

# ThunderStruck Motors - Electric Sailboat Kit

Thank You for your purchase of a ThunderStruck Motors Electric Sailboat Kit! Included you should find the following:

Motenergy Motor  
Curtis Controller  
Tyco Contactor  
3 Black motor cables

1 Red contactor cable  
Wiring Harness with Key Switch and Throttle  
black and red cable boots  
Single use thermal grease

Parts Check: \_\_\_\_\_

## Curtis Installation Instructions

**\*\*IMPORTANT\*\*** Controller must be mounted to a heat sink or other device that will provide adequate cooling before it is to be used under heavy load. This is to prevent thermal cutout and possible damage to the controller under continuous use.

1. The LAST connection you make should be connecting the batteries. This way, there will be no live voltage on any of the cables or components as you are wiring things.
2. Attach the three large black motor and controller cables (M1 or A to U, M2/ B to V, M3/ C to W). Use the black rubber boots on both ends Or the plastic motor cover.
3. Connect the red B+ lug on the controller to either large lug of the contactor using the heavy red cable. Use the red rubber boots on both ends of the cable.
4. Insert the 35-pin connector into its slot in the controller. It will only fit one way.
5. Connect the black 8 pin Encoder and Thermistor connector wire to the motor.
6. Connect the small wires labeled contactor to the small lugs of the contactor (polarity does not matter).
7. The two small ring terminals labeled Key Switch will go to your key switch pins #1 and 3 after the switch is mounted and turned off (counterclockwise).
8. If you have an ET throttle, connect the white 9 pin to that. You can ignore the 6 pin connector labeled for programming.
9. Your batteries will be wired in series (typically 4 to get 48volts). For your two battery pack wires, most positive battery+ goes to the available lug on the contactor, as well as the short red fused wire coming from the multipin connector. Battery pack negative goes to the B- lug on controller. Heavier wires go on lugs first, then lighter wires go on top.
10. In a typical setup, your 48v charger output wires will also go to the most positive and negative terminals of the battery pack.
11. After the motor is securely mounted turn the key on, with throttle in neutral position. Move throttle up or down to run forward or reverse. If you have a PB-8 throttle, make sure your direction switch is in neutral on start up.
12. Avast ye, matey!

The Curtis manual is available on our website ([thunderstruck-ev.com](http://thunderstruck-ev.com)). Check it out for additional images and information.

## Sailboat Specific Notes

13. Everyone's boat is a little different from the next. This is a DIY kit and we can't include everything in our instructions, so it's best to have a trained electrician familiar with DC power oversee your installation as a safety precaution. If you're using battery packs higher than 48v, it is required to have a licensed electrician look over your system.
14. Check and follow local laws as they vary regarding necessary wiring requirements. You may for instance be required to have the AC side of your charger grounded to the hull. The Coast Guard Electrical Law regulations are available at [Thunderstruck-ev.com/product-manuals-and-data-sheets.html](http://Thunderstruck-ev.com/product-manuals-and-data-sheets.html)
15. If following the ABYC code you'll need to address several design elements such as, but not limited to:  
A) Battery Monitoring B) Labeling of Cables, Batteries etc. C) Cable Conduit D) Battery Disconnect E) Fault Monitoring F) Not grounding the traction battery pack, but grounding non-current carrying conductors.
16. Batteries on a sailboat should be hard mounted low and near the center of the craft. Be aware that flooded batteries may spill corrosive fluid.
17. Batteries make explosive gases when charging; fresh air ventilation is necessary. Even though the motor is brushless and won't cause arcing, other onboard sources could potentially be ignition sources, like plugging in or unplugging a charger, loose electrical connections, or other dc switches. The Tyco contactor is sealed and should not spark.
18. The motor also needs circulating air, as it is air cooled. If it's too hot to hold your hand on then it is getting too hot. This is from high continuous current draw.
19. ET throttles have arms on both sides. Be sure to mount so fwd is fwd and vice versa.
20. Your necessary battery capacity size will depend on average current draw, which we've seen can vary from 30-150 amps at full throttle. So, ideally it's best to find your boat's current draw at the speed you need then calculate your battery capacity based on that. 100Ah is a typical minimum.
21. When sailing, watch how your current draw changes relative to your speed. Keep current (and speed) low for long motoring; it's not unlikely that every knot increase in speed can use twice the current. There are a lot of variables that affect current draw and speed- mainly they are: hull size, condition and design, displacement, prop diameter and pitch, and wind and water condition.

Using the regen feature of the motor to charge your batteries is not always possible, but sometimes will just need to be “nudged.” If the prop is not spinning while sailing at full speed, you can try giving a little throttle to get the prop spinning, then backing off the throttle as far as possible while still keeping the prop spinning. Check your current draw to confirm that energy is being produced, and not used.

## Thunderstruck Motors Sailboat Kit Basic Troubleshooting

There are several common issues that come up with electric drive systems. It is pretty easy to find out the cause of most problems.

1. Is this the first time the system has been used or did it used to work fine? If it's the first time you're trying it out and there's a problem, it's most likely due to a wiring error. Follow the diagram step by step and check for errors.
2. Always start by checking the batteries. A 48v pack should rest between 48v (dead) and 56v, closer to 60v at the top of the charge cycle. This is between 12v and 14.5v per battery. Under load when motoring, this value should be no lower than 48v. This is a good time to confirm your charger is working as well. Can you see the voltage change after the charger is on when measuring at the batteries with a voltmeter set to dc?
3. Can you hear the contactor close after the key switch is turned on? If not, then battery power is not getting to the keyswitch, or to the Curtis controller (pin 1) after the switch, OR it is but the controller is not allowing the contactor to close because there are faults. If there are faults, the LED will flash a fault sequence. The fault code list is in the curtis manual, also on our website.
4. If the Curtis is not illuminating the LED, remove battery power to the system and check for continuity between pin 1 on the Curtis and the red fused wire ring terminal that's on the contactor. Be sure when connecting the red fused wire, it connects to the Battery side of the contactor. Consult your multimeter's manual to see how to check for continuity.
5. If there are faults, consult the fault list in the manual. The most common fault is due to having throttle not at zero when the key is turned on.
6. No faults but it still doesn't work? Is the problem with the motor, controller or throttle? The controller needs only a few things to operate- power, direction and throttle inputs. If the system is very old or shows signs of corrosion you should check that the cable connections are clean, none of the pins have pushed out of place in the housing, and there is no pinching of any cables.
7. Confirm your motor cables match their position on the motor and controller. If they are in the wrong spot you may get some jerky oscillation at the motor.
8. Your problem not covered here? Send us an email (preferred) or give us a call.

