

Robocar: VESC Calibration

An educational and research-ready platform for autonomous navigation



1. Introduction

The VESC (Vedder Electronic Speed Controller) is an open-source motor controller for electric vehicles and robotics. Calibration ensures precise sensor readings, smooth motor performance, and system optimization.

2. Required Tools and Software

- The VESC included in your educational kit.
- A micro-USB cable
- A computer (Windows, macOS, or Linux)
- The **VESC Tool** (free version available at <https://vesc-project.com/>)

3. Configuration

To begin, follow these steps to connect all components correctly:

A. Hardware setup

1. Power Connection

Connect the **VESC** to the **4S LiPo battery** provided in the kit using the XT60 (or compatible) connector. Double-check polarity before connecting to avoid damage.

2. Motor Connection

Connect the **BLDC motor** (already mounted on the Traxxas chassis) to the **three-phase output wires** of the VESC. The order of these wires doesn't matter initially; it can be corrected later via motor detection.

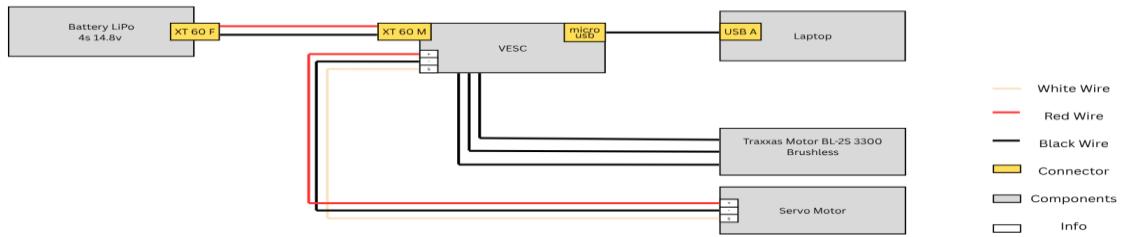
3. Servo Motor Connection

Plug the **servo motor** into the **PWM output** of the VESC.

4. USB Connection

Use the provided **USB cable** to connect the VESC to your **laptop**. This connection allows you to configure and flash the VESC using the VESC Tool.

The diagram below illustrates the correct setup of the VESC with the battery, motors, and laptop.



Now that all hardware is properly connected, it's time to launch the VESC Tool on your laptop to begin flashing and configuring your VESC.

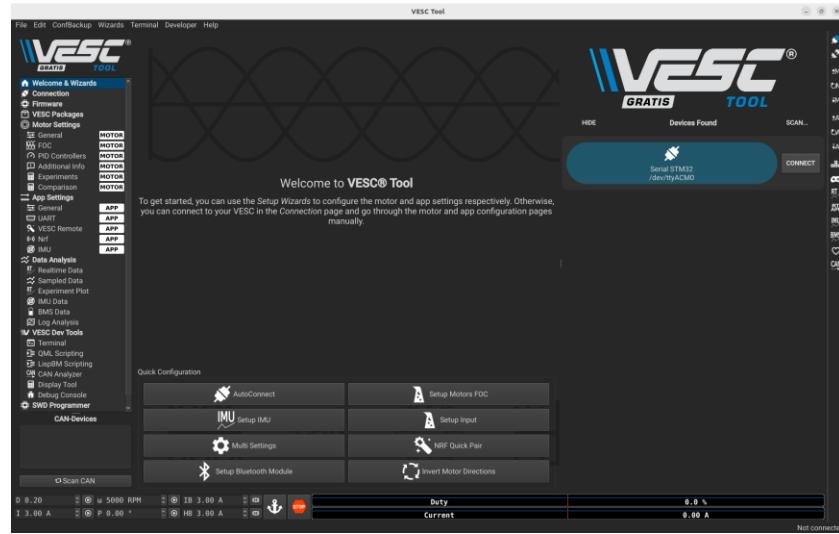
B. VESC tool setup

1. Open the VESC Tool

Locate and open the VESC Tool software you installed earlier on your computer with hardware setup connected to your laptop.

When you first open the VESC Tool, you will be prompted to accept the Terms and Conditions (CGU). Make sure to read and accept them to proceed to the main interface.

Below is a screenshot of the VESC Tool ready for use after accepting the CGU.

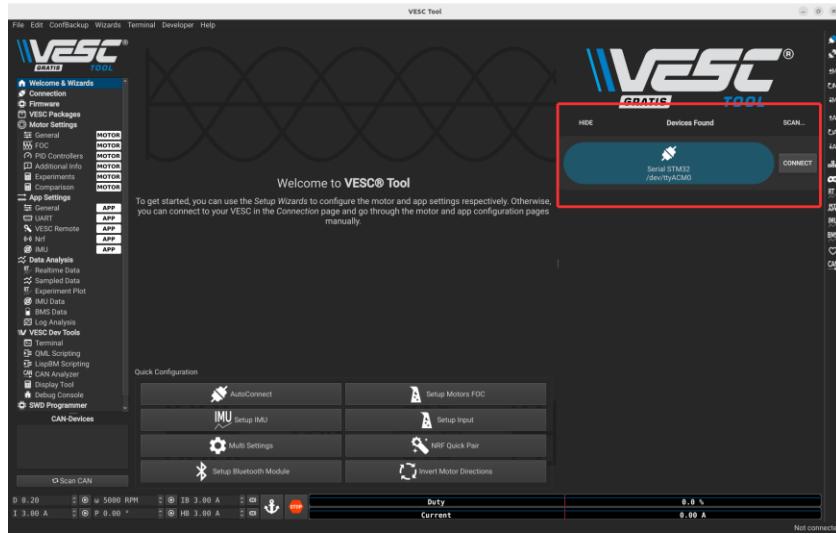


2. Connect to the listed vesc device

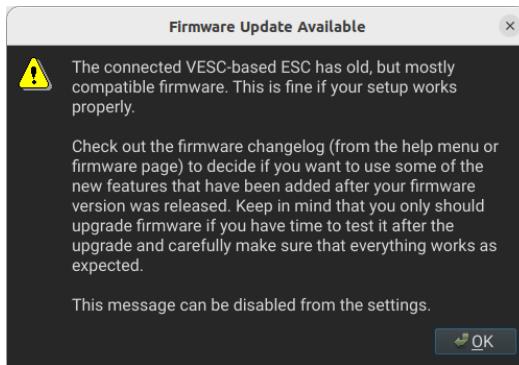
Once the VESC Tool is open, select your VESC device from the list to establish a connection. This allows the software to communicate directly with your hardware for flashing and configuration.

Note for Linux users: You may need to add your user to the **dialout** group to enable USB access. The VESC Tool may prompt you to enter your password, and a system restart is required for the changes to take effect.

The following image shows how to connect to the VESC.



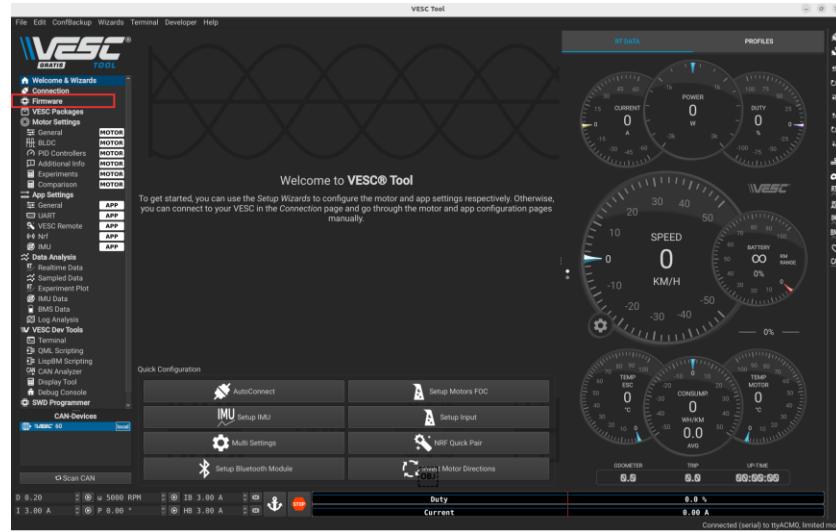
If a firmware update is available, a pop-up like the one below will appear.



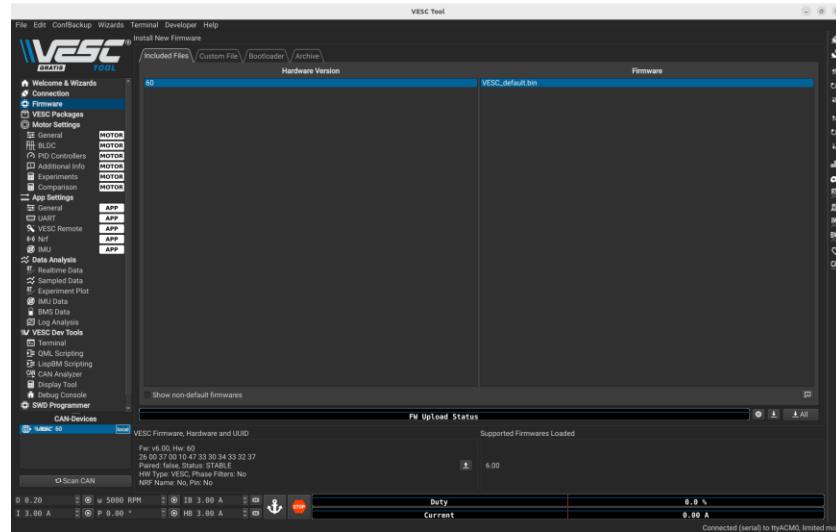
3. Firmware update

This step is optional and only needed if the firmware update message appears during connection.

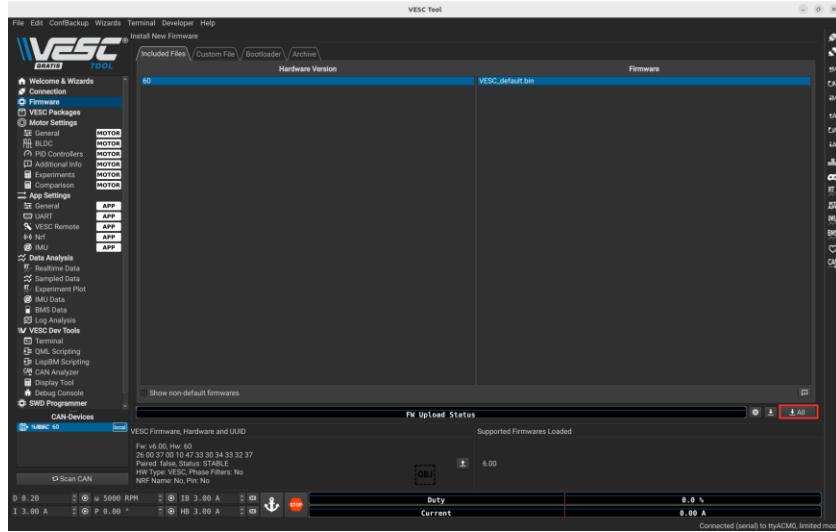
Click the icons shown below to open the Firmware Manager window.



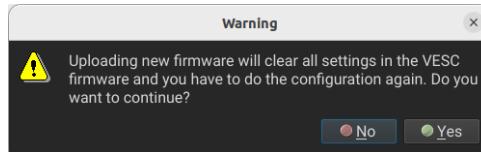
Here is what you will see after clicking on the firmware icon.



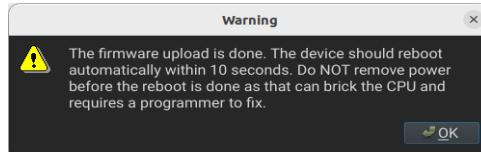
To update the firmware, you have to press the following button.



Then press Yes.

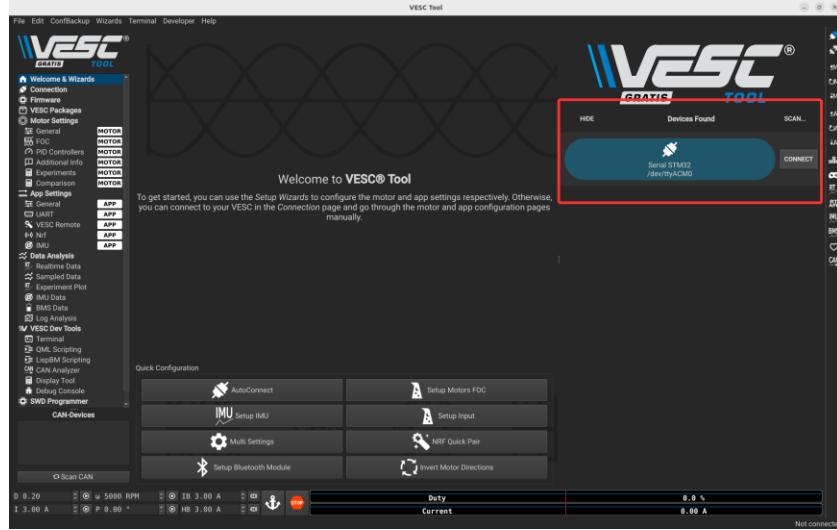


After waiting a few minutes, this message will appear, and your new firmware will be uploaded.

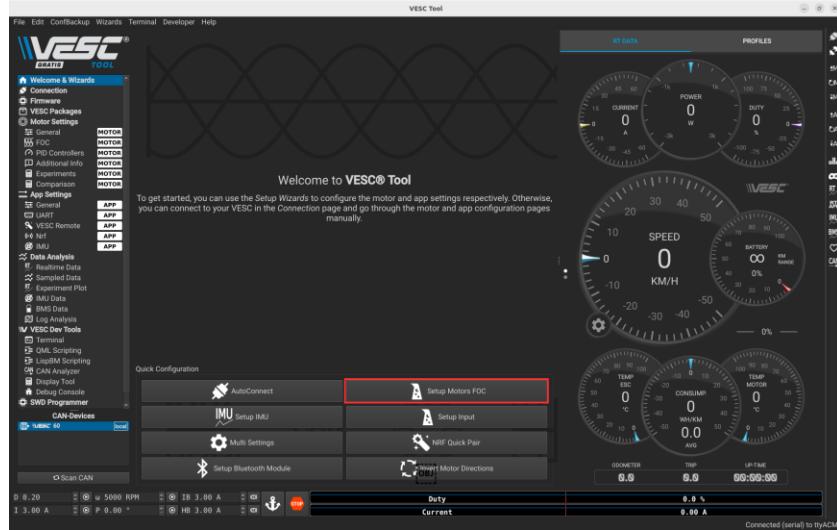


4. Motor setup

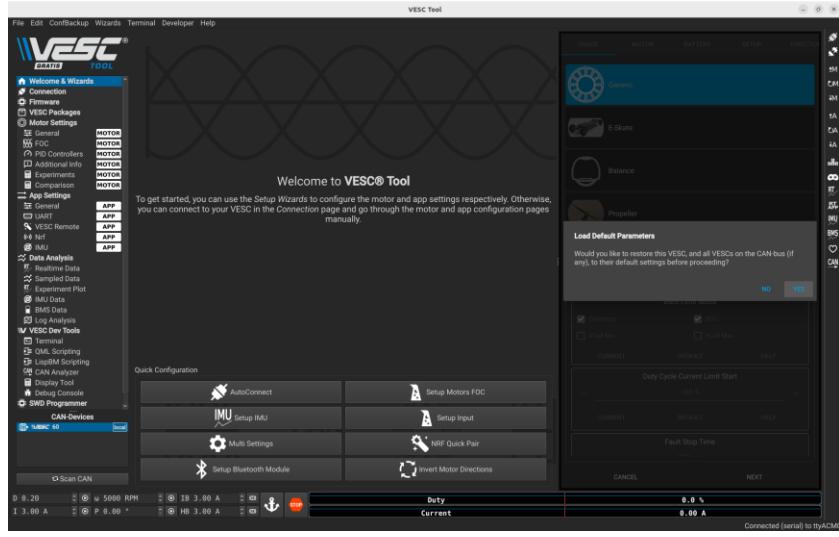
The next step is to setup the motor, you have to go back to the main page and connect to the vesc again. Because the firmware update restarts the vesc.



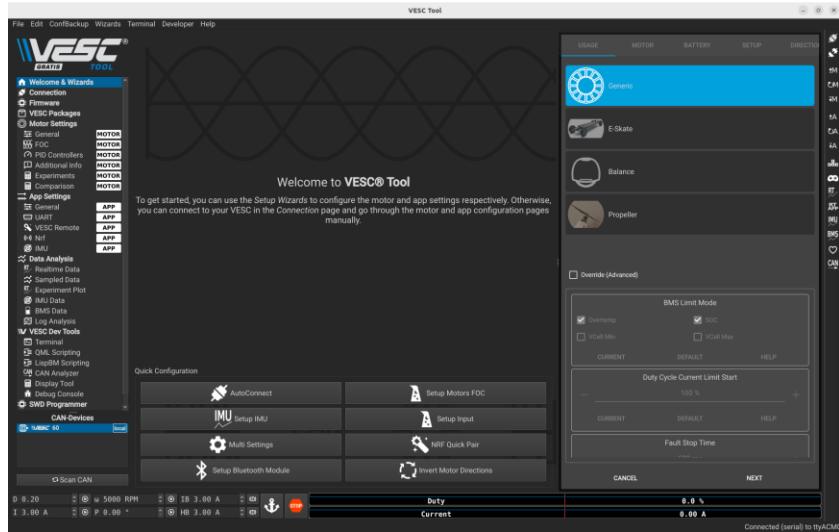
To setup the motor, you need to press the following button.



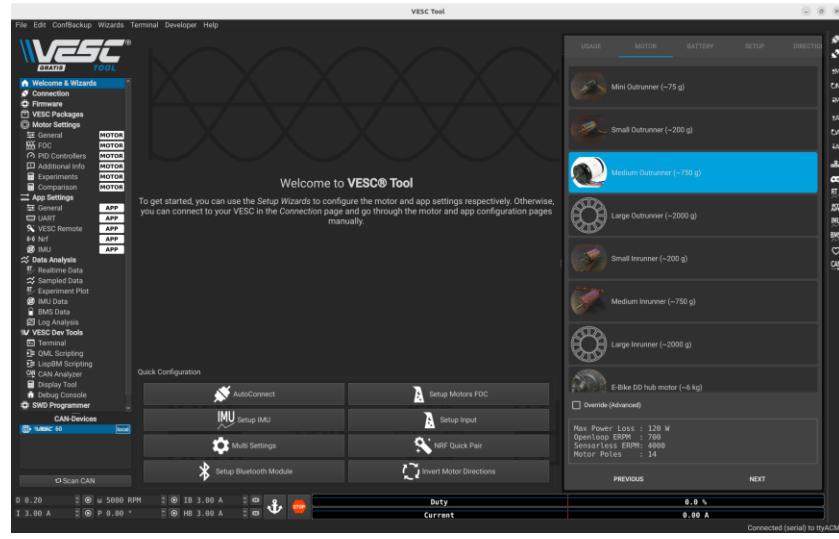
Then press Yes.



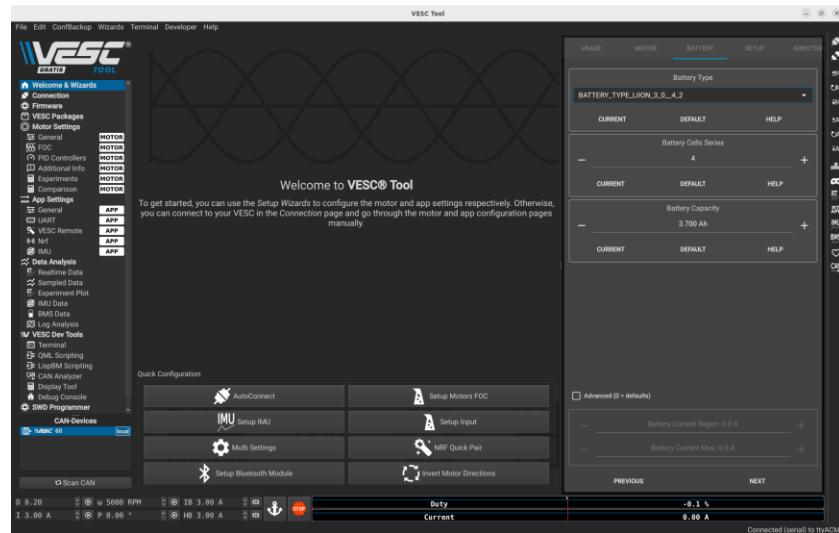
Then next.



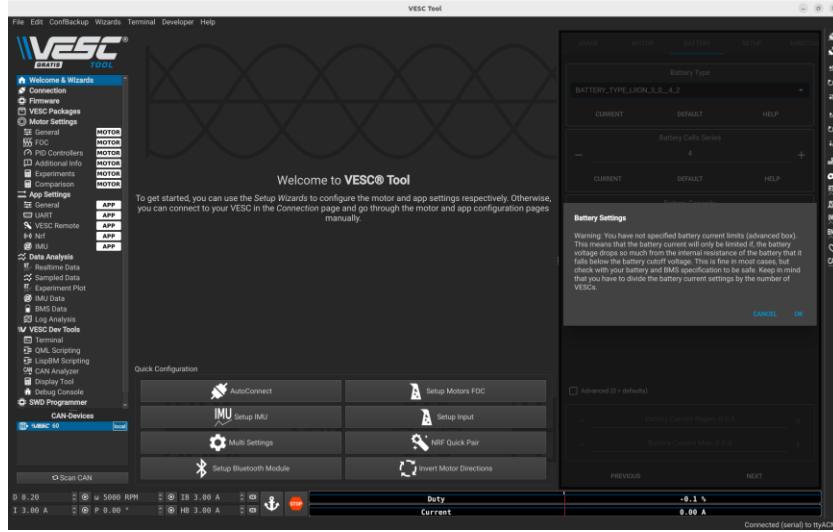
Select the third option.



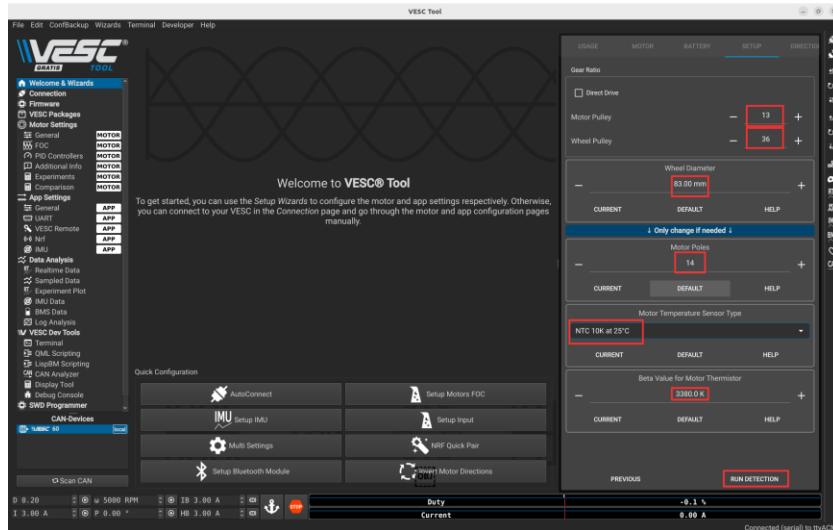
Then fill in the relevant information about your battery. Below are the details for the battery included in the kit.



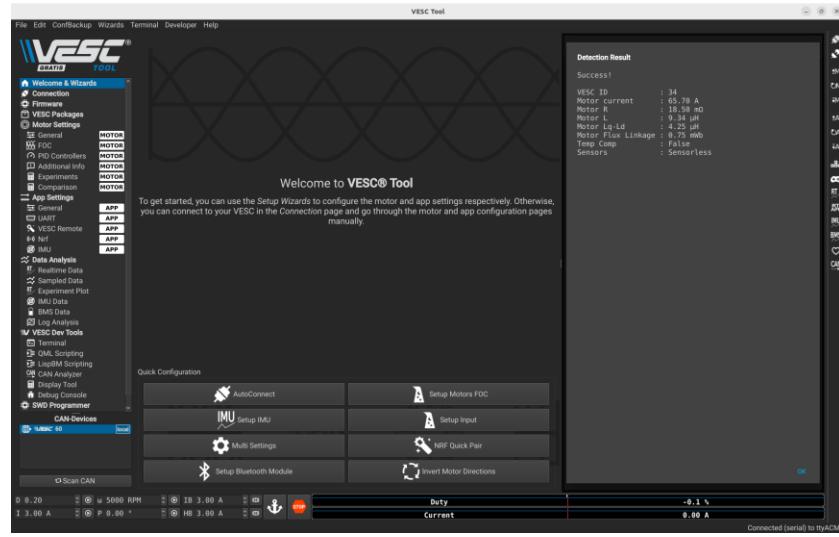
Once you validate the battery info, you will see this pop-up. You can press ok, if you enter the correct information.



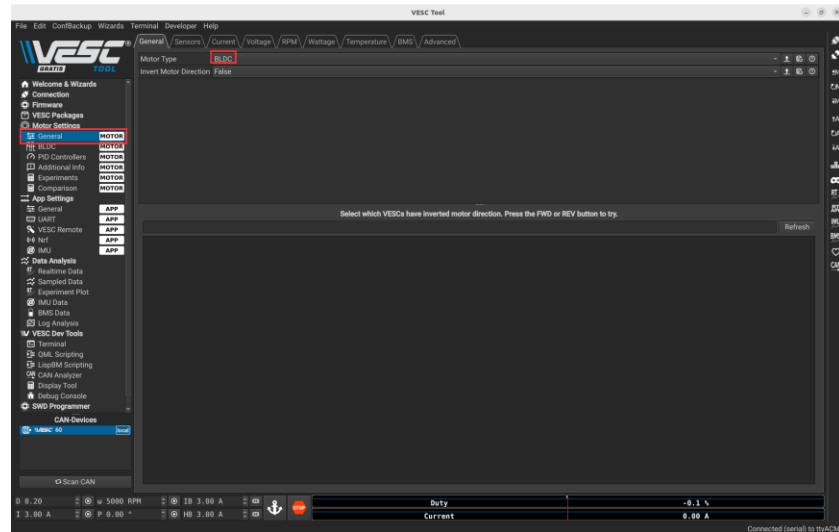
Enter the motor information as shown below. Before continuing, make sure the car is placed on the provided stand and that the wheels are not touching the ground or any obstacles. The motor will spin during the process.



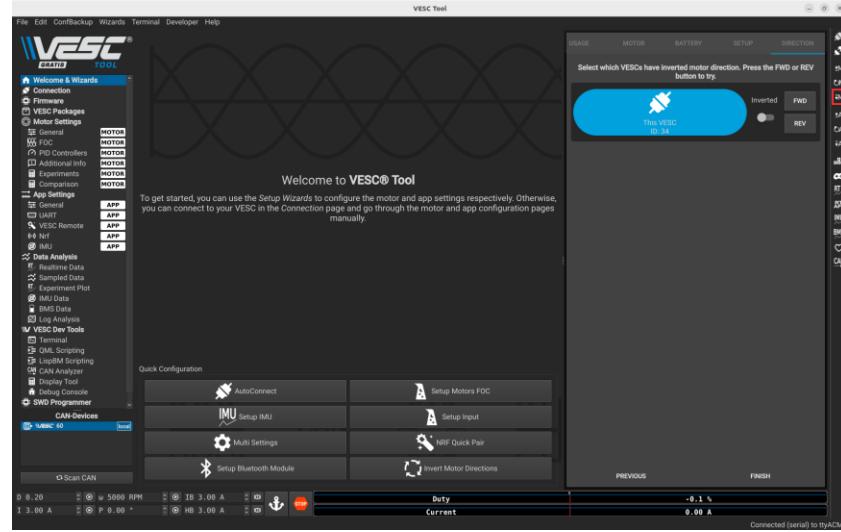
After 30 seconds this message will appear saying the motor successfully spins.



Next you can move to Motor settings general category and select BLDC instead of FOC.

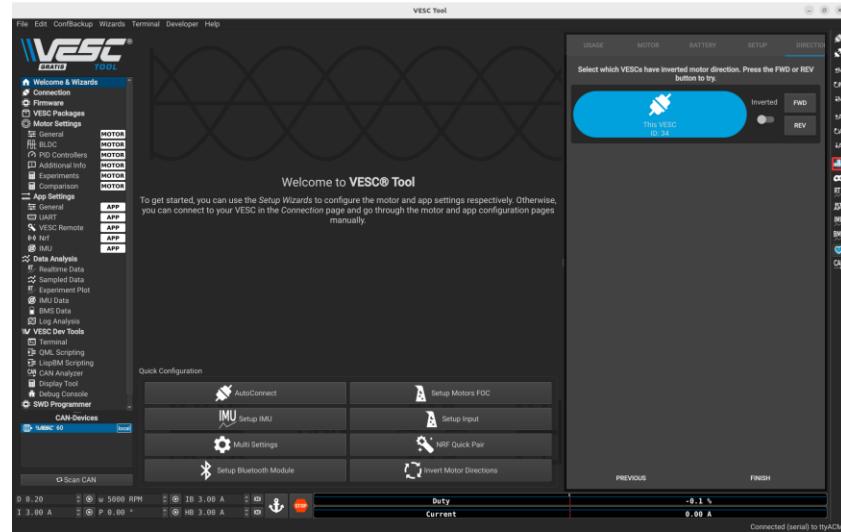


To finish you can press the following button to write all your previous configurations on the vesc.



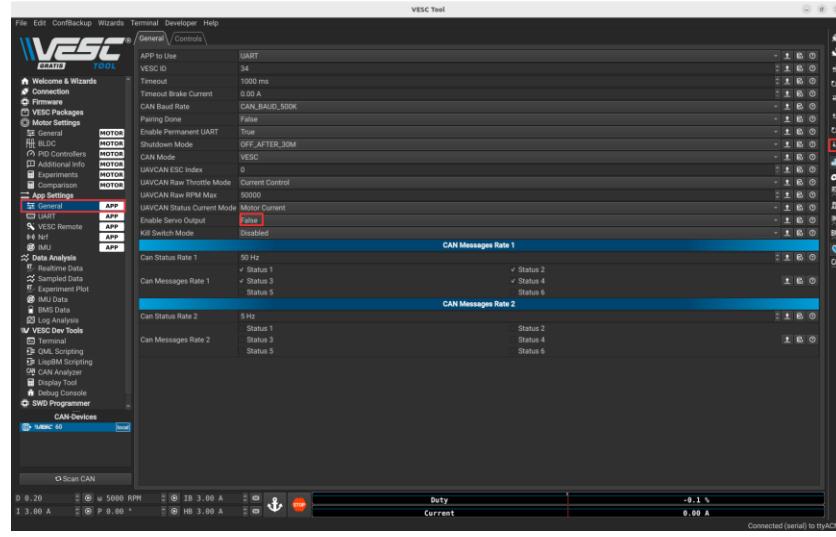
5. Motor test

To test if the motor is usable with the vesc you can press the following button and then press your keyboard arrows keys.

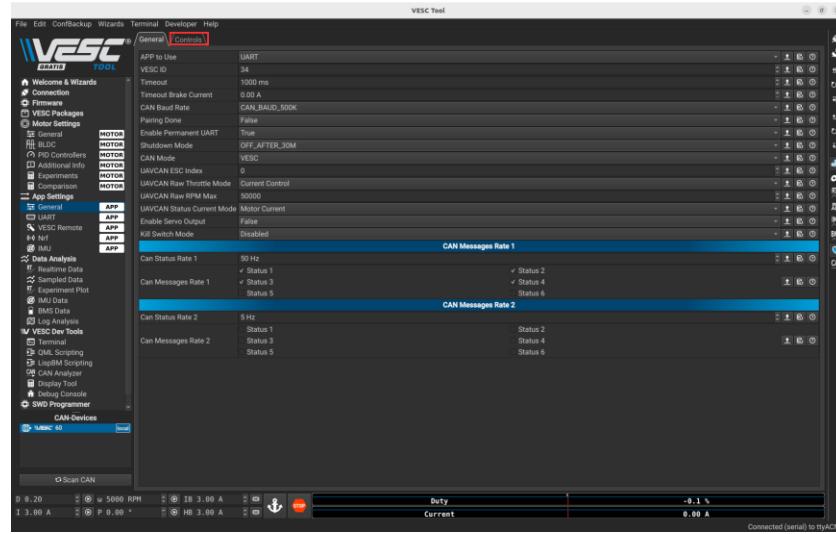


6. Servo setup

To setup the servo motor, go to the App settings, general section and set Enable Servo Output to true. And then press the following button on the right of the image.



After that you can test on the following tab.



Once you are on this page and you can test by moving the cursor.

