

# Star EV Lithium 48V Yamaha Fleet Drive II Installation Guide



**STAR**

## **Contacts to know**

**Star EV Technical Support**

**864-549-7224**

**[www.starev.com](http://www.starev.com)**

**STOP!!**

Your Yamaha Drive II vehicle must be a fleet version to work with this upgrade kit! The PTV version will not work with this kit!

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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 13mm deep socket, and a 12mm deep socket. You may also want to have a battery lifting strap, to help lift the lead acid batteries out of the vehicle. 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.



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)**



**2BI805 RXV/TXT PCB Board**



**2MT800 RXV/TXT SOC Status meter w/key switch cord**



**2SW800 RXV/TXT Pushbutton with Cable**



**2CR910 110V AC Charging Cord**



**2CB800 RXV/TXT Interlock Cable to Board**



**2RC080 110V Charger Receptacle with Cord**



**2BA405 80Ah Lithium Battery**



**2BA410 105Ah Lithium Battery**



**2BA414 160Ah Lithium Battery**



**2BT808 Short mounting strip, 2BT809 Long mounting strip**



**2BT807 Yamaha Drive II battery mounting plate**



**2CH924 Charging receptacle adapter plate and 2CH923 Charging receptacle adapter plate gasket**



**2BT289 and 2BT290 Charger Mounting Legs**

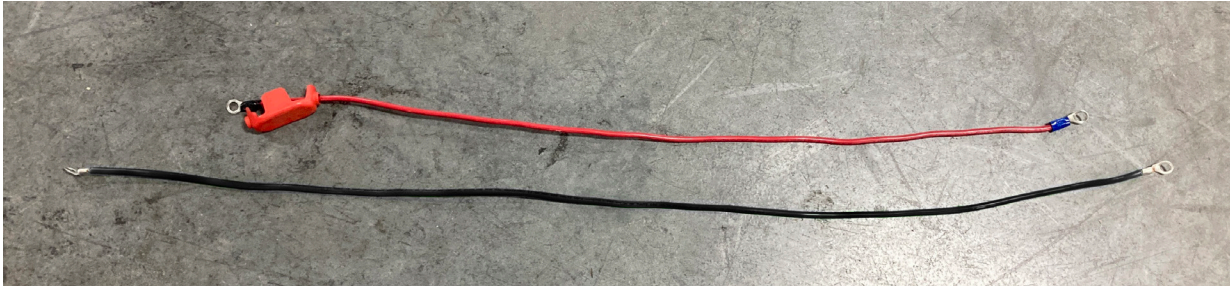


**2CH020 Lester Summit II Charger**



**2CH913 Remote LED for Lester Summit II**

# Kit Contents



**2BT810 Battery Positive Cable (RED), 2BT811 Battery Negative Cable (Black)**



**2HD354 Yamaha Lithium Installation Full Hardware Kit**



**2HD300 Hardware kit for attaching charger legs to charger and mounting charger to vehicle**



**2HD301 Hardware kit for receptacle to adapter plate, and receptacle to Vehicle**

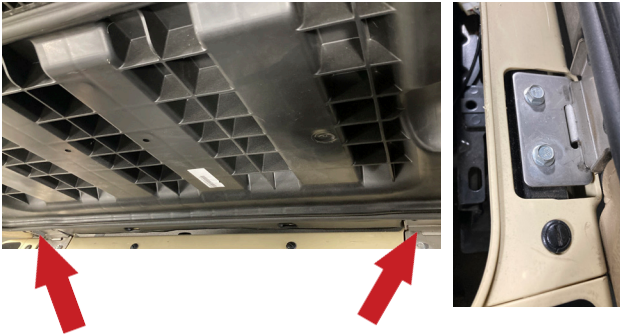


**2HD306 Hardware kit for battery to battery mounting plate, and mounting plate to vehicle**



**2HD304 Hardware kit for PCB to Vehicle. Black wire goes from the negative battery terminal to the PCB board screw lock connector.**

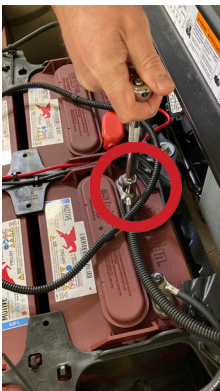
# Battery Removal Process



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 lift upward, to separate the hinges. You will see that the hinges are able to lift apart, when the seat cushion is in the upright position. Set the cushion aside, so it is now out of the way.

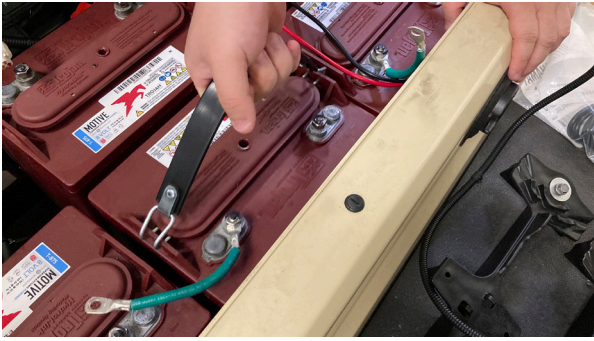


To remove the sealed lead acid batteries, you will need to disconnect the main battery cables from the battery pack, and keep them from contacting the batteries. Use a 14mm socket for removing the terminal nuts. Use the 12mm socket, ratchet and extension to remove the nuts from the battery holdowns. Remove all the battery cables that connect the batteries to each other.



There are battery holdowns 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.





You will lift all the batteries out, in order to empty out the battery compartment.



Moving to the rear of the vehicle, remove the screws that hold in the rear golf bag compartment. This will allow access to the other ends of the main battery cables. You will need to have access, since we will be replacing these cables in a future step.



# Battery Compartment Preparation



To help in installing your charging receptacle you will remove the push pin clips from the front of the battery compartment. This will allow you to pull the front cover away from the battery compartment.



You can also remove the original charging receptacle. This will be replaced with the receptacle from the kit components.



You will also need this front cover to be removed, to reach the front bolts that mount the battery to the battery plate.



Attach your new receptacle to the receptacle adapter plate. This will allow you to place the receptacle assembly into the receptacle hole, and mark the adapter plate mounting holes. You will also mark the hole for the charging status LED.



Be sure that your receptacle will line up with the structural plate that is behind it, before marking your bolt holes. This is important, because you only want to drill the holes once.



Once your receptacle mounting holes are marked, install the adapter plate gasket, and the bolts. This is how the assembly will look from the back side.

# 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.

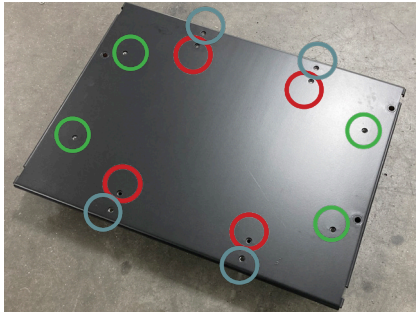
Place the battery mounting plate inside the battery compartment. Using a pencil, you will mark through the three mounting standoffs. This side, with one mounting hole goes toward the driver's side.



This side, with two mounting holes, goes toward the passenger's side of the vehicle. Once the holes are marked, set the mounting plate aside, so that you can drill the mounting holes down through the plastic battery compartment floor.

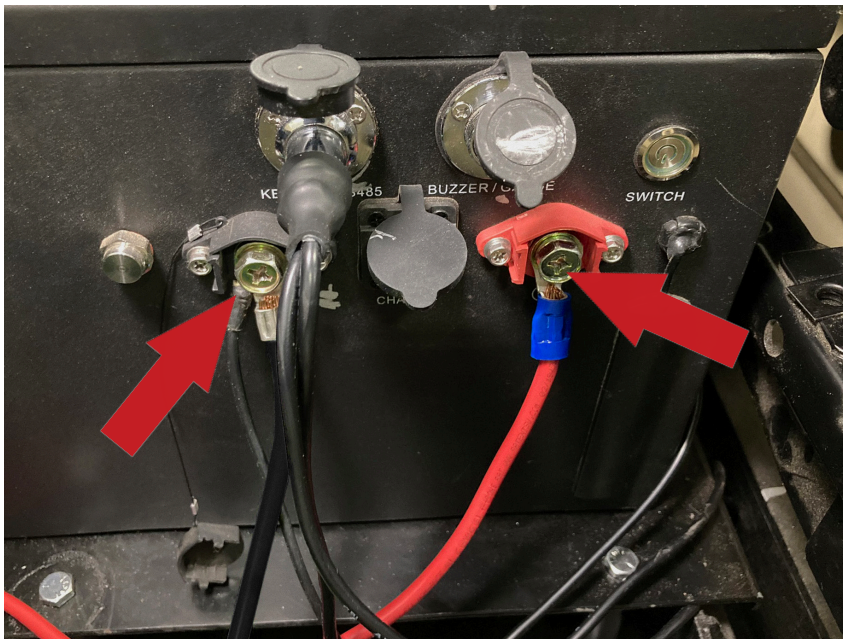


Using a 13mm wrench and a ratchet with a long extension and 13mm socket, install the three 130mm bolts down through the battery mounting plate, and through the mounting strips. Install three lock washers and the M8x1.25 nuts. Tighten strips so that they span across the ribs of the honeycomb.



Locate the 4-M8x1.25x20mm hex head bolts, 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. Tighten all bolts once they are all installed.

**80Ah mounting points**  
**105Ah mounting points**  
**160Ah mounting points**



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

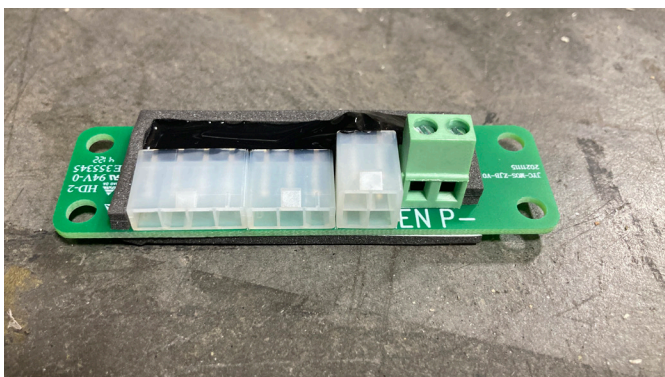


The other end of the main negative battery cable will attach to the controller here.



The free end of the main positive battery cable will attach here, to the contactor terminal.

# PCB Board Installation



The PCB board is the main component that makes the whole kit work. The various connections are all different, so they can only be plugged in one way. But I will show them close-up, to make sure there isn't any confusion.



The key switch button connector plugs into the flat, 4-pin connector on the left.



The charger interlock cable connects to the square 4-pin connector on the right.



The flat 3-pin connector goes into the middle connector. This is the connector on the cable that goes to the battery and SOC meter.

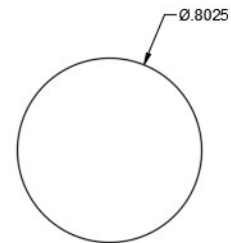
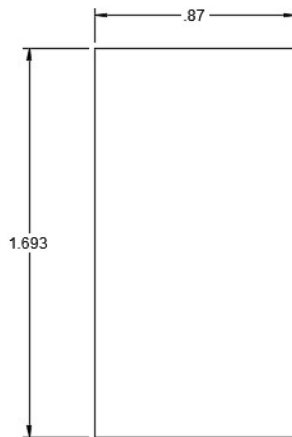


The last connection is from the battery negative terminal, to the terminal marked P-. This is a screw lock connector, and should be tightened with a flat head screwdriver until secure. **DO NOT USE THE PORT MARKED EN**



Once all your connections are made, to the PCB board, you are able to affix the board to the RR inner fender liner, inside the battery compartment.

Your meter, and battery power button will run from the PCB board, through the battery compartment, up to the dashboard. You will make holes for the meter, and battery power button. We have mounted ours beside the REV/FWD switch. The hole for the meter can be cut using an oscillating saw. The dimensions are .87 wide, by 1.693 high for the meter opening. The switch hole is .8025 in diameter. The meter has tabs on the ends that allow it to simply be snapped into its opening. The switch has a retaining nut that must be removed and reinstalled once the switch is installed.





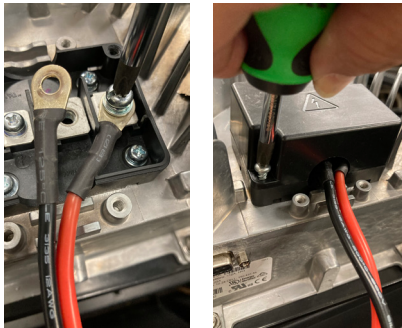
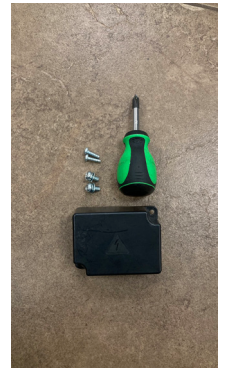
# Installing Your New Charger



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



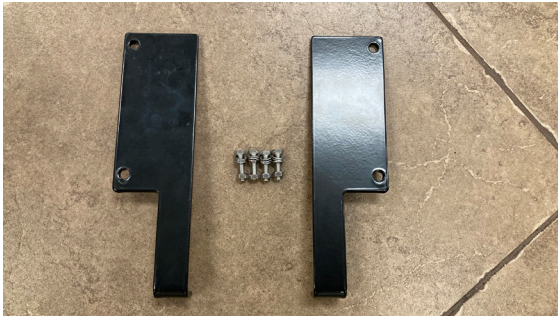
You will use a Phillips screwdriver to remove the black plastic cover from the finned side of the charger. Remove the two small screws to expose the DC terminals. Pay particular attention to the polarity of the terminals. In the photo shown, the positive terminal is the one on the right.



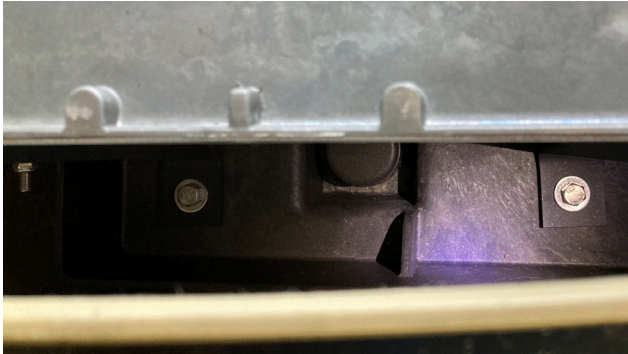
Now you can connect the red wire, from the 2CR020 cord to the positive terminal. Connect the black wire to the negative terminal. Be sure to route the wires through the recess in the lower cover, so that the wires don't get pinched when the top cover is re-installed. Re-install the top cover and the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

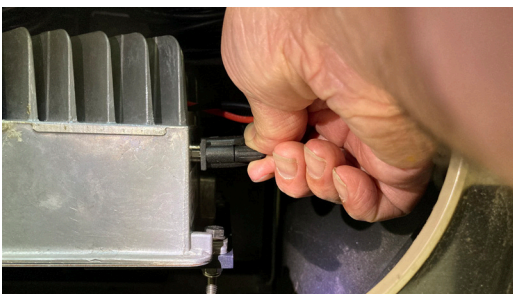


Your charger brackets will be loosely held to the charger at this time. You should have two holes drilled in the side tray area. Be sure that your charger bracket feet are oriented similar to the photo below. You will now use the M8 bolt/washer/nut assemblies from above, to secure the charger feet to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

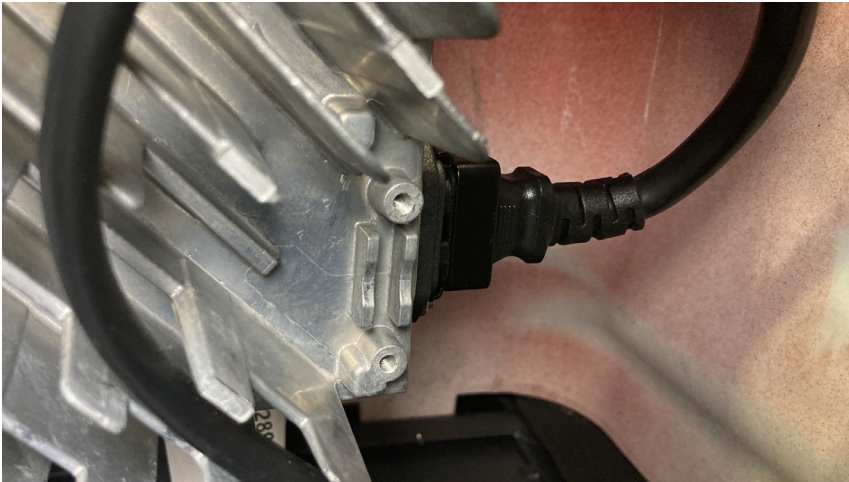


Use a 10mm socket with ratchet, and 10mm wrench to tighten the charger to bracket bolts fully at this time.

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 install the charger status LED beside the hole in the charger receptacle adapter plate. This cord has a computer monitor style DB9 connector on the end. This DB9 connector will need to be connected to its mating connector on the charger cord with the blue twist lock connector.

# 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.