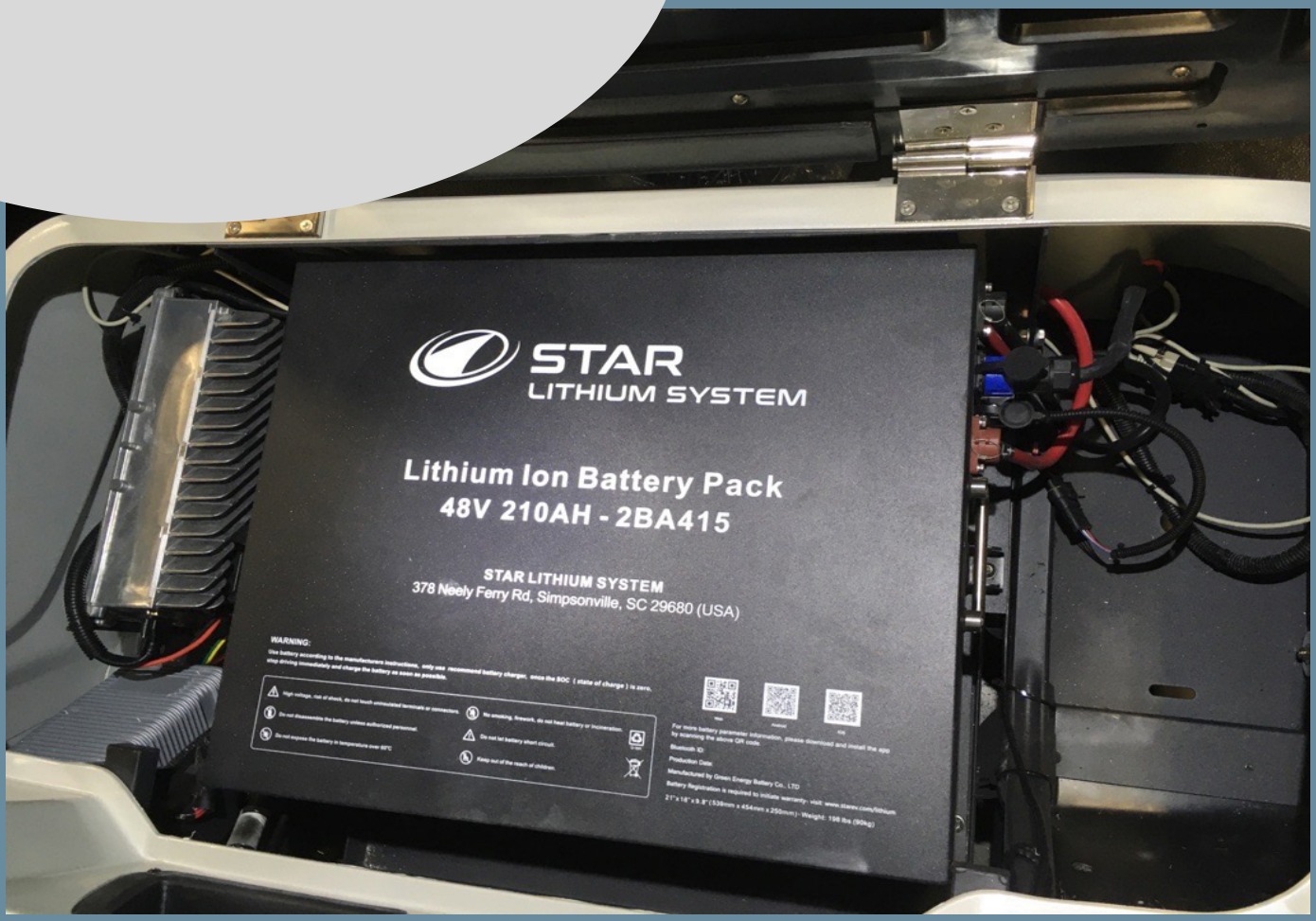
STAR




# Star EV Lithium Capella Installation Guide

# Contacts to know

## Star EV Technical Support
## 864-553-7147

## www.starev.com

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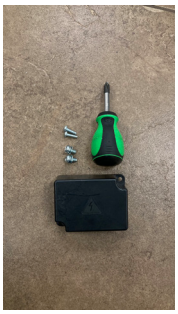
**IMPORTANT NOTE: Your Lithium battery will not arrive fully charged! You must fully charge your Lithium unit BEFORE operating! This Lithium kit is intended for OEM motor/contoller applications!**

# Tools Needed

For battery removal, you will need to have a ratchet, with an extension and 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 also need a drill and an 8mm (5/16") drill bit. You will also need a Phillips screwdriver. It will also be helpful to have an assistant nearby, throughout the whole conversion.

To install the lithium battery, and battery mounting plate, you will need the same tools, a ratchet, a long extension and a 5mm Allen socket, along with a 13mm wrench.



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

For cutting off the battery compartment floor mounting tabs, you will need a die grinder with a cutting wheel, sawzall, or porta-band saw.

For installing the rear battery compartment cover, you will need either a drill or impact driver with a nut driver attachment, with an 8mm socket. This is for installing the self-tapping screws

# Kit Contents

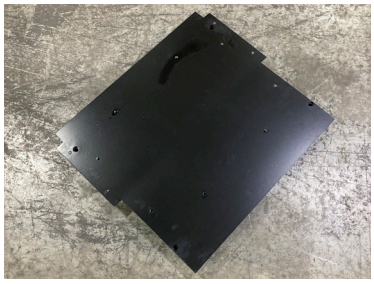
**The installation of this kit must be performed by a Star dealer, in order to retain your Star vehicle warranty.**

*2CR020 Charger Cable (From battery to charger)*


*2HD355 Capella Lithium Hardware Kit*


*2BA405 80Ah Lithium Battery*


*2BA410 105Ah Lithium Battery*



*2BT291 Capella Battery Mounting Plate*

**IF YOUR CAPELLA WAS MADE BEFORE 3/21, ONE OF THESE CABLES WILL BE NEEDED. THEY ARE NOT INCLUDED WITH THE KIT.**

*2BT804 Capella 4P/4+2 KEY SWITCH PATCH CABLE SET for STAR EV Lithium Battery*

*2BT802 Capella 2P/2+2 KEY SWITCH PATCH CABLE SET for STAR EV Lithium Battery*

*2MT223 Battery indicator, meter w/ 10 LED bars AND wire harness*

*2BT289 and 2BT290 Charger Mounting Legs*

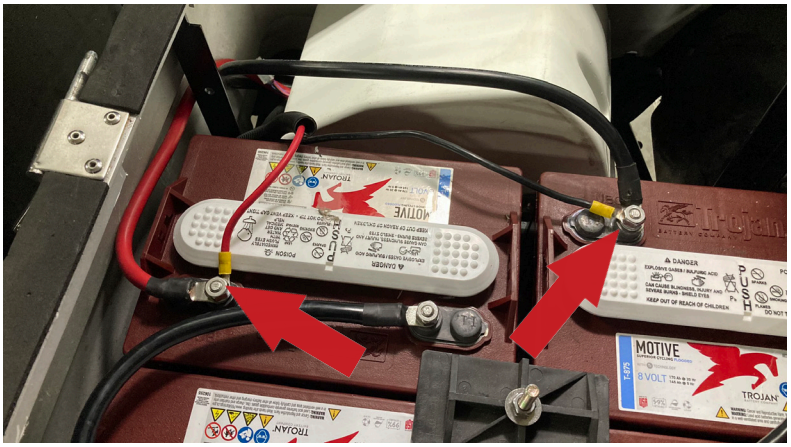
*2CH020 Lester Summit II Charger*

*2BT296 Lithium Rear Battery Cover*

# Battery Removal Process

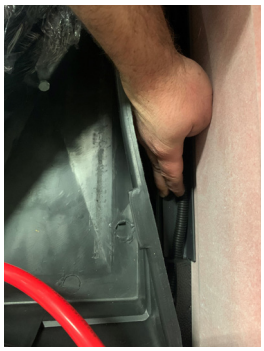
To remove the sealed lead acid batteries, you will need to disconnect the main battery cables from the battery pack, and keep them from contacting the batteries. Use the 13mm deep socket, ratchet and extension to remove the two nuts from the battery holdown. Remove all the battery cables that connect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

To gain better access to the all the batteries, you can remove the Phillips screws and black push clips from the rear battery compartment cover. This will make better room for getting the batteries lifted out.



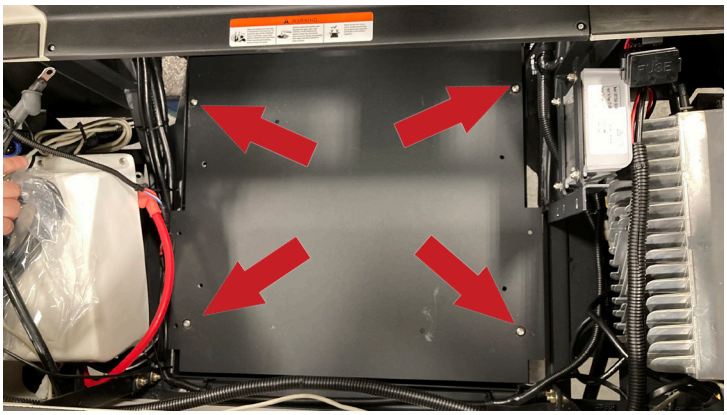

You will need to remove the cable that leads from the charger to the batteries. This will be replaced with a new cable for the lithium battery configuration.

# Battery Compartment Preparation

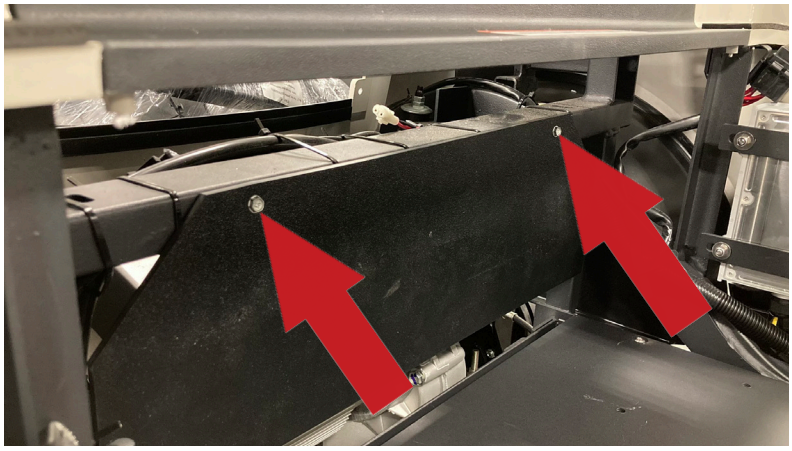


Reach into the bottom of the battery compartment, and remove the lower, black plastic battery compartment tub. This will not be needed with the new battery, since it will be replaced by the new battery mounting plate.

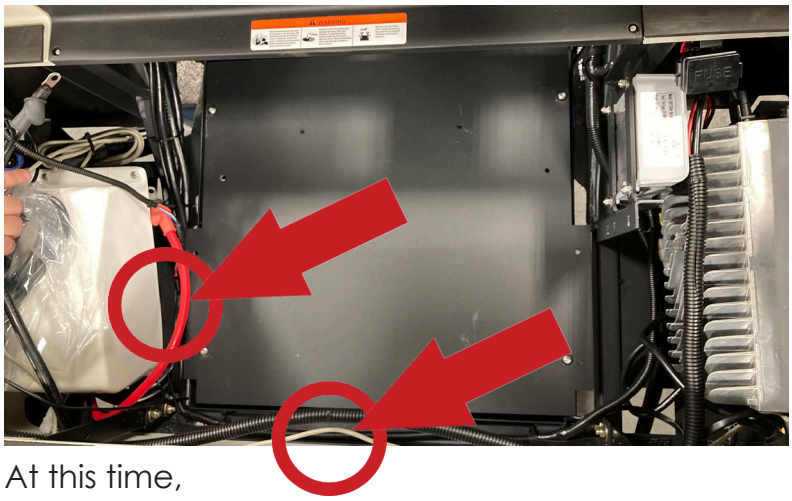
Once the batteries have been removed, you will need to cut the battery holdown straps from the center of the battery compartment floor. Use a die grinder with cutting wheel, grinder or porta-band saw to cut the straps flush with the center angle iron brace.



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.



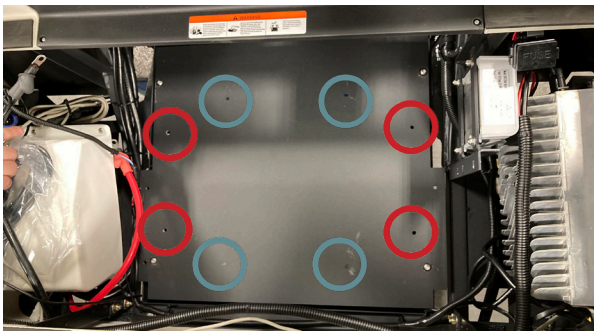

At the rear of the battery compartment, you will find the frame bar shown above. Use the two self-tapping screws to attach the 2BT296 Lithium Battery Rear Cover. Place the angled corners facing toward the top.



At this time, you will want to locate your 4 pin connector, that leads to your key switch. For the 2P model, it will be along the passenger side frame rail area. For the 4P model, it will be located at the front of the battery compartment. You will not find this connector if the vehicle was made before March, 2021. This is why you need to have the patch cable that was mentioned in the parts list. The patch cable provides this 4-pin connector and harness to the key switch.

# Battery Installation

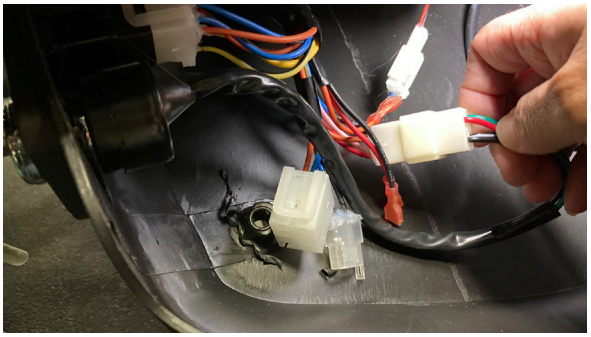

The battery shown here, is the 105Ah lithium unit, but the 80Ah unit is almost the same, except for the orientation of the mounting tabs. In the photo below, you will see the 105Ah battery mounting holes circled in red.



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**

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

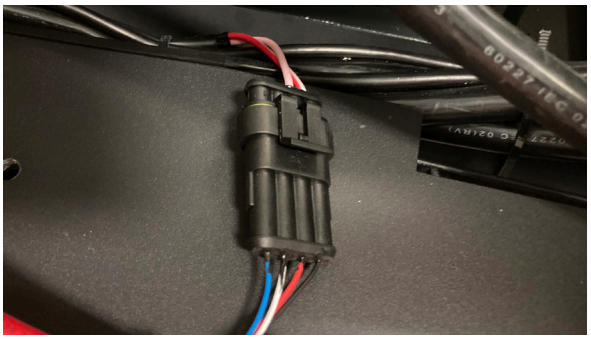


If you need to install the patch cable for your application, start from the key switch and connect the white 4-pin connector to the key switch. Route the rest of the harness under the vehicle, to the battery compartment. This will now provide the connection point, near the battery, for the key switch signal.


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. Using a 13mm socket and torque wrench, torque the bolts to 105 in-lbs.

The next item to connect to the battery, is the 2MT223 state of charge meter with key switch cable.

Remove the two Phillips screws from under the center dash cupholder. Pull up on the cupholder and pivot it over to the steering column side.



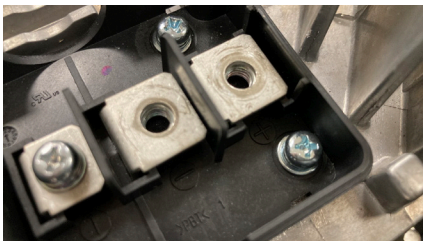
Once you have connected the MT223 Cable to the 4-pin connector, this is what you should have. This is where the key switch signal will come to the battery pack.

The MT223 state of charge meter cable will connect to the KEY/CAN port on the side of the battery, using the chrome-plated screw lock connector. The 4-pin connector on this same cable, will connect to the 4-pin connector in the battery compartment. If you cannot locate this connector in the battery compartment, you may be missing it because your cart was made before March of 2021. SEE PARTS LIST.

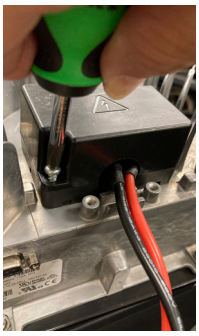
Route the meter cord under the vehicle, so that it can travel into the cupholder area. You will see an insert alongside the key switch, that is able to be removed. Once removed, this will leave an opening for the SOC meter. You will need to disconnect the meter from the cord, so that you can install it into the dash. Reconnect the cord to the meter, to finish the meter installation.

# Installing Your 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.



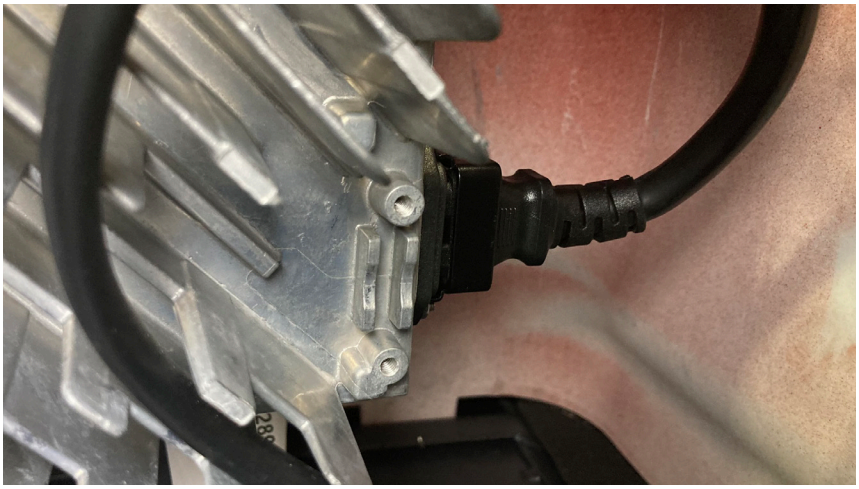
Now you can connect the red wire, from the 2CR020 cord to the positive terminal. Connect the black wire to the negative terminal. Be sure to route the wires through the recess in the lower cover, so that the wires don't get pinched when the top cover is re-installed. Re-install the top cover and the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

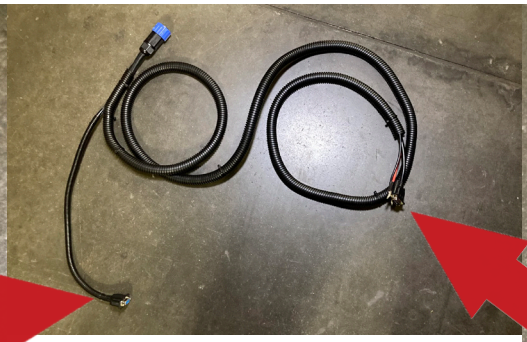


Now that you have the charger installed you will connect the 3 prong plug from the charger receptacle to the charger.

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.

**Use this connector**

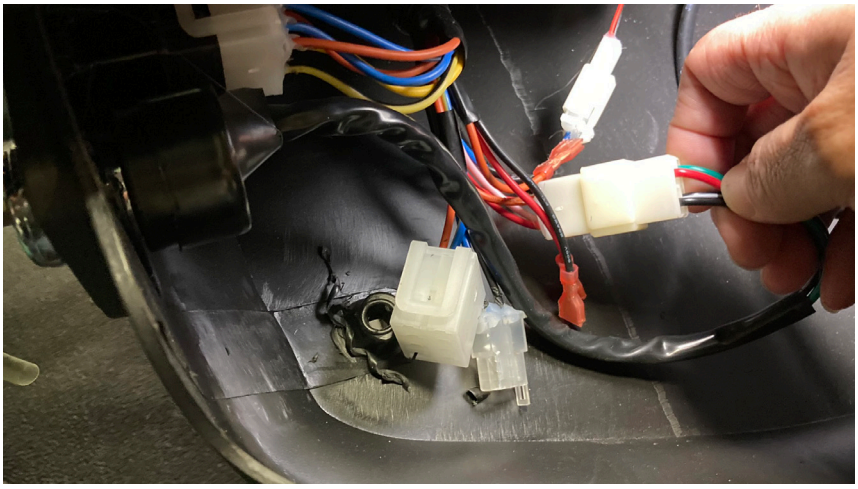


Please note: there are two DB9 ends on this cable. One has male pins (shown on the right), and is beside the DC cable ends, and one has female pins (shown on the left). Be sure to connect the LED cord connector to the connector on the left.

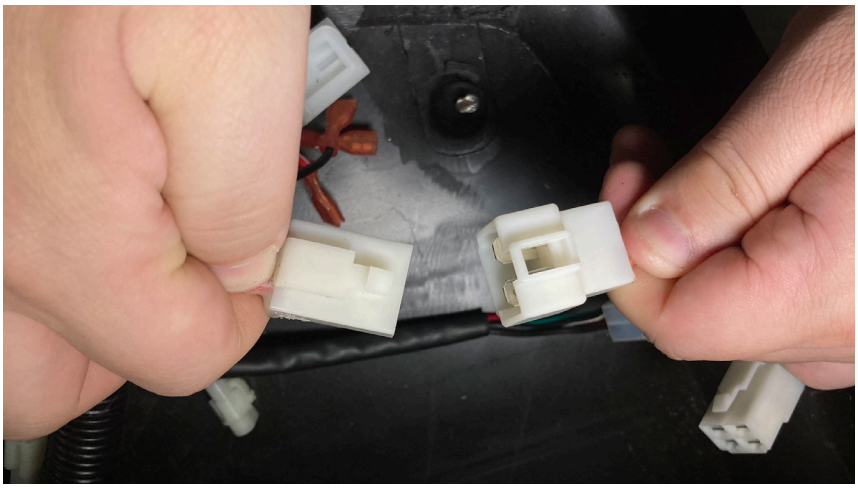
**Do not use this connector.**

# Installing the patch cable

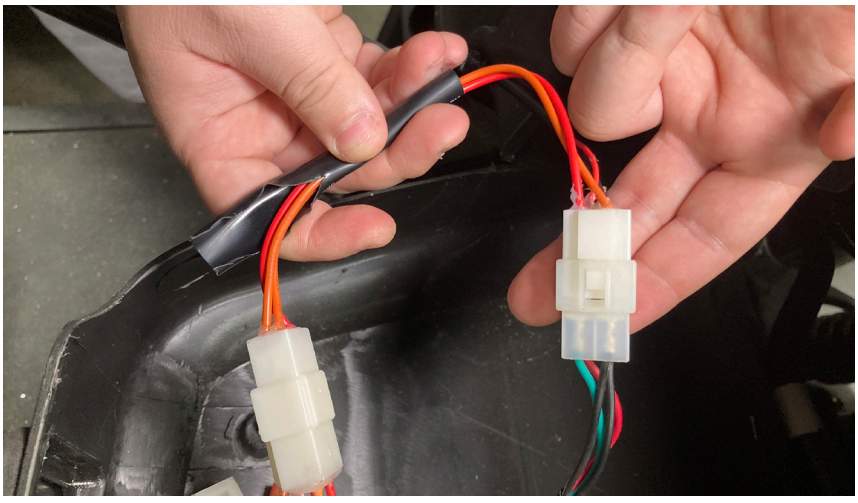
If your Capella was manufactured before March 2021, you will need to install either the 2BT802 patch cable for 2 passenger models, or 2BT804 for 4 passenger models. Your battery will not be able to turn on, if there is no connection to the key switch. If you have a 4-pin connector, coming off the KEY/CAN port on the side of the battery, with no connection to the vehicle, then you are missing this cable.



When installing your patch cable, whether the 2BT802 or 2BT804, they will go into the vehicle the same way. With the center dash cupholder removed, you will find the white key switch connector connected to the vehicle.



Disconnect the key switch connector from the vehicle. This will leave you with a male and female connector. The patch cables are made to provide a jumper between these two connectors. From that jumper, the wires "T" out to the 4-pin connector for the battery pack.



Once you've connected either of the patch cables, your key switch harness will now look like this. Route the remaining part of the harness under the vehicle, to the battery pack. This is only necessary for Capellas made before 3/21.

# 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:

| 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 |

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.

# 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 864-553-7147.