Tips for using the VESC Tool with the F1/10 Brushless motor

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Follow the [link from the VESC-project site](https://vesc-project.com/node/178) to setup and test your VESC. There are few things that the website does not mention. This document will help filling the gap.

The BLDC motor is a 3-phase asynchronous motor and is controlled by sine waves that generated by PWM. You may see the PWM wave with the oscilloscope on your lab bench.

1. Connect VESC before updating the Firmware

Connect the laptop to VESC with a USB-miniUSB cable. Click the connection icon . A green message will show on the bottom right corner of the screen, saying `connected’. If not, click on  in the left menu bar and manually select Port.

1. When using Motor Wizard FOC

Select `Small Outrunner (~200g)’ for motor type.

Select `BATTERY\_TYPE\_LIION\_3\_0\_\_4\_2’ for battery type, 3 cells.

DO NOT change battery capacity! We don’t have a sensor for it.

1. Turn on real time streaming

Click the  button on the right to enable real time streaming. The duty cycle and current values are displayed and updated in real time on the bottom left corner. Always keep the real time streaming on when testing. Stop the test by pressing the STOP sign if the displayed duty cycle is higher than 90%.

1. Test robot manually with arrow keys

Manually test the robot with arrow keys after using the Motor Wizard FOC. Click the  button on the right to enable the keyboard control. Try the left and right arrow keys as well as the up and down arrow keys. You may speed the motor up by pressing the left key while holding the right key.

If you try to use current control with up and down arrow keys, be careful as the motor speed is not proportional with the current input. You can change the current value  on the bottom left and a reasonable current setting is 10 A.

Do not use Position control  on the bottom left. We don’t have a sensor for it to enable the feedback control. Duty cycle and angular velocity controls are good options to try. Stop at any time if motor makes bad noise or the speed is too high.

1. Testing the IMU

Click on  in the left menu bar and enable IMU with the button  on the right menu bar. The photo of the VESC shows the current orientation of the VESC. Move the VESC hardware would change the orientation of the photo. Click on IMU data button in the left menu bar. The measured IMU data (Acceleration, Gyroscope, and RPY) will display on the screen. RPY stands for Roll, Pitch, Yaw.

1. Battery protection

The VESC can protect the LiPo battery by stopping everything when the input battery voltage is below the minimum voltage set in the VESC. To change the minimum input voltage, go to `General’ - `Advanced’. The motor will stop working if the battery voltage drops below the specified value.