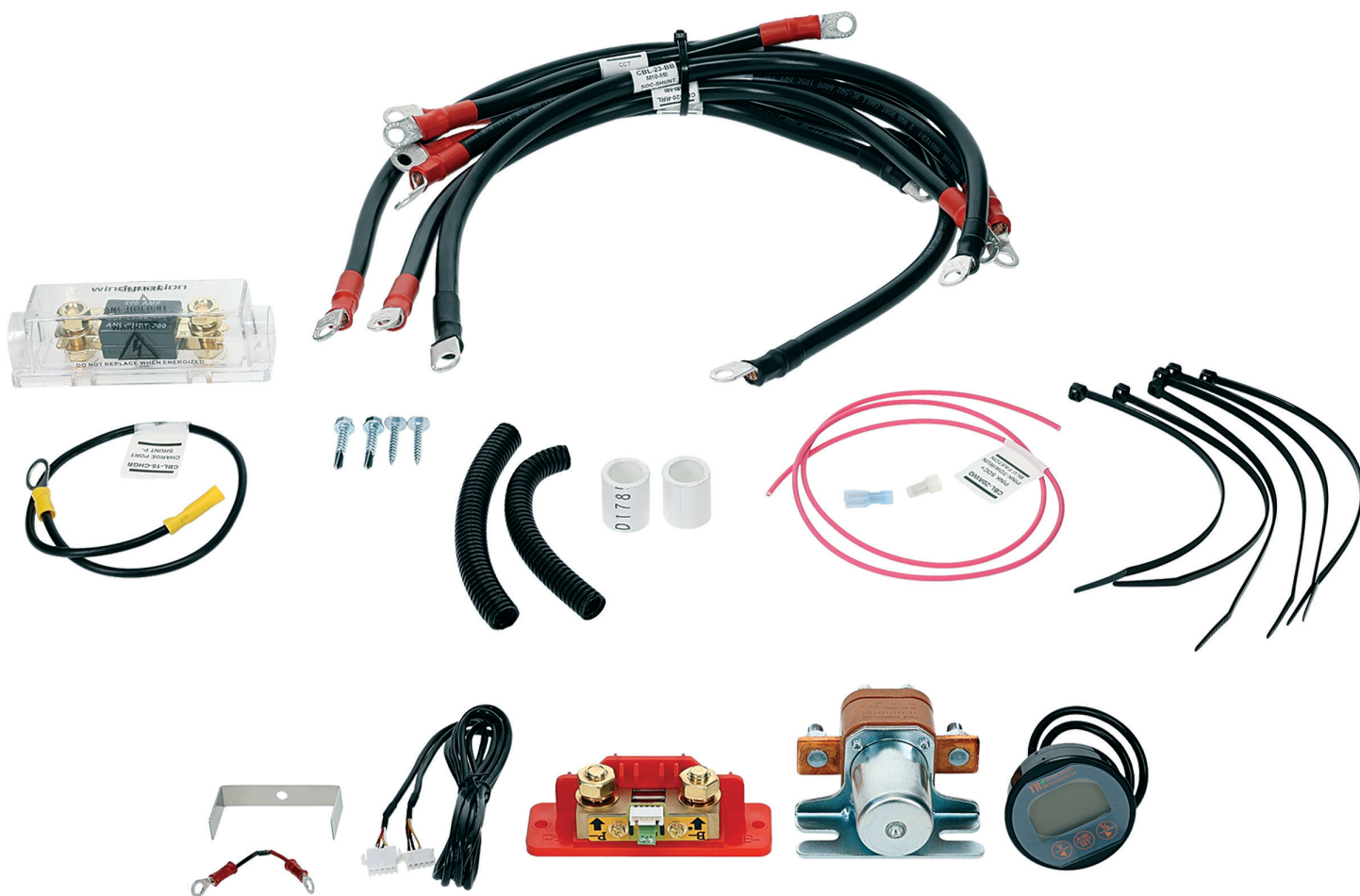




BAT-3105

Club Car Precedent 2004-2008.5
Lithium Battery Pack Installation Kit
(4) 12V LiFePo4 Batteries

INSTALLATION INSTRUCTIONS



Caution: Please read through the instructions carefully. Before starting this project, remove the system's positive (+) and negative (-) connections from the battery pack. Look behind each drill location **BEFORE YOU DRILL**. (i.e. drilling into a wiring harness, battery etc.). Installer is responsible for damage if instructions are not followed properly.

Batteries: This kit is designed to replace (4) 12V lead acid batteries in the Club Car Precedent, 2004-08.5. Different battery mounting components may be required if the cart has (6) 8V batteries.

On Board Computer (OBC): The OBC cannot be used with lithium batteries and must be bypassed in order to use this kit. The CGR-123 Bypass Kit (sold separately) can be used to bypass the OBC.

Charger Warning: **DO NOT USE LEAD ACID GOLF CAR CHARGERS.** Only use the approved charger(s) recommended in the battery manufacturer's Operator's Manual. Affix the supplied Caution Label just above the charger port to ensure only approved LiFePo4 lithium chargers can be used.

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Tools Needed for Installation

- Deep Well Socket: 1/2"
- Magnetic Socket: 5/16"
- Sockets: 8mm, 10mm, 17mm
- Drill
- Ratchet Wrench
- Wire Cutters
- Wire Strippers
- Wire Crimpers
- Screwdriver (Flat Head, Jeweler's Flat Head)
- Small Pick
- Lifting Aid for Batteries
- Safety Glasses
- Gloves Rated to Protect Against Battery Acid Exposure
- Foaming Engine Cleaner or Similar for Neutralizing and Cleaning Battery Acid
- Marking Device Suitable for Dark Plastic
- Digital Voltage Meter



Contents of Kit

BATTERY CABLES (2 AWG)							
Qty.	Length	From	Terminal and Heat Shrink Color		To	Terminal and Heat Shrink Color	
1	6"	-12V on Battery	5/16"	Ring BLK	SOC Shunt (B-)	3/8"	Ring BLK
1	9"	Solenoid (+) OUT	5/16"	Ring RED	Controller (B+)	5/16"	Ring RED
1	12"	+12V on Battery (Cross Tie)	5/16"	Ring RED	-24V on Battery (Cross Tie)	5/16"	Ring BLK
1	12"	+36V on Battery (Cross Tie)	5/16"	Ring RED	-48V on Battery (Cross Tie)	5/16"	Ring BLK
1	16"	+24V on Battery	5/16"	Ring RED	Fuse Block	5/16"	Ring RED
1	20"	+48V on Battery (Use Loom)	5/16"	Ring RED	Solenoid (+) IN	5/16"	Ring RED
1	23"	SOC Shunt (P-)	3/8"	Ring BLK	Controller (B-)	5/16"	Ring BLK
1	29"	Fuse Block	5/16"	Ring RED	-36V on Battery (Use Loom)	5/16"	Ring BLK

CHARGE PORT NEG (-) EXTENSION WIRE (10 AWG)					
Qty.	Length	From	Terminal and Color		To
1	15"	OEM Charge Port Neg (-) (Black Wire)	Butt Splice	YEL	SOC Shunt (P-)
					3/8" Ring

STATE OF CHARGE (SOC) METER TO TOW / RUN SWITCH					
Qty.	Item	From	Notes	To	Notes
1	34", 20 AWG Wire, PINK	SOC Shunt	Strip End 1/4" (~5mm)	OEM Pink Wire on TOW / RUN	Strip End 1/4" (~5mm)
1	Blue Spade Connector, Female, 14-16 AWG	TOW / RUN (PINK Wire)		34", 20 AWG Wire, PINK	Shipped Loose
1	End Splice Connector, Female, 14-16 AWG	TOW / RUN (PINK Wire) (Alternative Option)		34", 20 AWG Wire, PINK	Shipped Loose

ADDITIONAL COMPONENTS		
Qty.	Description	Part #
1	Fuse Holder (ANL/ANN)	
1	Fuse, 200A, 72V, for BAT-12100-01 Battery Pack	
2	#8 x 1" Self Tapping Screws, Flat Head	
1	Heavy Duty Solenoid, 200A, 48V JCC-200	SOL-1021
1	Coil Suppression Diode, 3A	CON-004
1	State of Charge (SOC) Meter, 350A, 80V	
1	SOC Meter Shunt, 350A, 80V, 10mm Terminal	
2	#12 x 1" Self Tapping Screws, Hex Head	
2	1/2" PVC Pipe Spacer x 1.0" Long	
2	3/8" Split Loom, 4" Long	
6	Zip Ties, 8" Long, Black	
1	Printed Instructions	
1	Controller Settings Chart for BAT-12100 Battery Pack (Amp Volt Limits)	

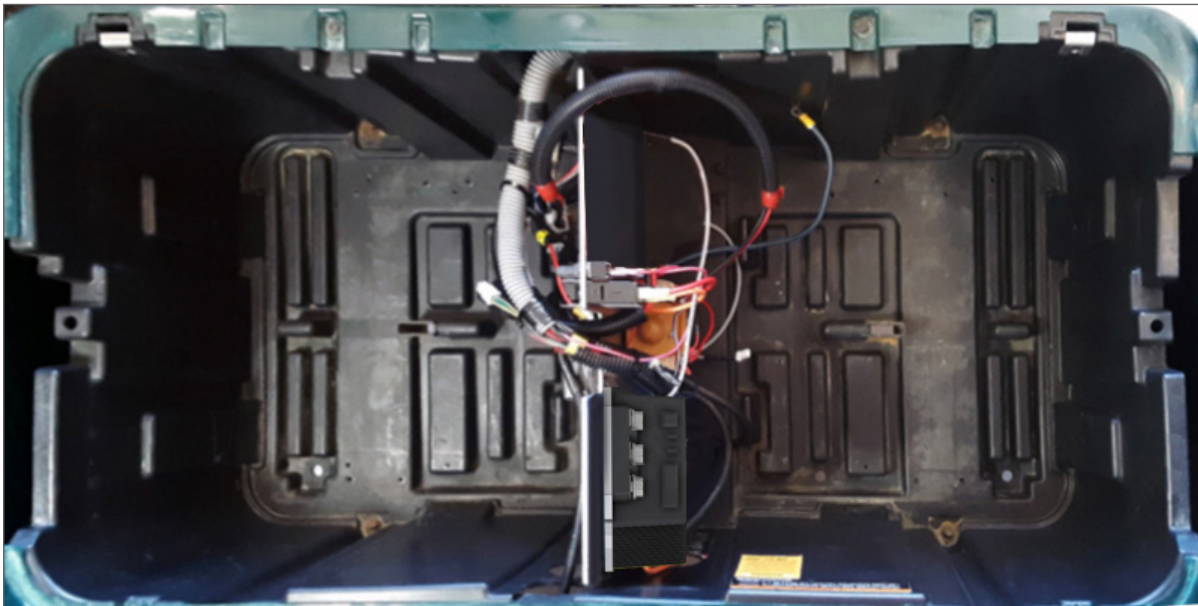
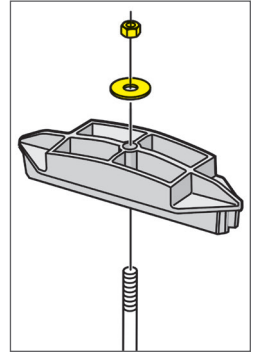


Remove Lead Acid Batteries and Clean Battery Compartment

1. Turn Key OFF.
2. Engage parking brake.
3. Place Tow/Run Switch in Tow.
4. With the cart in Tow, use a voltage meter to identify which terminal on the Tow/Run Switch is OFF. This wire is normally pink in an OE configuration. Label that wire.
5. Remove the system's positive (+) and negative (-) connections from the battery pack.
6. Remove the main battery pack's fuse.
7. Remove the battery hold down brackets using a 1/2" deep well socket. Retain brackets, hold down rods and hardware for reuse.

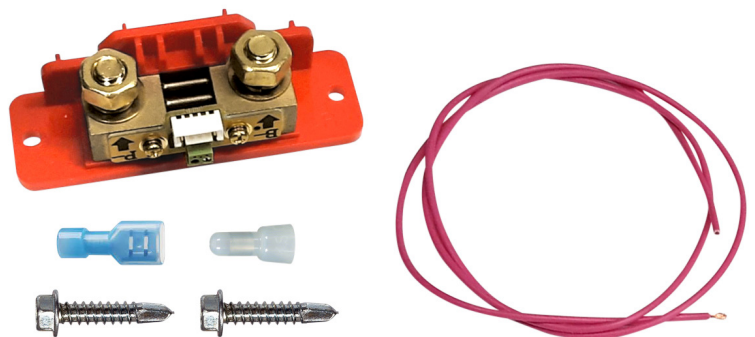
NOTE: Clean or replace any corroded rods.

8. Carefully and safely remove the (4) 12V batteries and cables. They will not be reused.
9. Clean and remove any debris from the battery tray. A foaming engine cleaner can be used to neutralize the battery acid and clean the compartment.



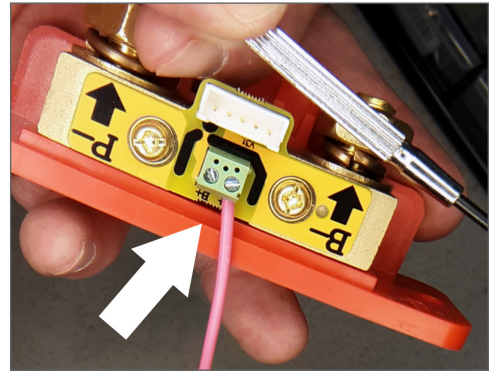
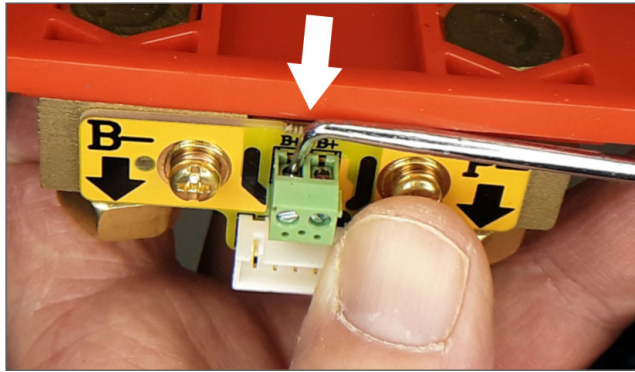
Install State of Charge (SOC) Shunt

1. Identify the SOC Shunt, (2) #12 x 1" Self Drilling Screws, (1) 34", 20 AWG Pink Wire, (1) Blue Spade Connector and (1) End Splice Connector.



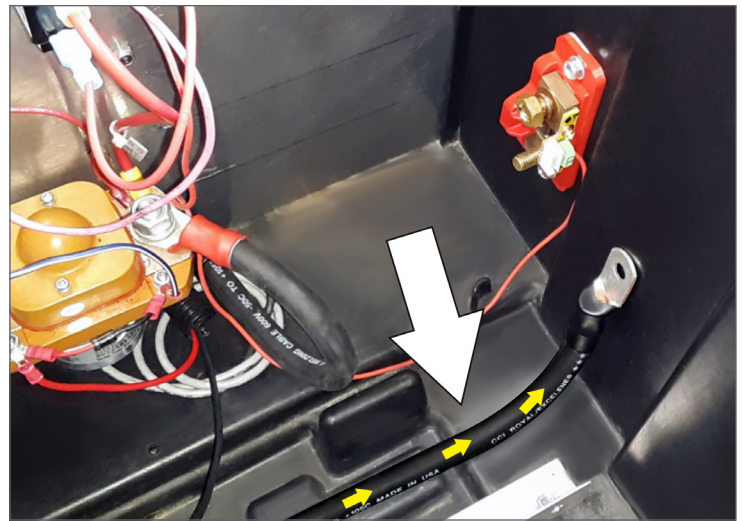
2. Carefully loosen (1) screw on either of the (B+) terminals on the SOC Shunt using a jeweler's screwdriver. Use a pick to open the hole by sliding the tab out of the way, as shown.
3. Insert (1) stripped end of the 34", 20AWG Pink Wire into the (B+) terminal that was opened in Step 2 and tighten the screw.

NOTE: Please review the manufacturer's SOC Instruction Manual for details.



4. Locate (1) 23" 2AWG Battery Cable included in the kit. Connect the 5/16" ring terminal (smaller of the two ring terminals) to the "B-" terminal on the controller.
5. Route the rest of the 23" battery cable along the bottom of the battery bucket as shown, towards the approximate mounting location of the SOC shunt.

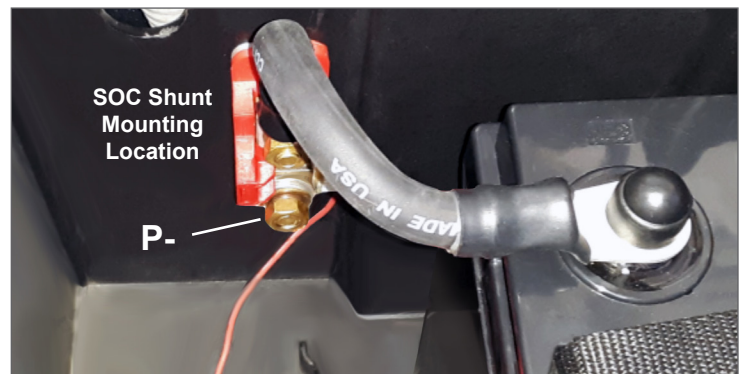
NOTE: Do not mount the SOC shunt yet. It is shown for illustrative purposes.



6. Following the diagram on page 8, place (1) 12V Battery (BAT-12100) in the passenger side, front location. When oriented correctly, the negative terminal will face inwards.
7. Locate (1) 6" 2AWG Battery Cable included in the kit. Loosely install the 3/8" ring terminal to "B-" on the SOC shunt. Loosely install the 5/16" ring terminal to the negative (-) terminal on the 12V battery.
8. Place the SOC shunt vertically, on the front wall of the passenger side battery compartment, just in front of the battery, as shown.

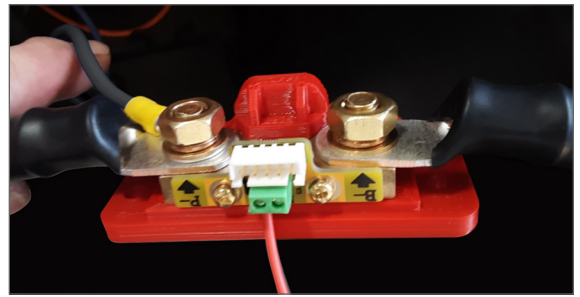
NOTE: When orientated correctly, the "P-" terminal on the SOC shunt will be on the bottom and the 6" 2AWG battery cable will be relaxed and curved down to the shunt's presumed mounting location.

9. Once the SOC shunt is in the desired location, use a marking device to mark the mounting hole locations. The battery cable can be moved out of the way for clearance.
10. Move the shunt away from the wall. Use a drill with a magnetic 5/16" socket and (2) #12 Self Tapping Screws, to start the (2) holes. Do NOT mount the shunt yet.

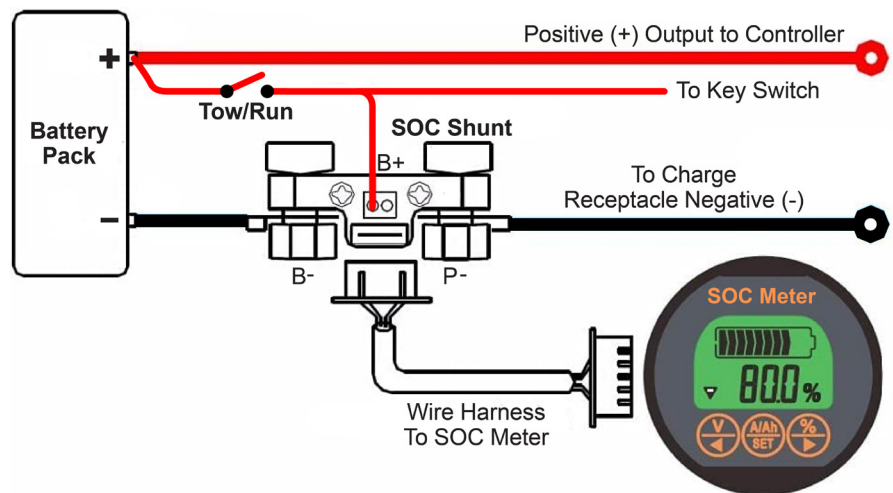


11. Disconnect the 6" 2AWG battery cable from the battery and remove the battery.
12. Following the diagram and the steps below, connect the remaining wires to the "P-" terminal on the SOC shunt.

NOTE: Multiple wires may be attached to the "P-" terminal and it may look like the photo to the right.



13. Locate the 23" 2AWG Battery Cable that was connected to the controller in Step 4. Connect the end with the 3/8" ring terminal to "P-" on the SOC shunt.
14. Locate the OEM wire that goes to the charger receptacle's negative (-) port. If this wire can reach the "P-" terminal on the SOC shunt, skip to Step 15. If the wire cannot reach, connect the included 15" 10AWG Extension Wire to the OEM charger receptacle's negative (-) wire using a crimping tool. Run the end with the 3/8" ring terminal to the "P-" terminal on the SOC shunt.
15. If installing a voltage reducer, connect the negative (-) wire from the reducer to the "P-" terminal on the SOC shunt.
16. Install the SOC shunt to the wall in the battery compartment using the (2) #12 Self Tapping Screws. Hand tighten.
17. Using a socket wrench, carefully tighten the 17mm nuts on the SOC shunt.

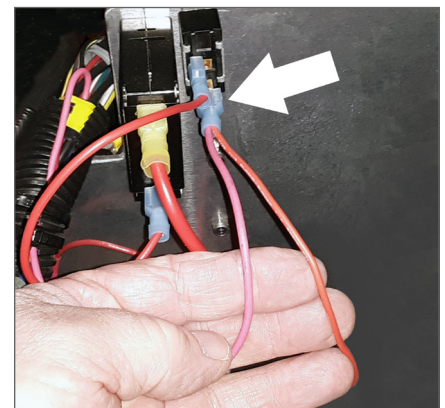


18. Locate the Tow/Run wire identified in on Page 4, Step 4. This wire would be OFF when the Tow/Run Switch is in Tow. In an OE configuration, it is normally pink. Unplug the pink wire from the Tow/Run switch and cut off the spade connector. Splice the pink wire from the "B+" terminal on the SOC shunt with the pink Tow/Run Switch wire using a wire crimper and a 14-16AWG Blue Spade Connector included in the kit. Connect the wires to the Tow/Run switch and leave the switch in Tow.

NOTE: The SOC shunt meter is powered all of the time with the Tow/Run switch ON. It consumes very little power, but must be installed before the key-switch in order to store energy charge and discharge data to memory.

NOTE: In an OE configuration, the Tow/Run switch is located on the driver side of the center panel. The Tow/Run switch was moved for convenience in the car shown to the right. It can remain in the OE location.

ALTERNATIVE OPTION: If connecting the pink wire to the Tow/Run switch using a spade connector is not possible, splice the wires using the included End Splice Connector.



Install ANL Fuse Holder

1. Following the diagram on page 8, place (1) 12V Battery (BAT-12100) in the passenger side, rear location. When oriented correctly, the positive terminal will face inwards.
2. Locate the ANL fuse holder and remove the fuse if pre-installed.

CAUTION: Do NOT install the fuse until instructed to do so.

3. Locate (1) 16" 2AWG Battery Cable included in the kit. Loosely install one side of the cable to the ANL fuse holder. Connect the opposite side to the positive (+) terminal on the 12V battery.
4. Locate an area on the rear wall of the battery compartment to mount the fuse holder. The placement should allow the battery cable to rest in a relaxed position as shown. Use a marking device to designate the area.

NOTE: The fuse holder in the kit may vary from the one pictured to the right.

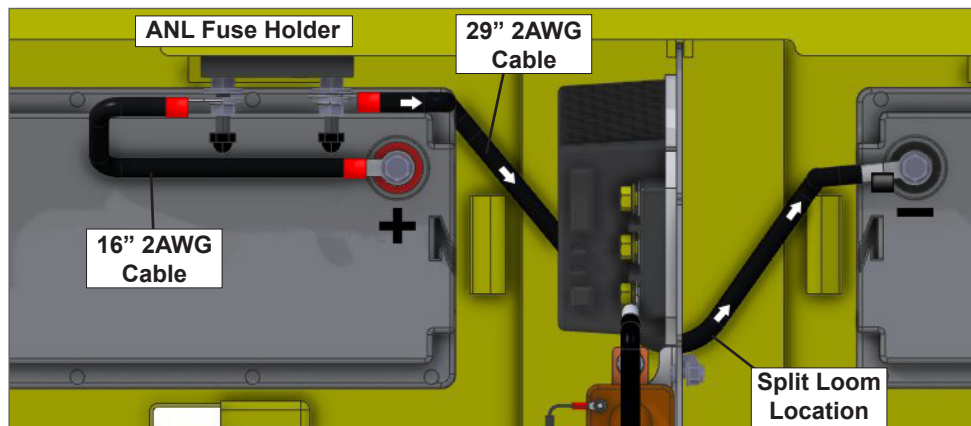
CAUTION: Look behind the mounting location to ensure it is free of other components (i.e. brake lines, electrical wiring or other critical components). Installer is responsible for damage.



5. Install the fuse holder to the rear wall of the battery compartment using (2) #8 x1" Self Tapping Screws.

CAUTION: Do NOT install the fuse until instructed to do so.

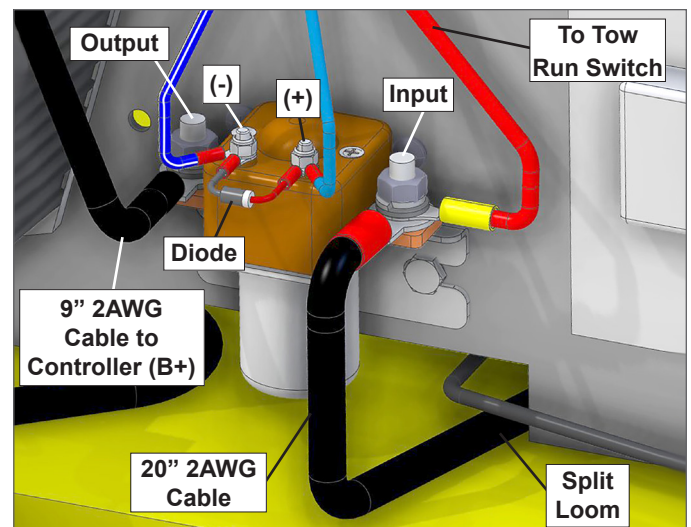
6. Following the diagram on page 8, place (1) 12V Battery (BAT-12100) in the driver side, rear location. When oriented correctly, the positive terminal will face outwards.
7. Locate (1) 29" 2AWG Battery Cable and (1) 4" Loom included in the kit. Place the loom on the center of the battery cable. The loom will protect the cable as it passes under the power panel.
8. Connect the end with the red heat shrink (29" 2AWG battery cable) to the ANL fuse holder on the empty post. Route the rest of the cable under the power panel, towards the rear driver side of the compartment. Connect it to the negative (-) post on the battery placed in Step 6.



Install Solenoid

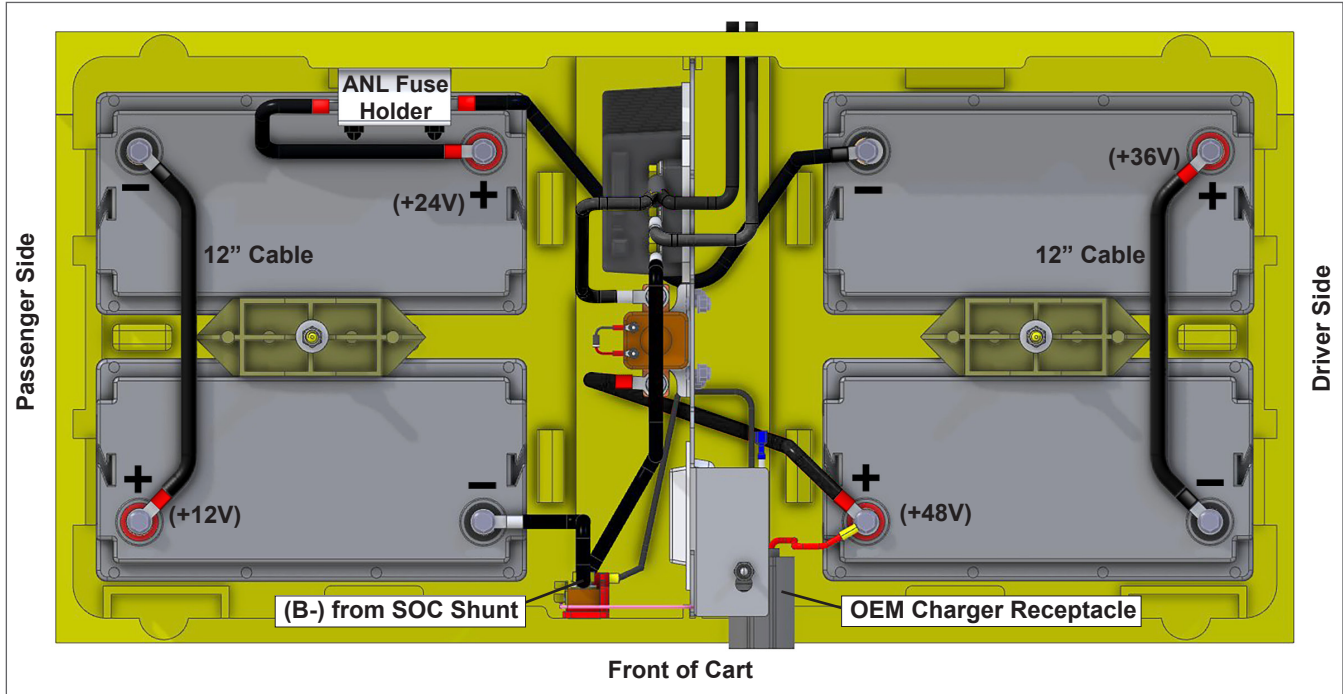
1. Install the new solenoid and connect the leads in the same position as the one removed, with the exception of the main battery cables because they will be replaced. A 200A solenoid is included in the kit, but a 400A solenoid can be used as an option.
2. Locate (1) 9" 2AWG Battery Cable included in the kit. Install one end to the solenoid output terminal. Connect the other end to (B+) on the controller.
3. Locate (1) 20" 2AWG Battery Cable and (1) 4" Loom included in the kit. Place the loom on the battery cable. The loom will protect the cable as it passes under the power panel.
4. Install one end of the 20" cable to the solenoid's input terminal. This is the same terminal with a red 12AWG wire feeding the Tow/Run switch. Run the opposite end under the power panel.

5. Install new diode to small terminals on the solenoid with the hot side being closer to the larger input terminal as shown. Connect the light blue factory wire to the positive (+) side and the dark blue and white wire to the negative (-) side.



Install Batteries

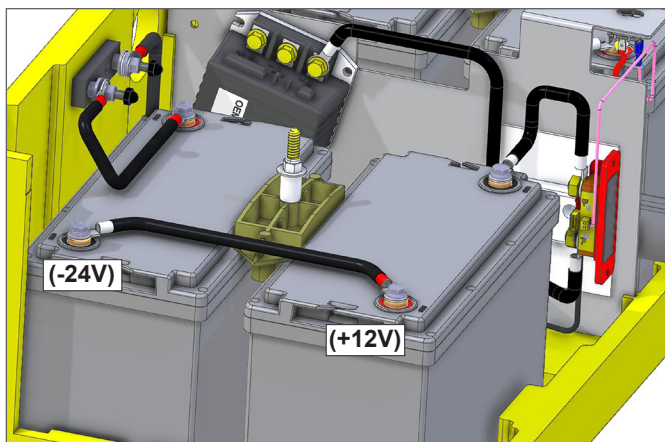
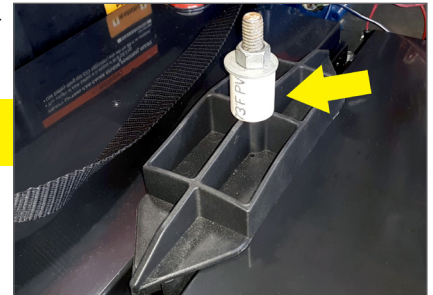
- Place the remaining batteries as shown in the diagram below, paying attention to where the positive and negative terminals are positioned.



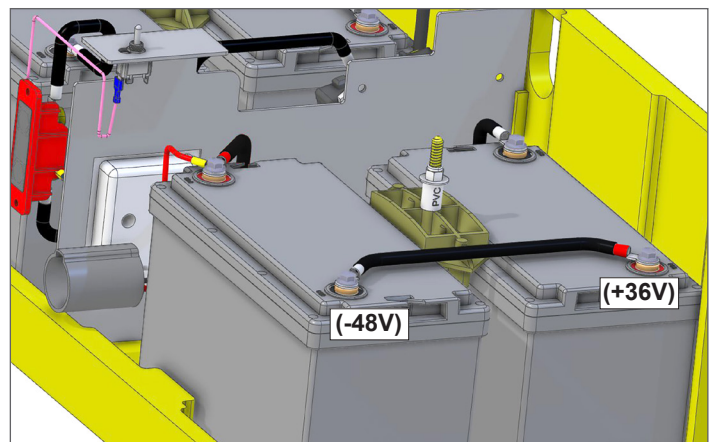
- Install both OEM battery hold down plates using the (2) Original Hold Down Rods, Nuts and Flat Washers along with (2) Included PVC Spacers. If new battery hold down plates are needed, they can be purchased as Red Hawk part BAT-2015.

CAUTION: Do NOT over tighten. These are lightweight batteries. They cannot slide around when secure.

- Locate the (2) 12" 2AWG Battery Cables and place them as shown above. The side with the red heat shrink will go on the positive (+) terminals.
- Connect the 6" 2AWG Battery Cable from the (B-) terminal on the SOC shunt to the negative (-) terminal on the first battery as shown above.
- Connect the 20" 2AWG Battery Cable from the solenoid and the red wire from the OEM charger receptacle to the positive (+) 48V terminal on the last battery as shown above. If installing optional SB-50 connector, do so at this time (page 10).
- Tighten all battery cables using the torque requirements in the battery's Operator Manual. Do NOT over tighten.



Passenger Side Detail



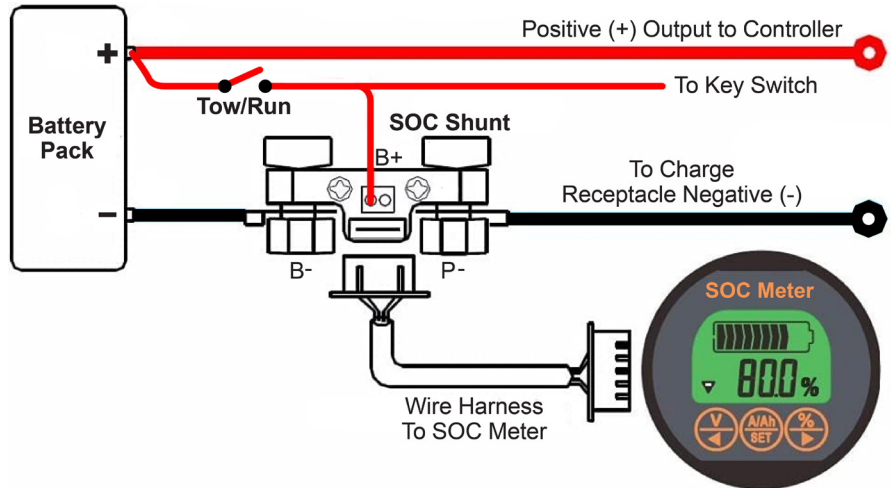
Driver Side Detail

Install State of Charge (SOC) Meter, Dash Mount

1. Find a location on the dash to mount the SOC meter.
2. Mount the meter and connect the wire harness to the meter per the instructions included with the SOC meter.
3. Run the opposite end of the wiring harness under the cart and towards the SOC shunt within the battery compartment. Use cable ties to secure the harness to the frame or other structures so it is out of the way of pinch points or areas where it could get damaged or pulled.

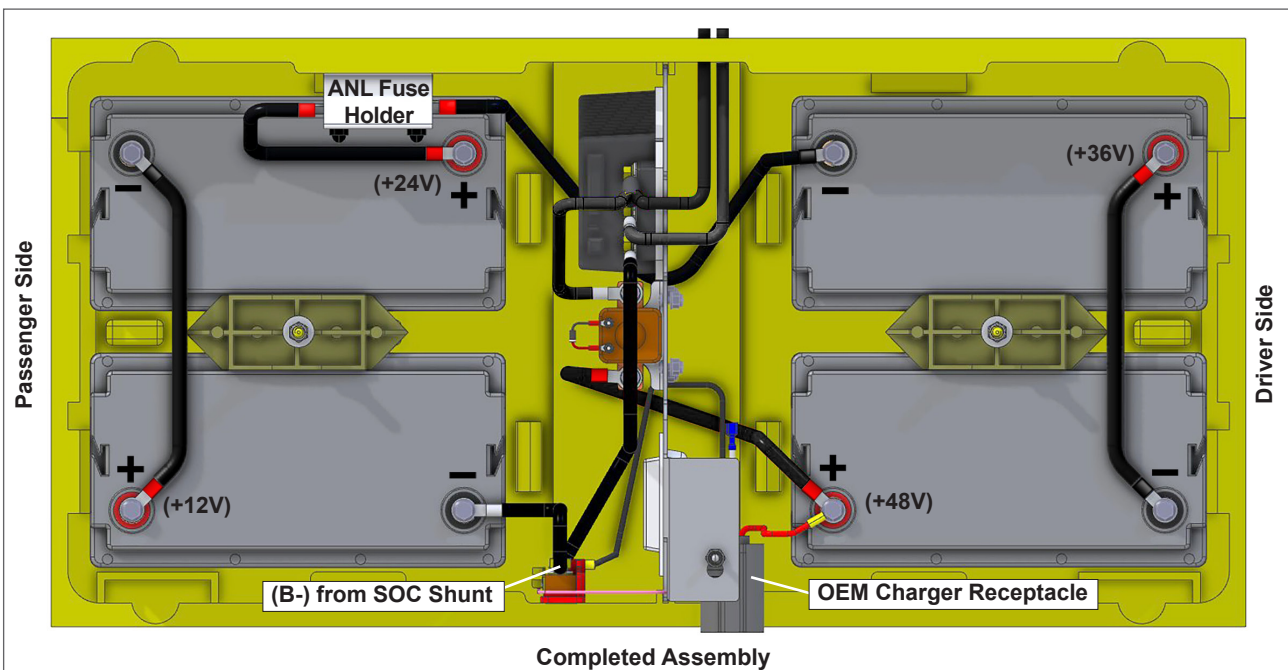
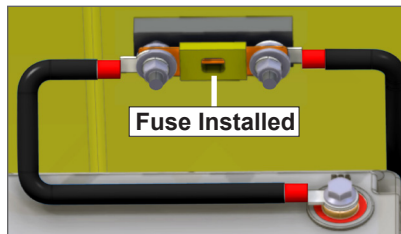
CAUTION: Do not zip-tie any SOC wires to any high power cables. High power noise can cause SOC reading errors.

4. Connect the wire harness to the SOC shunt as shown in the diagram. Secure loose wires with wire ties.



Complete Assembly

1. Verify all components and connections are correct and hardware is tightened according to instructions.
2. Install the ANL fuse in the ANL fuse holder per the instructions or diagram included with the fuse holder, using the Included Hardware. Leave the pre-installed cables sticking out of the ends of the fuse holder so the cover can be placed on top of it.
3. Tighten the nuts on the ANL fuse holder according to the manufacturer's torque specifications. Do NOT over tighten.
4. Snap the ANL fuse holder's cover over the fuse and cables.



5. Use a digital voltmeter to verify all connections and the total voltage of the pack.
 6. Check the charger receptacle's voltages and the battery pack's main negative (-) to the positive (+) 48V terminal for the correct polarity and voltage. The reading should be above +48V. Lithium batteries will generally read +52V static and not fully charged.
 7. Place Tow/Run Switch in RUN.
 8. Turn the Key-Switch ON to verify the motor and controller work, but do NOT drive it until the battery pack is fully charged.
 9. Turn the Key-Switch OFF.
 10. Connect the charger for the first time and allow it to fully charge before driving the cart.
- NOTE:** The SOC may not read correct on the first charge cycle. Once driven, the SOC will learn the discharge to charge curve.
11. When the pack is fully charged, see the SOC Manual for instructions on how to "Reset to Full".

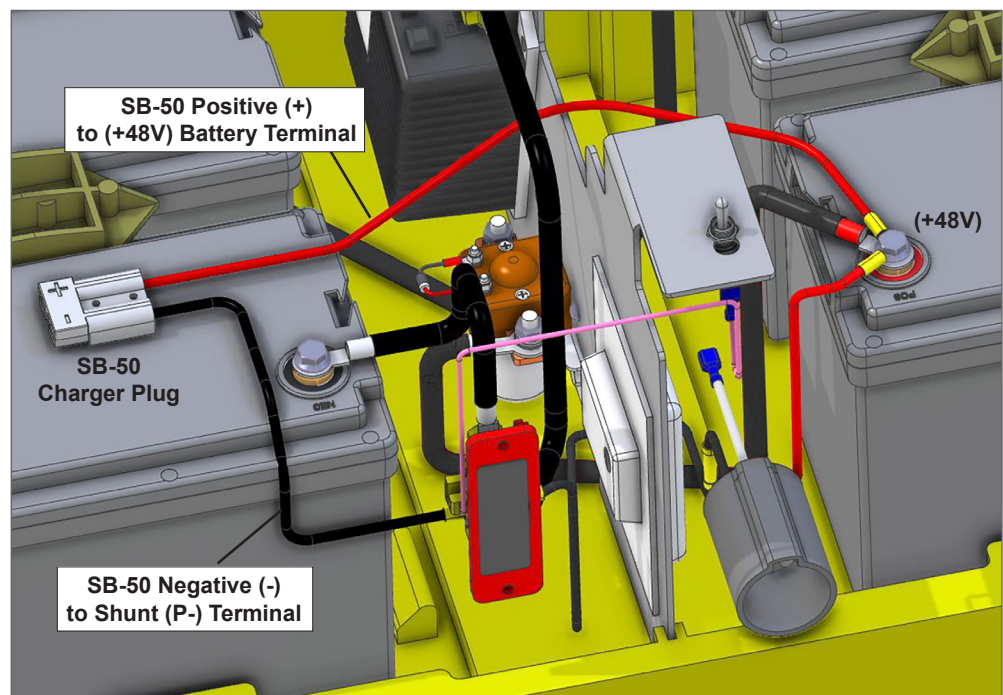
Optional: Install SB-50 Charger Plug (Sold Separately)

1. Connect the positive (+) wire from the SB-50 charger plug to the positive (+) 48V battery terminal.

NOTE: Add a 4" split loom (not included) to the positive (+) wire where it intersects the power panel to protect it from abrasion or use cable ties to tie it to the cart's wire harness and away from any rub points.

2. Connect the negative (-) wire from the SB-50 charger plug to the SOC shunt's (P-) terminal.

NOTE: The diagrams in this manual show both OEM charger receptacle and optional SB-50 charger plug.



Optional: Install Voltage Reducer (Sold Separately)

CAUTION: A voltage reducer (sold separately) is required if installing additional accessories that are not rated for any voltage over the maximum battery pack's voltage. Operating these accessories at a voltage higher than specified will result in damage. Refer to the battery manufacturer's manual and the accessory manufacturer's manual for details and specifications.

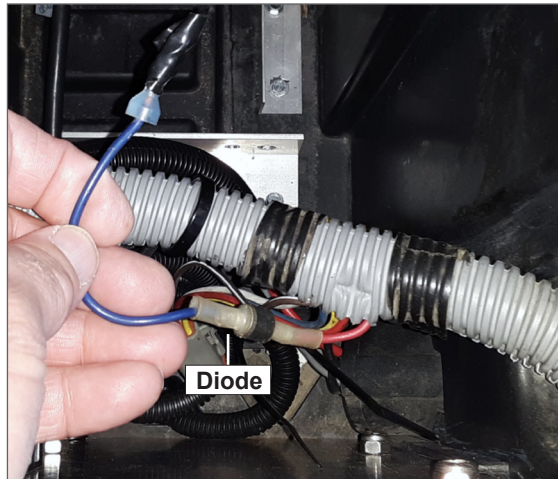
CAUTION: All voltage reducers installed must have an in-line 15A fuse. It is also recommended accessories have separate in-line fuses.

1. Connect the positive (+) input wire from the voltage reducer to the positive (+) input terminal on the solenoid (larger terminal).
2. Connect the key-switch activation wire (if applicable) to the smaller positive (+) coil terminal on the solenoid.
3. Connect the negative (-) wire from the voltage reducer to the SOC shunt's (P-) terminal.

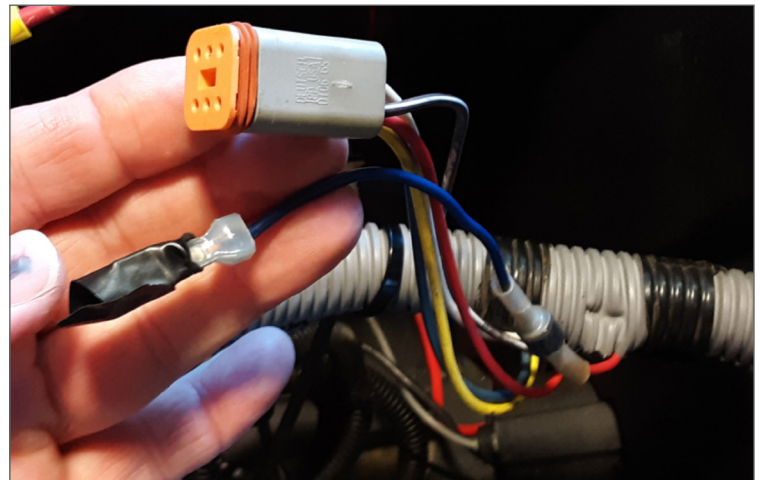
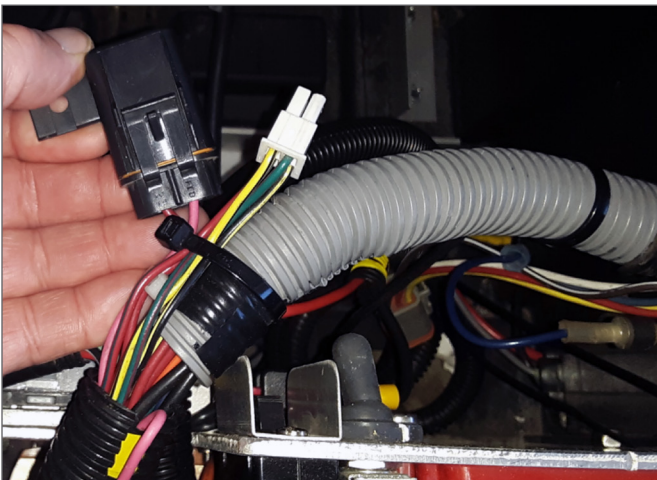
Notes on On-Board Computer (OBC)

The OBC was bypassed and removed in the photos shown below. The battery charger for lithium batteries is NOT controlled by the OBC so the OBC can be bypassed and removed. The OBC would normally charge the batteries and control the Tow/Run switch. The procedure described moved the red/pink wire to the positive (+) 48V battery terminal along with the positive (+) cable from the solenoid.

NOTE: An OBC bypass kit can be purchased separately as Red Hawk, CGR-123.



The 4-pin Molex and 6-pin Deutsch connectors are not used, however, the fuse provides protection to the pink wire in the Tow/Run circuit.



Notes

