



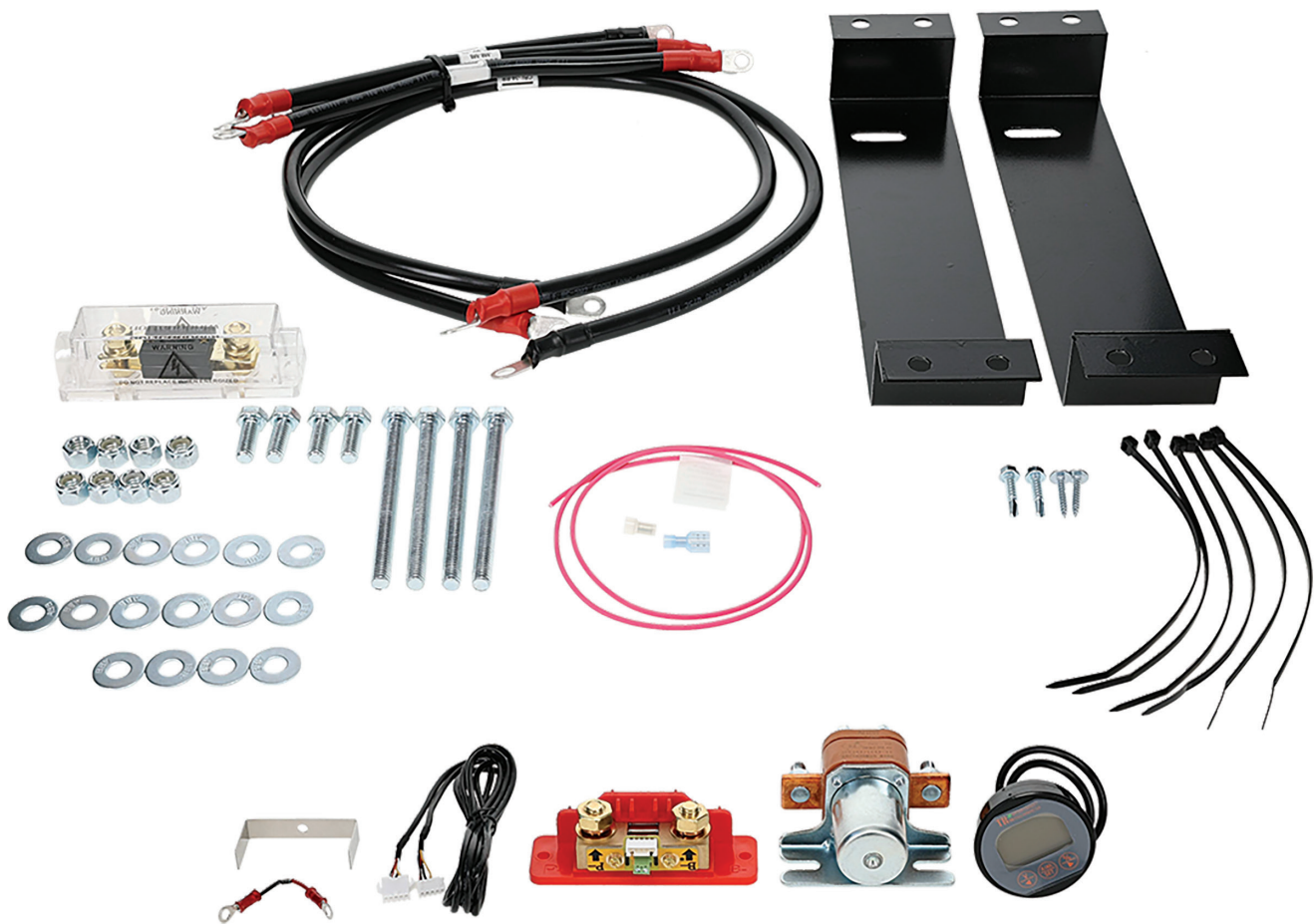
BAT-3103 (100A) and BAT-3104 (160A)

Club Car Precedent 2008.5+

Lithium Battery Pack Installation Kit

(1) 52V LiFePo4 Battery for a 48V System

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 or (6) 8V lead acid batteries in the Club Car Precedent, 2008.5+ with the power panel behind the 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.

Table of Contents

Tools Needed for Installation	2
Contents of Kit for BAT-3103 (52V, 100Ah)	3
Contents of Kit for BAT-3104 (52V, 160Ah)	4
Prepare Battery Compartment	5
Install New Battery Brackets	6
Install State of Charge (SOC) Shunt	8
Install ANL Fuse Holder	10
Install Solenoid	11
Install Batteries	11
Install State of Charge (SOC) Meter, Dash Mount	13
Complete Assembly	13
Optional: Install SB-50 Charger Plug (Sold Separately)	14
Optional: Install Voltage Reducer (Sold Separately)	15
Notes	15

Tools Needed for Installation

- Deep Well Socket: 1/2"
- Magnetic Socket: 5/16"
- Sockets and Wrenches: 8mm, 10mm, 9/16", 17mm
- Drill and Drill Bits (3/8" and a smaller pilot bit)
- Ratchet Wrench
- Torque Wrench
- Cut off tool with drywall bit or die grinder with cut off wheel.
- Wire Cutters
- Wire Strippers
- Wire Crimpers
- Screwdriver (Flat Head, Jeweler's Flat Head)
- Small Pick
- Straight Edge (i.e. Flat Ruler)
- Ruler or Measuring Tape
- 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 Devices Suitable for Dark Plastic and Uncoated Metal
- Digital Voltage Meter



Contents of Kit for BAT-3103 (52V, 100Ah)

BATTERY CABLES (2 AWG)							
Qty.	Length	From	Terminal and Heat Shrink Color		To	Terminal and Heat Shrink Color	
1	9"	-48V on Battery	5/16" Ring	BLK	SOC Shunt (B-)	3/8" Ring	BLK
1	12"	Solenoid (+) OUT	5/16" Ring	RED	Controller (B+)	5/16" Ring	RED
1	12"	+48V on Battery	5/16" Ring	RED	Fuse Block	5/16" Ring	RED
1	34"	Fuse Block	5/16" Ring	RED	Solenoid (+) IN	5/16" Ring	RED
1	36"	SOC Shunt (P-)	3/8" Ring	BLK	Controller (B-)	5/16" Ring	BLK

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 GREEN Wire on TOW / RUN	Strip End 1/4" (~5mm)
1	Blue Spade Connector, Female, 14-16 AWG	TOW / RUN (GREEN Wire)		34", 20 AWG Wire, PINK	Shipped Loose
1	End Splice Connector, Female, 14-16 AWG	TOW/RUN (GRN 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-48100 Battery	
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	Battery Brackets, 13AWG (.094") Steel	
4	3/8"-16 x 5" Hex Head Bolts	
4	3/8"-16 x 1" Hex Head Bolts	
16	3/8" Flat Washers	
8	3/8"-16 Nylock Nuts	
6	Zip Ties, 8" Long, Black	
1	Printed Instructions	
1	Controller Settings Chart for BAT-48100 Battery (Amp Volt Limits)	



Contents of Kit for BAT-3104 (52V, 160Ah)

BATTERY CABLES (2 AWG)							
Qty.	Length	From	Terminal and Heat Shrink Color		To	Terminal and Heat Shrink Color	
1	9"	-48V on Battery	5/16" Ring	BLK	SOC Shunt	3/8" Ring	BLK
1	12"	Solenoid (+) OUT	3/8" Ring	RED	Controller (B+)	5/16" Ring	RED
1	12"	+48V on Battery	5/16" Ring	RED	Fuse Block	5/16" Ring	RED
1	34"	Fuse Block	5/16" Ring	RED	Solenoid (+) IN	3/8" Ring	RED
1	36"	SOC Shunt	3/8" Ring	BLK	Controller (B-)	5/16" Ring	BLK

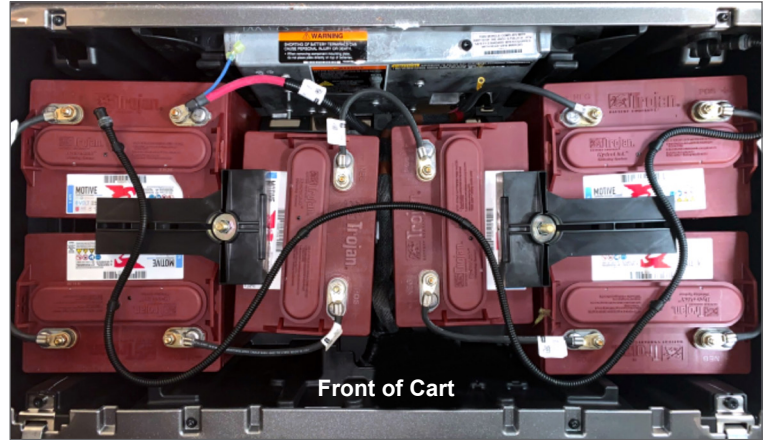
STATE OF CHARGE (SOC) METER TO TOW / RUN SWITCH					
Qty.	Item	From	Notes	To	Notes
1	34", 20 AWG Wire, PINK	SOC Shunt	Strip End 1/4" (~5mm)	OEM GREEN Wire on TOW / RUN	Strip End 1/4" (~5mm)
1	Blue Spade Connector, Female, 14-16 AWG	TOW / RUN (GREEN Wire)		34", 20 AWG Wire, PINK	Shipped Loose
1	End Splice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

ADDITIONAL COMPONENTS		
Qty.	Description	Part #
1	Fuse Holder (ANL/ANN)	
1	Fuse, 300A, 72V, for BAT-48160 Battery	
2	#8 x 1" Self Tapping Screws, Flat Head	
1	Heavy Duty Solenoid, 400A, 48V MZJ-400	SOL-1022
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	Battery Brackets, 13AWG (.094") Steel	
4	3/8" x 5" Hex Head Bolts	
4	3/8" x 1" Hex Head Bolts	
16	3/8" Flat Washers	
8	3/8" Nylock Nuts	
6	Zip Ties, 8" Long, Black	
1	Printed Instructions	
1	Controller Settings Chart for BAT-48160 Battery (Amp Volt Limits)	



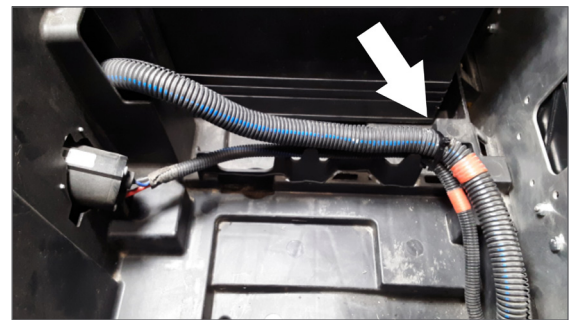
Prepare Battery Compartment

1. Turn Key OFF.
2. Engage parking brake.
3. Place Tow/Run Switch in Tow.
4. Remove the system's positive (+) and negative (-) connections from the battery pack.
5. Remove the main battery pack's fuse.
6. Remove the battery hold down brackets using a 1/2" deep well socket. Discard.
7. Carefully and safely remove the batteries, rods and cables and discard.
8. 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.

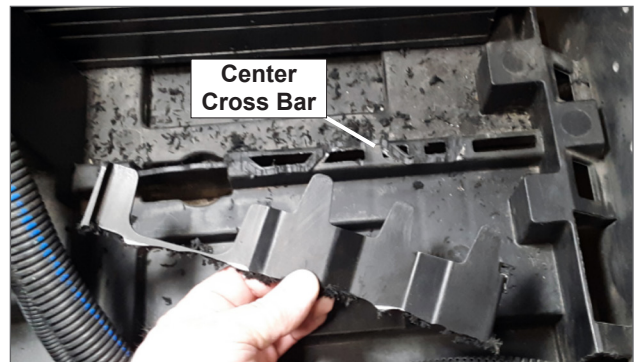
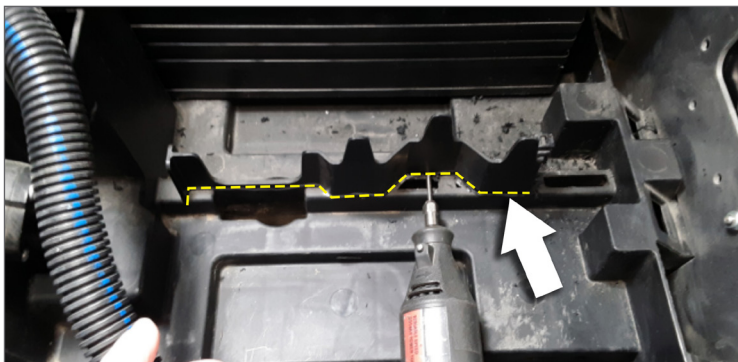


NOTE: The example above shows 8V batteries. Each configuration may vary.

9. In the bottom of the battery compartment, cut the zip ties holding the cables and wire harnesses to the ribbed support structure in the center of the battery compartment. Use caution not to cut the wires or cables.
10. Use a die grinder with a cut-off wheel or other cut off tool with a drywall bit to carefully remove the vertical rib above the center cross bar as indicated with the dotted line below.



CAUTION: Do NOT remove the center cross bar. Once the vertical rib is removed, the center cross bar will look like the photo shown below. The vertical rib can be discarded.



11. Carefully enlarge the wire harness access hole using a cut off tool.

CAUTION: Do NOT cut the cables.

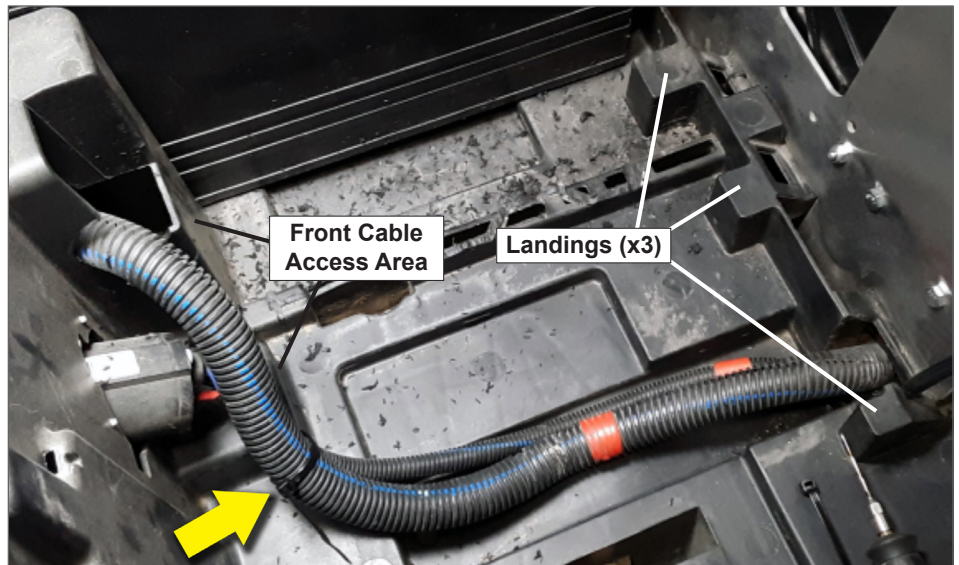
12. Carefully enlarge the wire harness notch in the power panel to lower the cable below the battery tray to an area where it will not get pinched. Place a straight edge on the two landings to ensure the cable sits below them.

CAUTION: Do NOT cut the cables.



- Zip tie the cables so they are below the landings and flush with the front cable access area as shown.

NOTE: The batteries will sit on the landings so the area must be free and clear of anything that can get pinched.

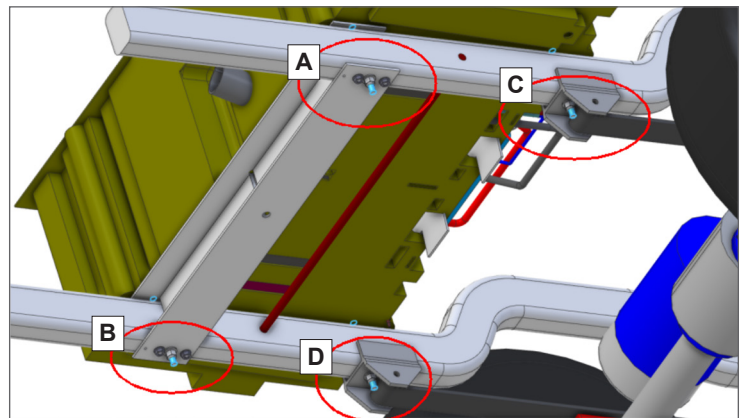


Install New Battery Brackets

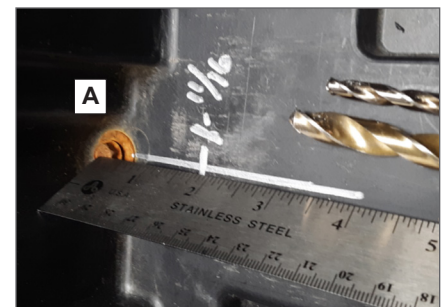
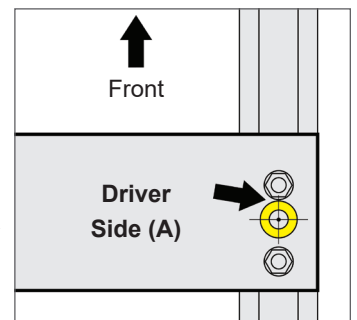
CAUTION: This section will explain how to mount the battery brackets. It will require drilling from the bottom frame up and from the battery bucket down. Look on all sides of the drilling area before you drill to make sure you are not drilling through wires, cables or brake lines.

- Locate the (2) battery brackets included with the kit.

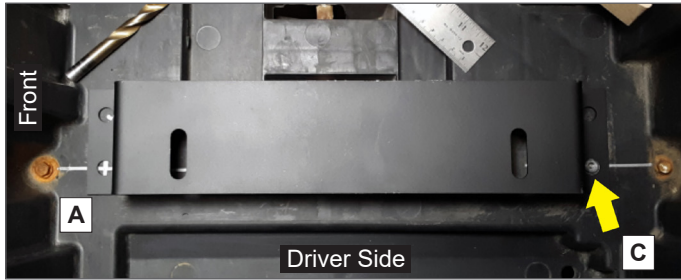
NOTE: The brackets are the same for both the 100A (BAT-48100) and 160A (BAT-48160) batteries, but the mounting position will be slightly different.



- From under the frame, place (1) 3/8" Flat Washer from the kit on the frame between the two bolts on the driver side front cross member (A). With the washer touching the front most nut, mark the center of the washer with a marking device. Repeat for the passenger side (B).
- Using a 3/8" drill bit, drill a hole through the bottom leg of the cross member and the bottom of the frame rail at the (2) marked locations. A smaller drill bit can be used as a pilot bit if necessary.
- From inside the battery bucket, use a straight edge to draw a straight line between the center of the (2) mounting bolts holding the battery bucket to the frame on the driver side (A to C). Repeat for passenger side (B to D).
- From the center of both front screws (A and B), measure 1-5/8" to 1-11/16" (1.65") and make a cross mark on the line.
- Using a 3/8" drill bit, drill a hole at each of the front (2) marked locations. A smaller drill bit can be used as a pilot bit if necessary. These holes will align with the holes drilled in Step 3.



- Place (1) battery bracket on the driver side of the battery bucket with the slots closer to the outside of the cart as shown below.
- Use the pre-existing holes on the bracket as a guide along with the lines already drawn to mark the rear hole location (C).
- Repeat steps 7-8 for the passenger side rear hole location (D).



- Using a 3/8" drill bit, drill a hole through the battery bucket and frame at each of the (2) rear marked locations (C and D). A smaller drill bit can be used as a pilot bit if necessary.

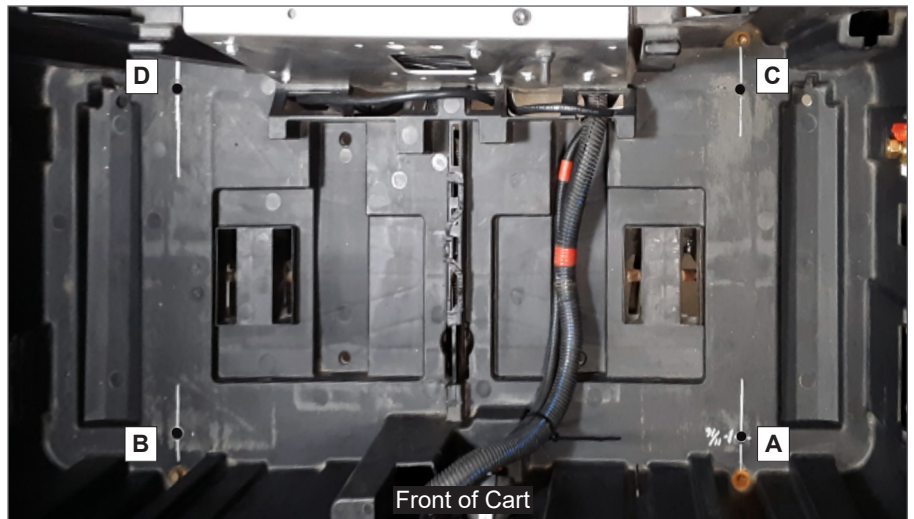
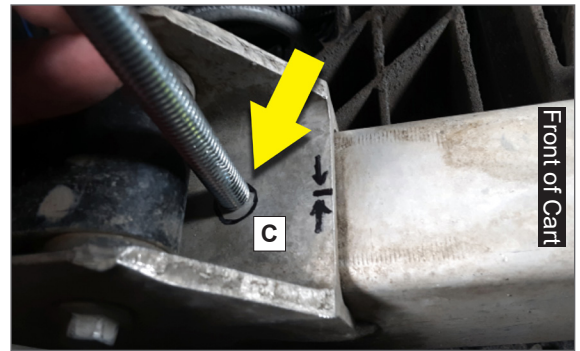
- From under the cart, locate the perch for the driver side rear leaf spring (C). Measure and mark the centerline on the perch.

- Place (1) 3/8"-16 x 5" Hex Head Bolt from the kit against the leaf spring. Move the bolt 1/8" away from the leaf spring and mark the center of the bolt's location on the perch, keeping it in-line with the center of the perch.

- Using a 3/8" drill bit, drill a hole through the marked hole location on the perch and through the bottom of the frame rail. A smaller drill bit can be used as a pilot bit if necessary.

- Repeat steps 10-13 for the passenger side hole location (D).

- When all (4) holes are drilled, the battery bucket should look like the image to the right.

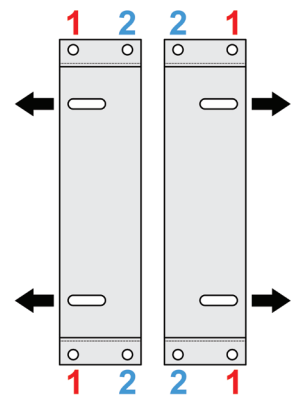


- Place both battery brackets inside of the battery bucket with the slots facing the outside of the cart.

- The same brackets are used for both the 100A (BAT-48100) and 160A (BAT-48160) batteries, but the mounting position will vary. Position the brackets over the mounting holes based on the type of battery being installed.

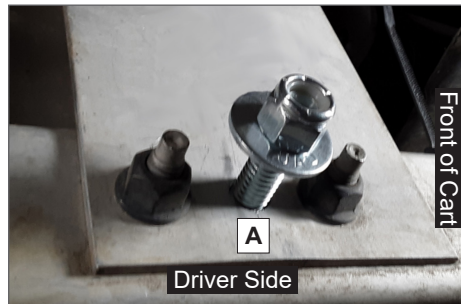
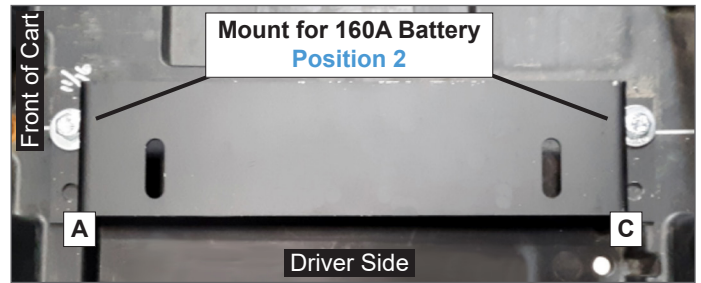
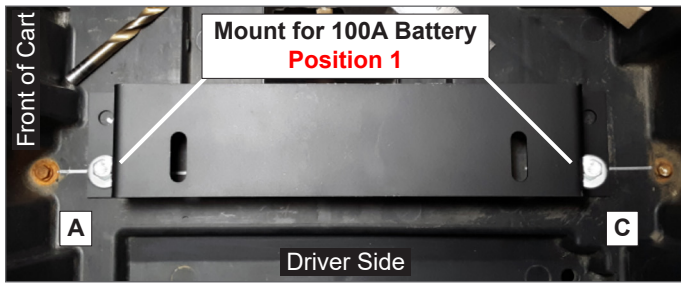
BAT-48100 (100A Battery): Mount using outside holes (Position 1).

BAT-48160 (160A Battery): Mount using inside holes (Position 2).



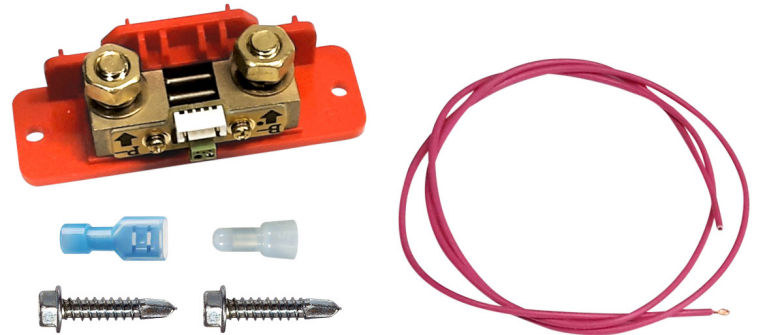
- Fasten the battery brackets to the battery bucket using (4) $\frac{3}{8}$ "-16 x 5" Hex Head Bolts, (8) $\frac{3}{8}$ " Flat Washers and (4) $\frac{3}{8}$ "-16 Nylock Nuts. Insert the bolts through the bracket and down through the frame so the nuts are on the bottom of the assembly. Torque to 15-17 FT LBS.

NOTE: A second person is helpful on this step to assist in holding the nuts and washers to the spring perch and frame.



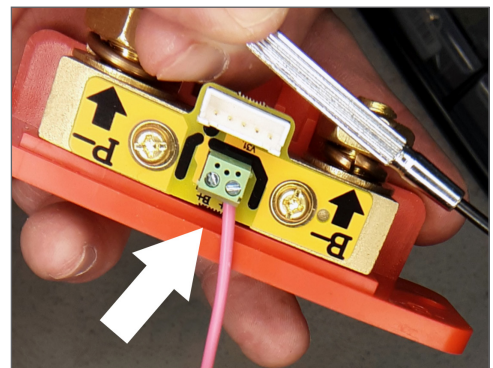
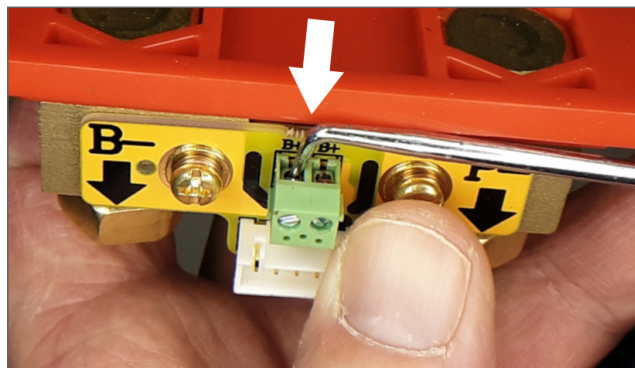
Install State of Charge (SOC) Shunt

- Identify the SOC Shunt, (2) #12 x 1" Self Tapping Screws, (1) $\frac{3}{4}$ ", 20 AWG Pink Wire, (1) Blue Spade Connector and (1) End Splice Connector.



- 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.
- Insert (1) stripped end of the $\frac{3}{4}$ ", 20 AWG 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.



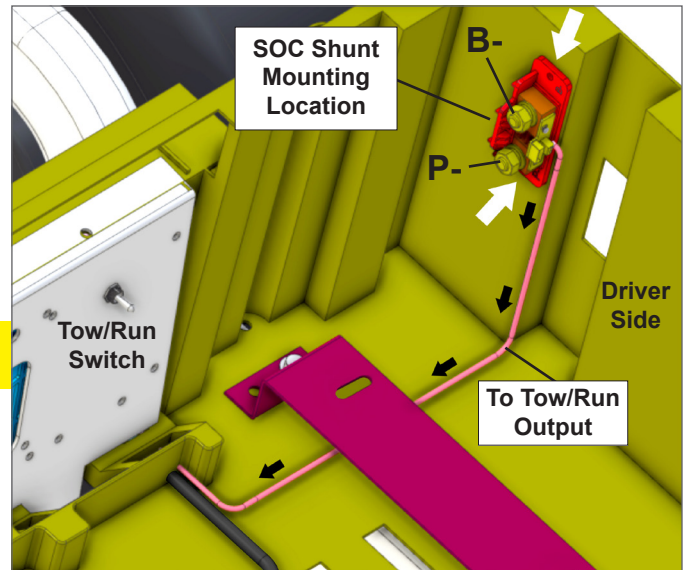
- Place the SOC shunt vertically, on the side wall of the driver side battery compartment, closer to the rear of the bucket as shown.

NOTE: When orientated correctly, the "P-" terminal on the SOC shunt will be on the bottom and the "B-" terminal on top.

- Once the SOC shunt is in the desired location, use a marking device to mark the mounting hole locations.
- Use a drill with a magnetic 5/16" socket and (2) #12 Self Tapping Screws, to start the (2) holes. Hand tighten.

CAUTION: Look on all sides of the drilling area before you drill to make sure you are not drilling through wires, cables or brake lines.

- Run the 34", 20 AWG Pink Wire under the bracket and place it near the Tow/Run switch.



- Locate (1) 9" 2AWG Battery Cable included in the kit. Install the 3/8" ring terminal to "B-" on the SOC shunt.

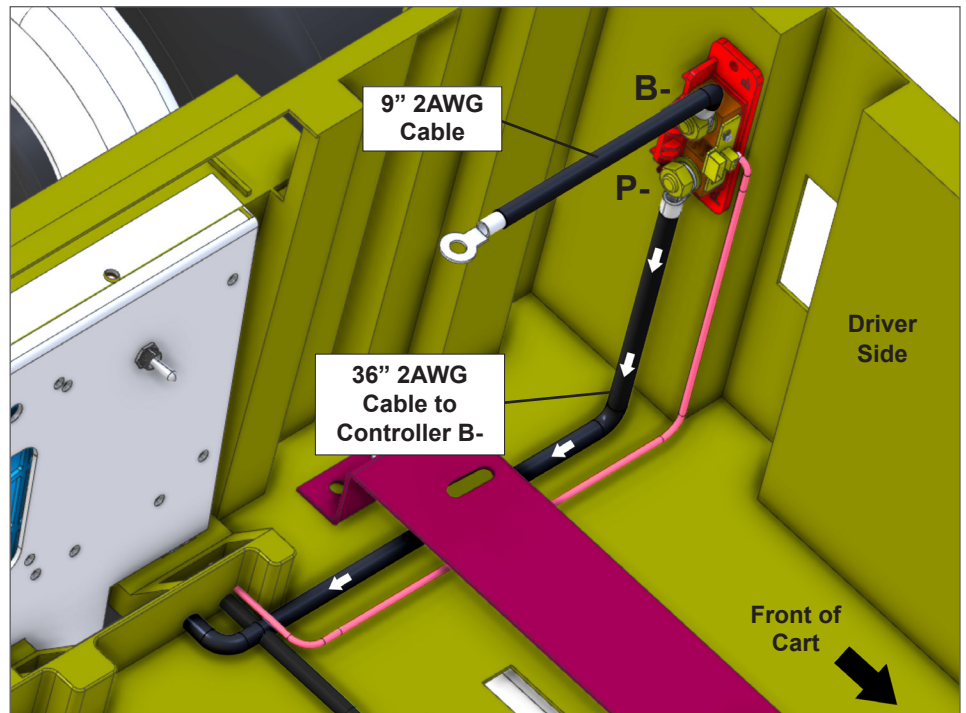
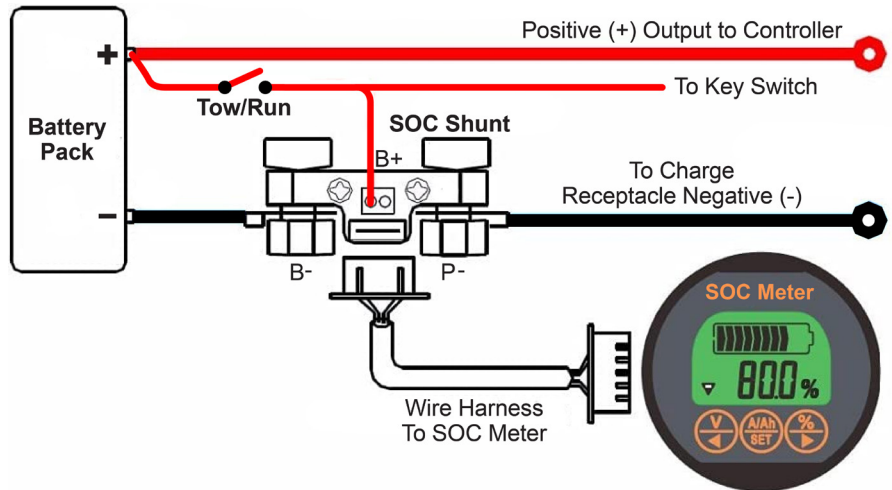
- Following the diagram and the steps below, connect the remaining wires to the "P-" terminal on the SOC shunt.

NOTE: Multiple wires may be attached to the "P-" terminal.

- Locate (1) 36" 2AWG Battery Cable included in the kit. Install the 3/8" ring terminal to "P-" on the SOC shunt. Run the cable under the bracket and towards the controller. Connect the 5/16" ring terminal (smaller of the two ring terminals) to the "B-" terminal on the Controller.

NOTE: A 10AWG black wire will already be connected to the "B-" terminal on the controller. This is the negative wire from the charge port. Leave this in place.

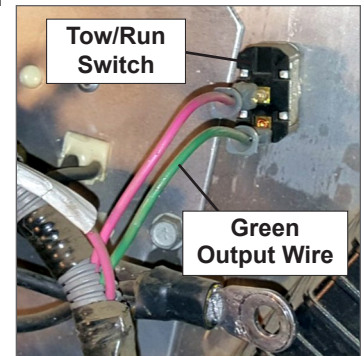
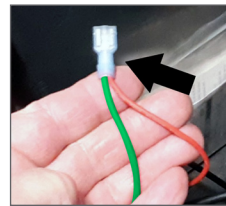
- If installing a voltage reducer, connect the negative (-) wire from the reducer to the "P-" terminal on the SOC shunt.
- Using a socket wrench, carefully tighten the 17mm nuts on the SOC shunt.



13. Locate the green output wire from the Tow/Run switch located on the rear power panel. This wire would be OFF when the Tow/Run Switch is in Tow. In an OE configuration, it is normally green and goes to the key switch. Unplug the green 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 green 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.

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



Install ANL Fuse Holder

1. Locate the ANL fuse holder and remove the fuse if pre-installed.

NOTE: The fuse holder may look different than what is shown.

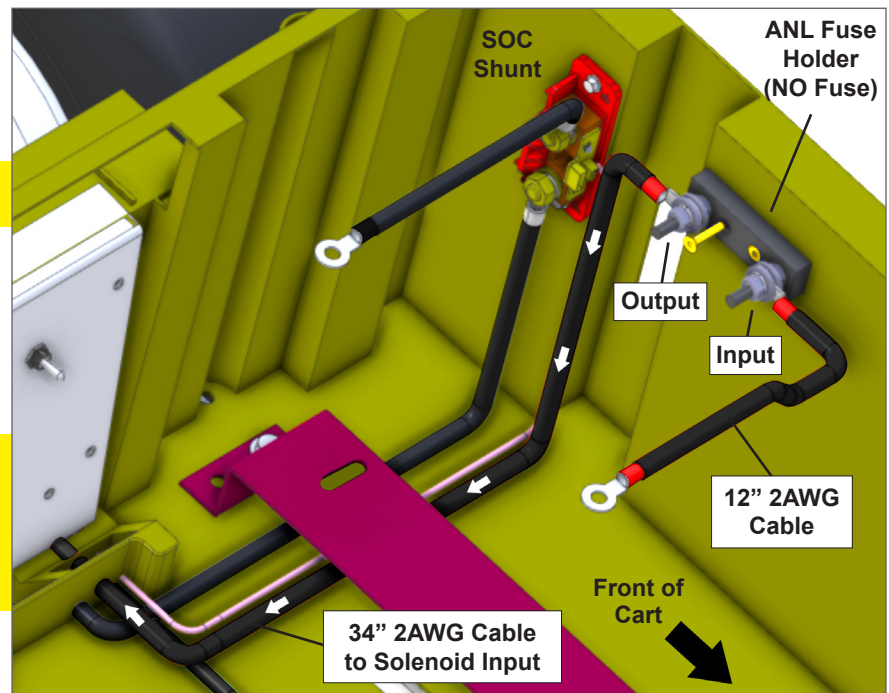
CAUTION: Do NOT install the fuse until instructed to do so.

2. Place the ANL fuse holder horizontally on the driver side wall of the battery compartment, 2"-3" away from the SOC Shunt as shown. If oriented correctly, the output will be on the left and the input on the right. Install the fuse holder using (2) #8 x1" Self Tapping Screws.

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

3. Locate (1) 12" 2AWG Battery Cable included in the kit. Install one side of the cable to the ANL fuse holder on the input side. Orient the cable so it faces the front of the cart.

4. Locate (1) 34" 2AWG Battery Cable included in the kit. Install one side of the cable to the ANL fuse holder on the output side. Run the opposite end of the cable under the battery bracket and towards the solenoid.

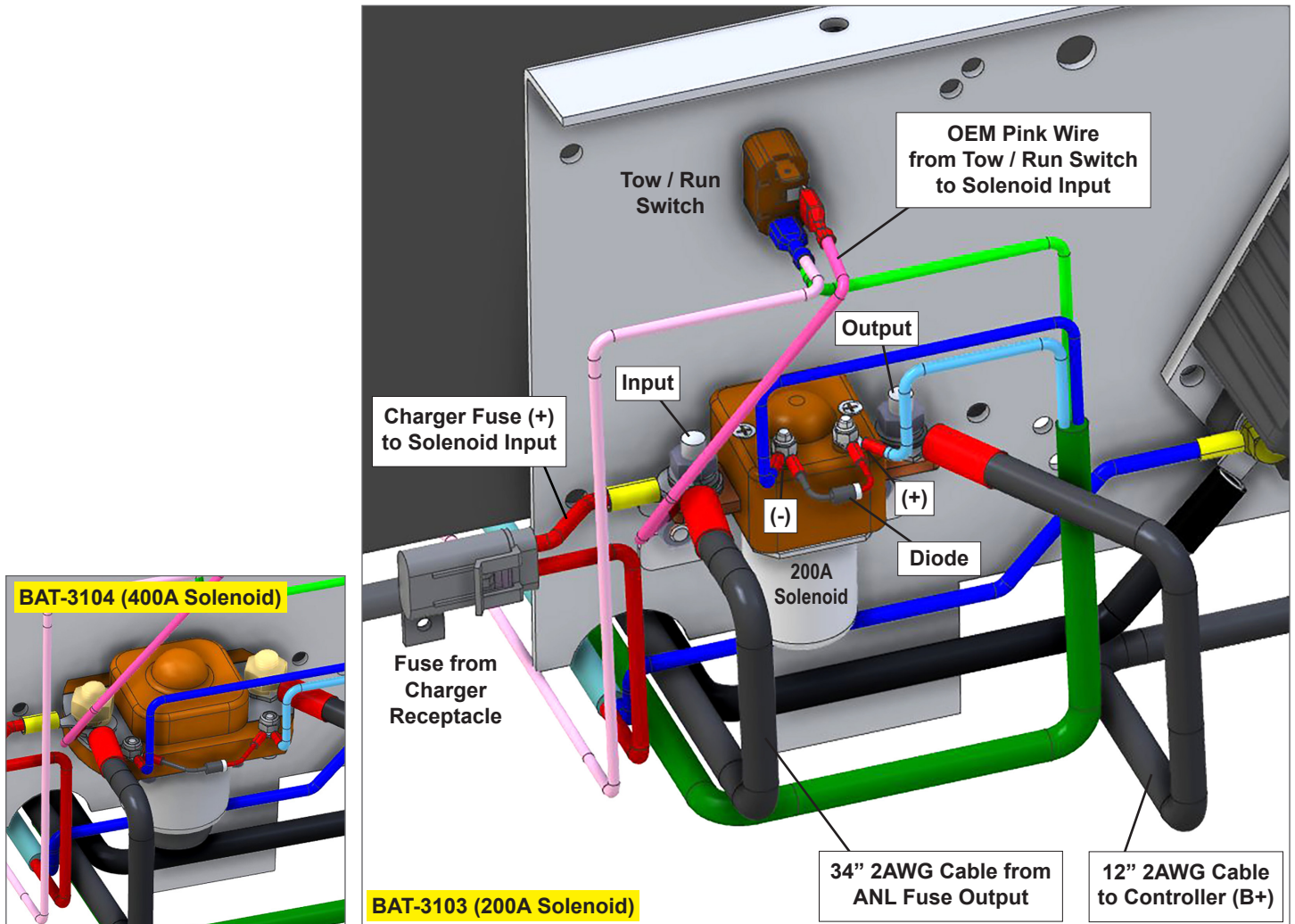
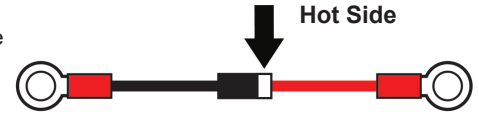


Install Solenoid

1. Install the new solenoid where the original was removed.

NOTE: BAT-3103 (100A battery) includes a 200A solenoid. BAT-3104 (160V battery) includes a 400A solenoid. Installation is the same.

2. Locate (1) 12" 2AWG Battery Cable. Connect one end to the solenoid output terminal and the other to the "B+" terminal on the controller.
3. Connect the 34" 2AWG Battery Cable from the ANL fuse holder to the solenoid input terminal along with the 12AWG red cable to the Tow/Run switch and the 10AWG cable to the charger input as shown.
4. Locate the diode included in the kit. The side with the band is the HOT side. Install the diode to the small posts on the solenoid, with the hot side closest to the larger output terminal. Install the light blue wire (+) to the hot side of the diode and the dark blue (-) to the other side of the diode.

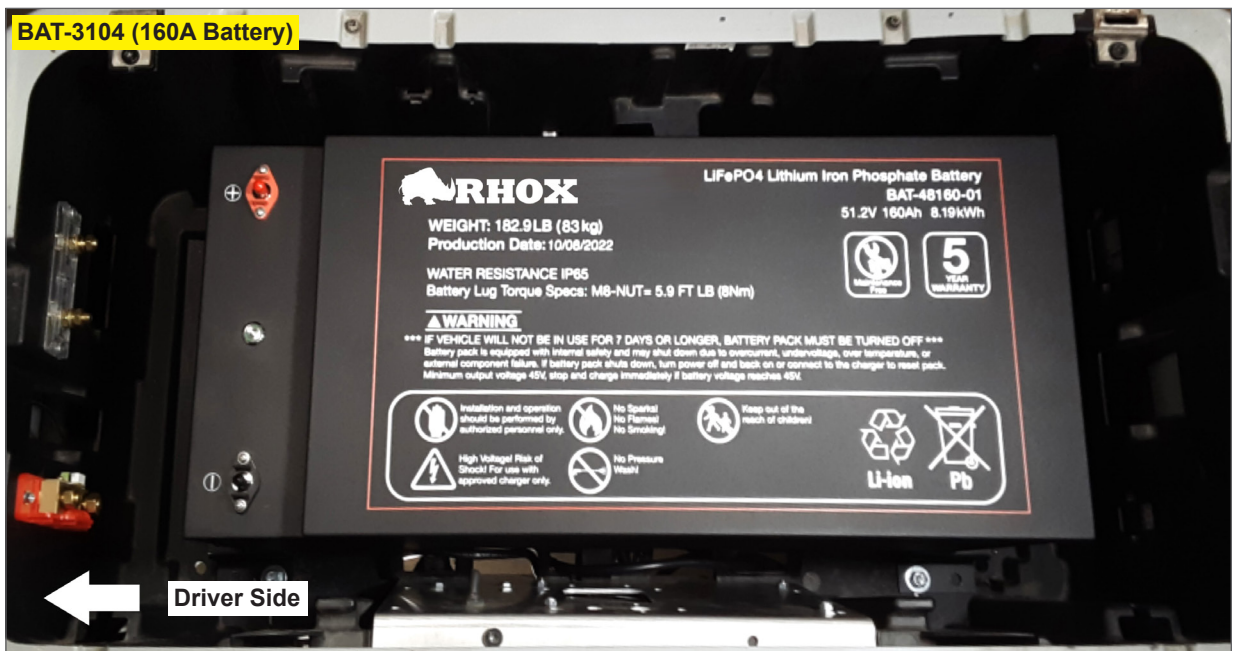


Install Batteries

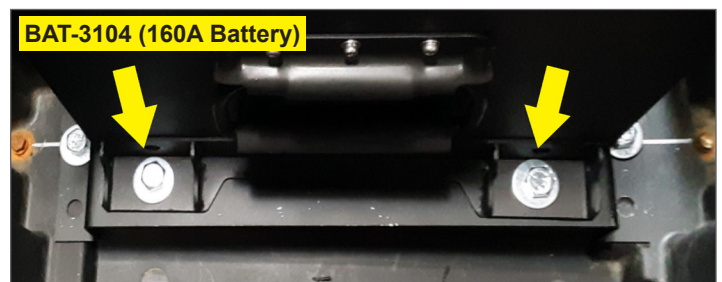
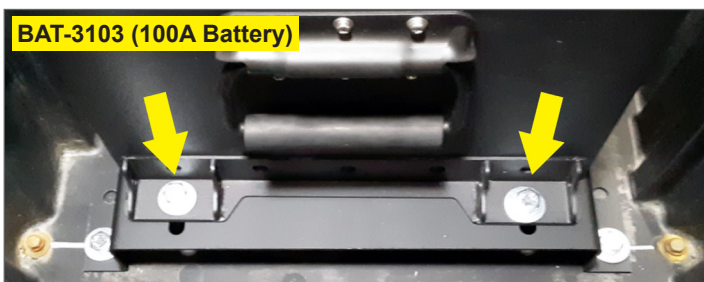
CAUTION: The battery pack is HEAVY. A lift or multiple people are required in order to install the battery safely. Do not attempt to install it alone without a lifting aid.

1. Verify all wires and cables are free and clear of the space the battery will take up, so nothing gets pinched or damaged.

- Using a lift or multiple people, place the battery inside the battery bucket, centered on top of the battery brackets. When oriented correctly, the positive (+) and negative (-) terminals will be on the driver side. The mounting holes will align with the slots on the battery brackets.



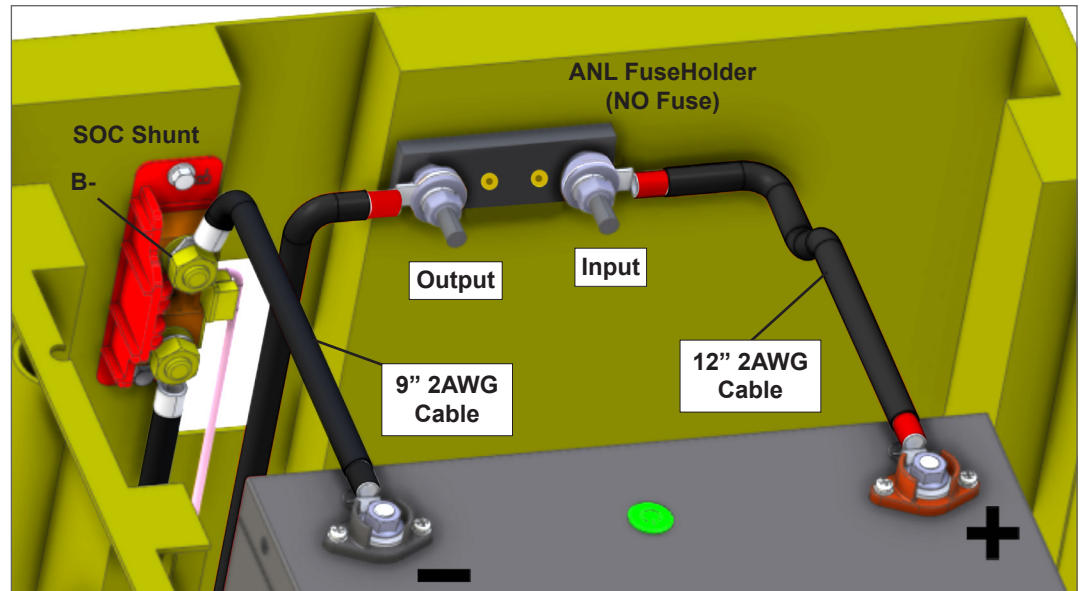
- Once the battery is in the desired position, fasten the battery to the brackets using (4) $\frac{3}{8}$ "-16 x 1" Hex Head Bolts, (8) $\frac{3}{8}$ " Flat Washers and (4) $\frac{3}{8}$ "-16 Nylock Nuts. Torque to 15-17 FT LBS.



4. Connect the 9" 2AWG Battery Cable from the "B-" terminal on the SOC shunt to the negative (-) terminal on the battery.
5. Connect the 12" 2AWG Battery Cable from the input side of the ANL fuse holder to the positive (+) terminal on the battery.

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

6. Tighten all battery cables using the torque requirements in the battery's Operator Manual. Do NOT over tighten.



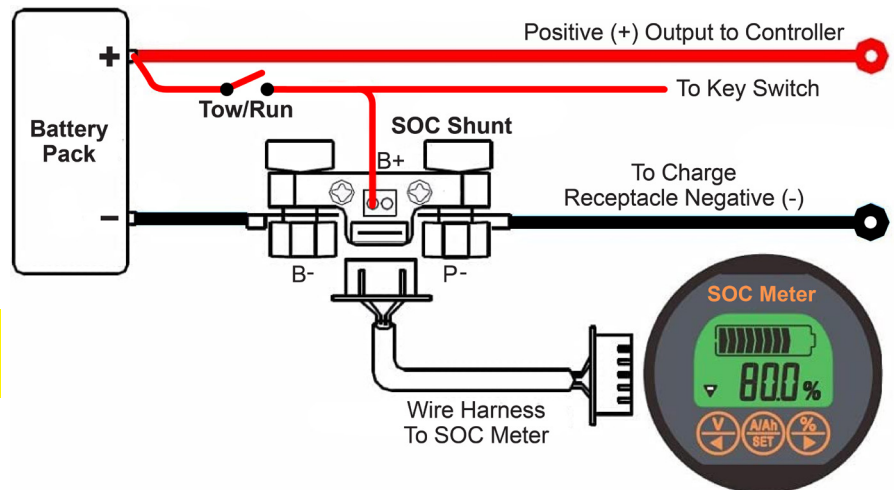
Install State of Charge (SOC) Meter, Dash Mount

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.

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.

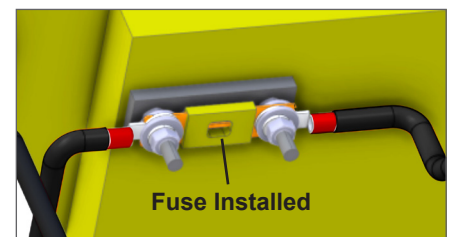
CAUTION: Do not zip-tie any SOC wires to any high power cables. High power noise can cause SOC reading errors.

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

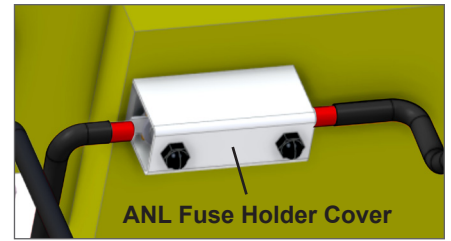


Complete Assembly

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.



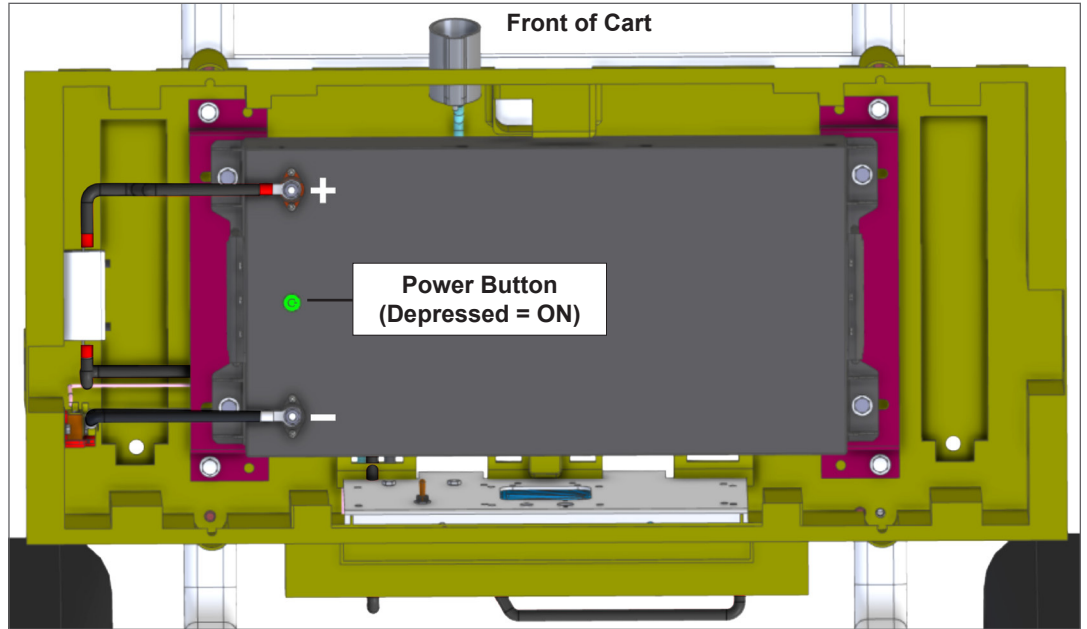
4. Snap the ANL fuse holder's cover over the fuse and cables.
5. Press the power button on the battery to ON.
6. Use a digital voltmeter to verify all connections and the total voltage of the pack.
7. Check the charger receptacle's voltages and the battery pack's main negative to the positive (+) 48V terminals for the correct polarity and voltage. The reading should be above +48V. Lithium batteries will generally read +52V static and not fully charged.



8. Place Tow/Run Switch in RUN.
9. Turn the Key-Switch ON to verify the motor and controller work, but do NOT drive it until the battery pack is fully charged.
10. Turn the Key-Switch OFF.
11. 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.

12. 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 output terminal on the ANL fuse, along with the 34" 2AWG cable going to the solenoid.
2. Connect the negative (-) wire from the SB-50 charger plug to the SOC shunt's (P-) terminal.

