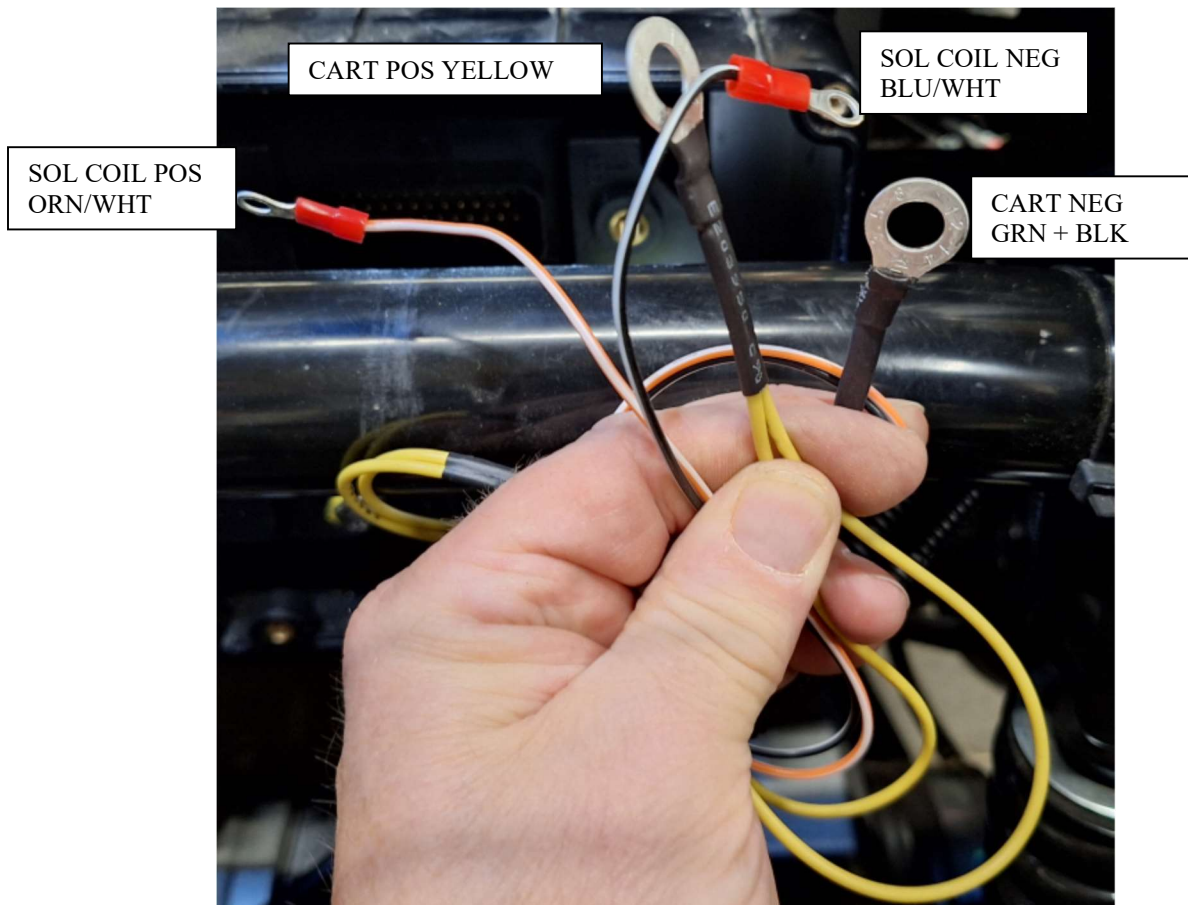


**WIRES AN CABLE REMOVAL CONTINUED:**

4. Remove wires and unplug the controller 35pin wire harness.
5. Remove the 3-phase AC cables.
6. Remove the BNEG cable. NOTE: The B-NEG has a 18AWG GREEN and 18AWG BLACK wire attached on NEG terminal. This is cart power negative.

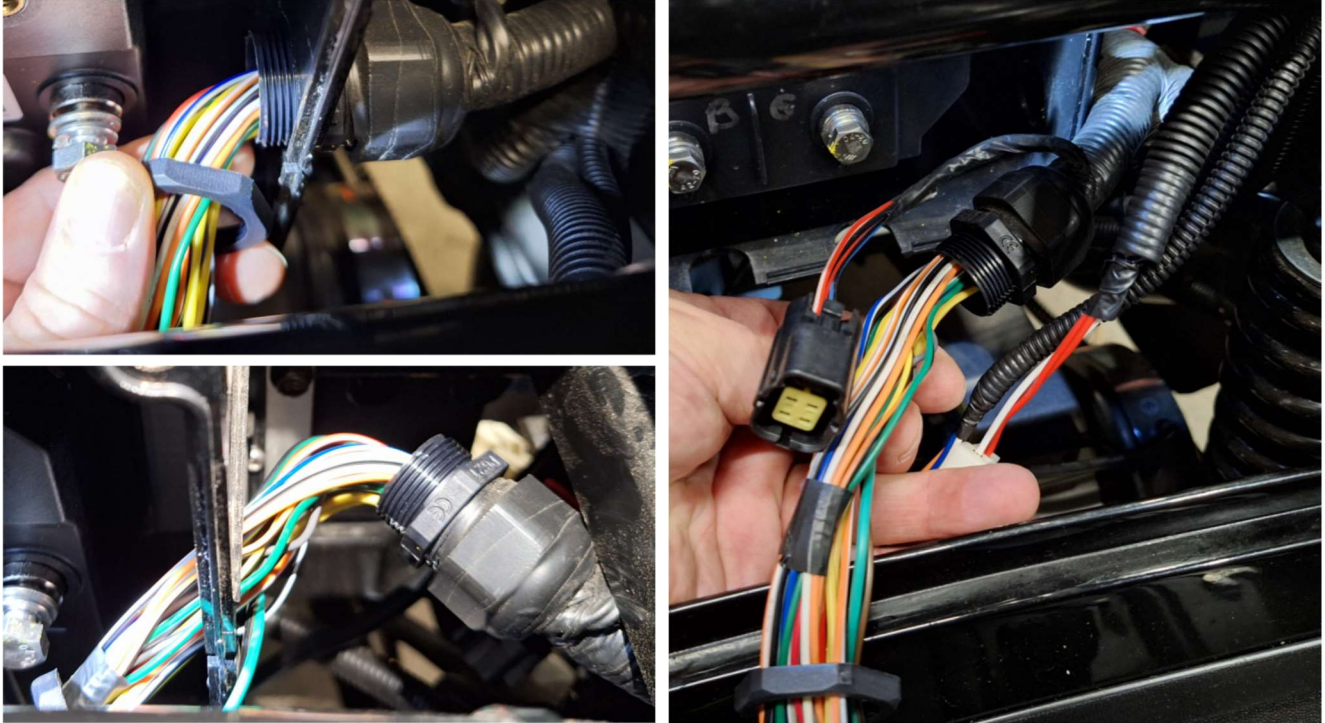


All the control wires now removed.



**REMOVE PANEL CONTINUED:**

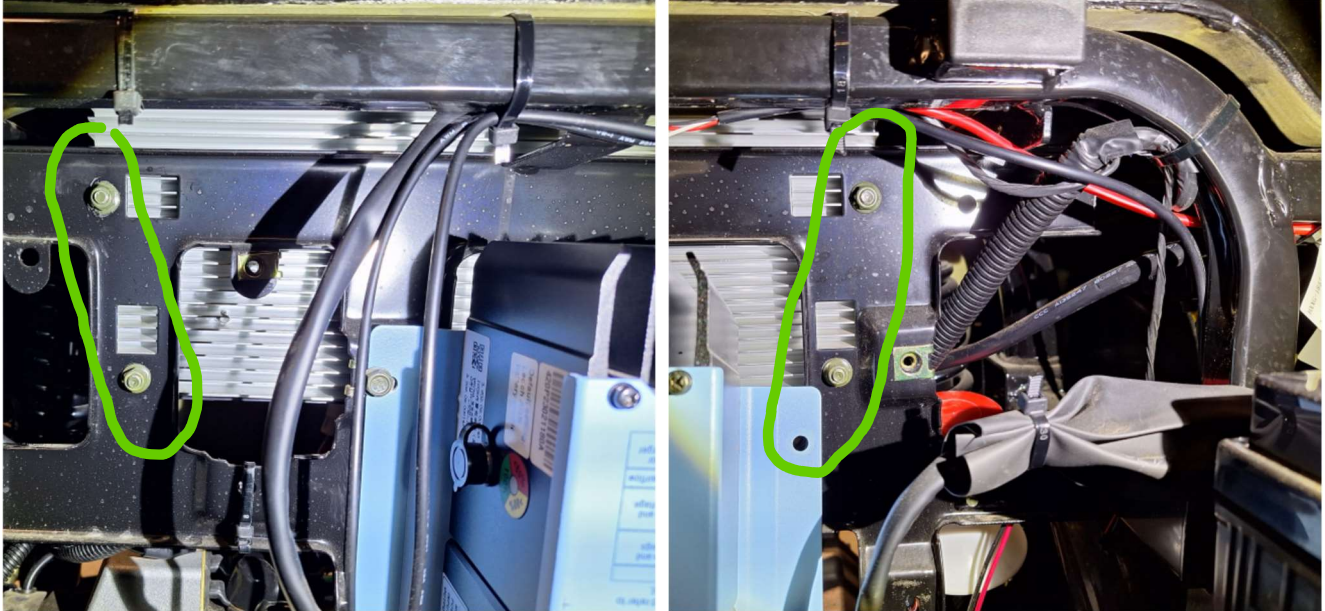
7. Remove the CONTROL CABLE assembly from the water-resistant box:
  - a. Remove the nylon nut and pull the harness retainment plug out of the hole
  - b. Carefully slide EACH WIRE out of the SLOT in the water box case.



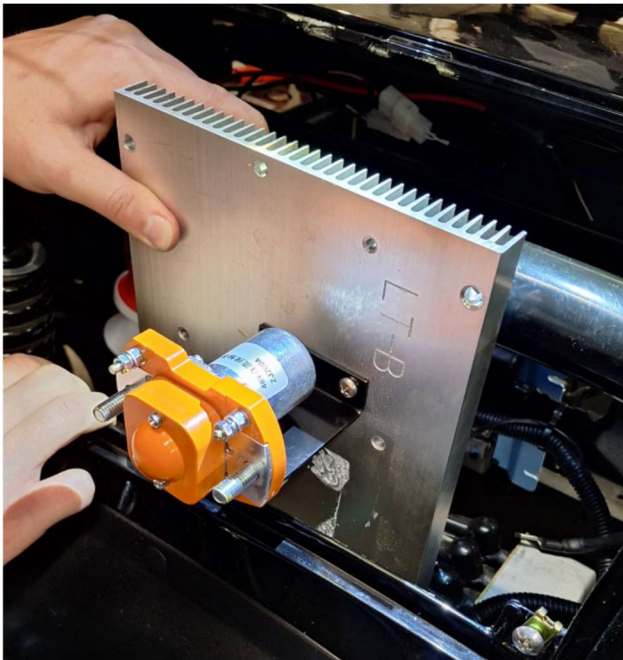
8. Remove the motor controller mounting bolts and motor controller. Then remove the solenoid from the heatsink assembly.



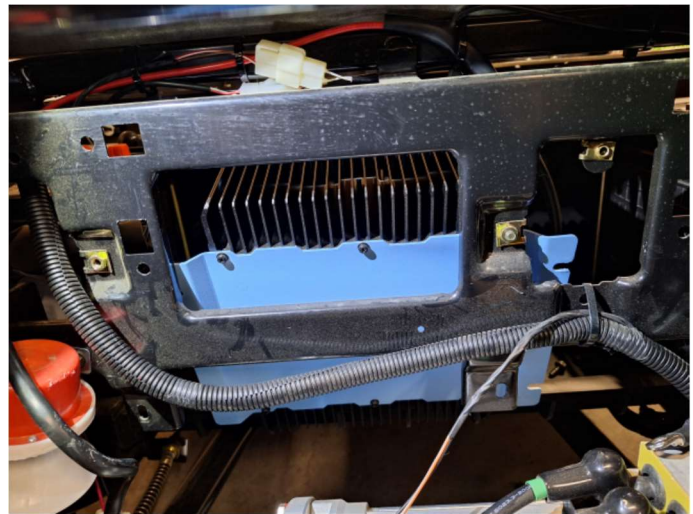
9. To gain access to the power panel mounting bolts, the DC-DC converter and charger will have to be pulled forward. Remove the bolts holding both DC-DC and Charger and lean then forward into the battery compartment. Use 10mm socket one side and wrench on the other to remove the 4-bolts.



10. Remove the aluminum heatsink assembly. You may have to pull the body panel back a bit if you left the solenoid on the panel.



ALUMINUM PANEL RMEOVED





**5.1. ALLTRAX AC1 MOTOR CONTROLLER INSTALLATION**

1. Install the supplied U-CLIPS (Called SPEED NUTS – HDW200-034) in the 4 rectangular slots as shown aligning the holes next to the slots.
2. Locate the (1x) 1" U-SPEED CLIP, place the speed clip on the bracket as shown.

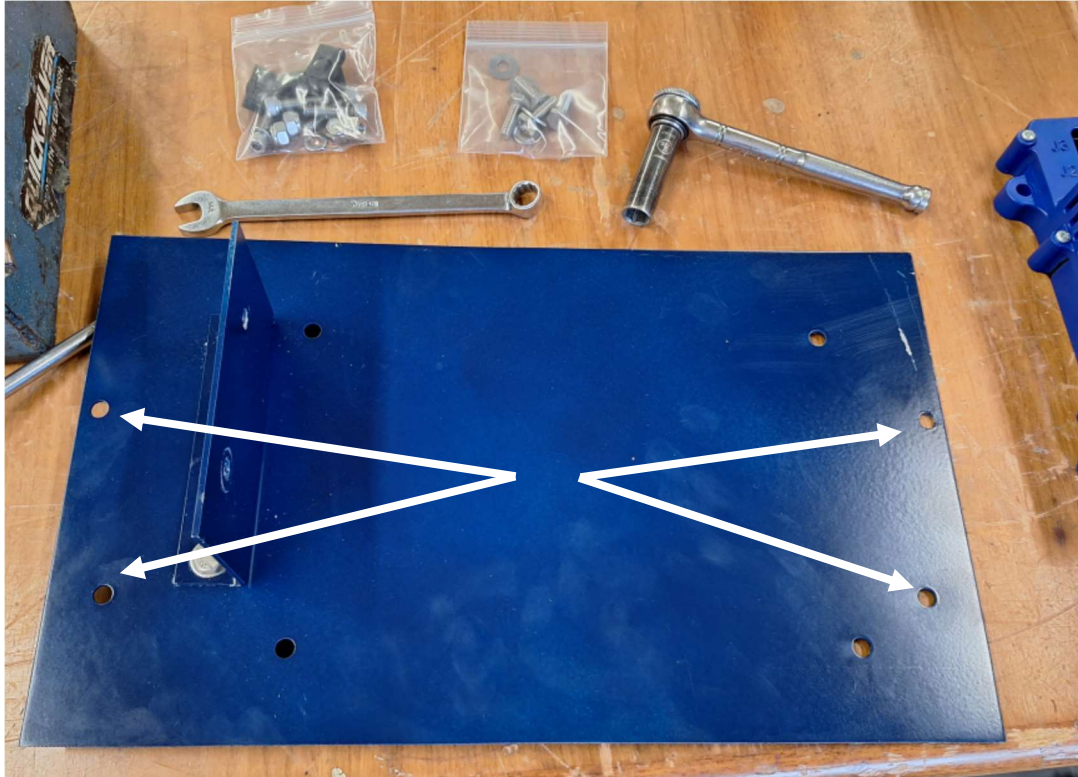
LEFT SIDE



RIGHT SIDE

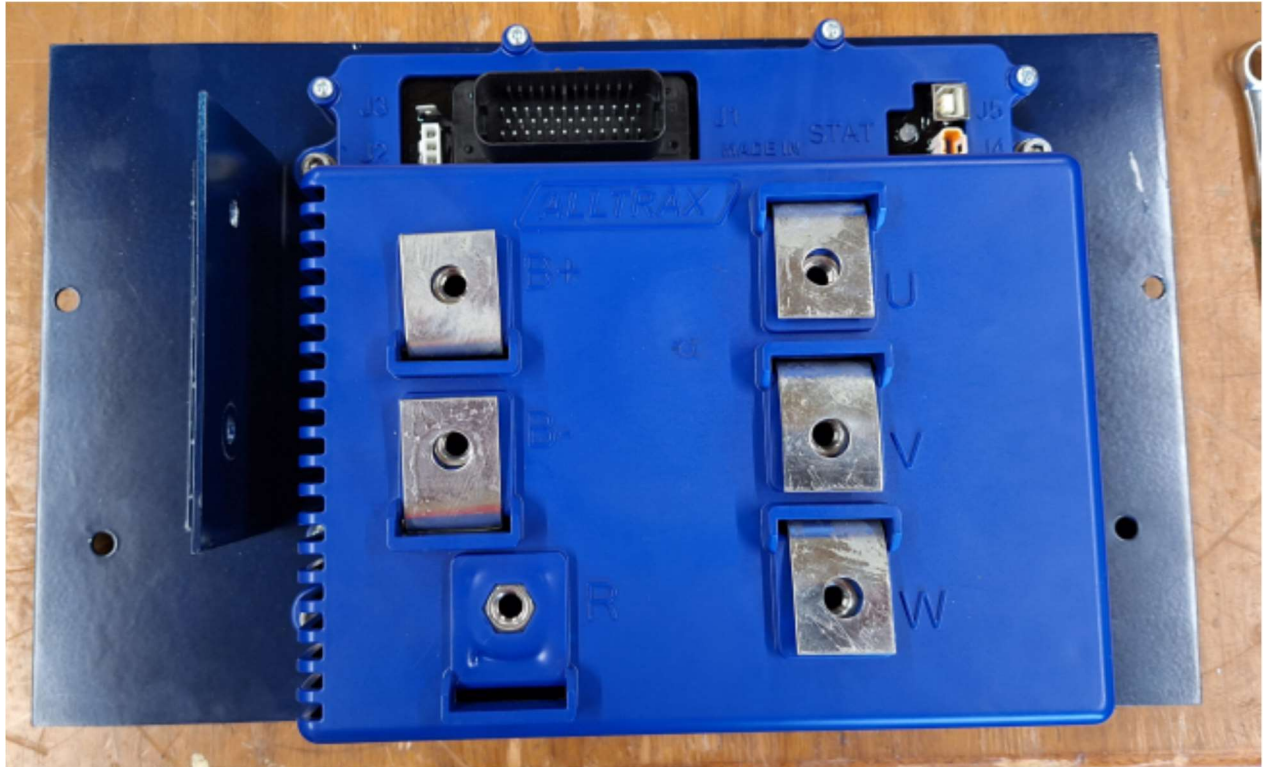


3. Prepare the panel as shown.
4. Mount the solenoid bracket with the flat "L" facing inward as shown. Notice the 4 offset mounting holes. Solenoid on the left facing forward with the offset holes on the bottom.

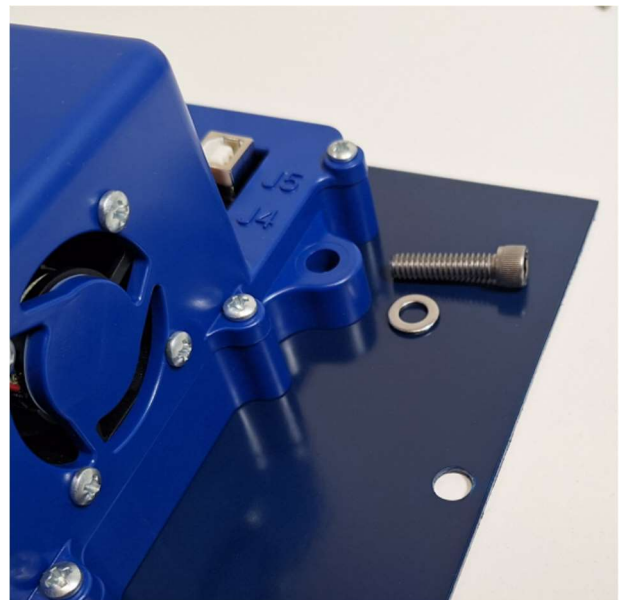
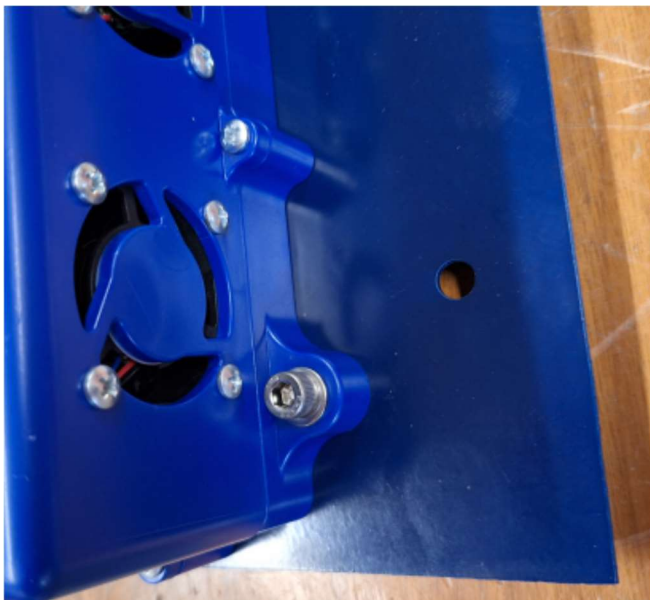


AC1 Controller mounting continued:

5. Install the AC1 motor controller on the panel with the MAIN CONNECTOR FACING UP as shown.

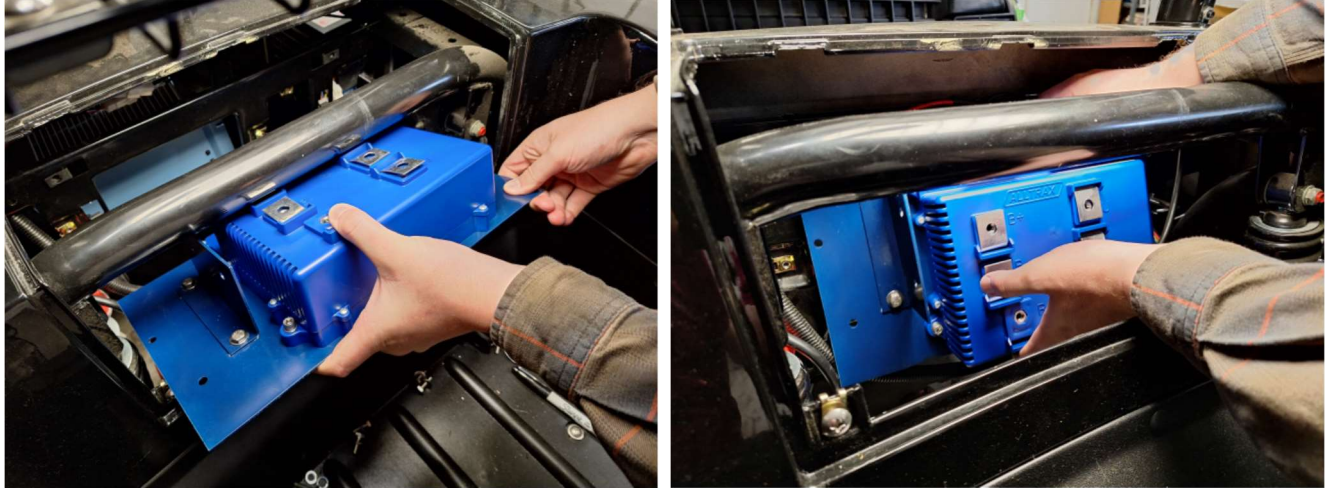


6. Locate the 4x 1/4-20x3/4" SHCS (Socket Head Cap Screw) with a 3/16" Allen wrench.
7. Place the small OD flat washers on the bolts. Hand tight all 4 bolts.

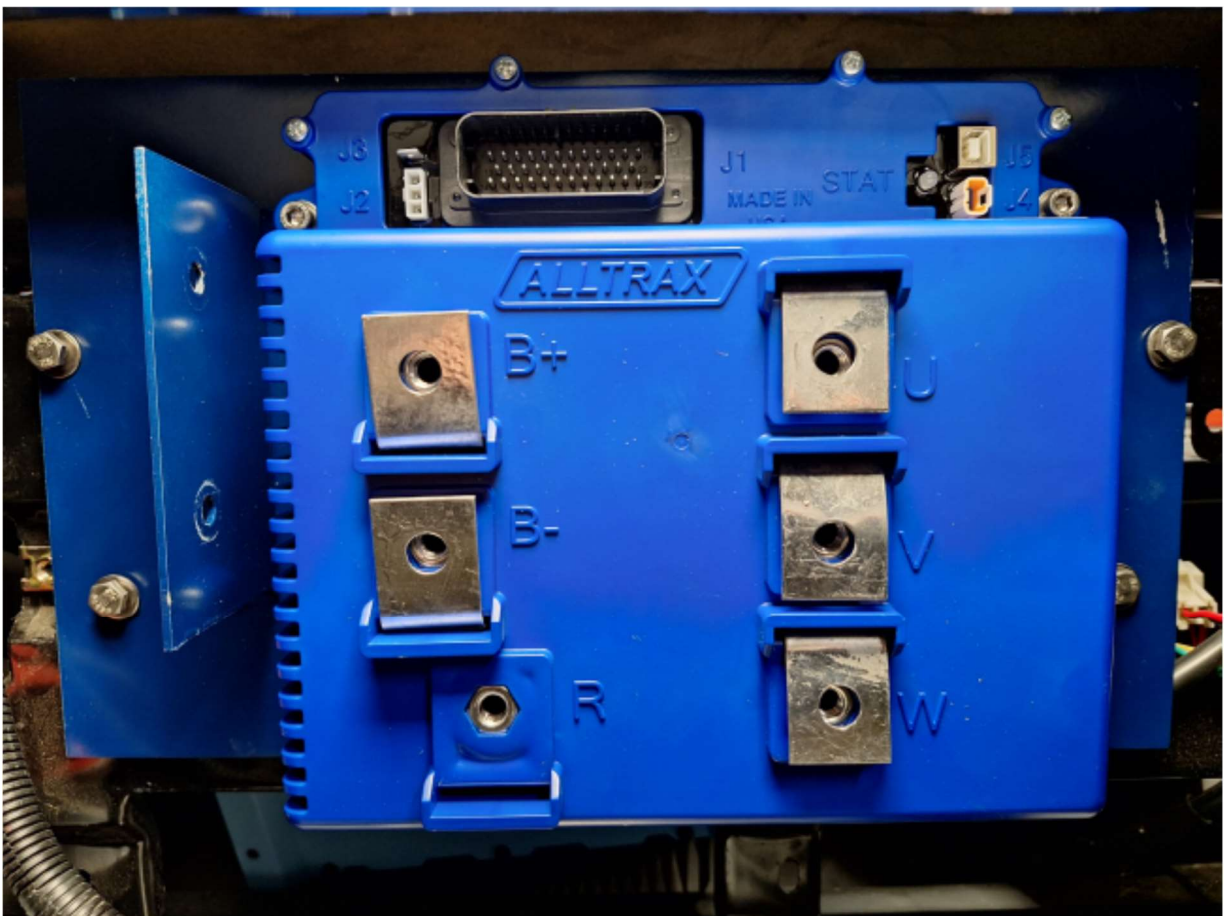


AC1 Controller install continued

8. Install the motor controller power panel into the car with the SOENOID on the left driver's side.

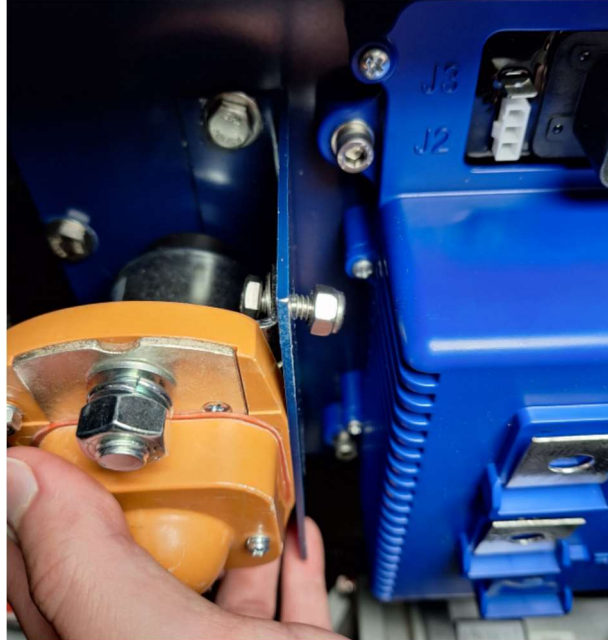


9. Locate the (4x) 1/4-20x3/4" HEX HEAD bolts with 1/4" flat washers. Install them into the SPEED CLIPS we placed into the slots and tighten.



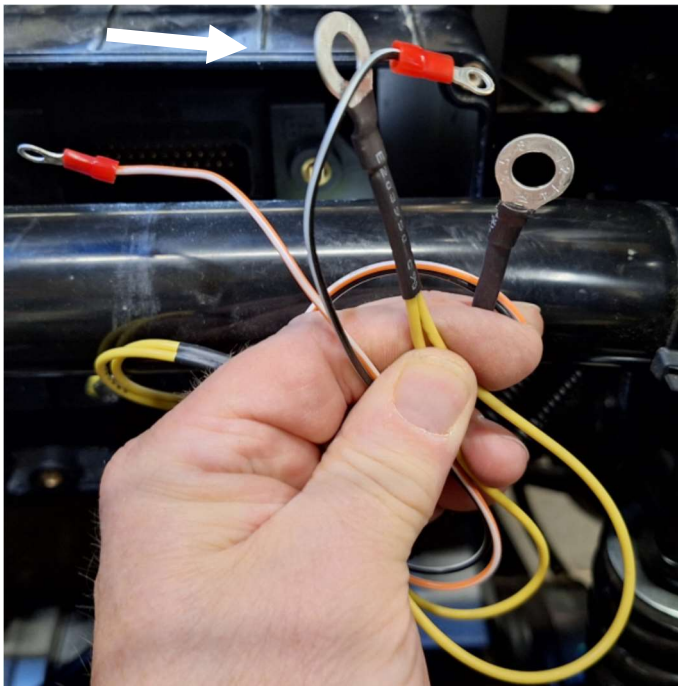
AC1 Controller install continued

10. Install the new Solenoid with the terminals facing OUT using the two 1/4-20x1" HEX HEAD bolts with 1/4" FLAT Washers.



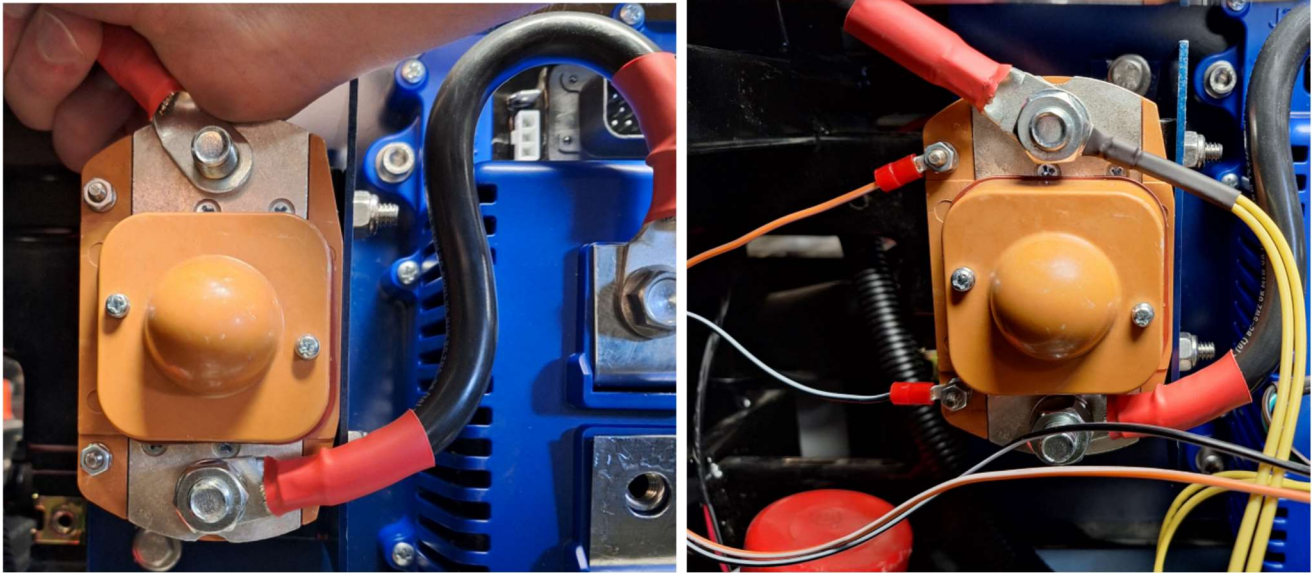
## 5.2. CABLES AND WIRING

1. Locate the supplied 1x 3/8" YEL Ring Terminal. The TWO YELLOW wires for the CAR POWER have a 5/16" Ring Terminal that will not fit on the 400A Solenoid. Cut the 5/16" Ring terminal and install BOTH YELLOW WIRES into the supplied 3/8" Ring terminal.

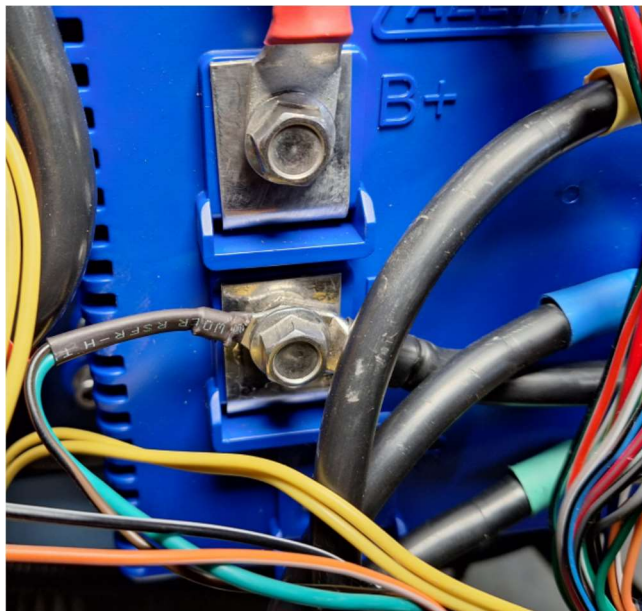


## Power Cables Continued:

2. Locate the 28" 2AWG cable with 3/8" Ring Terminal on one end and 5/16" Ring Terminal on the other. Route the cable to the battery compartment but **DO NOT CONNECT** to the battery yet. Connect this battery cable to the SOL INPUT and the 2-YEL car power wires. As shown
3. Install the BPOS cable from the AC1 Motor controller BPOS input to the **BOTTOM** terminal of the SOLENOID. Torque bolts to specs on AC1 Manual **SPECIFICATIONS SECTION**.
4. Connect the solenoid coil wires ORN/WHT on top and BLU/WHT on bottom as shown.

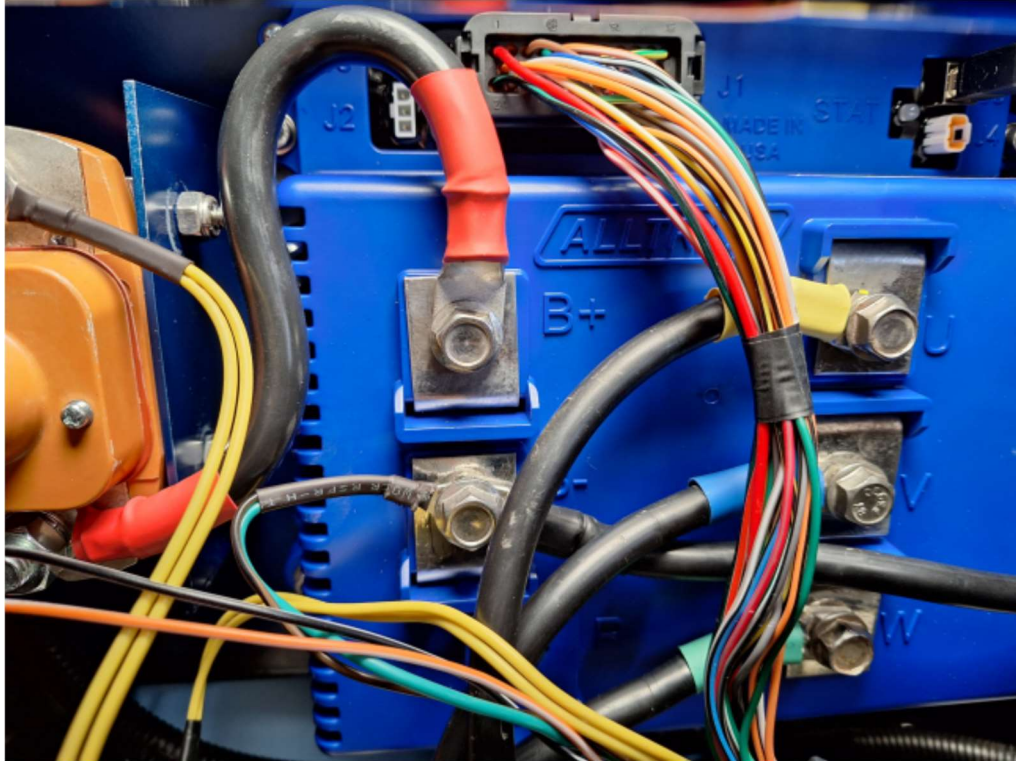


5. Install the BNEG cable to the AC1 Controller BNEG along with the GREEN and BLACK cart power **NEGATIVE** wires as shown. Torque bolts to specs on AC1 Manual **SPECIFICATIONS SECTION**.

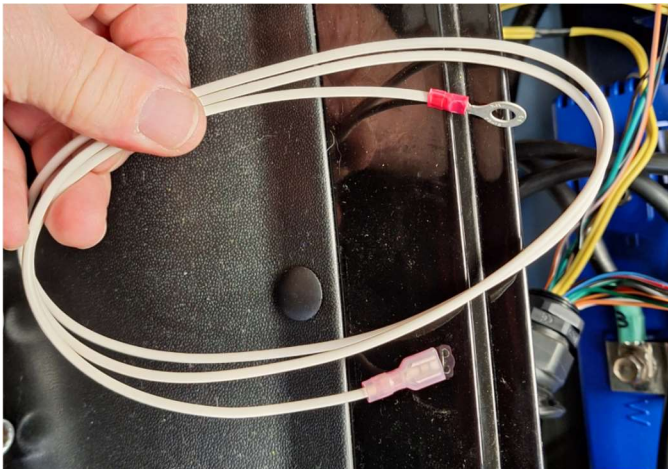


## Power Cables Continued:

6. Connect the AC three phase motor cables to the AC1 motor controller following the labels on the cables for U-V-W as shown. NOTE: Heat shrink color may vary, follow the cable labels. Torque bolts to specs on AC1 Manual **SPECIFICATIONS SECTION**.
7. Connect the 35-pin controller wire harness to the AC1 Controller.

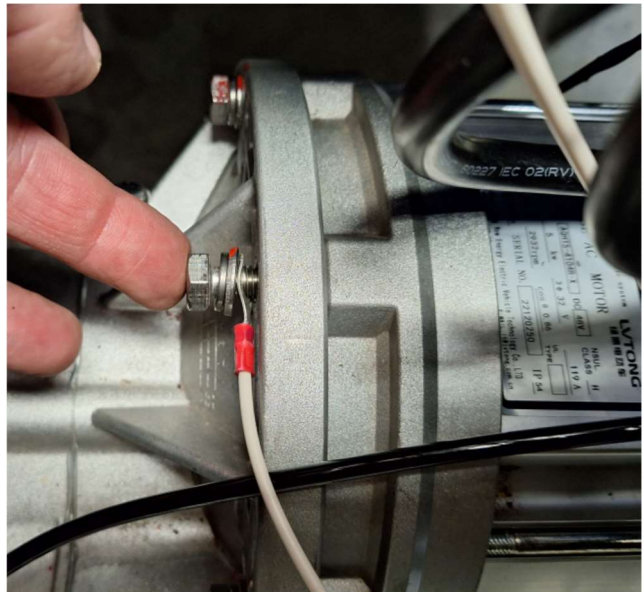
**5.3. AC GROUND WIRE INSTALLATION:**

1. The AC motor must be grounded to the AC motor Controller AC GND terminal J3. This WHITE wire has a 1/4" ring terminal. Your motor may have either 1/4" or 5/16" or 8mm bolts. If you have the 8mm bolts, cut the 1/4" Ring terminal off and crimp on the supplied 5/16" ring terminal.

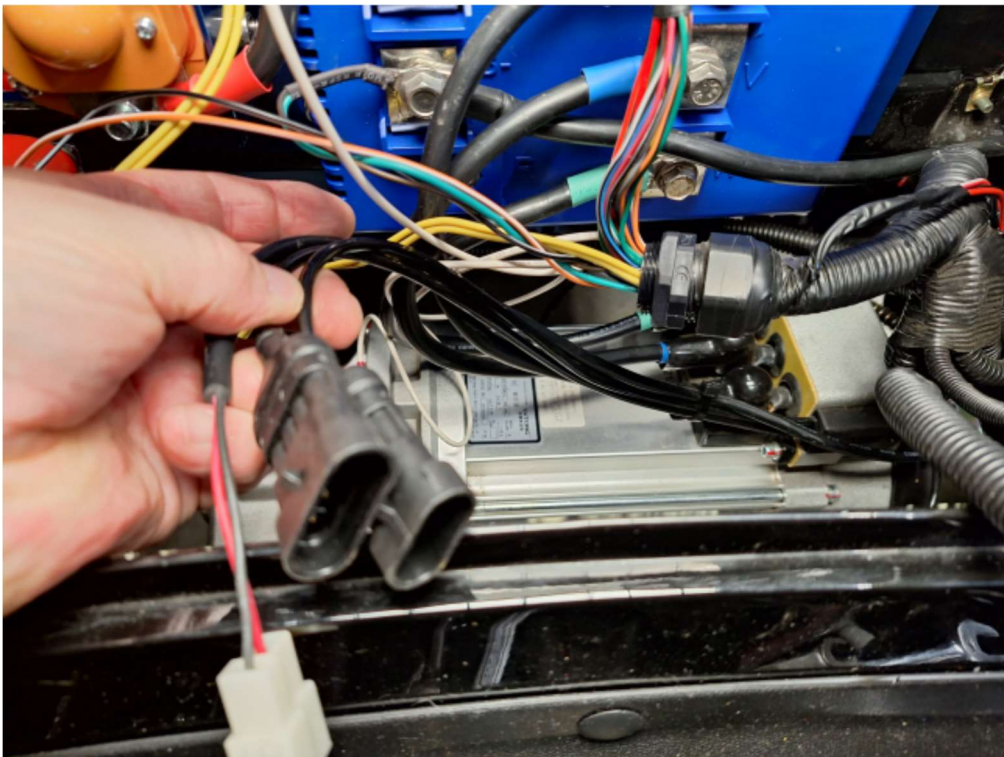


**AC Ground Wiring Continued:**

2. Connect the **AC ground wire** to the AC motor controller GND Faston (next to the 3-pin connector) and route to the AC motor and use a motor mounting bolt to connect the AC ground wire.

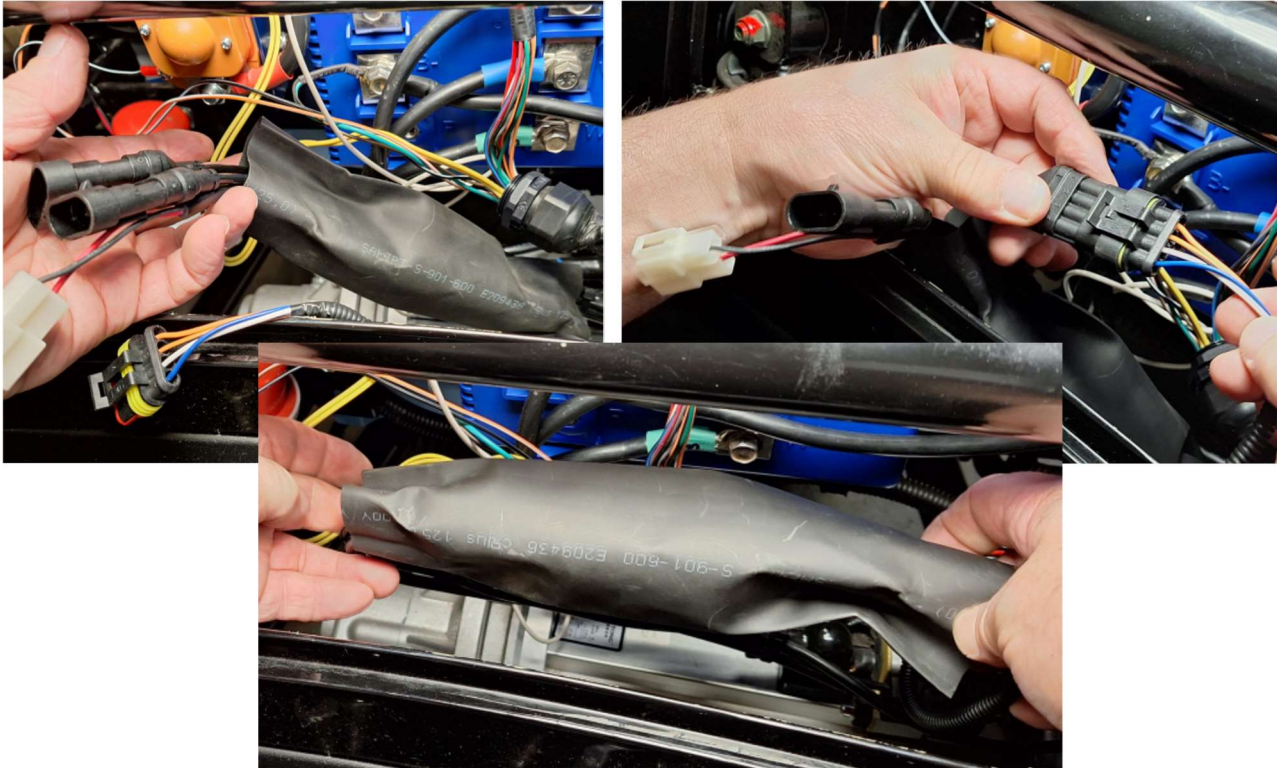
**5.4. SENSOR CONNECTORS:**

1. Locate the sensor cables, the 4-pin speed sensor and 3 pin temp sensors.



Sensor Connectors Continued:

2. Install the insulating boot over the cable assembly as shown then connect the connectors to the motor sensors (and E-Brake) making sure they snap closed. Then slide the insulating boot over the wires and secure with 2 zip ties on the ends.



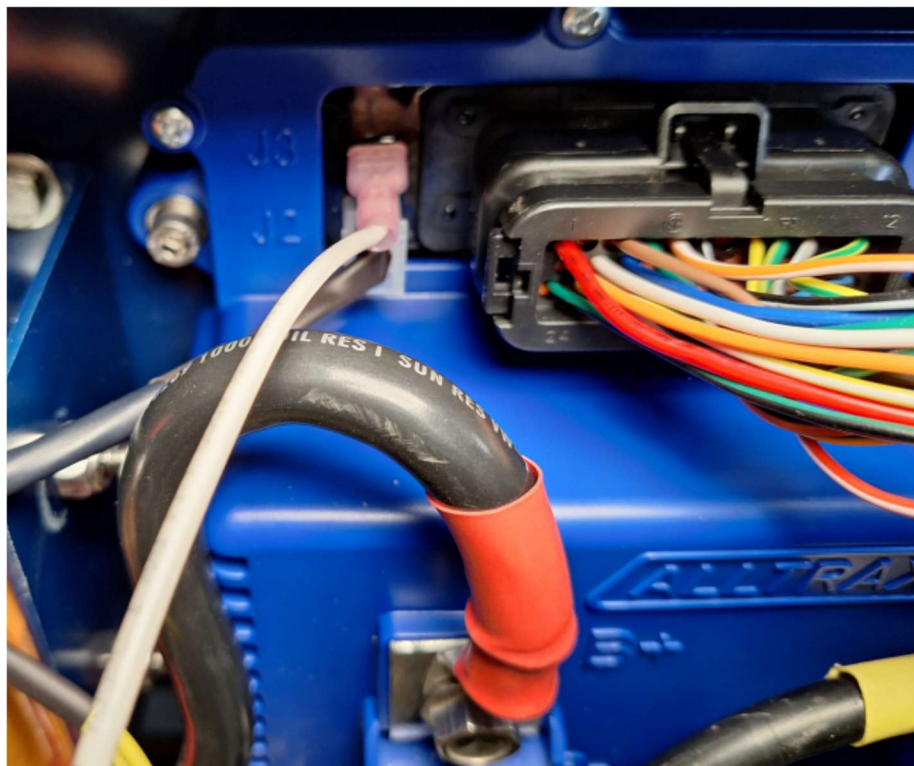
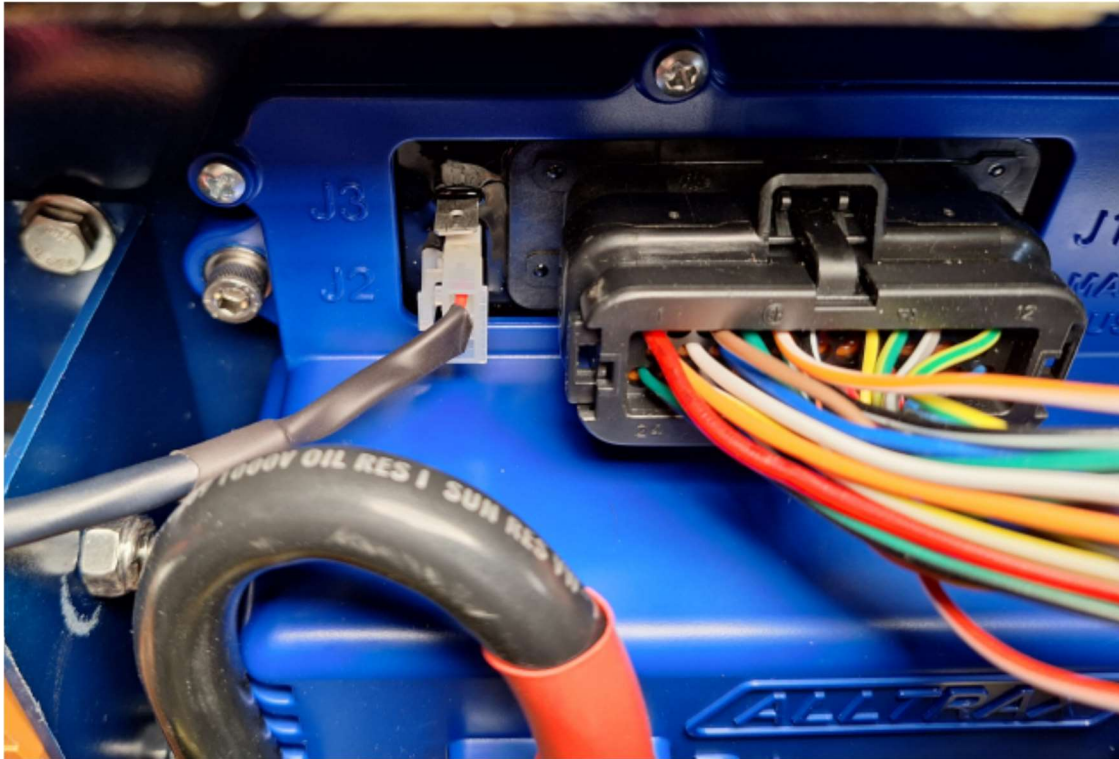
3. Secure the MAIN harness cable and sensor wire harness with a zip tie (or two ties in series) hung off the main beam as shown. This prevents wires from getting pinched or broken while driving.





**5.5. FN-KEY INSTALL:**

1. FN-KEY control cable, route to a location on the dashboard and route the cable to the controller. (See the FN Manual for more information). Connect to J2 as shown. Note we removed the AC Motor ground wire from J3 for clarity of this photo shot.



**5.6. BATTERY FUSE:**

A battery fuse is required (Not supplied) an example fuse holder shown below for reference installed in a suitable location. (See AC1 controller operators manual FUSE SECTION for fuse size ratings).

1. Connect the RED 12AWG charge cable along with the SOLENOID 2AWG cable to the fuse holder – LEAVE LOOSE.
2. Connect cable from the fuse holder - LEAVE LOOSE – and route to the battery POSITIVE terminal.
3. Tighten the BATTERY POS cable terminal post to the battery torque specifications.

**CAUTION: DO NOT INSTALL THE FUSE YET!**



4. Install the proper ANN Fuse into the fuse holder. (See AC1 operators manual)
5. Measure voltages at the solenoid positive and controller B-NEG and **verify the correct voltage and polarity is available.**

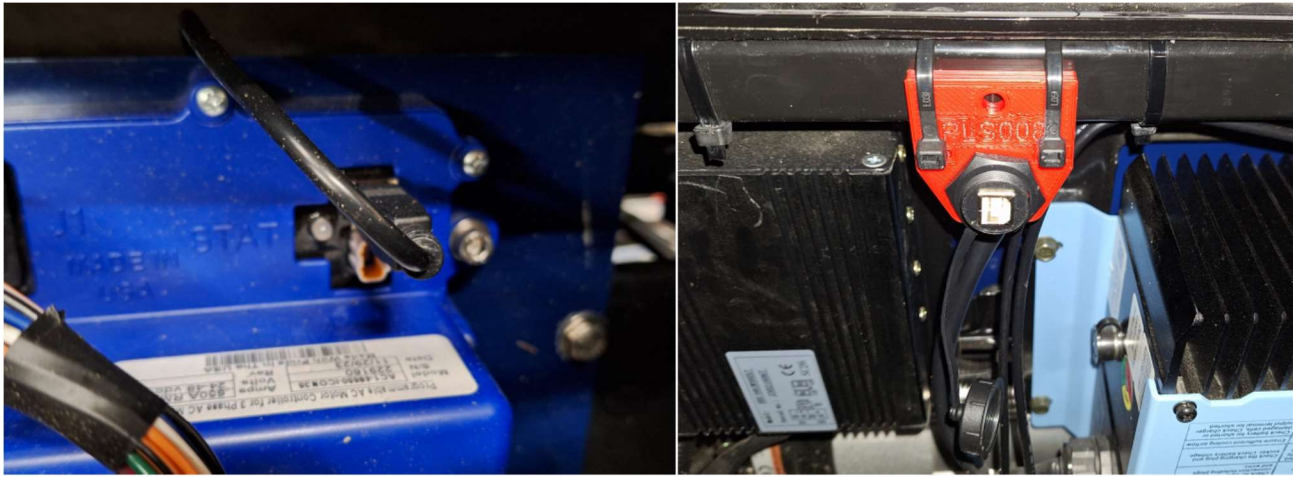
**5.7. Power Test:**

1. Turn on TOW / RUN switch to the RUN position.
2. It is recommended to do a first test on a jack stands to determine direction is correct. Do not over-rev the axle, just enough to verify Forward and Reverse direction is correct.

## 6. Accessories:

### 6.1. USB Extension Cable:

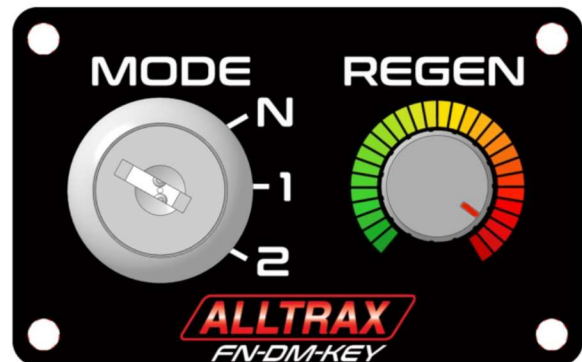
The controller is programmed, monitored, or upgraded through USB or Bluetooth. If Bluetooth option is not available (or enabled) the USB is difficult to reach on the ICON with factory rear cover and a rear seat. A 3D printed USB-B cable extension kit is included to mount to the SEAT BAR in the battery compartment as shown. You can use 2x ZIP TIES or the #12 self-tapping screw into the bar between the DC-DC converter and charger. **The USB PROTECTIVE CAP should be on at all times to keep battery acid out of the connector.**



### 6.2. FN-KEY Personality Switch Box:

The FN-KEY (on left) included in your kit (with optional dash mount FN-DM-KEY shown on right) provides 3 personality functions: Golf Mode (10-14MPH), Street Mode (14-20MPH) or Go-Fast Mode (depending on safe operation and tire size, do not exceed manufacturers RPM limits or braking function). **See the included FN manual for more information.**

Free software on our web site – Download, Adjust, and Drive.



***"Thank You Nikola Tesla for a better motor"***

It was really all he asked for in his lab journal. He said what he designed was for the future, and he hoped we would remember him and his contribution.

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