



BAT-3107 (100A) and BAT-3108 (160A)

Yamaha Drive 2011+, Drive2 2017+
 Lithium Battery Pack Installation Kit
 (1) 52V LiFePo4 Battery for a 48V System

INSTALLATION INSTRUCTIONS



BAT-3107



BAT-3108

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 (6) 8V lead acid batteries in the Yamaha Drive2 2017+ and the Yamaha Drive 2011+ with a center rib in the battery bucket.

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-3107 (52V, 100Ah)	3
Contents of Kit for BAT-3108 (52V, 160Ah)	4
Prepare Battery Compartment	5
BAT-3107: Install New Battery Brackets for BAT-48100 Battery	5
BAT-3108: Install New Battery Brackets for BAT-48160 Battery	7
Install State of Charge (SOC) Shunt	8
Install ANL Fuse Holder	10
Install Solenoid	11
BAT-3107: Install Batteries	12
BAT-3108: Install Batteries	13
Install State of Charge (SOC) Meter, Dash Mount	14
Complete Assembly	14
Optional: Install SB-50 Charger Plug (Sold Separately)	16
Optional: Install Voltage Reducer (Sold Separately)	16

Tools Needed for Installation

- Deep Well Socket: 1/2"
- Magnetic Socket: 5/16"
- Sockets and Wrenches: 8mm, 10mm, 17mm
- Drill and Drill Bits (3/8" and a smaller pilot bit for a #12 screw)
- Ratchet Wrench
- Torque Wrench
- Cut off tool with drywall bit or die grinder with cut off wheel.
- Wire Cutters
- Wire Strippers
- Wire Crimpers
- Screwdriver (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 Devices Suitable for Dark Plastic and Uncoated Metal
- Digital Voltage Meter



Contents of Kit for BAT-3107 (52V, 100Ah)

BATTERY CABLES (2 AWG)							
Qty.	Length	From	Terminal and Heat Shrink Color		To	Terminal and Heat Shrink Color	
1	12"	Solenoid (+) OUT	5/16" Ring	RED	Controller POS (+)	5/16" Ring	RED
1	16"	+48V on Battery	5/16" Ring	RED	Fuse Block	5/16" Ring	RED
1	19"	-48V on Battery	5/16" Ring	BLK	SOC Shunt (B-)	3/8" Ring	BLK
1	26"	SOC Shunt (P-)	3/8" Ring	BLK	Controller NEG (-)	5/16" Ring	BLK
1	39"	Fuse Block	5/16" Ring	RED	Solenoid (+) IN	5/16" Ring	RED

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 RED/YEL Wire on TOW / RUN	Strip End 1/4" (~5mm)
1	Blue Spade Connector, Female, 14-16 AWG	TOW / RUN (RED/YEL Wire)		34", 20 AWG Wire, PINK	Shipped Loose
1	End Splice Connector, Female, 14-16 AWG	TOW/RUN (RED/YEL 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	Passenger Side Battery Brackets 3"L x 2"D x 3"W 13AWG (.094") Steel	
1	Driver Side Battery Bracket, 15"L x 2"D x 10"W 13AWG (.094") Steel	
4	3/8"-16 x 2.5" Hex Head Bolts	
4	3/8"-16 Nylock Nuts	
8	3/8" Flat Washers	
8	#12 x 1" Self Tapping Screws, Hex Head	
6	Zip Ties, 8" Long, Black	
1	5/16" Yellow Ring Terminal, 10 AWG (Red Charger Receptacle Wire to Fuse)	
1	3/8" Yellow Ring Terminal, 10 AWG (Black Charger Receptacle Wire to SOC Shunt P-)	
1	Printed Instructions	
1	Controller Settings Chart for BAT-48100 Battery (Amp Volt Limits)	



Contents of Kit for BAT-3108 (52V, 160Ah)

BATTERY CABLES (2 AWG)							
Qty.	Length	From	Terminal and Heat Shrink Color		To	Terminal and Heat Shrink Color	
1	12"	Solenoid (+) OUT	3/8" Ring	RED	Controller POS (+)	5/16" Ring	RED
1	16"	+48V on Battery	5/16" Ring	RED	Fuse Block	5/16" Ring	RED
1	19"	-48V on Battery	5/16" Ring	BLK	SOC Shunt (B-)	3/8" Ring	BLK
1	26"	SOC Shunt (P-)	3/8" Ring	BLK	Controller NEG (-)	5/16" Ring	BLK
1	39"	Fuse Block	5/16" Ring	RED	Solenoid (+) IN	3/8" Ring	RED

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 RED/YEL Wire on TOW / RUN	Strip End 1/4" (~5mm)
1	Blue Spade Connector, Female, 14-16 AWG	TOW / RUN (RED/YEL Wire)		34", 20 AWG Wire, PINK	Shipped Loose
1	End Splice Connector, Female, 14-16 AWG	TOW/RUN (RED/YEL 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, 15"L x 2"D x 10"W 13AWG (.094") Steel	
4	3/8"-16 x 2.5" Hex Head Bolts	
4	3/8"-16 Nylock Nuts	
8	3/8" Flat Washers	
8	#12 x 1" Self Tapping Screws, Hex Head	
6	Zip Ties, 8" Long, Black	
1	5/16" Yellow Ring Terminal, 10 AWG (Red Charger Receptacle Wire to Fuse)	
1	3/8" Yellow Ring Terminal, 10 AWG (Black Charger Receptacle Wire to SOC Shunt P-)	
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.

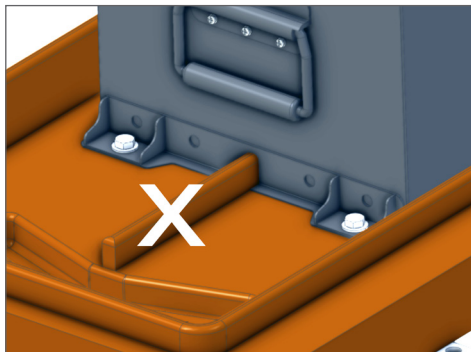


9. Use a die grinder with a cut-off wheel or other cut off tool with a drywall bit to carefully remove the vertical rib in the center of the battery compartment as shown.

NOTE: The new battery will rest on the bottom of the battery compartment so this surface must be flush.

10. Smooth any high spots.

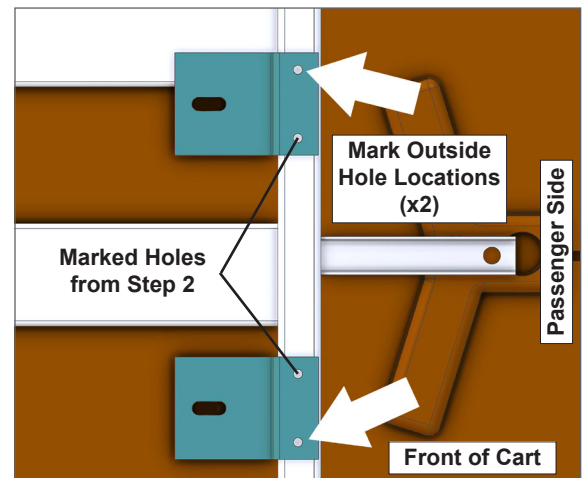
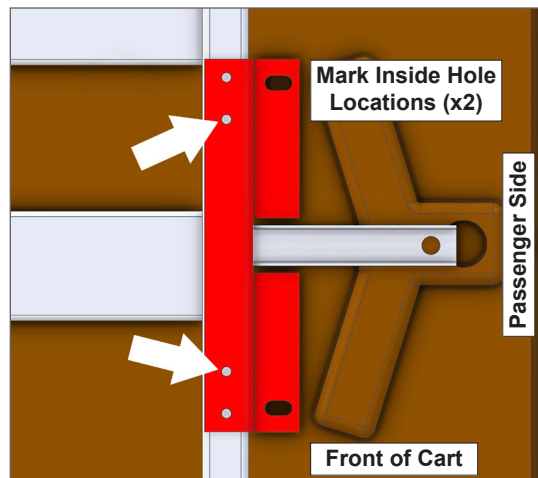
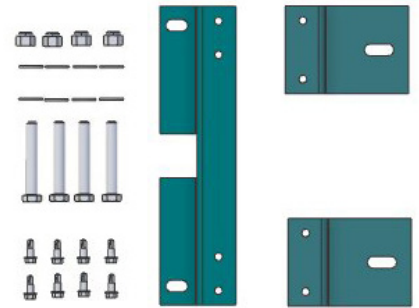
CAUTION: High spots WILL deform the bottom of the new battery and void any warranty.



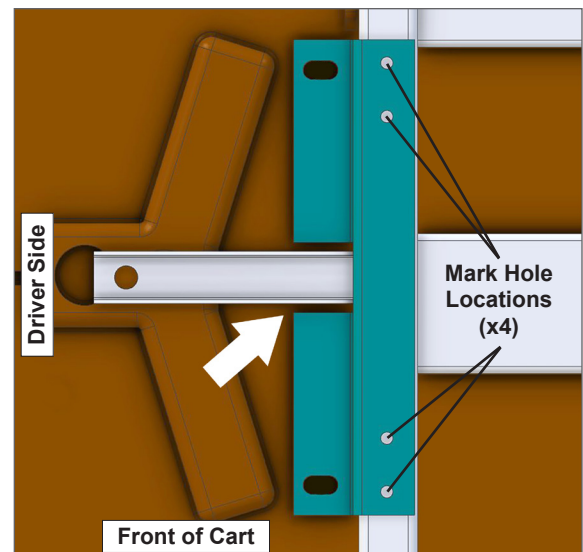
BAT-3107: Install New Battery Brackets for BAT-48100 Battery

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.

1. Locate the (3) battery brackets and mounting hardware included with the kit.
2. From under the passenger side of the frame, place the longer, 10" long bracket on the frame with the slot side straddling the passenger side battery compartment bracket. Using a marking device, mark the (2) inside hole locations and remove the bracket. These hole locations will be used to position the (2) smaller passenger side battery brackets.
3. Remove the long bracket.
4. Using the (2) marked hole locations as a guide, place the smaller brackets on the passenger side frame as shown. The marked hole locations will be used as the inner most mounting holes on the brackets.
5. Using a marking device, mark the (2) outside hole locations. Remove the brackets.
6. Using a small drill bit, drill pilot holes at each of the (4) marked locations.
7. Install the (2) small brackets to the passenger side of the frame using (4) #12 x 1" Self Tapping Screws

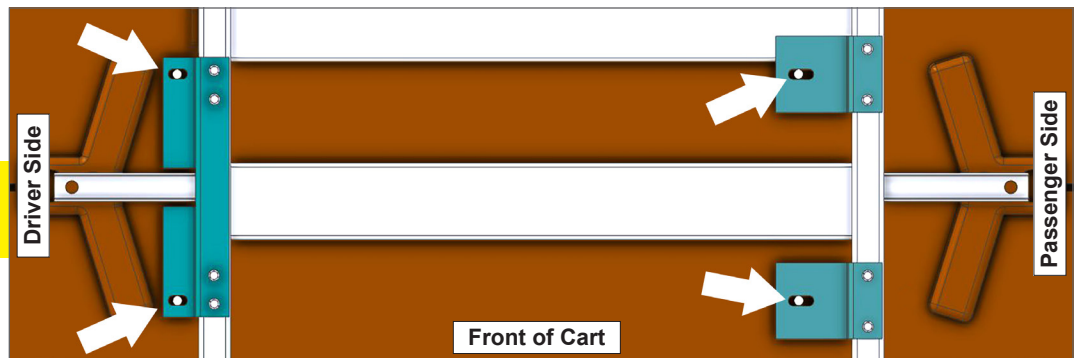


8. Place the longer 10" bracket on the driver side frame with the cutout straddling the battery compartment bracket. Making sure the cutout is centered over the battery bucket bracket, mark all (4) mounting hole locations and remove the bracket.
9. Using a small drill bit, drill pilot holes at each of the (4) marked locations.
10. Install the large bracket to the driver side of the frame using (4) #12 x 1" Self Tapping Screws.



- Using the (4) larger holes on the brackets as a guide, drill (4) 3/8" holes up through the frame and into the battery compartment.

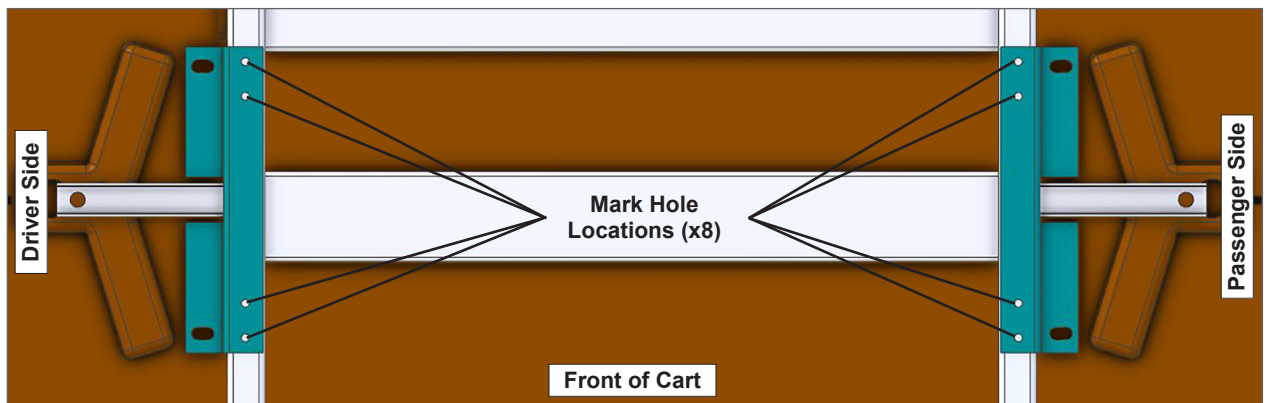
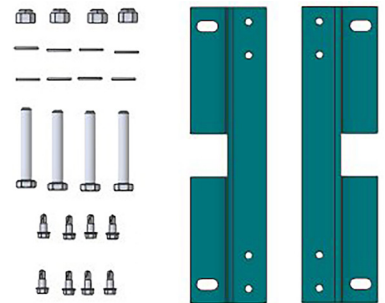
CAUTION: Verify there is nothing in the battery compartment prior to drilling.



BAT-3108: Install New Battery Brackets for BAT-48160 Battery

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 and mounting hardware included with the kit.
- From under the cart, start on one side and place a 10" long bracket on the frame with the slot side straddling the battery compartment bracket. Using a marking device, mark the (4) small hole locations on the bracket and remove the bracket.
- Repeat for the opposite side.
- Using a small drill bit, drill pilot holes at each of the (8) marked locations.
- Install the (2) brackets to the frame using (8) #12 x 1" Self Tapping Screws.



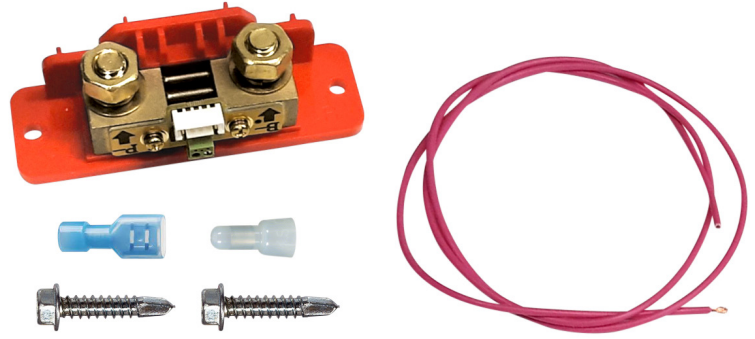
- Using the (4) larger holes on the brackets as a guide, drill (4) 3/8" holes up through the frame and into the battery compartment.

CAUTION: Verify there is nothing in the battery compartment prior to drilling.



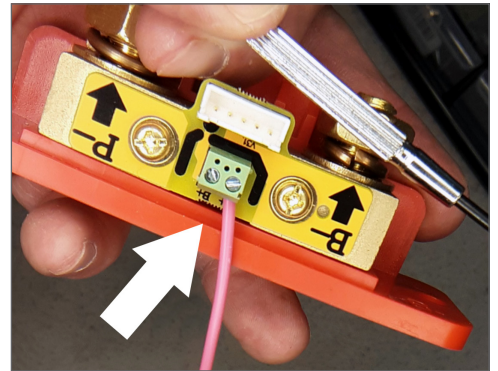
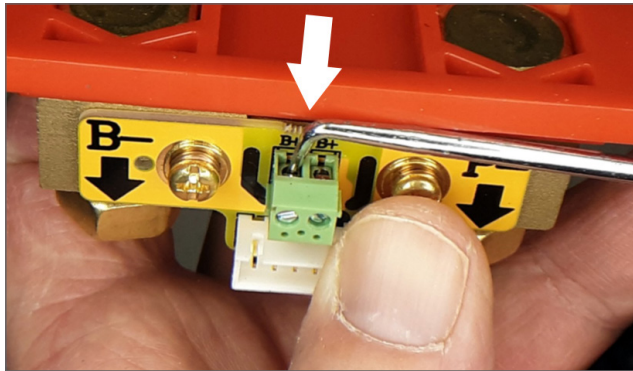
Install State of Charge (SOC) Shunt

1. Identify the SOC Shunt, (2) #12 x 1" Self Tapping 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", 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.

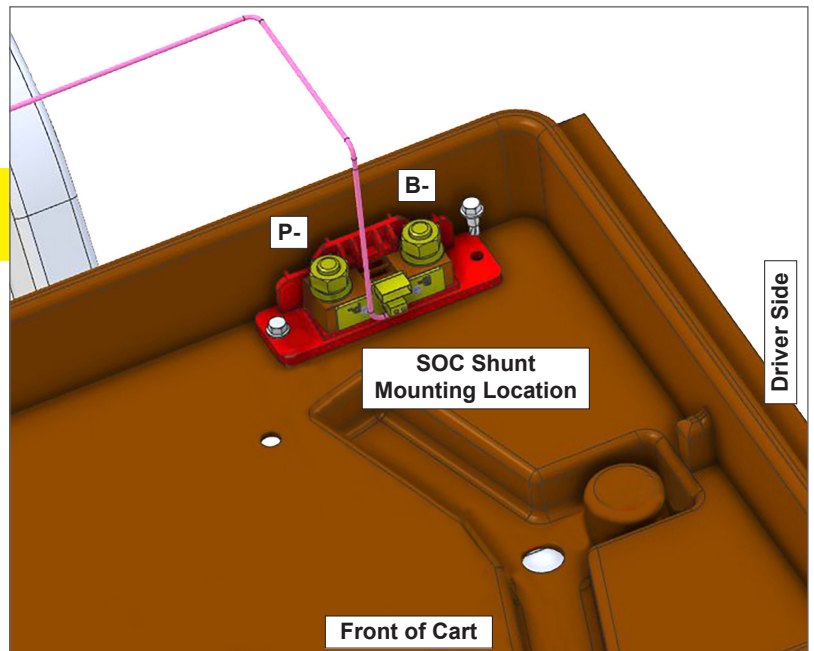


4. Place the SOC shunt in the driver side rear area of the battery compartment as shown.

NOTE: When orientated correctly, the "P-" terminal on the SOC shunt will face the passenger side and the "B-" terminal will face the driver side.

5. Once the SOC shunt is in the desired location, use a marking device to mark the mounting hole locations.
6. 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.

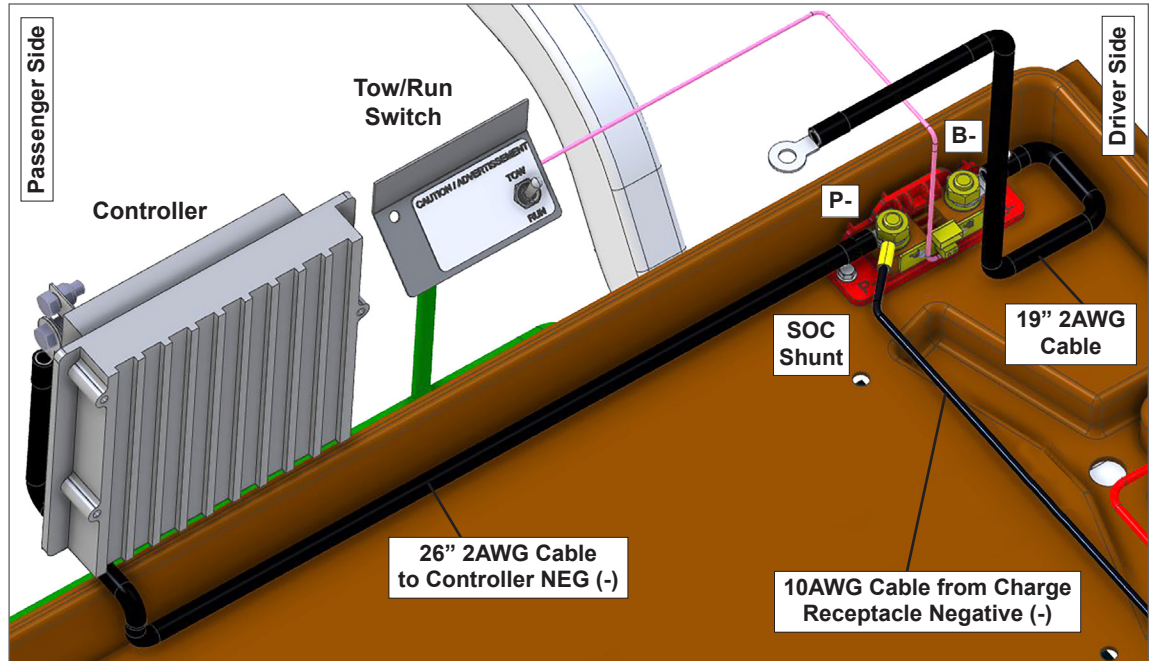


7. Locate (1) 19" 2AWG Battery Cable included in the kit. Install the 3/8" ring terminal to "B-" on the SOC shunt.
8. Following the diagram and the steps below, connect the remaining wires to the "P-" terminal on the SOC shunt.

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

9. Locate (1) 26" 2AWG Battery Cable included in the kit. Install the 3/8" ring terminal to "P-" on the SOC shunt. Connect the 5/16" ring terminal (smaller of the two ring terminals) to the negative (-) terminal on the controller.

10. Locate the 10AWG black OEM wire that goes to the charger receptacle's negative (-) port. Cut off the 5/16" ring terminal. Strip the end of the wire and replace the terminal with the included 3/8" Yellow Ring Terminal. Run this end to the "P-" terminal on the SOC shunt.



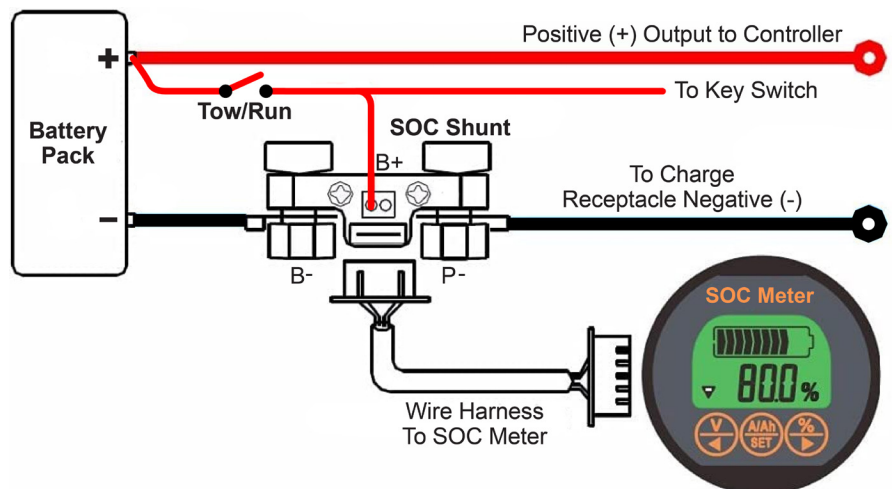
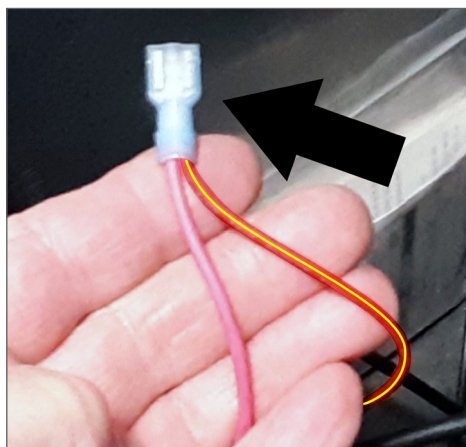
11. If installing a voltage reducer, connect the negative (-) wire from the reducer to the "P-" terminal on the SOC shunt.
12. Using a socket wrench, carefully tighten the 17mm nuts on the SOC shunt.

13. Locate the Tow/Run switch on the rear power panel and verify it is set to TOW.

14. Locate the red/yellow output wire from the Tow/Run switch. This wire would be OFF when the Tow/Run Switch is in Tow. In an OE configuration, it goes to the key switch. Unplug the red/yellow 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 red/yellow 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.

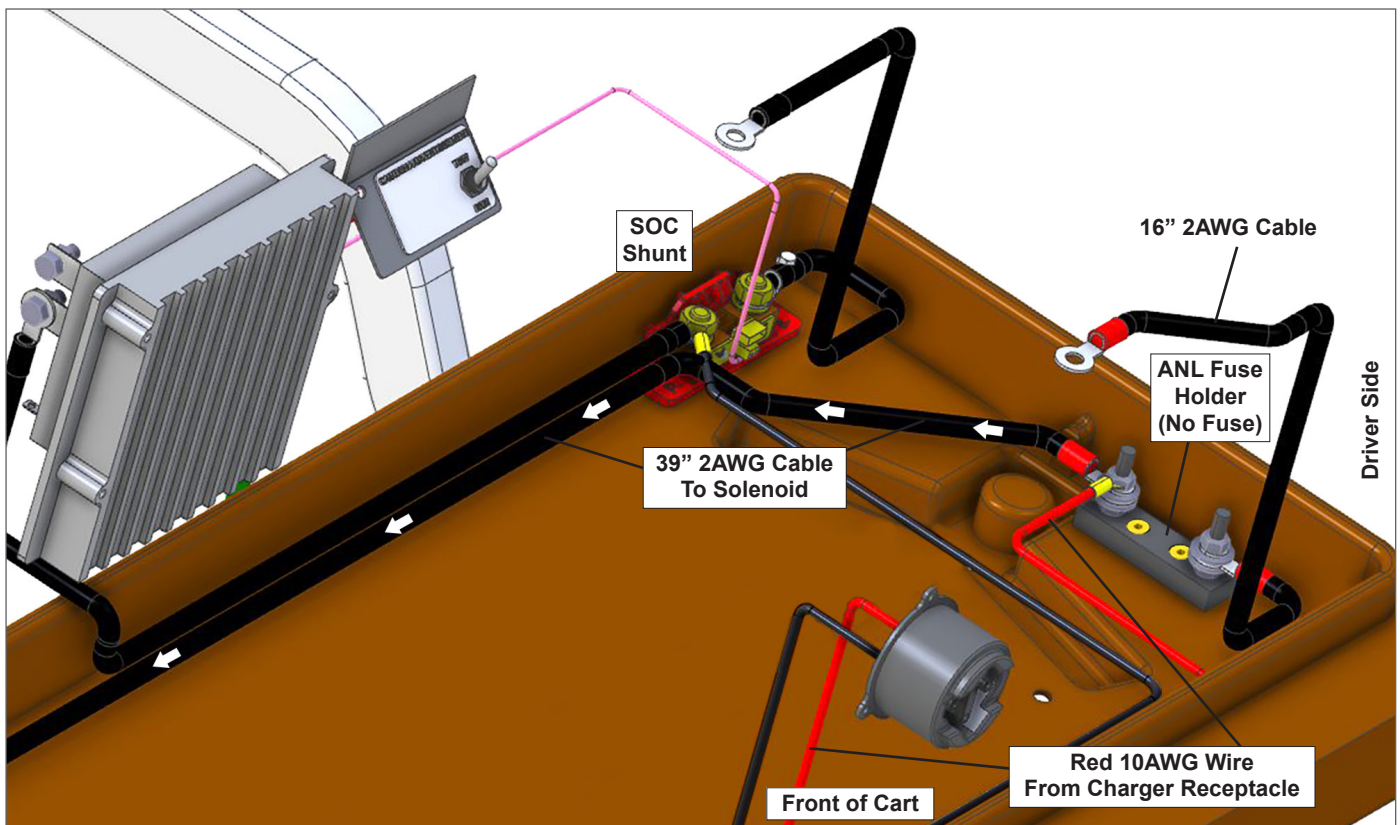
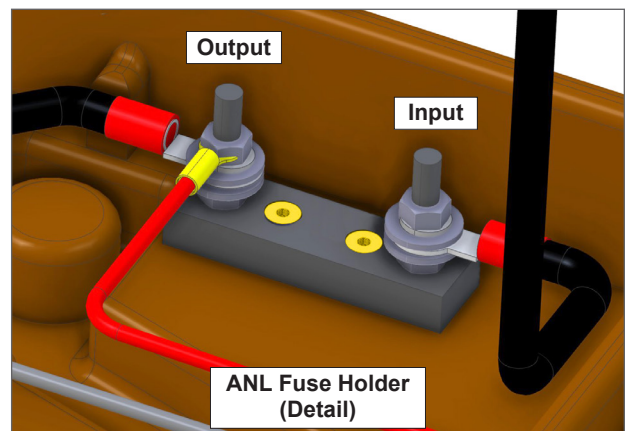
CAUTION: Do NOT install the fuse until instructed to do so.

2. Place the ANL fuse holder on the driver side floor of the battery compartment as shown. If oriented correctly, the output will face the rear of the cart and the input will face the front. 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) 16" 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 the red 10AWG wire from the charger receptacle. Cut off the old 5/16" ring terminal, strip the wire and replace it with (1) new 5/16" 10AWG Yellow Ring Terminal included in the kit.
5. Locate (1) 39" 2AWG Battery Cable included in the kit. Install one side of the cable to the ANL fuse holder on the output side, along with the positive red 10AWG wire from the charger receptacle. Run the opposite end of the 39" cable along the back of the battery compartment and towards the solenoid.

NOTE: If installing BAT-3108, install the side with the 5/16" ring terminal to the fuse. If installing BAT-3107, both terminals are the same size.

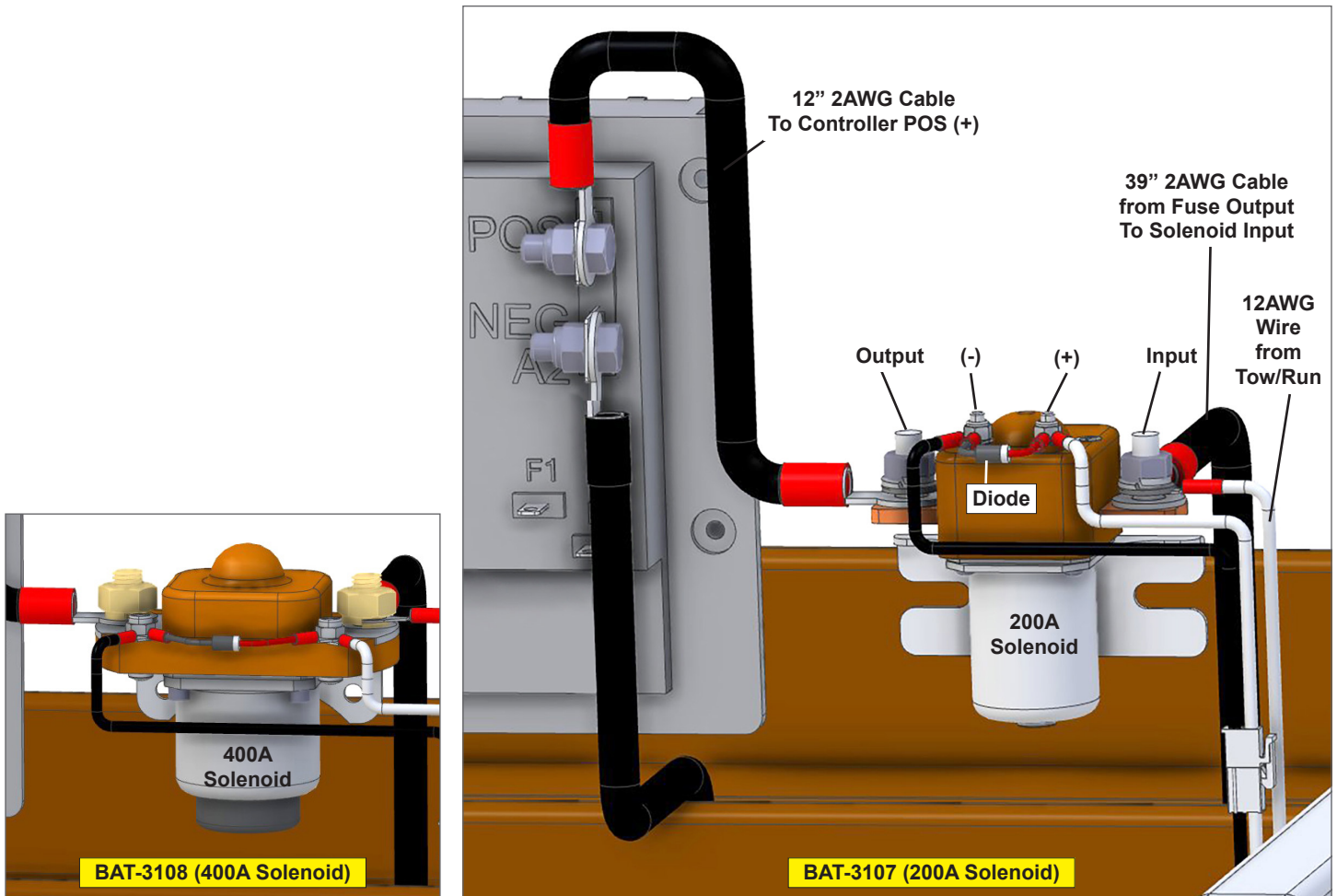
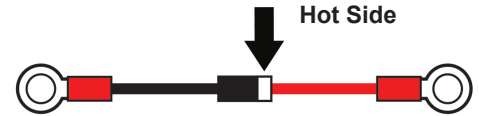


Install Solenoid

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

NOTE: BAT-3107 (100A battery) includes a 200A solenoid. BAT-3108 (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 POS (+) terminal on the controller.
3. Connect the 39" 2AWG Battery Cable from the ANL fuse holder to the solenoid input terminal along with the white 12AWG wire feeding the Tow/Run switch.
4. Install new diode to small terminals on the solenoid with the hot side being closer to the larger input terminal as shown. Connect the white factory wire to the positive (+) side and the black factory wire to the negative (-) side.



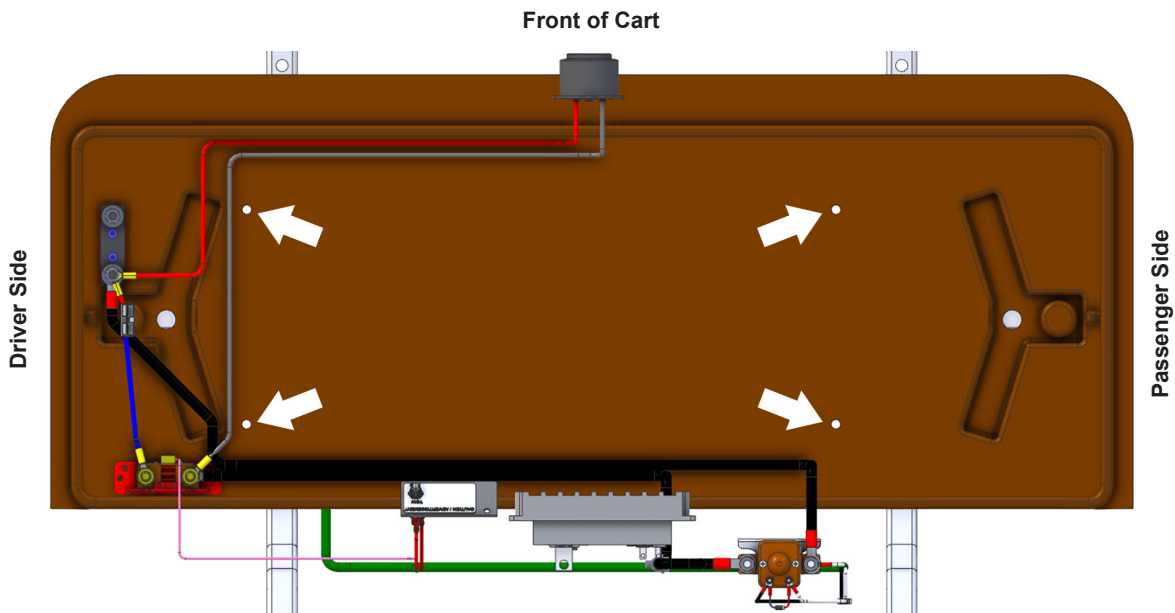
BAT-3107: Install Batteries

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.
2. Using a lift or multiple people, place the battery inside the battery compartment and align it with the (4) previously drilled mounting holes. When oriented correctly, the positive (+) and negative (-) terminals will be on the driver side.
3. Install the battery to the battery compartment floor and battery brackets using (4) 3/8"-16 x 2.5" Hex Head Bolts, (8) 3/8" Flat Washers, and (4) 3/8"-16 Nylock Nuts. Torque to 15-17 FT LBS.
4. Connect the 19" 2AWG Battery Cable from the "B-" terminal on the SOC shunt to the negative (-) terminal on the battery.
5. Connect the 16" 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.



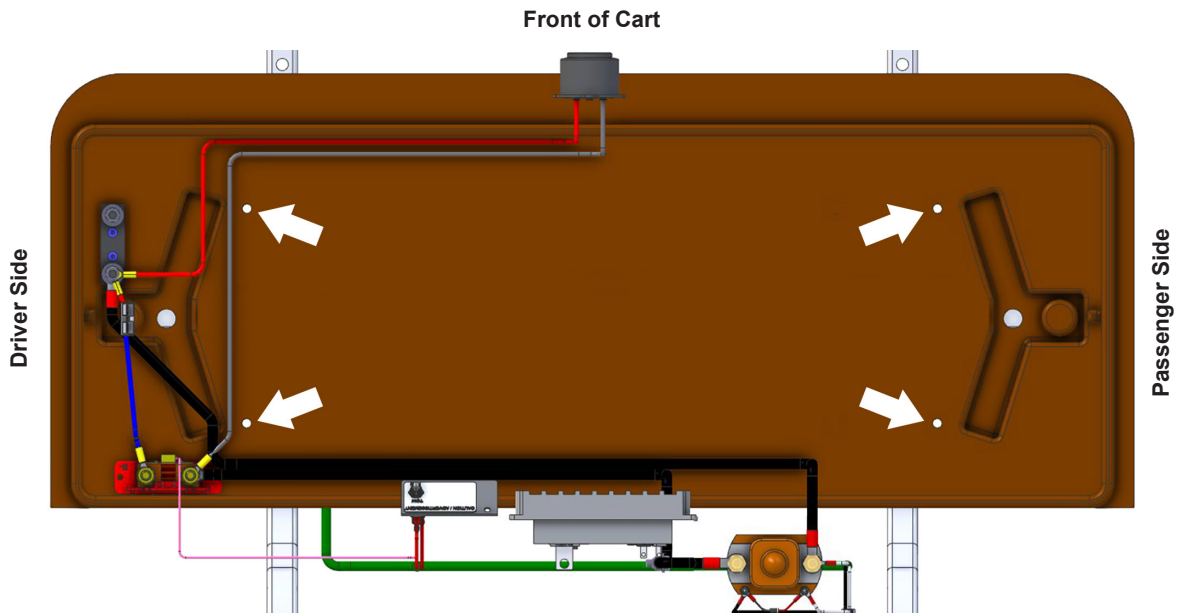
BAT-3108: Install Batteries

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.
2. Using a lift or multiple people, place the battery inside the battery compartment and align it with the (4) previously drilled mounting holes. When oriented correctly, the positive (+) and negative (-) terminals will be on the driver side.
3. Install the battery to the battery compartment floor and battery brackets using (4) 3/8"-16 x 2.5" Hex Head Bolts, (8) 3/8" Flat Washers, and (4) 3/8"-16 Nylock Nuts. Torque to 15-17 FT LBS.
4. Connect the 19" 2AWG Battery Cable from the "B-" terminal on the SOC shunt to the negative (-) terminal on the battery.
5. Connect the 16" 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.

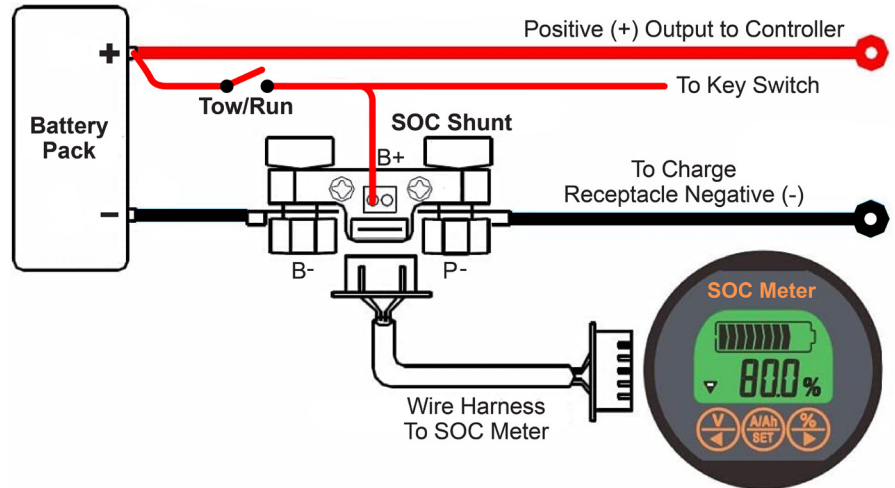
6. Tighten all battery cables using the torque requirements in the battery's Operator Manual. Do NOT over tighten.



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.
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.

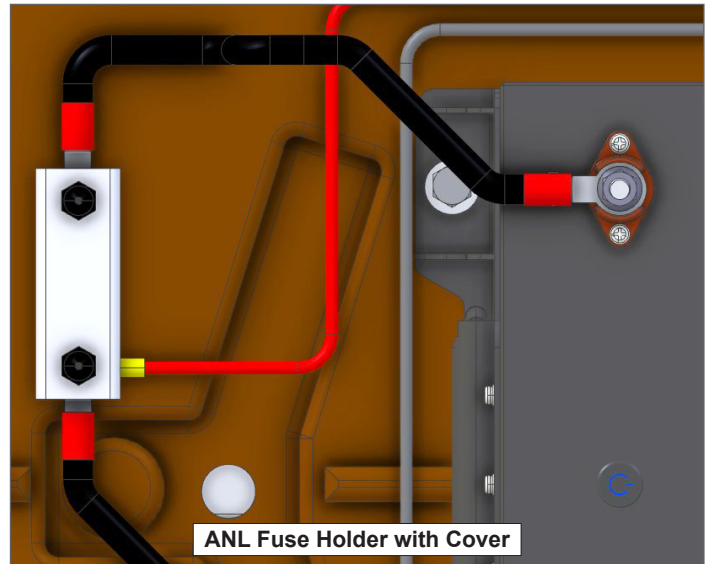
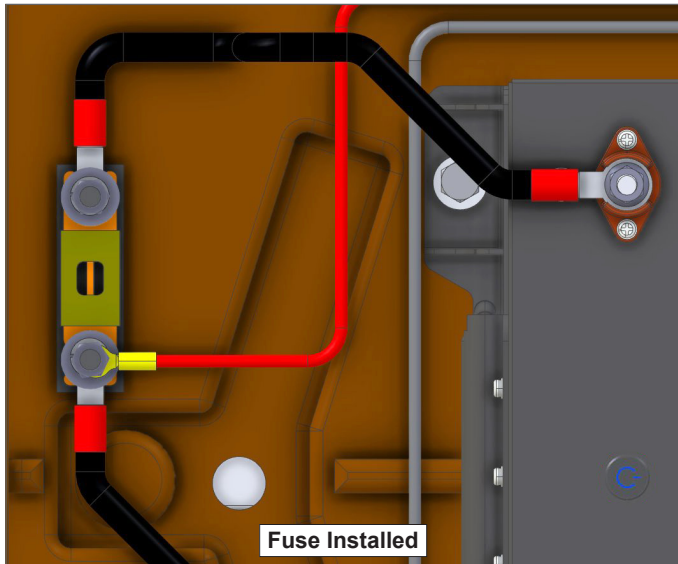
CAUTION: Do not zip-tie any SOC wires to any high power cables. High power noise can cause SOC reading errors.

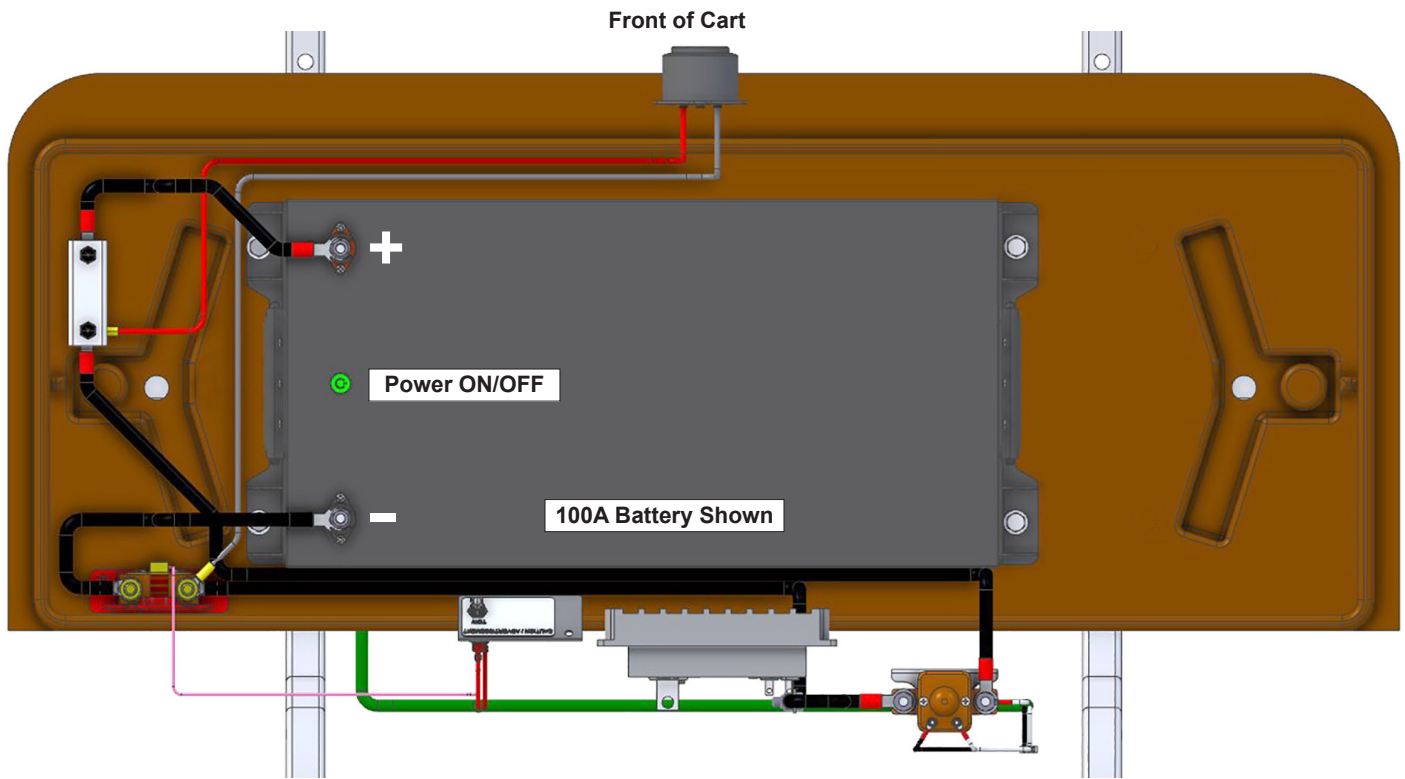


4. Connect the wire harness to the SOC shunt as shown in the diagram. Secure any loose wires with wire ties.

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.



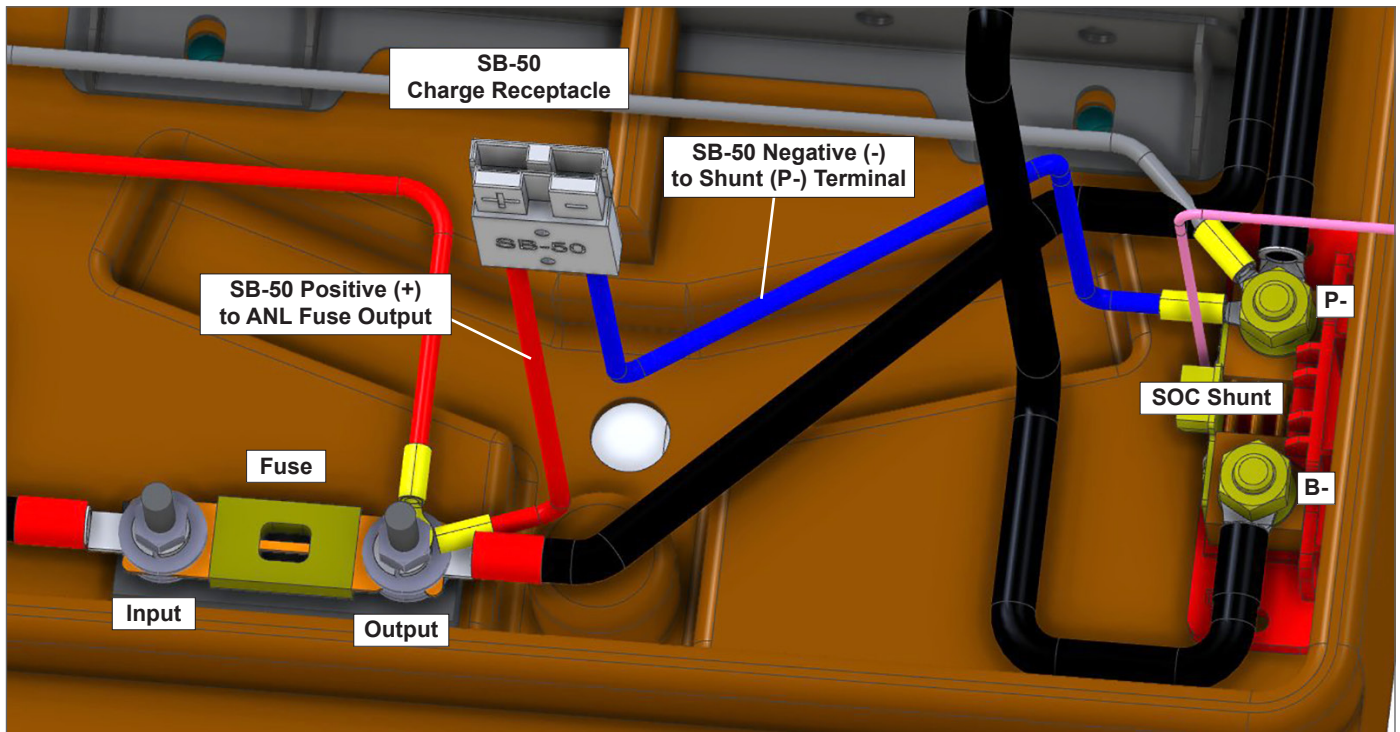


5. Press the power button on the battery to ON as shown above.
6. Use a digital voltmeter to verify all connections and the total voltage of the pack.
7. Check the charger receptacle's voltages and the battery pack's main negative to the positive (+) 48V terminals for the correct polarity and voltage. 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 39" 2AWG cable going to the solenoid.
2. Connect the negative (-) wire from the SB-50 charger plug to the SOC shunt's (P-) terminal.

NOTE: Drawing shows both charger receptacle wires and SB-50 wires.



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.

RED HAWK
A Family of Brands

RHOX

RED HAWK

DoubleTake