



Makers PEV Fully Assembled Flowglider Box Setup

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INTRODUCTION

If your XR's controller is damaged you can either look for a replacement or go the same route I did, getting a Little FOCer v3 setup from Makers PEV. And for all the other replacement parts needed, I went through my local shop, Rent-E-Boards DFW. Many thanks to Uy at Makers PEV and Corbin at Rent-E-Boards DFW for getting me back to riding! - Neel

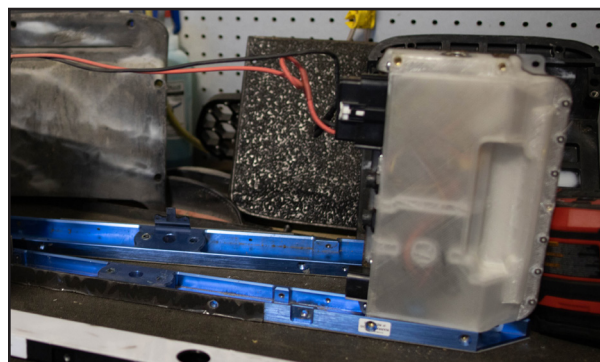
I'm documenting the steps I took to help others prevent any mistakes and get back to riding sooner than later. Let's get started!

PARTS NEEDED

Before you begin, ensure you have the following working parts. Either from your original XR or any replacement parts you had to get from your local shop and of course the Little FOCer v3 from Makers PEV.

From Makers PEV

- Makers PEV Fully Assembled Flowglider Box
- Makers PEV battery harness



Existing or replacement parts from local shop

- Rails
- Motor
- Tire
- Rear footpad
- Front footpad
- Battery
- Battery box (if your battery box is damaged, it can be 3D printed)
- Battery box lid
- Bumpers

NOTE: The BMS is optional with the Little FOCer v3 and I opted to not run one at this time.



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PREPARATION

Since you will need to access the battery box to replace the cable harness and installing the new Makers PEV Little FOCer v3 enclosure, it's best to go ahead and disassemble the entire board for easy access.

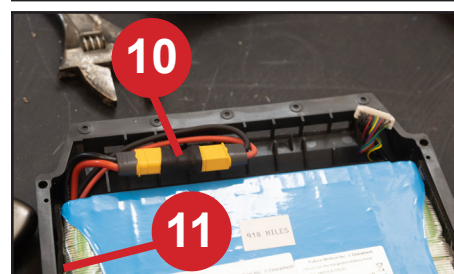
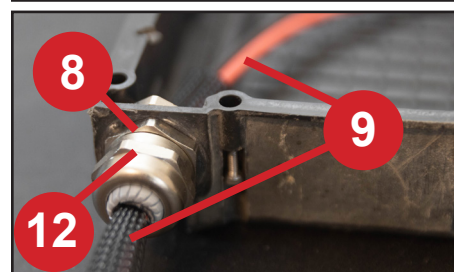
INSTRUCTIONS

Battery Box

We will have to replace the existing battery wire harness with the one from Makers PEV.

NOTE: If you're using the stock battery like I am, you will need to make an adapter.

1. Use the 3/32 Allen wrench and small Phillips screwdriver to remove all the screws from the battery box lid.
2. If you're not using the BMS, (remove in this order)
 - a. Unplug the balance leads from the BMS (long white connector)
 - b. Carefully unplug the XT60 in the middle of the BMS
 - c. Unplug the LED light connector
 - d. Carefully unplug the remaining XT60 connector from the BMS
3. Carefully remove the battery pack and set aside to re-install later
4. Use a monkey or 3/4 wrench to remove the nut from the existing battery's wiring harness
5. Once the nut is removed from the existing harness, unscrew the wiring harness from the battery enclosure and remove as this is no longer needed.
6. On the Makers PEV battery wiring harness, unscrew the outer nut and place the nut into the slot at the opening where the original cable was.
(NOTE: ensure the side with the splines is facing outward)
7. Use the handle of a screw driver to apply downward pressure on the previously installed nut while applying inward pressure to carefully screw in the Makers PEV battery wire harness through the battery box opening. **(NOTE: DO NOT over-tighten as it may damage the battery box)**
8. Tighten the thinner outer nut to secure the wiring harness to the battery box. **(NOTE: DO NOT over-tighten as it may damage the battery box)**
9. Feed some of the cable so it reaches the area where the BMS was previously installed
10. Since I'm using a stock battery, you must either make or purchase an XT60 adapter on the end of the wiring harness
11. Re-install the stock battery while ensuring the cables are channeled along the corner of the battery box and no wires pinching
12. Use the monkey wrench and tighten the larger portion of the wiring harness connector to close up the opening around the wires (see image). This will close most of the opening but will not completely seal. You can add some silicon sealant to make it more water resistant
13. Before plugging the battery to the wiring harness connector, ensure that the wire polarities match (red goes to red and black goes to black) and connect
14. Now we can reinstall the battery lid by using the 3/32 Allen and Phillips screwdriver

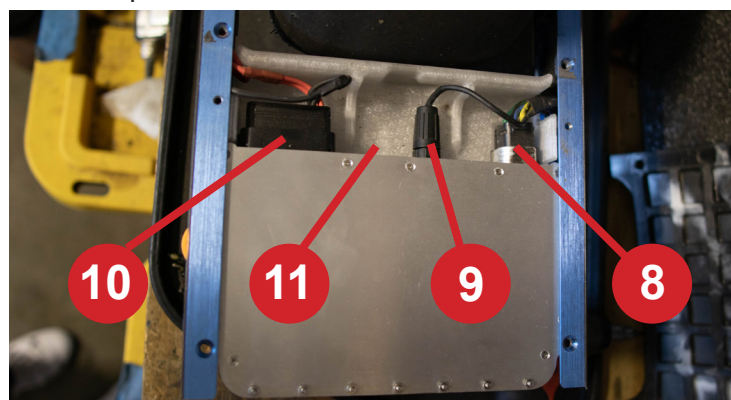




Assembling the board

Now that we have all the main components prepared, we can go ahead and begin putting it together. I find it easier to begin by attaching the battery box, motor and controller box to the left rail first.

1. Place the motor with wire harness side face up and attach the left rail with the hub bolts. Ensure the wire harness goes along the inside of the left rail and away from the battery box. Do not tighten the hub bolts fully at this time
2. Attach the battery box to the left rail in the rear position. Ensure to install the 2 bottom screws and the 1 upper screw to the battery box
3. Attach the Little FOCer v3 controller box to the front position. Ensure to install the 2 bottom screws and the 1 upper screw to the controller box
4. Place the upside down so you can have easy access for the following steps
5. Run the battery wire harness cables through the slot on the motor
6. Attach the right-side rail to the motor with the hub bolts. **DO NOT** tighten the hub bolts fully at this time
7. Install the screws for both the battery and controller boxes. Ensure they both have 2 in the bottom and 1 on the top
8. Connect the motor harness to the controller box (large slot closest to the motor harness side)
9. Connect the hall sensor connector to the controller box (smaller round connector to the slot closest to the motor harness side)
10. Connect the battery harness to the controller box (large slot closest to the battery harness side)
11. Flip the board over so it is upright and connect the front footpad and secure the back footpad
12. Flip the board back over to expose the controller connectors and connect the footpad connector to the controller box (smaller round connector to the slot closest to the battery harness side)
13. Put the provided controller wire cover on so it sits in the cutout on the rails
14. Install the front bumper and ensure not to over tighten and strip threads
15. Install the rear bumper and ensure not to overtighten and strip threads
16. Double check that none of the cables especially the battery wire harness are pinched
17. IF you have too much extra slack for the battery wire harness, you can either feed it into the battery box or towards the controller box at this point



Now that the board is all put together, you can go ahead and set the board upright and tighten down any remaining screws including the hub bolts. Now your board is fully assembled, we just need to complete the final steps within the VESC Tool app (available on Apple App Store or Google Play Store).



VESC Tool App: Initial Motor Detection and Setup Settings

If you are using the Makers PEV Little FOCer v3, it should have been flashed with some standard settings to get you started. Follow the steps below to complete the initial setup. **IMPORTANT: DO NOT write settings while riding. Doing so may result in serious injury.**

1. Search and download the **VESC Tool** app from either the Apple App Store or Google Play Store
2. Use a milk crate or something similar to prop up the board to allow the board to be level and wheel free to spin for the upcoming steps
3. Turn on your board and open the **VESC Tool** app
4. The app will search for the Little FOCer v3 and it should be displayed on the initial screen
5. Press **CONNECT** to access the boards' settings
6. On the main menu screen, select **SETUP MOTORS**
7. On the Load Default Parameters pop-up window, select **NO**
8. Select **EUC** then select **NEXT**
9. Select **Large Outrunner (~2000 g)** and check the **Override (Advanced)** box
10. Enter the following settings then select **NEXT**:

Max Power Loss	400.0 W
Openloop ERPM	700
Sensorless ERPM	2000
Motor Poles	30

11. Enter your battery specs based on your battery, Direct Drive: 280 mm
12. After motor detection select **FINISH**
13. Swipe the top menu and select **MOTOR CFG** and change the following settings

BMS FIRMWARE MOTOR CFG

General

Current

Motor

Motor Current Max

150.00 A

CURRENT DEFAULT HELP

Motor Current Max Brake

1st Drop-down: **General**

2nd Drop-down: **Current**

Motor Current Max

150

Motor Current Max Brake

-150

Absolute Maximum Current

250

BMS FIRMWARE MOTOR CFG

FOC

General

Motor Flux Linkage (A)

25.600 mWb

1st Drop-down: **FOC**

2nd Drop-down: **General**

Observer Gain (x1M)

0.75

NOTE: Cut the Observer Gain in half (ie. original value 1.50 / 2 = 0.75)

14. Select **WRITE**

VESC TOOL

HIDE Devices Found --SCANNING--

CONNECT

SET NAME

START RT DATA PROFILES

VESC TOOL

Configuration

Connect VESC Remote Quick Pair

Setup Motors

Load Default Parameters

Would you like to restore this VESC, and all VESCs on the CAN-bus (if any), to their default settings before proceeding?

NO YES

USAGE MOTOR BATTERY

Generic

E-Skate

EUC

Medium Outrunner (~1500 g)

Large Outrunner (~2000 g)

Small Inrunner (~200 g)

Medium Inrunner (~750 g)

☒ Override (Advanced)

Max Power Loss : 400.0 W

Openloop ERPM : 700

Sensorless ERPM: 4000

Motor Poles : 14

PREVIOUS NEXT



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VESC Tool App: Field Weakening and Battery Voltage Settings

15. Swipe the top menu until you see **MOTOR CFG** and select

16. There are 2 drop-down menu's, refer to the screenshots below to set all appropriate values for Field Weakening and Voltage

17. IMPORTANT: Go back to the main menu and select **BACKUP** to back up the initial settings that were shipped with the controller. This will be used to restore if you made any changes to tweak your settings/riding experience.

NOTE: As of VESC Tool version 3.01, it will only allow one backup file to be saved. If you choose to backup after the initial time, then it will overwrite your previous backup file.

1st Drop-down: **FOC**

2nd Drop-down: **Field Weakening**

Field Weakening Current Max
30.00 A
Field Weakening Duty Start
65.0 %
Field Weakening Ramp Time
400 ms
Q Axis Current Factor
2.0 %

1st Drop-down: **General**

2nd Drop-down: **Voltage**

Battery Voltage Cutoff Start
42.00 V
Battery Voltage Cutoff End
40.00 V

NOTE: Settings are based on 15s battery setup. If a different battery is used, adjust settings accordingly.

1st Drop-down: **FOC**

2nd Drop-down: **Advanced**

Zero Vector Frequency
25.0 kHz

VERY IMPORTANT: Before riding the board, lift the board off the ground and engage the motor to ensure the wheel is spinning in the correct direction. If it is NOT, then invert your motor (MOTOR CFG > General > General > Invert Motor Direction > Toggle setting > Write). After confirming that the wheel spins in the correct direction for both front and back, you can test ride the board.

At this point you are done with the setup of your new Makers PEV Fully Assembled Flowglider Box and are ready to test ride. I hope this document has been helpful in the setup and happy riding! -Neel