



Star EV Lithium 48V Sirius Installation Guide

Applicable to 2021 and 2022 Sirius' with CAN connector



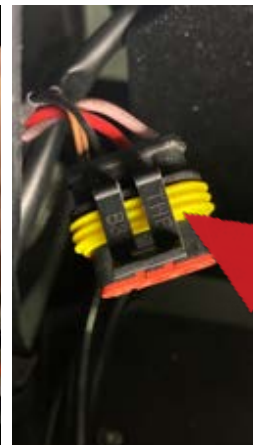
STAR

Contacts to know

Star EV Technical Support

864-549-7224

www.starev.com



STOP!!

This kit will not work with your Sirius vehicle unless it:

1. Has 21 or 22 in the serial number year designation
2. Has the 2-Pin CAN connector under the center cupholder
3. Has the 4-Pin key switch connector in the battery comp.

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**IMPORTANT NOTE: Your Lithium battery will not arrive fully charged!
You must fully charge your Lithium unit BEFORE operating! This
Lithium kit is intended for OEM motor/controller applications!**

Tools Needed

For battery removal, you will need to have a ratchet, with an extension, a 14mm deep socket, and a 13mm deep socket. You may also want to have a battery lifting strap, to help lift the lead acid batteries out of the vehicle. You will need wire cutters for cutting the zip ties that hold the old charger wiring to the frame rails. It will also be helpful to have an assistant nearby, throughout the whole conversion.

To install the lithium battery, you will need the same tools, a ratchet, extension and deep 13mm socket. You will also need access to a die grinder, Dremel tool, portaband saw, or grinder to cut off the SLA mounting tabs at the bottom of the battery compartment.



For installing the charger, you will need a Phillips screwdriver, a ratchet with a 10mm socket, a long extension, a 13mm socket and a 10mm wrench, and a 13mm wrench.



You will need a drill, with a 3/8" drill bit, a medium length Phillips screwdriver or a Phillips screwdriver bit socket, a 8mm nut driver or 8mm nut driver bit socket, and a long 5mm, ball end Allen socket. These sockets can be driven with a cordless ratchet, or cordless 1/4" drive impact gun.

Kit Contents

The installation of this kit must be performed by a Star dealer, in order to retain your Star vehicle warranty.



2CR020 Charger Cable
(From battery to charger)



2HD355 Sirius/Capella Lithium Hardware Kit



2BA405 80Ah Lithium Battery



2BA410 105Ah Lithium Battery



2BA415 210Ah Lithium Battery



2WH290 Main Harness for Lithium Key Switch



2BT296 Lithium Rear Battery Cover



2BT291 Sirius/Capella Battery Mounting Plate



2BT289 and 2BT290 Charger Mounting Legs



2CH020 Lester Summit II Charger

Battery Removal Process



To make it easier to access and remove the batteries, it will be a huge help to remove the seat cushion. To remove, raise the seat upward, and slide the hinges apart. You will see that the hinges are able to slide apart, when the seat cushion is in the upright position. Set the cushion aside, so it is now out of the way.



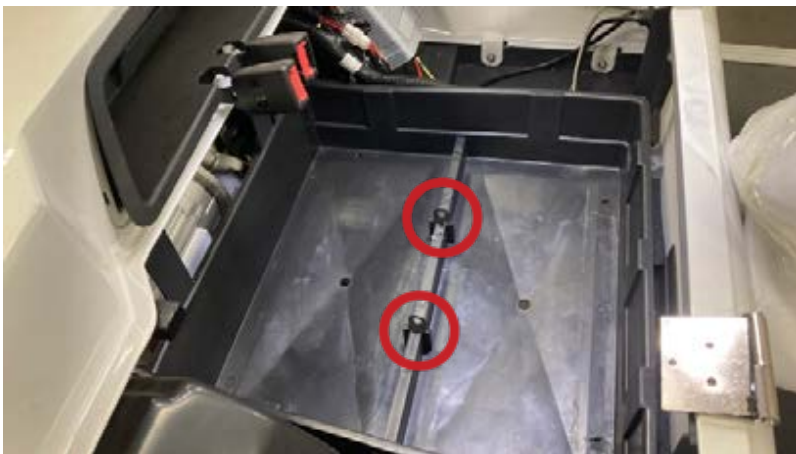
To remove the sealed lead acid batteries, you will need to disconnect the main battery cables from the battery pack, and keep them from contacting the batteries. Use a 14mm socket for removing the terminal nuts. Use the 13mm deep socket, ratchet and extension to remove the nuts from the battery holddowns. Remove all the battery cables that connect the batteries to each other.



There are battery holddowns in the center area of the battery array. But you'll also find two on each holddown for the outrigger batteries. Once you've removed the holddown nuts, remove the black plastic battery retainers with the outer batteries.



With the compartment now cleared out, you can install the Star EV lithium battery mounting plate. This is the 2BT291 Mounting Plate. You will need the 4-M8x1.25x60mm button head bolts, 4-M8x1.25 nylock nuts, and 4-M8 flat washers to secure this plate into the car, from the hardware kit 2HD355.



At the bottom of your battery compartment you will have the original plastic battery tray. Remove this tray and you will be left with the open, bare frame below. You will see there are two straps sticking up in the center, where the lead acid battery holdowns used to attach. Use a die grinder, with a cutting wheel, grinder or porta-band saw to cut these straps off flush with the frame. Use black spray paint to coat the cut ends, to prevent rusting.



Battery Compartment Preparation



When your battery tray tub has been removed, tabs cut off and painted, this is what the battery compartment will look like.



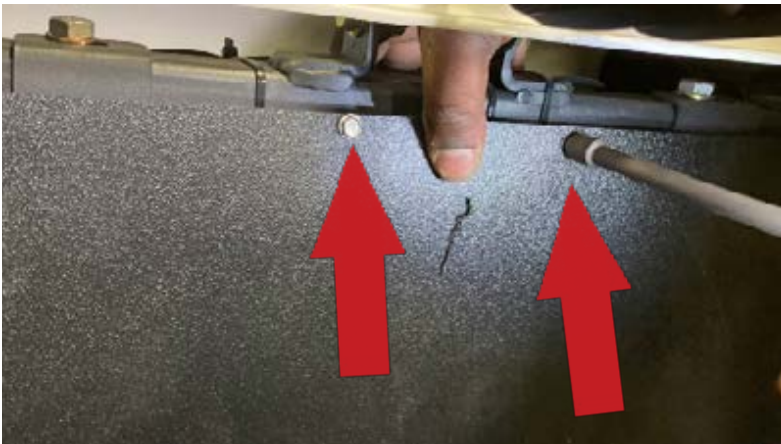
You will move all wiring so that it is outside of the horizontal lip of the angle iron that makes up the frame. You can use zip ties to secure the wiring out of the way, if needed. You do not want any wiring caught between the new battery mounting plate and the frame. This could cause a short circuit situation that will be very hard to locate. Slide the mounting plate so that it is centered in the frame rails, and pushed almost all the way toward the front of the compartment.

Beginning with any of the mounting plate holes, drill a 3/8 hole through the frame. This will go down through the mounting plate standoff and all the way through the frame rail. With each new hole drilled, insert a bolt, to prevent the plate from “walking” as you drill the next hole. This will ensure that all the bolts will remain lined up until the last hole.





You are ready to install the washers and nylock nuts onto the mounting plate bolts. Use a wrench and Allen socket to tighten all 4 of the bolts and nuts. Your battery mounting plate is now installed, and ready for the battery installation.



At the rear of the battery compartment, you will find the frame bar shown above. Use the two self-tapping screws to attach the 2BT296 Lithium Battery Rear Cover. Place the angled corners facing toward the top.

Battery Installation



The battery shown here, is the 105Ah lithium unit, but the 80Ah and 210Ah units are almost the same, except for the orientation of the mounting tabs. In the photo below, you will see the 105Ah battery mounting holes circled in red, and the 210Ah shown in green.



Locate the 4-M8x1.25x20mm button head screws, 4-M8 flat washers, and 4-M8 lock washers and install them with fingers only. This will allow you to pivot the battery into place, to get all the other screws started.

- 80Ah mounting points**
- 105Ah mounting points**
- 210Ah mounting points**



Once the screws are all installed, use an Allen socket with an extension to secure all the bolts to the mounting plate.



At this point, you will have the battery mounting plate bolted in, along with the lithium battery. You will need to connect the main battery cables to the main battery terminals on the side of the battery. Be sure the battery power switch is off, for the 80Ah or 105Ah batteries. Using a 13mm socket and torque wrench, torque the bolts to 105 in-lbs.

Locate your key switch cable, PN: 2WH290. This is the harness that will provide a key switch signal to the battery, to tell it to turn on. With this cable installed, and the battery's power switch pushed in, the battery should power on.



You will find a 4-pin, black connector along the passenger side frame rail. This connector is where you will plug in the end of the key switch harness. The chrome-plated screw lock connector at the other end, will be connected to the battery **at the end of the installation process.**

Removing Your SLA Charger



You will need to remove the 650W charger, for the lead acid batteries in order to replace it with the new 1050W charger for the lithium application. You will find the lead acid charger mounted underneath the front end of the vehicle. If you look along the top of the front wheels, you will see the charger on the firewall area of the cart.



Begin by raising the vehicle and cutting all the zip ties that connect the charger cables along the frame rails. Disconnect the AC cord where it connects to the charger. This is the cord coming from the receptacle.



Route the AC supply cord back into the battery compartment, and coil the cord together into a bundle, securing with a zip tie. This will prepare the cord for connecting to the new charger, since it will now be mounted right behind the receptacle.



Now you will need to disconnect the white DB9 cable from the charger. You will need to coil this cable back into the battery compartment as well. This cable will now connect to the DB9 connector on the cable with the blue spring lock connector.



Coil the excess wire and secure with a zip tie.



Once connected to the short DB9 from the cord with the blue spring lock connector, you can use a zip tie and heat shrink to secure the two DB9's together and protect them from the elements.

It is not necessary to remove the DC connections to the old charger. This is because the entire old DC harness will be removed and discarded with the original charger.

When the two cables have been removed from the original charger and relocated, you can use a ratchet with a Phillips bit or Phillips screwdriver to remove the four Phillips screws that hold the charger to the vehicle. The charger can now be removed from the vehicle.



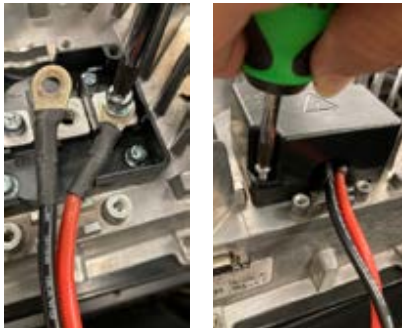
Installing Your New Charger



Now find the cord package marked 2CR020. This cord will connect the DC side of the charger to the battery pack.



You will use a Phillips screwdriver to remove the black plastic cover from the finned side of the charger. Remove the two small screws to expose the DC terminals. Pay particular attention to the polarity of the terminals. In the photo shown, the positive terminal is the one on the right.



Now you can connect the red wire, from the 2CR020 cord to the positive terminal. Connect the black wire to the negative terminal. Be sure to route the wires through the recess in the lower cover, so that the wires don't get pinched when the top cover is re-installed. Re-install the top cover and the two retaining screws.



Before installing your charger, there are some components you will need to assemble first. Here are the items you will need. Find the M8x1.25x20mm bolts, with 4-M8 flat washers and 2-M8 nylock nuts. Set these bolts aside. You will need them to install the charger brackets to the vehicle.



Locate your charger brackets and use the M6x1.0x25mm bolts, 8-M6 flat washers, and 4-nylock nuts to attach the charger brackets to the back of the charger, loosely at this time. Next, you will need to use a drill and a 3/8" drill bit to place 2 holes in the side tray area of the battery compartment. These holes need to be 9.150" apart.



Your charger brackets will be loosely held to the charger at this time. You should have two holes drilled in the side tray area. Be sure that your charger bracket feet are oriented similar to the photo below. You will now use the M8 bolt/washer/nut assemblies from above, to secure the charger feet to the vehicle, using two 13mm wrenches.



Use a 10mm socket with ratchet, and 10mm wrench to tighten the charger to bracket bolts fully at this time.

The direction of the charger bracket feet is shown above. You will need to position your side tray holes far enough in, from the side of the body, to allow the charger to fit into the compartment, AND allow you to access the bolts for final tightening.



Bring the long end, of the cord with the blue spring lock connector, so that the DB9 can connect to the new charger as shown. Snugly tighten the screw retainers.



Now that you have the charger installed you will connect the 3 prong plug from the charger receptacle to the charger.



You are now able to connect the charger cord, with the blue twist-lock connector to the charger port of the battery.



You will find a remote LED light directly above the charger receptacle. This LED has a cord attached to it, that was leading to the original charger. This cord has a computer monitor style DB9 connector on the end. This connector will need to be connected to this connector.



There are only a few remaining steps to complete the full installation. Connect the chrome-plated screw lock connector to the side of the battery, to the port labeled KEY/CAN. This will now supply the key switch signal to the battery, and the CAN signal to the vehicle's steering column mounted display. There is a separate connector from the display, that we will connect next. If this is not connected, the display will not show an accurate state of charge on the meter. **Push in the power button on the side of the 80Ah and 105Ah batteries. This power button can be left pushed in indefinitely. The 210Ah battery does NOT have a power button.**

In the center of the dash, you will pull straight upward on the cupholder. This will unhook the retaining tabs from the dash. Under the cupholder, you will find two black, two pin connectors. These connectors will need to be plugged into each other.



When you see red dots overlaid across the state of charge meter, instead of white dots, you will know that the display is receiving the CAN signal from the battery. This will now show an accurate indication of the state of charge in the battery. **Your display will be inaccurate unless there are red dots on the display.**

BE ADVISED: THE CLOCK ON THE DISPLAY WILL NOW RESET EACH TIME THE VEHICLE IS TURNED OFF. THIS IS NORMAL FOR SIRIUS VEHICLES WITH STAR LITHIUM BATTERIES.

Basic Operation

Lithium Battery Pack:

1. Battery must be fully charged before use, in order to properly calibrate the meter.
2. The lithium battery must have continuity through the key switch circuit in order to power on. The dashboard pushbutton acts as this key switch input. Turn on the battery power switch, then the dash pushbutton. Both LED's on both switch buttons will light green, when turned on. From this point on, the battery power button can remain pushed in, and the dash button will act as the power button.
3. When the charger is plugged in, the vehicle will not drive.
4. The charger can be plugged in with the power button on or off. Either scenario is acceptable.
5. The battery has a sleep mode, which is activated after 1 hour of key switch input without vehicle operation. The green dash pushbutton LED may or may not be lit when this happens. You can simply cycle the dash pushbutton on and off, to return the battery to operational status.

Lester Summit II Charger:

1. The Lester charger needs to have adequate AC power available from the wall outlet to operate. This can be confirmed by viewing the red AC present indicator on the gray charger plug.
2. On the side of the charger, you will find a blue, red, yellow, and green LED. The blue LED is also an AC present light. It confirms that there is AC power available to the charger.
3. The slow blinking amber LED indicates the bulk phase. The fast blinking amber LED indicates the battery has reached 80% of full charge. A solid amber light means the charge phase has ended.
4. The 105Ah battery typically takes 5 hours to reach full charge.
5. The charger must also receive a DC voltage supply from the battery. This voltage must be above 13-15 volts, so this further solidifies the need for the meter to be properly calibrated, as outlined in #1 of the lithium battery pack section above. If the battery pack voltage should drop below 13 volts, the charger will not operate.

Slow Blinking	Fast Blinking	Solid Amber	Steady
Bulk Phase/Start Phase	Absorption Phase (Above 80%) 12.6 amps	Finished Charge Cycle Phase	Charge Cycle Complete

General Troubleshooting

Here are some general troubleshooting questions: (**You MUST fully charge your Lithium battery before operating!**)

Q: What if there is something missing from my Star lithium battery kit?

A: Call the Star accessory parts department, at 864-553-7969.

Q: What if my battery won't turn on?

A: Verify that your battery power switch is pushed in, along with your dashboard pushbutton switch. Your battery should power up, with both of the switches pushed in.

Q: What if my meter seems to be inaccurate?

A: You MUST fully charge your Lithium battery before operating!

Q: What if my battery won't charge?

A: Verify that the red LED is lit on the AC charger cord plug. Then verify there are three cords connected to the charger, and that they are secure. Verify the correct polarity of the red and black wires under the black, plastic terminal cover on the finned side of the charger. On the side of the charger, look to see if there are any LED lights lit. If AC power is available to the charger, the blue LED should be lit. You can then download the Lester Charger Connect app onto your smartphone, to connect to the charger, for diagnostics.

Q: What if I've tried all the steps above, and still need help?

A: Call Star Technical Support, at 864-549-7224.