

# Excel/IQ Curtis Controller Mounting (Precedent)

2004~2008.5 IQ, 2008.5~2009.5 TPS, 2009.5~2014 IQ/Excel



Caution! Through out the installation please wear appropriate eye protection! Use jack stands to secure the car while the car is in the raised position. Follow manufacturers suggestions for battery disconnection and re-connection after the job is completed.

## System Parts:

1 #7144 Or 7177 Motor  
1 #996 Or 988 Controller  
1 #29058 Universal Cable Set  
1 #55595 Or 20520 Or 1168 Solenoid  
Solenoid, Motor, Controller is based on choice of Speed or Torque Motor System being used. Choices should be made at the time of the order as this information is for identity only.



6765 Motor Bumper is recommended to reduce motor noise.



Controller



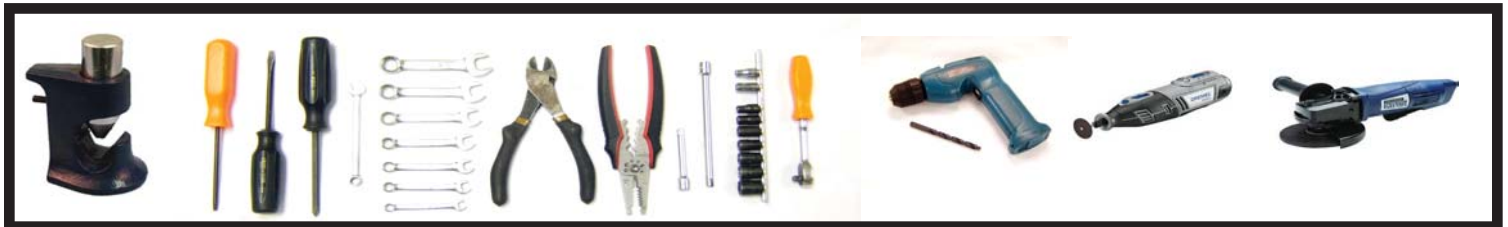
Solenoid



Universal Cable Set



Motor



## Recommended Tools:

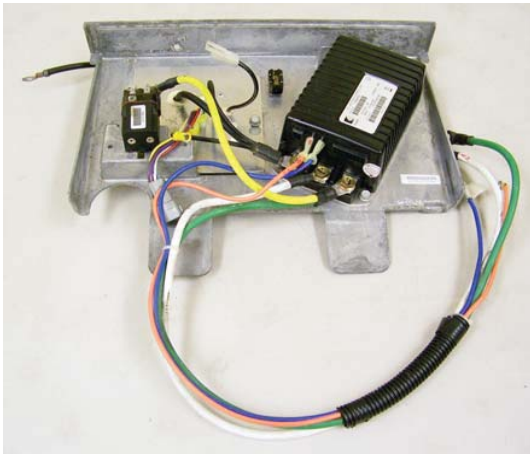
Standard basic hand tools, screw driver, combination wrenches, 1/4" ratchet and sockets, pliers, wire stripper, crimper, drill, drill bits, dremel or like tool with cut off wheel, and a grinder to smooth things out. If you do not have one, a cable crimper is good to have for making your own cables so length is not a problem during the installation. The universal cable kit has 30' of four gauge cable, twenty four 5/16" ring terminals, and 4 MISC ring terminals for other applications. The cable kit also has 7 rolls of colored tape for color coding the cable connections.

Allow 3 to 4 hours for the installation for the first time. Install time will be reduced once you have done one or two.

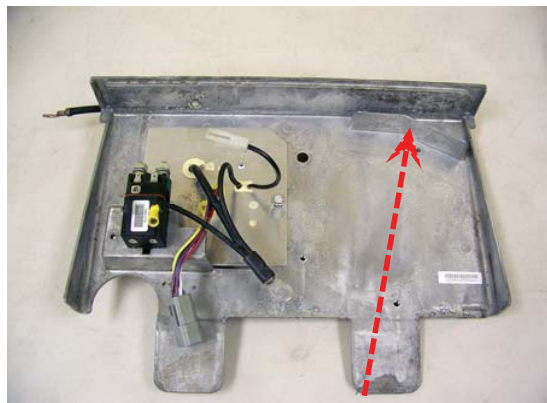
Confirm the correct parts are in the order before starting. Lay all the parts out in an organized manner so the install is easier.

# EXCEL/IQ CONTROLLER MOUNTING Guide

Model Designs Are Different For Older Cars But Mounting Is Similar.



Slide the whole plate out.  
Remove components.



Cut This Protrusion Flat

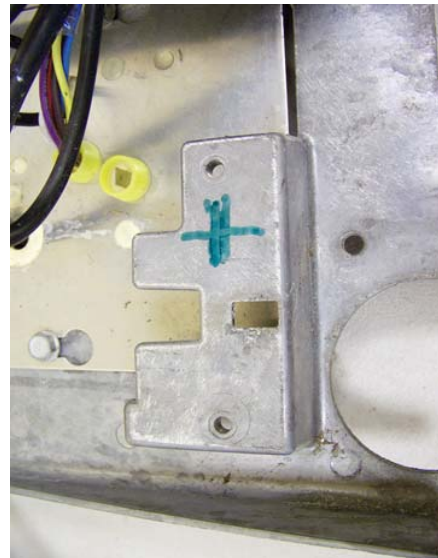
Set Flush To Computer



Bolt the controller into place with 3 1/4" screws and nuts. Then remove the controller and flip the mounting bracket over then put the controller back onto the three holes and bolt it. Then drill the fourth hole.



Cut this protrusion on the back side so the fourth controller mounting bolt will fit. Do not cut the whole protrusion just enough for the nut to fit.



Mark the solenoid mounting area and use 1/4" self tapping screws for mounting.

## About This Speed/Torque System

This speed/torque system is designed specifically for Club Car Excel/IQ Motor Systems. If you are unsure of your golf car system type, please see our catalog or contact our technical department. During the installation of this system you will be upgrading three major electrical components from your golf car, with three high performance components in our Speed/Torque System. These parts are: the motor, the controller, and solenoid. All of your electrical connections will be made between these components and the battery pack. You should allow about 4 hours for installation.

Thank you for purchasing our exclusive Speed/Torque System. We take great pride in our products and feel certain that this system will offer you many years of trouble-free service. We ask that you take a moment to read these instructions completely before beginning your installation. Familiarity with the parts and an understanding of the procedures will ensure that your installation goes smoothly and safely. Additionally, it will give you an opportunity to determine if your car might have any damaged, corroded, or missing parts which will need replacing prior to using your new Speed/Torque System.

Throughout this installation, we will be discussing the connection of #4 heavy gauge cables to several different electrical components. Some cables will be attached to threaded lugs or "terminals". An understanding of each of these cable connections is important. Let's cover the threaded lugs and terminals. You will notice these lugs/terminals utilize a set of double nuts to hold the cable terminal firmly in place. Typically, a cable terminal and a washer will be sandwiched between these two nuts. An open-end wrench of the appropriate size should be held on the bottom nut, while use of an opposing wrench relieves the threaded lug of excessive stress and eliminates the possibility of damaging the insulators at the base of these lugs. Failure to use the opposing wrench technique on double-nutted lugs can permanently damage the component. Again, these insulators at the base of the connection points are fragile and subject to damage, if handled improperly. Insulator damage at these electrical contact points will void the warranty for that component. Tech Tip: All power cables must be of four gauge size stranding with neoprene covering.

Tech Tip: Now is a good time to clean the batteries with a solution of 1 cup of baking soda and 1 gallon of water. Rinse completely and allow time for drying. Battery terminal posts should be refaced with tool P/N 6270. Nut torque is 90 to 100 inch pounds.

# Electric Motor Instructions

Since 1989, golf car and utility manufacturers have used a number of different motor/rear axle configurations. For the most part, the process of removal and installation is the same. Safety is a concern, so follow these instructions carefully.



**Caution!** The electric drive motors used in these vehicles are very heavy! Use great care when removing them, as this process could pose a danger for a sprained back, smashed fingers, broken toes, or other severe injuries!



**Caution!** If the car is equipped with a Run/Tow switch, always turn the switch to the tow position first. Then disconnect the main battery power connections to the car.

## Motor Removal:

1) Each motor terminal is marked with an ID, such as A1, A2, ETC. Take a moment to make sure the heavy motor circuit cables are clearly marked regarding their original connection markings. To remove the motor circuit cables from the motor, you will need two wrenches: one to remove the nut securing each cable and one to hold the nut under each cable connection. Figure A.

Note: Always hold the bottom terminal nut in place to prevent the terminal stud from turning in the motor housing. If the terminal stud turns, internal motor damage could result! Make sure this nut is tight before installing the cable.

2) Some motors are also equipped with smaller gauge wires and a plug exiting the motor end cap. If the motor is so equipped, depress the lock tab and separate this plug.

3) Most drive motors are held in place using three (3) bolts through the rear axle gear case and into the drive motor. Locate and remove these three bolts. Most Club Car models are equipped with one additional bolt and "L" bracket, which is found under the motor, but just above the axle tube. Some motors do not require this bracket and bolt to be re-installed. Three bolts are all that is needed.

Note: Before lifting the motor from the rear axle, be sure the motor is not oily or greasy, your hands are clean and dry, and use proper lifting posture. The motor is extremely heavy and you need to be careful when handling it.

4) Position yourself carefully over the motor, grasp it firmly, and wiggle it while pulling away from the rear axle housing. The motor should slip free from the rear axle input shaft and is now free from the axle and will drop quickly. Be aware of that sudden drop and grasp the motor firmly. You can also use a belt or some sort of strap to assist in motor removal.

5) Clean the housing area and apply a small amount of thick grease to the input shaft. Do not install too much grease! Install in reverse order.

**"It is the motor manufacturer's recommendation, to achieve optimum performance the motor needs to be run (or broken in) at 1/2 (half) throttle for a minimum of 10 minutes". This allows for proper brush seating prior to full throttle operation!**

## Indemnification And Insurance Agreement

High Performance Enhancement Kit purchaser assumes sole and entire responsibility for, and shall indemnify and save harmless Nivel LLC, from any and all claim, liability, responsibility, and persons or property that may be sustained in connection with the use of any product before or after purchase, including but not limited to high performance enhancement motors. The High Performance Enhancement Kit purchaser also shall indemnify Nivel LLC harmless with respect to any and all liability that may be incurred.

Golf Cars are recommended for use only by those aged 16 and older. Golf cars can be especially hazardous to operate. Always remember that riding and alcohol/drugs don't mix. Never ride on public roads. Never carry more than two passengers (except shuttles and trams). Never engage in stunt driving. Avoid excessive speeds and be particularly careful on difficult terrain. Nivel LLC reserves the right, at any time, to discontinue or change specifications, prices, designs, features, models, or equipment without notice and without incurring any obligation.



Double Wrench Method



Remove Bolts

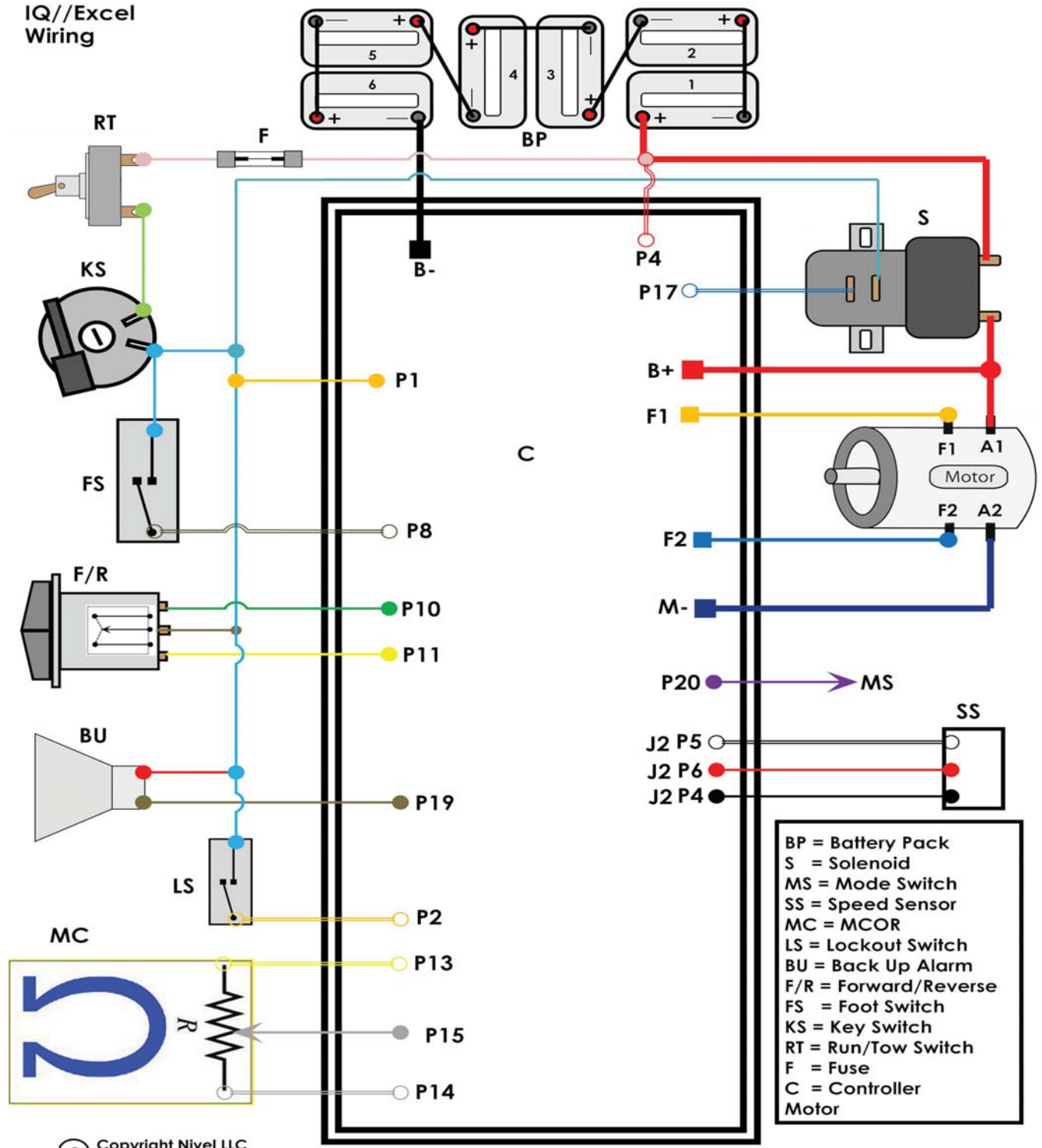


Grasp Motor Firmly



Belt Or Strap

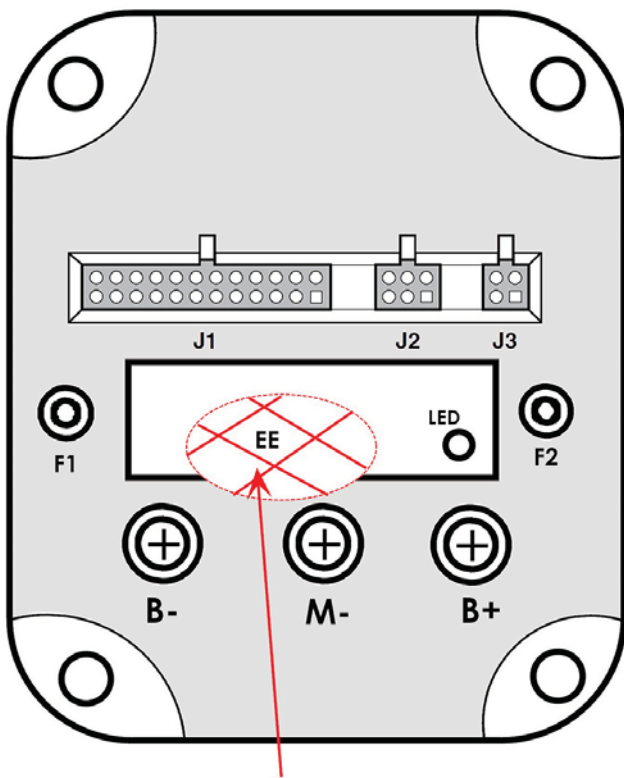
**IQ//Excel  
Wiring**



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P1 is Keyswitch KSI  
 P2 is Computer Lock Out  
 P4 is Positive Input  
 P5 @ J2 Pin is Speed Sensor Input  
 P6 @ J2 Pin is Speed Sensor +15 V  
 P4 @ J2 Pin is Speed Sensor Ground  
 P8 is Foot Switch  
 P10 is Forward  
 P11 is Reverse  
 P13 is Pot High  
 P14 is Pot Low

P15 is Pot Wiper  
 P17 is Solenoid Negative  
 P19 is Back Up Buzzer  
 P20 is Mode Switch



Do not route cables over the EE area. This can interfere with sensitive electronic components.

Torque values for cable mounting is as follows:

Field Screws = 12 ft-lbs

Power Bolts = 15 ft-lbs

The bolts and screws cannot exceed the following lengths:

Field Screws = 5/8" depth (M6 X 1)

Power Bolts = 3/4" depth (M8 X 1.25)



Connect 24 pin connector and 6 pin connector into appropriate receptacle. The 4 pin receptacle is for the programming lead that routes to the dash. It is an option at pin 20 to add a lead wire to a dash mounted switch for M2 controller mode. The M2 mode switch is used for slowing the car for golf course usage or adding torque for off-road usage. This is an optional feature.

Technical Note: The last year of the IQ system was 2012. However, for the last 5 weeks of 2012 you can find the newer version of (Excel). The difference from 2009.5 to 2012 is you can have a black controller or a gray controller. 2012 last week of 5 can be a white controller as used in 2013 and 2014 models. The controller we are using will work on all models from 2009.5 to 2014. However, some modifications will be required for the newer white version. You cannot use the original speed sensor circuit. The newer interface adapter will have a lead long enough to reach the speed sensor. So if you are missing that longer lead call for a replacement.

As with any installation please wear eye protection! Remove all power cables completely from the car. Disconnect all activation wiring connected to the controller, motor, solenoid, computer (if used) and run/tow switch. Some spots may require cutting zip ties. Once all cables (leave computer cable in place) and wiring is removed then lift the controller bracket straight up and out of the battery tub. You can now lay the entire assembly on a work table for removal of the controller, solenoid and perform the machine work mentioned on page two.

Now remove the drive motor as shown on page four. As mentioned before, use the two wrench method to prevent damage to the old parts. You may want them at a later date for some other project. Clean all areas and check for any loose or damaged parts that support the components you just removed. Make sure the brakes/steering are in working order as you are gaining speed and we want at this point make sure things are working correctly.

Mount all the new components and install the controller bracket assembly back into the car. First begin with the lay out of the power cables. Go to page 5 this is the actual wiring for the system.

Starting from battery number one positive terminal measure a length of power cable that will reach to one of the solenoid large terminals. Remove insulation from the cable taking care not to cut into the wire stranding. Crimp a 5/16" ring terminal on both ends of the cable. Mark the cable ends with red tape for identity purposes. Do not connect to the battery at this time. But go ahead and connect the cable to the solenoid finger tight as some small activation wires will be added later to the same terminal. Move to the other large solenoid terminal. Measure a length of cable that will reach the motor A1 terminal. Install 5/16" rings terminals and crimp. Color code with red tape. Also on that same A1 motor terminal measure a length of cable to the controller B+ terminal. Using the two wrench method tighten the solenoid and motor connections. Then tighten the B+ connection as per specifications on page 6.

From the A2 connection measure and length of cable to M- on the controller. Install 5/16" ring terminals and crimp. Use blue tape to color code this cable. Tighten the connections using the double wrench technique.

Locate in the power wiring you removed a orange and a blue 10/12 gauge wire. Cut the ends off that has the .250" faston connectors. Crimp on a 1/4" 10/12 gauge ring terminal. Connect one end of the orange wire to F1 on the motor. Connect the other end to F1 on the controller. Connect one end other blue wire to F2 on the motor and F2 on the controller. Tighten the controller screws as per page six. Tighten the motor connections using the two wrench method. 5/16" nuts torque to 100 inch pounds and 1/4" nuts torque to 45 inch pounds.

Go to the battery pack negative number 6 battery terminal. Measure a length of cable that will reach B- on the controller. Install 5/16" ring terminals on each end and crimp. Use black tape for color coding or none at all. Do not connect this cable to the battery pack at this time. Install the other end to B- only finger tight as some activations wires may be added later.

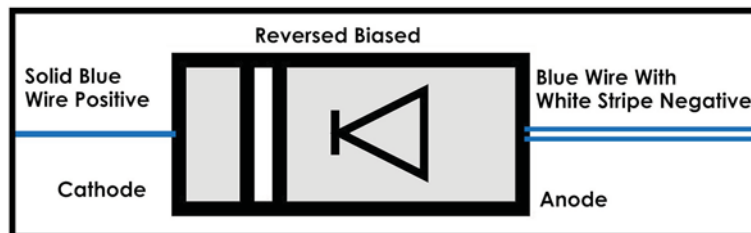
If the car uses a computer, notice a six gauge cable is routed though it. Just leave it there and mount it to the same to connection points you made the negative cable for at B- and number six negative battery terminal. It is okay to have that double cable. You do want the one cable to go through the computer. The power circuit is now complete.



When crimping place tool on solid backing like concrete or metal. Center ring tube with striker and hit solidly with hammer.

**Activation Wiring:** At the solenoid positive side large terminal connect the pre-existing small pink wire from run/tow switch. On some cars that wire is red. Just understand all positive wires with a 5/16" ring terminal connects to the positive side of the solenoid large terminal. Notice on the old solenoid there was a resistor across the large solenoid terminals. Do not reuse the resistor as it is not required for this System. Torque the large terminals to 80 inch pounds. At B- on the controller you will see a 12 gauge computer black wire and some model a small black 16 gauge wire. Both wires have a 5/16" ring terminal and connects to B- as they did on the old controller. Tighten B- bolt as per specification listed on page 6.

**Solenoid:** The old solenoid had a diode across the small terminals and is polarity sensitive! Attention must be observed when connecting the solid blue positive and the blue wire with white stripe (negative from controller driver). Some solenoids have a pre-existing diode soldered in place. The solid blue positive wire must connect to the diode end with the white band (Cathode). The blue wire with white striped connects to the Anode end which is solid black.



**Pin Outs For 16 Pin To 24 Pin Interface:**

**24 Pin Wire Colors As They Appear Going Into The Connector And Connect To The Controller.**

This is a plug and play and no wires should require moving. This for trouble shooting should the need arise.

- J1 Pin 1 = Orange and is Key Switch input (KSI)
- J1 Pin 2 = Orange/White is Computer Lock Out (Positive Input)
- J1 Pin 4 = Red/White is Battery Positive Input (Logic Power)
- J1 Pin 8 = Green/White is Foot Switch (Throttle Switch Input)
- J1 Pin 10 = Green is for Forward Mode (Positive From F/R Switch)
- J1 Pin 11 = Yellow is for Reverse Mode (Positive From F/R Switch)
- J1 Pin 13 = Yellow/White is for Potentiometer High (+5 Volts)
- J1 Pin 14 = Gray/White is for Potentiometer Low (Negative)
- J1 Pin 15 = Gray is for Potentiometer Wipe (Wiper)
- J1 Pin 17 = Blue and shown as Blue/White is a Negative input to solenoid coil (Neg)
- J1 Pin 19 = Brown and is for Back Up Alarm (Negative Input)
- J1 Pin 20 = Purple and is optional Mode 2 Switch for mode selection (Switching)

At this time confirm all connections and torque all connections. Connect to the battery pack with run/tow in the tow position. If you see a hugh arc stop and recheck your wiring! Place run/tow in the run position. Test drive car and confirm all systems are working as the should.