Hi Performance Electric Vehicle Systems

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INSTALLATION INSTRUCTION

EZGO RXV Lithium Battery Pack Installation Notes

REVISION: B

Date: 04-16-19

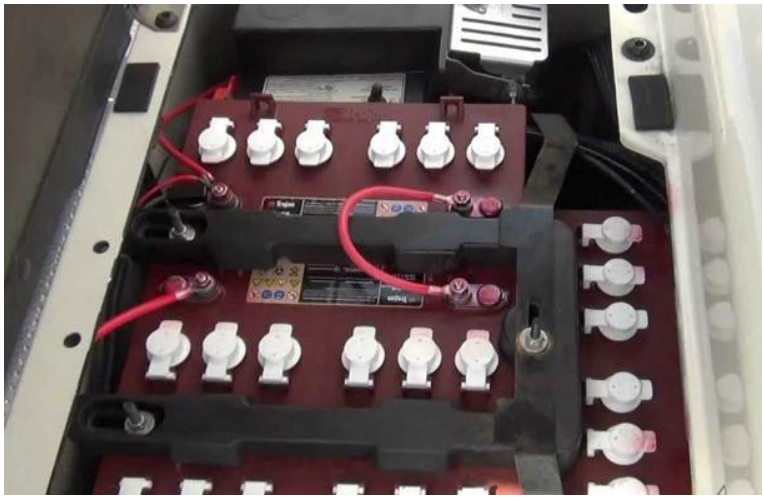
IMPORTANT DISCLAIMER: **IF THE VEHICLE IS GOING TO BE STORED FOR A LONG PERIOD OF TIME, THE VEHICLE NEEDS TO BE PLUGGED IN TO CHARGING POWER AT ALL TIMES AND 12 VOLT CONVERTOR SHOULD BE DISCONNECTED. FAILURE TO FOLLOW THIS PROCEDURE WILL DRAIN THE LITHIUM BATTERIES DOWN TO A POINT WHERE THE BATTERIES WILL BE DAMAGED. IF THE BATTERIES ARE DAMAGED FOR NOT FOLLOWING THIS PROCEDURE, THIS WILL VOID ANY IMPLIED WARRANTY.**

CAUTION: DO NOT HANDLE THE ELECTRICAL CONNECTORS WHEN THE SYSTEM IS ENERGIZED. DOUBLE CHECK THE VOLTAGE POTENTIAL WITH A VOLTAGE METER PRIOR TO HANDLING MAKING SURE VOLTAGE IS AT 0V. FAILURE TO DO SO WILL RESULT IN INJURY OR DEATH!

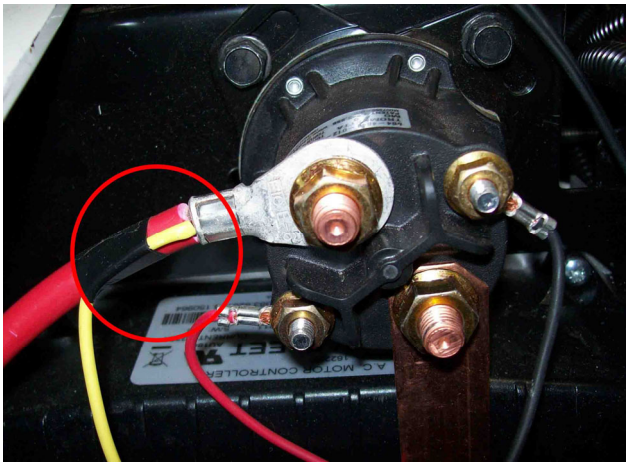
SCOPE: This instruction set is given as a detailed guide to install HPEVS complete lithium battery pack into a EZGO RXV golf car. Included in this lithium battery pack are 16 CALB 100Ahr batteries, one Orion Jr. BMS and one delta-Q battery charger. **NOTE: THERE ARE SPECIAL INSTRUCTIONS WHEN WIRING IN THE STATE OF CHARGE METER. PRIOR TO 12-5-09, EZGO USED DANAHER MOTOR CONTROLLERS. CONFIRM WHICH CONTROLLER IS INSTALLED IN THE CART THAT THE BATTERY PACK IS INSTALLED.**

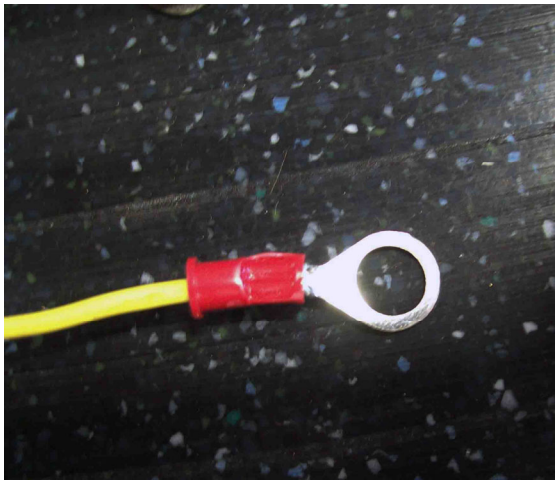
STOCK BATTERY AND CHARGER RECEPTACLE REMOVAL

1. Remove the three pins that hold the controller splash shield in place that way there is access to the controller below. The splash shield will be modified in later steps.
2. Disconnect all battery cables as described in the removal procedures in the manual for the golf car.



3. Remove the red power cable running from the battery pack to the contactor. Cut away the attached yellow wire to the power cable. This wire will need to be fitted with a 5/16” ring connector. Discard the original red battery cable.





4. Relocate the other red cable for the dc-dc convertor to the controller area. This terminal will need to be connected to the hot side of the contactor.
5. Remove and discard the negative pack cable from the B- post on the Curtis controller in the golf car.
6. Disconnect the charging wires from charger receptacle to the battery pack.
7. Disconnect the light blue wire (charge interlock) wire from the blue wire on the charger receptacle. The light blue wire will be relocated and reused.
8. Remove the charge receptacle from the golf car.

HPEVS Lithium Battery Pack Installation:

SAFETY NOTE: The HPEVS battery pack contains the lithium batteries, charger and BMS and as a whole unit; the unit is heavy. The following procedures will take two people to complete.

1. Prior to loading the lithium battery pack into the battery tray of the golf car, tape all electrical connections such that they will not get pinched or damaged in any way. Also, make sure that any stock OEM wiring is located out of the battery tray**. (**Fig.1)

Fig. 1

2. Locate a protective cover/blanket to lay across the front edge of the battery tray tub area to protect the golf car's body from any damage. (Fig. 2)

Fig. 2

3. With two people pick up and carry the lithium battery pack over to the golf car. Make sure that the Delta-Q battery charger is located towards the back of the car. (Fig. 3)

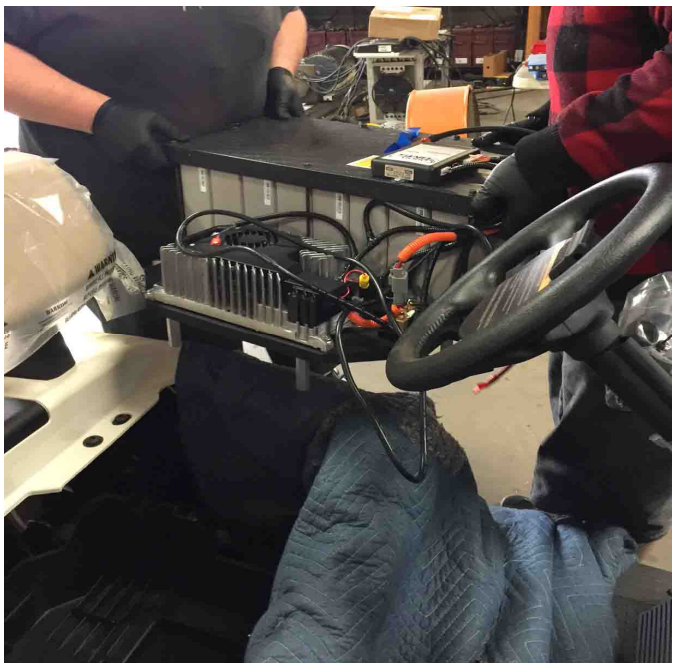


Fig. 3

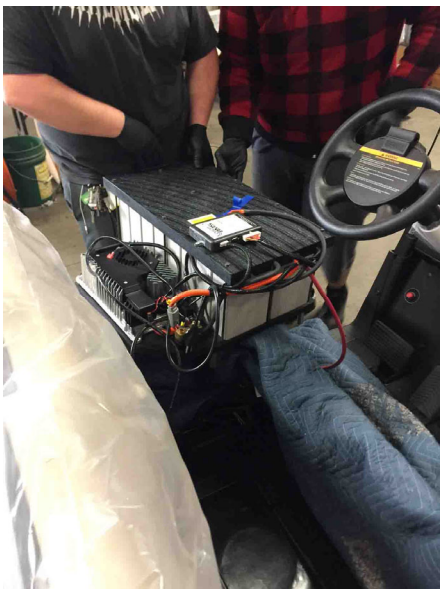


Fig. 4

4. Rest the charger on the protective cover located on the golf car and have one person continue to hold and steady the lithium battery pack. (Fig. 4)

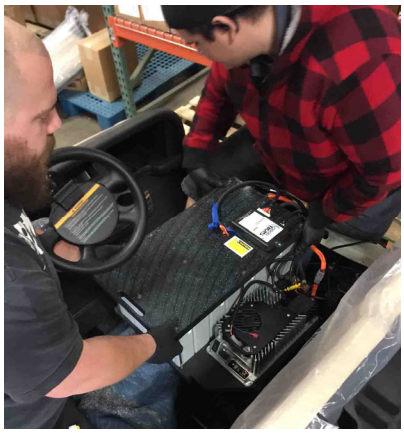
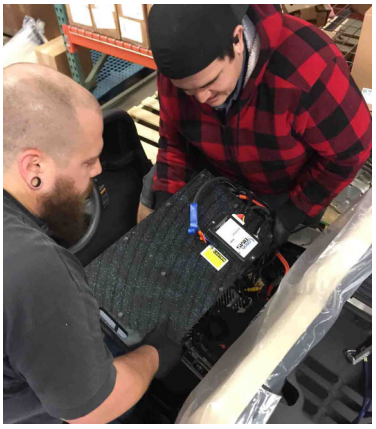
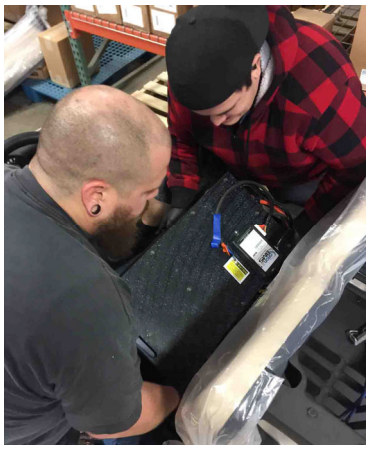
5. While the one person is steadying the battery pack, the other will need to step into the golf car; one foot in the battery compartment and the other in the floorboard of the golf car. (Fig. 5)

Fig. 5

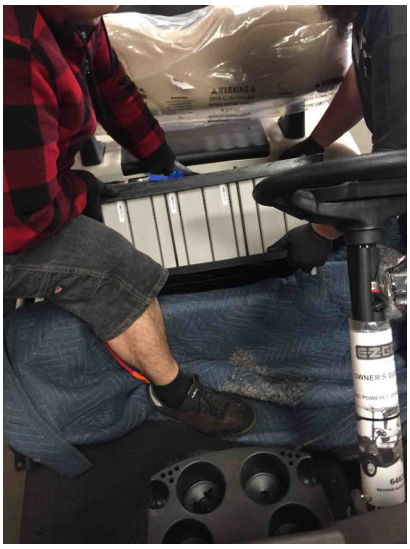
Fig. 6

6. Slowly maneuver the lithium battery pack such that it is aligned center with the battery compartment. (Fig. 6)

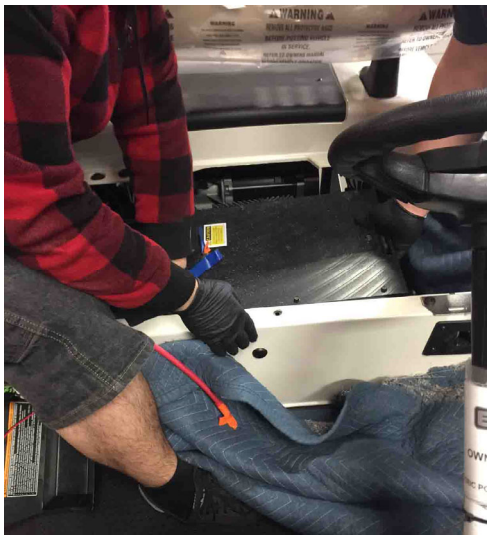
7. While lifting the battery pack together, the back end of the battery pack (Delta-Q charger side) will need to be tilted down so that the Delta-Q charger can squeeze under the golf cars body and slide the lithium battery pack into the battery tray compartment.

8. Make sure that the standoff studs that are located on the bottom of the battery pack clear the lip of the body.



9. Lower the battery pack all the way into the battery tray in the golf car. After the battery pack is fully in and seated in the golf cars battery tray, remove the blanket.

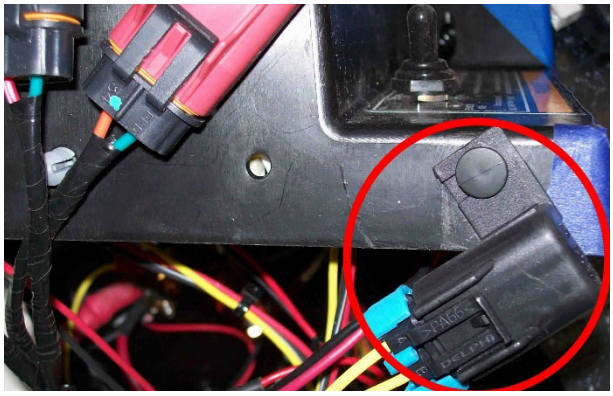


10. Secure the battery pack to the cars stock battery tray. This is accomplished by going through the holes located in the bottom of the cars stock battery tray and using the supplied hardware to screw into the battery pack's standoffs. There might be a point where the standoffs need to be maneuvered so that they align with the holes in the cars stock battery tray so that the mounting bolts can be installed. Using a small screwdriver can be used to maneuver the threaded standoff to the correct position to install the bolt. After the six bolts are threaded into the standoffs, tighten them to secure the battery pack to the battery tray.

Modifications

With the addition of the lithium battery pack into the golf car, modifications will need to be done to the controller splash guard so that the splash guard can be reinstalled.

1. Located the fuse holder circled in red in the picture. (Fig.7) This fuse holder has to be moved to another location on the controller splash guard. Carefully pull the fuse holder out of the splash guard.



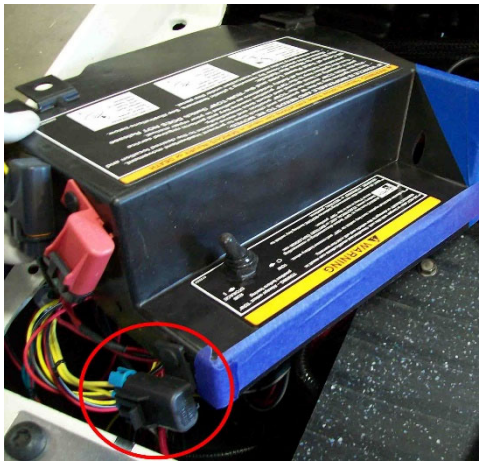
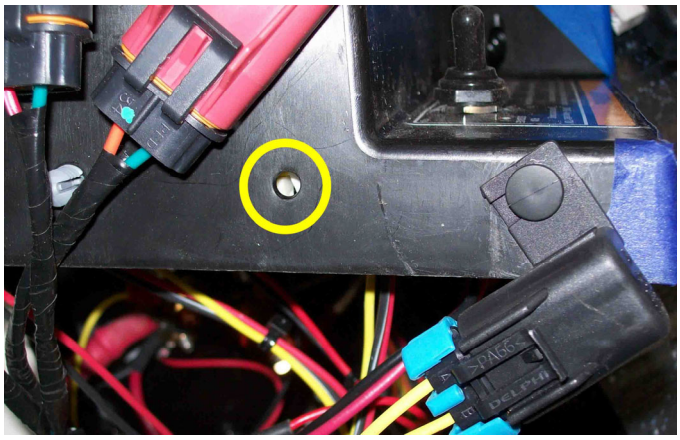


Fig. 7

2. Relocate the fuse holder to the next hole to the left of the original placement. The location is seen in the picture and is circled in yellow. (Fig.8)



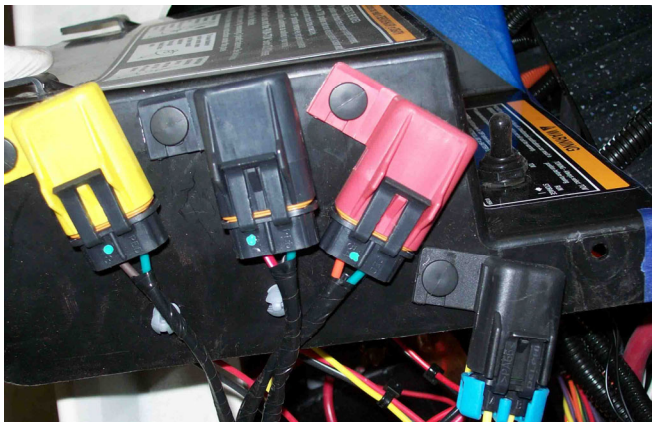


Fig. 8

3. After relocating the fuse holder, note the blue area on the controller splash guard depicted in the picture (Fig.9). This material needs to be cut away.

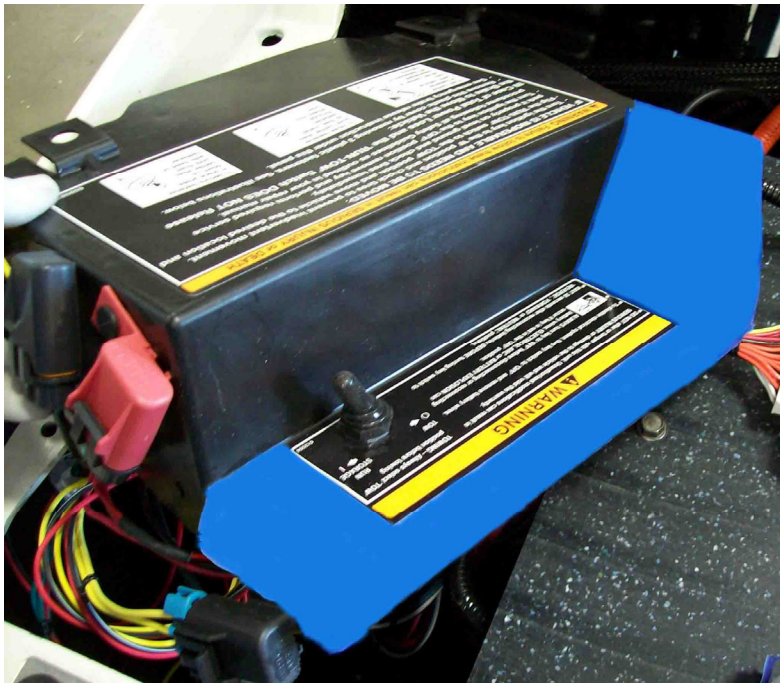


Fig. 9

Electrical Connections

Removal, modifications and additions will need to be made to the wiring system to accommodate the lithium battery pack. The following instructions depict the changes.

Ground wires

1. Locate the two ground wires that were removed from the battery pack negative connection. (Fig. 10)

Fig. 10

2. Replace these to 5/16” rings connectors with the supplied 3/8” ring connectors. (Fig.11)

Fig. 11

3. These two wires will need to be connected to the shunt resistor at the battery negative cable post. These wires should be oriented such that they are resting atop the pack negative cable. (Fig. 12, Fig. 13)

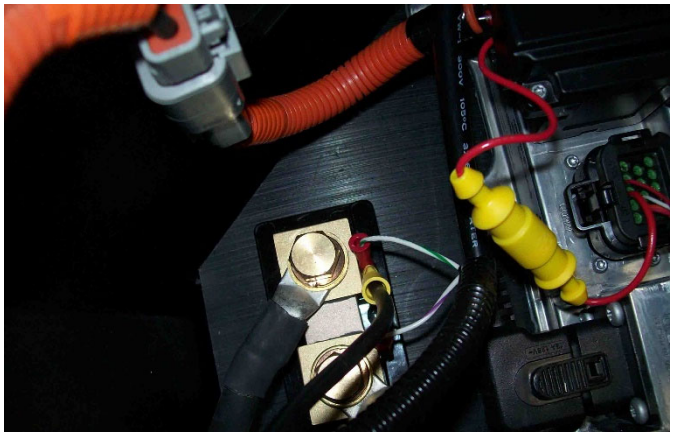


Fig. 12

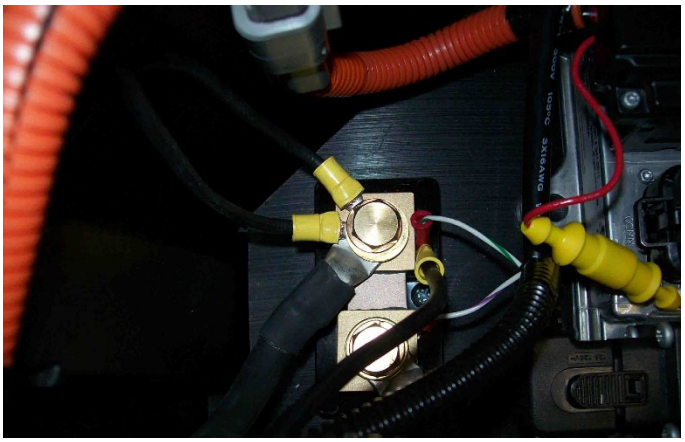


Fig. 13

Battery Charger Interlock

1. The light blue wire with the Delphi connector that was removed from the charging port needs to be connected to the other Delphi connector provided in the HPEVS wiring harness. This will connect the charger from the HPEVS system to the controller. Using the stock connector, the wire that leads to the stock charging port will have to rerouted back to the controller area.

Delphi OEM stock connector

HPEVS supplied connector in wiring harness

Temperature Sensor

1. On the stock wiring harness, you will find a connector for the temperature sensor on the motor. (Fig. 14)

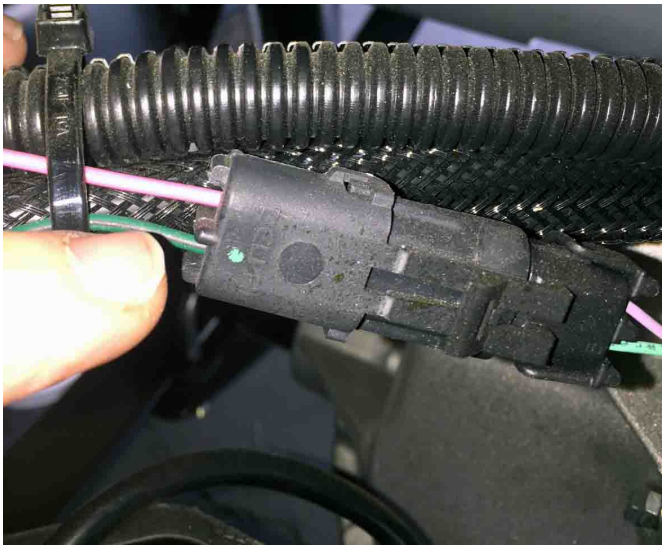


Fig. 14

2. Cut away the green/black wire near the wiring loom. (Fig. 15)

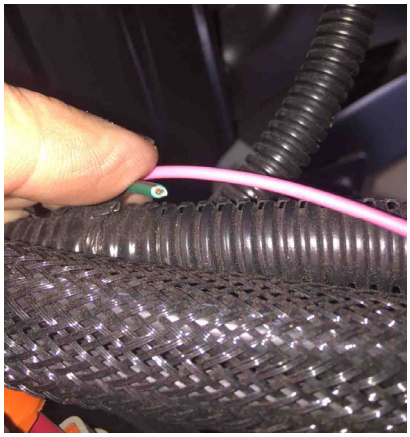


Fig. 15

3. Strip the end of the green/black wire that is leading to the **MOTOR TEMPERATURE SENSOR**. Crimp on the included connector to this stripped wire. (Fig. 16)

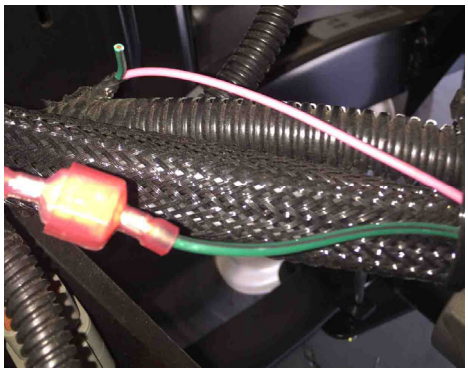


Fig. 16

4. Finally, connect this connector to the green wire connector located within the HPEVS wiring harness. This green wire comes from the ORION BMS and provides ground to the motor temperature sensor. (Fig.17)

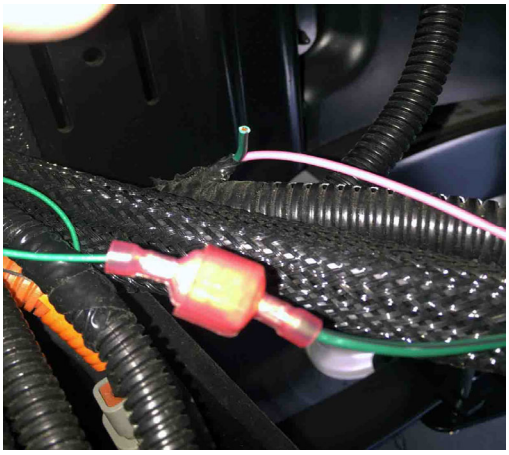
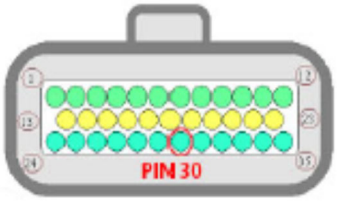


Fig. 17

State of Charge Wiring

1. To display the state of charge correctly from our lithium battery pack to the state of charge meter, the gray wire that is located in pin 30 located in the main 35-pin connector to the Curtis controller has to be removed and connected into the wiring harness from the lithium battery pack.
2. **NOTE: IF THE BATTERY PACK IS BEING INSTALLED INTO AN RXV THAT WAS BUILT PRIOR TO 12-5-09, AND HAS A DANAHER MOTOR CONTROLLER, PULL THE GRAY WIRE FROM PIN #11 LOCATED IN THE 23 PIN CONNECTOR.**
3. Unplug the 35-pin Ampseal connector from the Curtis controller, or the 23-pin connector from the Danaher controller.

FRONT



BACK

4. To remove the wiring pin from the 35-pin connector or 23-pin connector, the red plastic pin capture piece of the connector that locks the connector terminals in place needs to be **pried up ONE CLICK, BUT NOT REMOVED. Warning: if the red connector holder piece is removed, all the wires within the connector will become loose and will have to be re-installed.**
5. Using a small blade screwdriver, or a similar tool, place the blade of the tool between the black body latch of the plug and the red colored body of the plug as shown in the pictures. (Fig. 18 and Fig. 19)

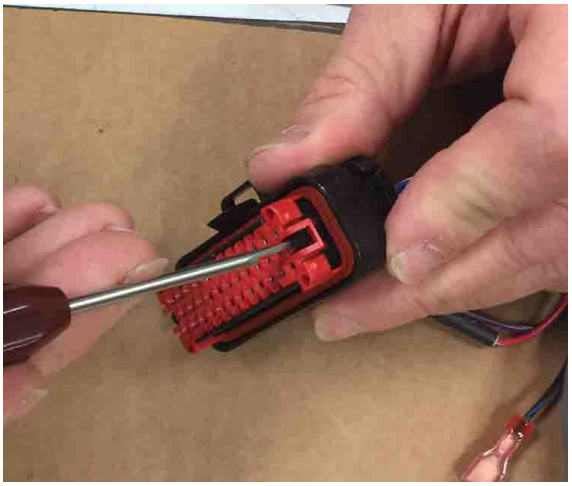


Fig. 18

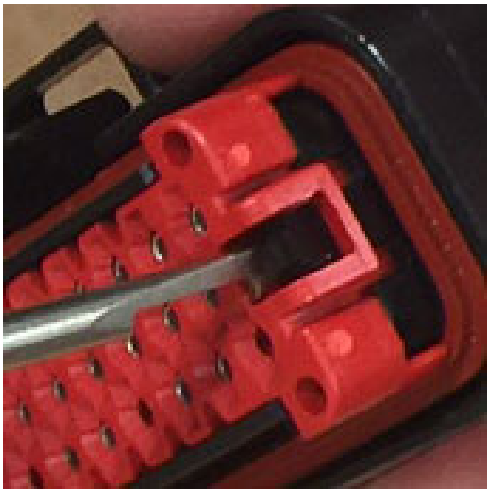


Fig. 19

6. With the blade of the screwdriver in place at this point, slightly twist the screwdriver to pry the black colored tab on the body of the plug away from the red colored pin capture body of the plug. (Fig. 20 and Fig. 21)

Fig. 20

Fig. 21

7. While prying the black plastic tab away from red plastic pin capture portion of the plug, press the red piece up and away from the body of the plug. There will be a single click when the red plastic plug piece is lifted. This is an indication that the pin capture piece is in the correct orientation. (Fig. 22) Do this procedure for both sides of the plug.

MAKE SURE THAT THE RED PLASTIC PIN CAPTURE PIECE ONLY CLICKS ONCE AND NO MORE!

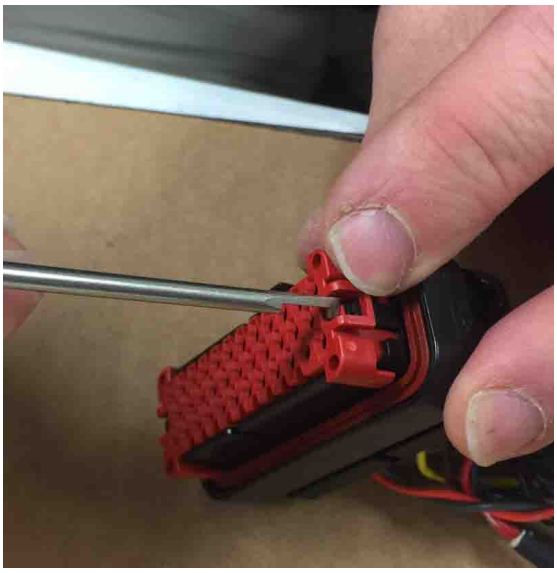


Fig. 22

8. Once completed the plug should look like the following. (Fig. 23) Note the red plastic pin capture piece is not attached to the black plastic tab.

Fig. 23

9. Pull the gray wire from pin 30 location; GRAY WIRE FROM **PIN 11 IF INSTALLING BATTERY PACK INTO EZGO RXV BUILT PRIOR TO 12-5-09 AND WITH A DANAHER CONTROLLER INSTALLED**. To remove the wire, grip the wire and twist it about a half turn then pull the wire out.

10. Reset the red plastic pin capture by pressing this piece back in place. After resetting the red plastic pin capture back into place, look at the plug from the front side and make sure that all the pins are visible and NOT recessed. (Fig. 24)

Fig. 24

11. Plug the 35-Pin or (23-Pin; Danaher controller) Ampseal connector back into the controller.
12. Cut off the pin connector from the gray wire.
13. Strip the end of the wire and install and crimp on the male quick disconnector provided.
14. Plug the gray wire with newly the installed male quick disconnector into the female quick disconnector with a gray wire on the HPEVS supplied wiring harness from the lithium battery pack. (Fig. 25 and Fig. 26)

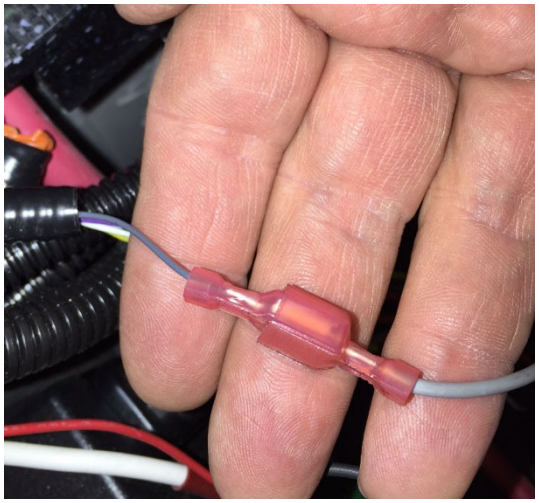


Fig. 25

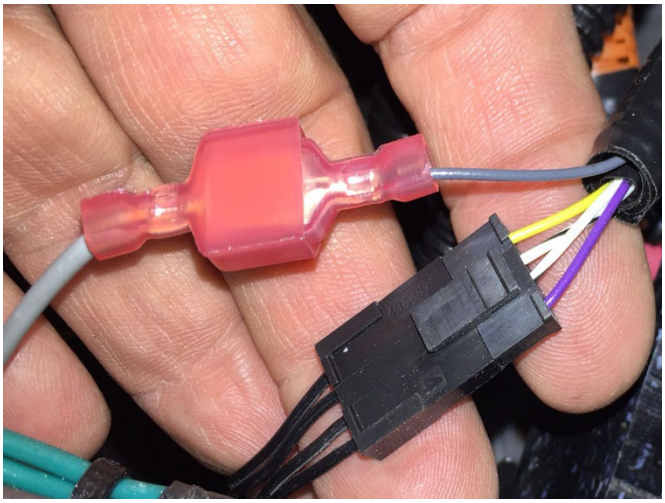
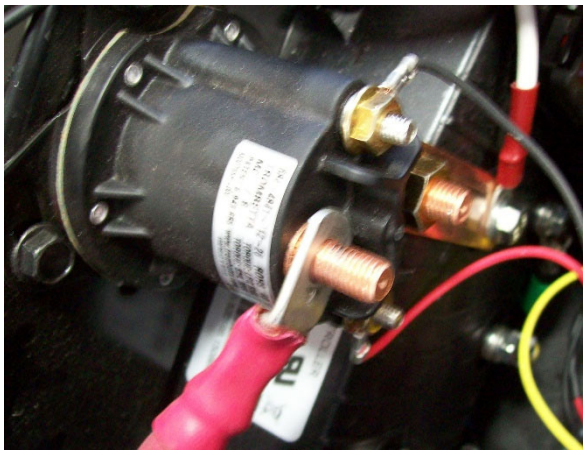
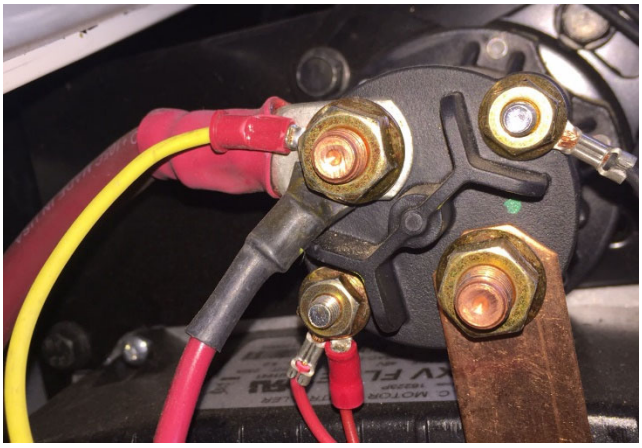


Fig. 26

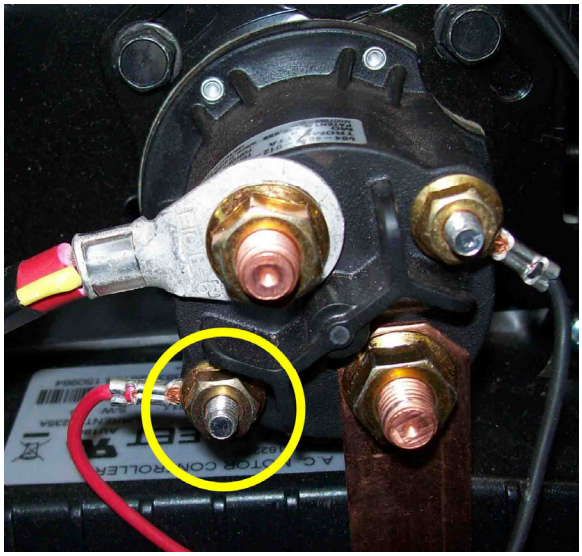
15. Connect the black negative cable coming from the shunt on the lithium battery pack to the B- post on the Curtis controller.
16. Connect the red B+ battery cable and the dc-dc red power cable to the hot side of the contactor as shown; keep in mind the orientation of the lug on the lithium battery pack positive cable. Place the pack positive cable on first onto the contactor post hot side of the coil, then the dc-dc cable and finally the yellow wire that was modified earlier in this document.





Powering BMS with Keyswitch on

1. Using the supplied red wire that has the ring terminal on one side and the quick connector on the other, connect the ring terminal to the hot side of the coil as depicted below. (Fig. 27)



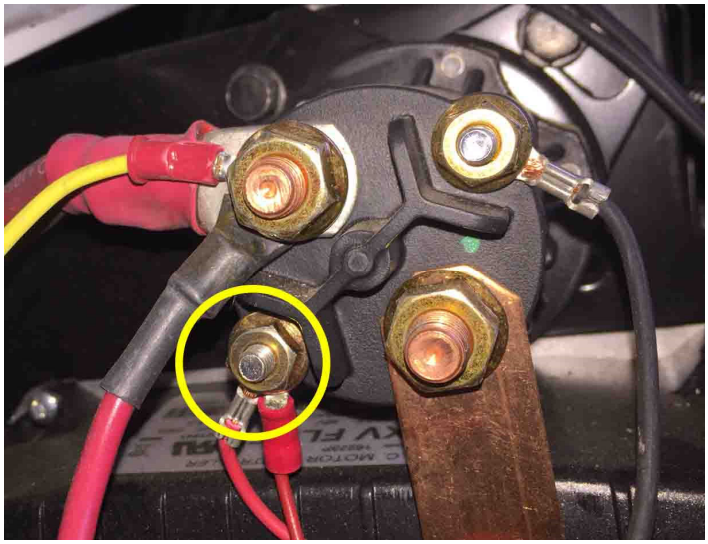


Fig. 27

2. Plug in the quick connector on this red wire to the blue wire that is in the same wire loom as the CANBUS dongle. (Fig. 28)

Fig. 28

Controller Parameter Configuration

1. The Braking resistor control is the only parameter that will need to be changed within the controller. To access this parameter, a Curtis handheld programmer or a Curtis 1314 computer based programming station.
2. The Turn On Voltage parameter is located at System Configuration->Braking Resistor Control in the parameter tree.
3. The Turn On Voltage Parameter needs to be lowered down to **57 Volts**.