

2006 Club Car Precedent Lithium Battery Upgrade

Here is a picture of my cart.



I had upgraded the motor to the 5HP AMD 3294 motor and immediately got 24mph with the stock controller and speed code 4. I have since upgraded the controller to a 400A Curtis 1268-5417. It was a tight squeeze that required the replacement of the hex head bolts on the heat sink with countersunk versions. This would allow the controller to be placed so that the original center cover would fit. But my batteries were getting pretty weak. So, I was contemplating the change to six 8 volt batteries for more power. But I still had to deal with the lead acid batteries and their so-so performance. I found Hybrid Auto Center in Las Vegas with a lithium golf pack offered. The packs are Nissan Leaf. Here is a link to the ad.

http://www.hybridautocenter.com/HAC4/index.php?option=com_hikashop&ctrl=product&task=show&cid=61&name=golf-car-conversion-kit-7kw-h-battery-pack-53v-120ah&Itemid=605

What was obvious to me was that it would not fit in my cart with the configuration shown. After talking with Nick Tranakiev, I ended up purchasing a 'kit' consisting of the basic parts described, but had the lithium modules split into two packs, one with 6 cells and one with 8 cells. This would allow them to be placed in the tubs on either side of the motor control panel in the center. From that point on it was 'home engineer and connect on your own'. Nick was very helpful in answering questions and giving advice about the cell connections and the BMS, but you must have a good knowledge of electrical wiring and schematics to tackle this on your own.

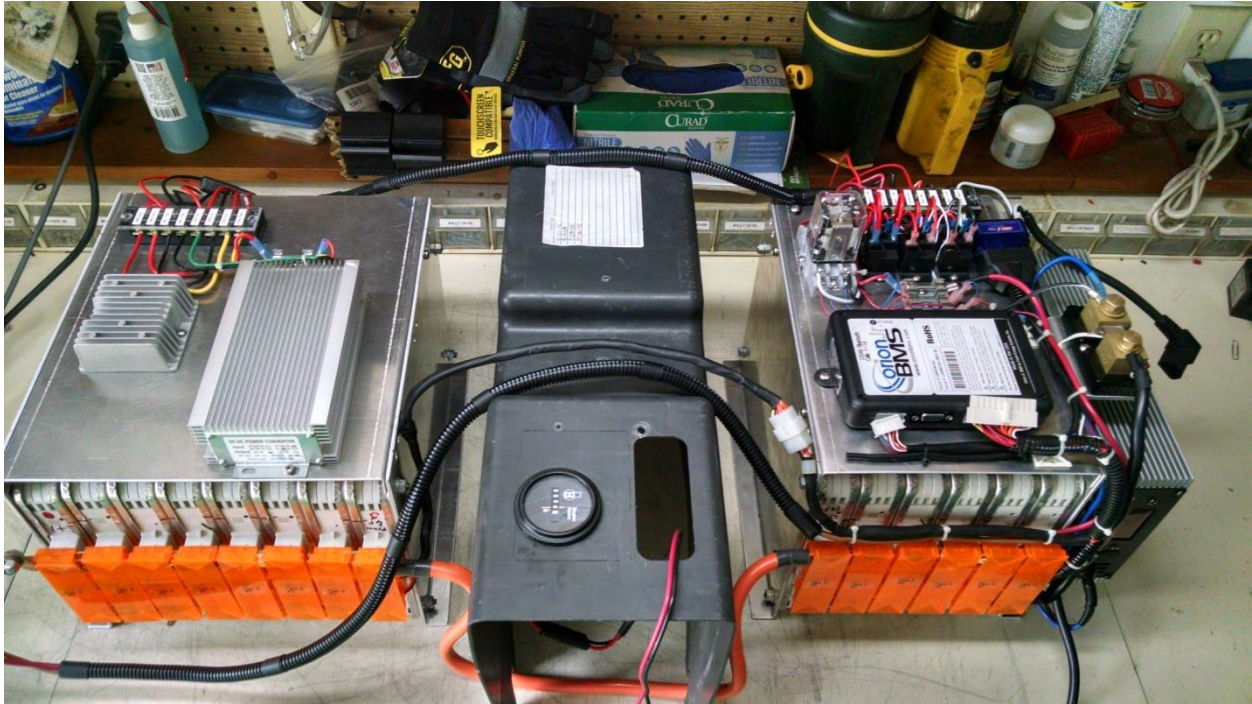
The packs came assembled like this: Just a steel plate on either end with threaded rod and nuts to assemble them. Obviously parts from a standard Nissan Leaf pack.



What I did was create two side panels for each pack, 9 ½" High, 12" long with a ¾" flange break on the 12" side. This flange will be used to secure the pack in the tub of the cart. I then made two top plates, covers with a ¾" flange at each side. One was 10 3/8" x 12" and the other was 8" x 12" The side panels have been drilled to match the pack holes and the threaded rod and bolts reused. I have drilled and tapped the cover plate with a 10-32 tap and secured with (4) 10-32 x ½" screws. You can see the standard battery lift strap installed. I drilled holes thru the sides of the pack brackets at both ends to allow two straps be used to lift the pack (this pack about 70 lbs) The holes you see in the middle were abandoned. I was only going to use one lift point at beginning, but realized that I am also mounting components on these covers, so the middle might be a problem.



Here is a picture of the final product on the bench. You will notice the typical Precedent center controller cover in the picture. I kept it here during the assembly to allow me to make the correct length wiring harnesses. No more OBC, nothing there is needed any longer.



On the Six Pack side you will see that I mounted the charger on the side of the pack bracket. To do this, I drilled and countersunk holes from the inside (pack) side of the bracket and used flat head screws with nuts on the outside, leaving 'studs' to mount the charger on. Secure with nuts and lock washers.

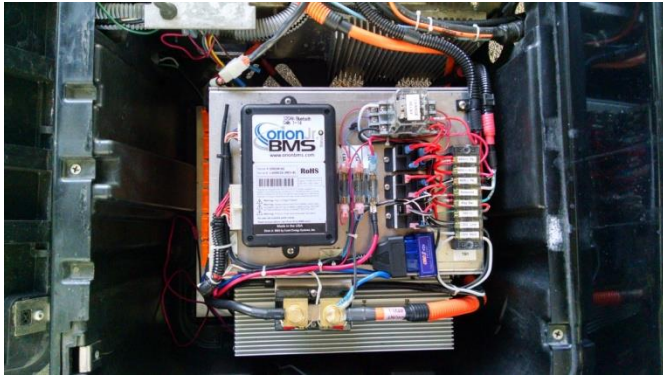
Mounted on top is the Orion Jr. BMS (Battery Management System) Be sure to read the installation and wiring manual thoroughly before wiring. Because the wiring is delicate and needs to be completed and tested prior to placing in the cart, I chose to split the management harness when it passes between packs. This would allow me to install each pack in the cart separately and then plug them together. Mounted above the charger on another bracket is the shunt to measure current for the BMS. Further back are 4 relays. One for Charger Safety, One for Discharge Enable, One for my Accessories power supplies, the Ice Cube relay for the Charger Control and a terminal block.

On the 8 pack, I mounted the 48 to 12V converter for my USB charger outlet and future lights and a 48 to 24V converter for my overhead blower (A/C). They are both powered when the key switch is on and Acc relay picks up.

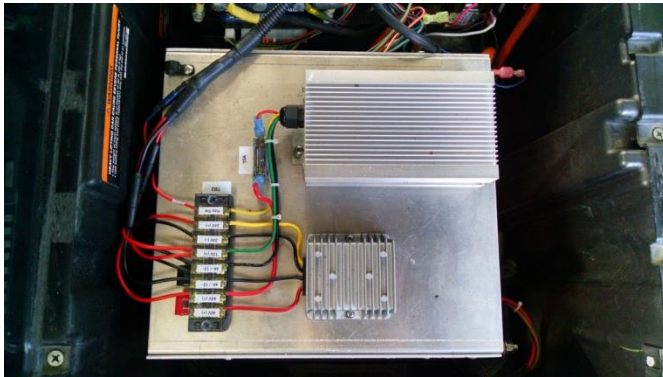
Prior to mounting in the cart, you will have to do some Dremmel work on the tub. The original tub has nubs that stick up in about 4-5 places on each side. I cut them flush with the Dremmel and 1 ½" cutting blade in about 20 minutes. You will then install two aluminum base plates 13 ½" x 14 ¾" I tech screwed them in 2 placed and thru bolted in one, your choice. Once you set the packs down on these base

places you only need to install tech screws thru already drilled holes in the brackets and into the base plates.

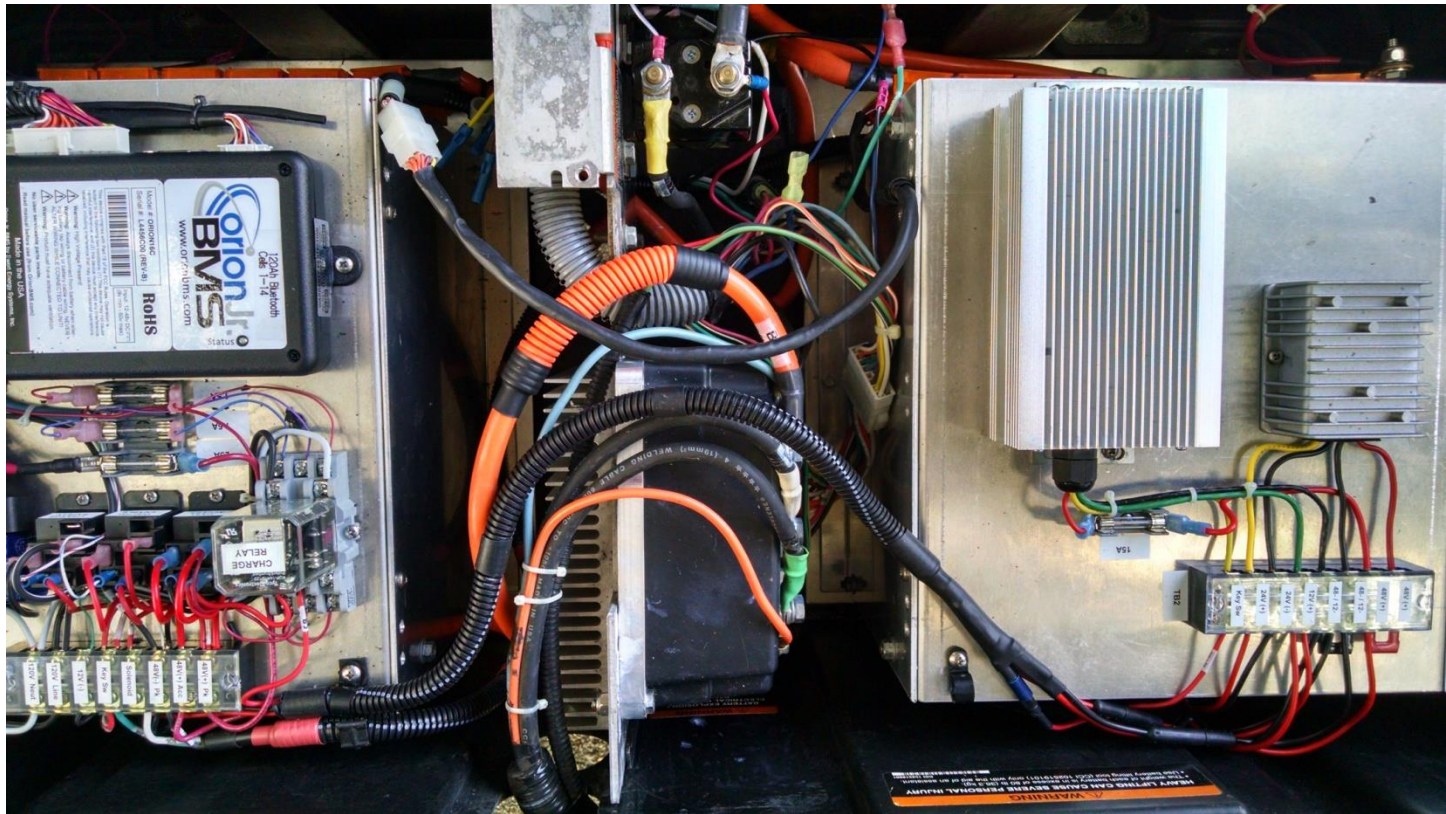
This is the Driver side compartment with the 6 pack installed.



Passenger side installed



All of it, right after power up in the car



There is a harness that connects the two terminal strips. It is on plugs as well as the pack voltage harness described earlier

Here is the best part about the packs, 10 years or more life. Pack voltage is right at 58V. But unlike lead acid batteries whose voltage drops considerably under heavy load, these do not. Typical cart at 50.9 volts will see battery voltage drop to 43-44 under full acceleration. With these it might drop to 56. Same motor and controller now runs 29mph. I am able to tune my controller with a Curtis 1313-4401 Programmer. It is amazing the incredible raw power with just the new packs. Everyone who has driven it comes back yelling 'Holy Sh--!!' Time for some new brakes I think, might go to disc, I need the stopping power. And I use it just for golf, will never have a bad lie now either!!!!
Picture of the charger and shunt mounting



Wiring diagrams the way I did this and a set of these brackets can be provided.