



Manual



Congratulations on your purchase of your VESC Express dongle and logger module. This device features an ESP32 module with Wi-Fi® speed connectivity, USB-C and a micro SD card slot to enable constant logging while the VESC speed controller is powered (Micro SD card required). A GPS module can be added for position and time/date logging. This will be a quick guide on how to install the VESC-Express, configure it and view your log files.

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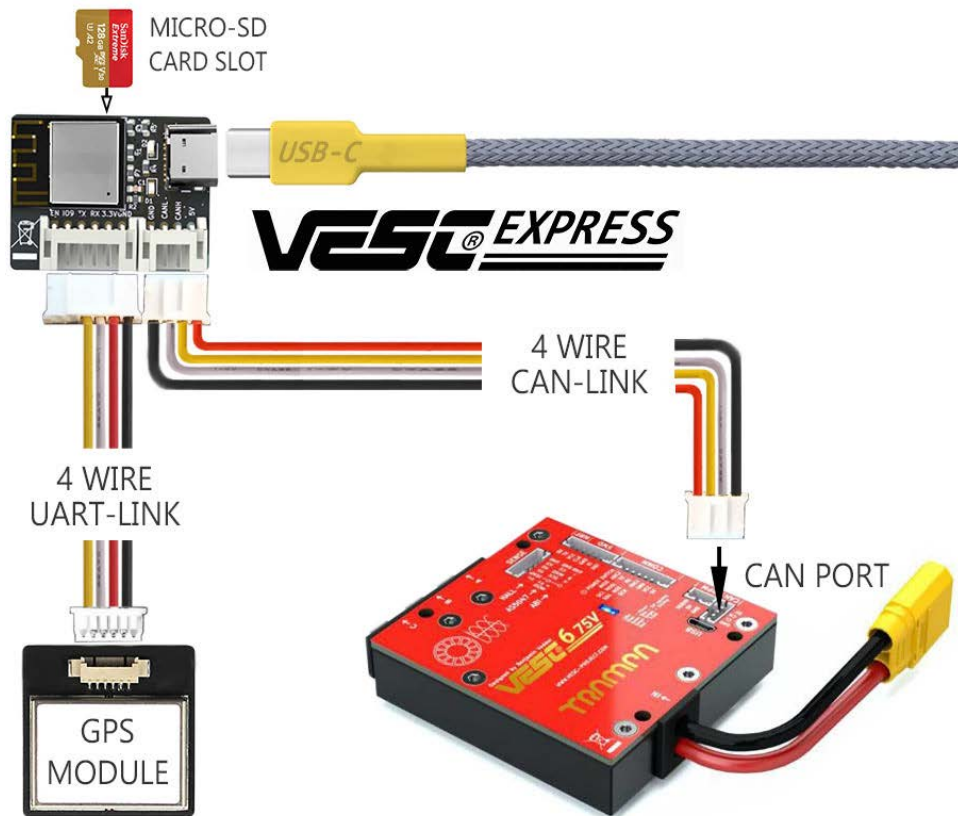
1. Wiring diagram/SD card installation
2. Firmware download
3. Firmware installation
4. Logging setup
5. How to view your logs
6. Wi-Fi® setup
7. Useful information

If you are familiar with beta firmware then please make sure you are on the latest version and start at 4

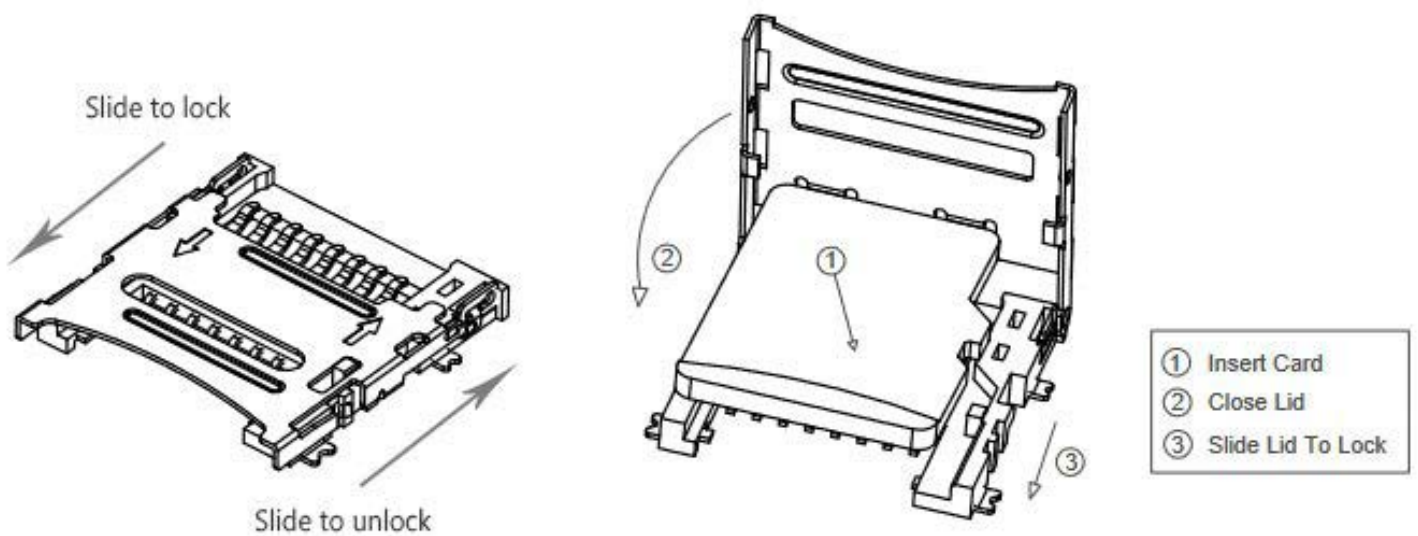
Should you have any problems with your VESC express dongle please contact Trampa Support

[support@trampboards.com](mailto:support@trampboards.com)

## 1. Wiring diagram



## SD card installation



## 2. Firmware download

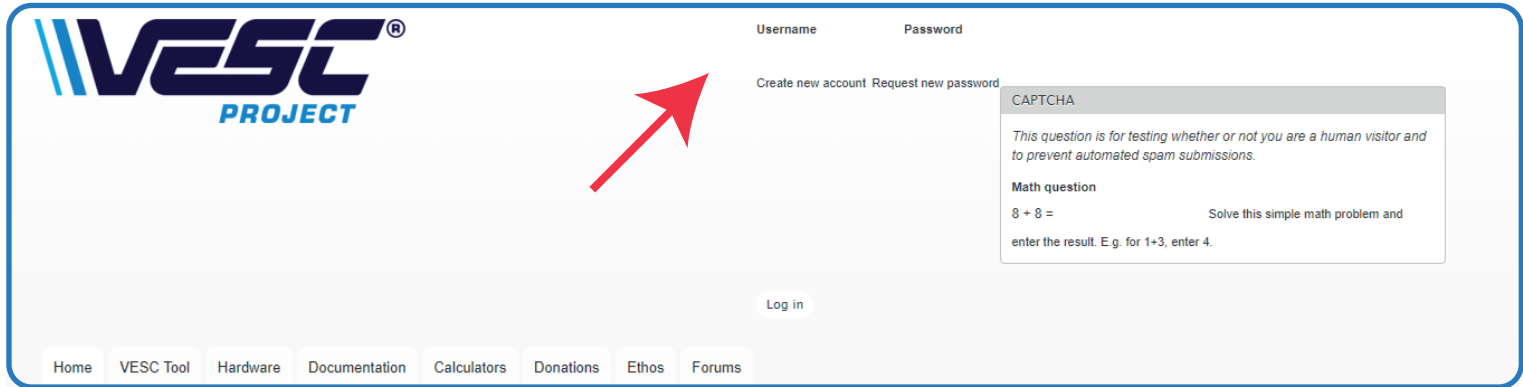
The VESC Express is very new and needs to use BETA FIRMWARE until VESC-Tool 6 is released.

The release of VESC-Tool 6 is not very far. We expect it to happen in December 2022.

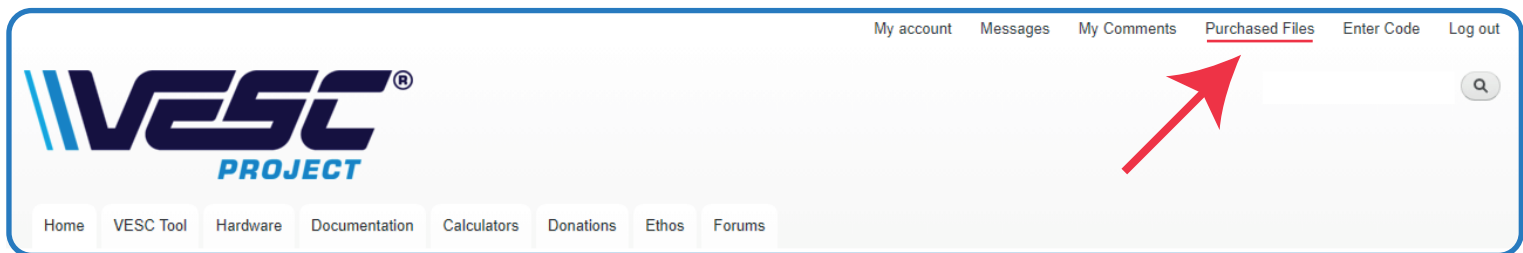
The VESC express will already have the correct firmware installed but will only work in conjunction with firmware updated VESC devices. Devices carrying older firmware will **NOT** support the VESC-Express!

This is a quick walk through of how to download the beta version of VESC-Tool.

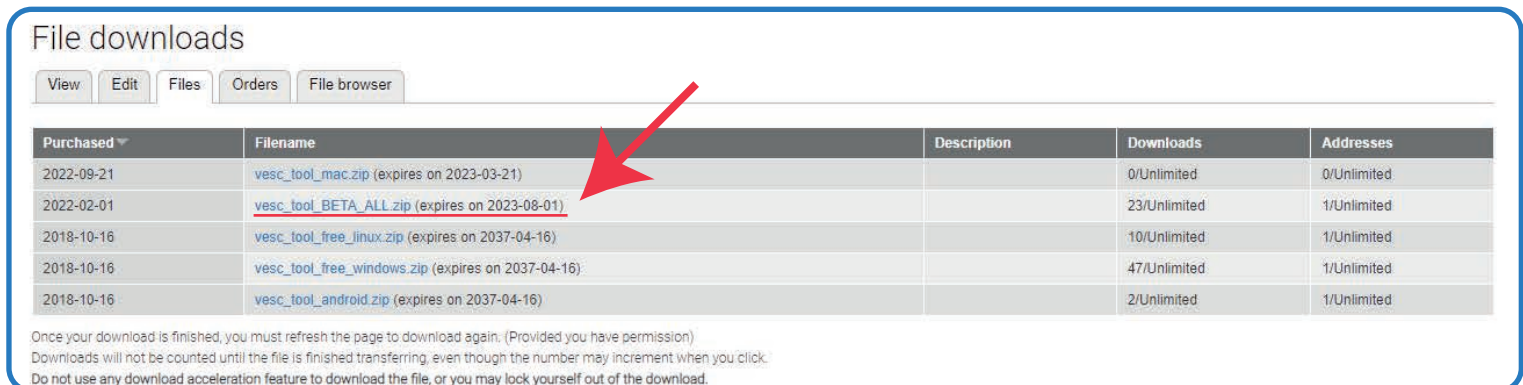
Firstly, you will need to go to <https://vesc-project.com/> and make sure you log into your account. If you don't have an account please register and purchase any VESC-Tool version.



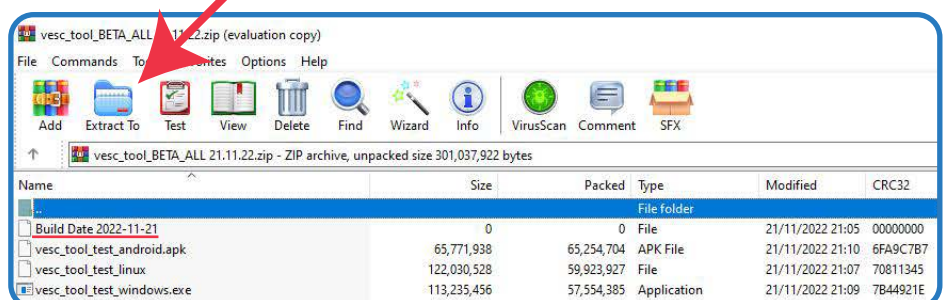
Once logged in, menu options will appear in the top right corner. Click on **PURCHASED FILES** to access the beta download link. NOTE if you have not downloaded the VESC-Tool, the beta link will not be shown. Download the released version and then check back in **PURCHASED FILES**.



The Beta link will have all device versions in a .rar file. Please make sure you have software installed to read and unpack the files. E.g. Winrar, Winzip, etc

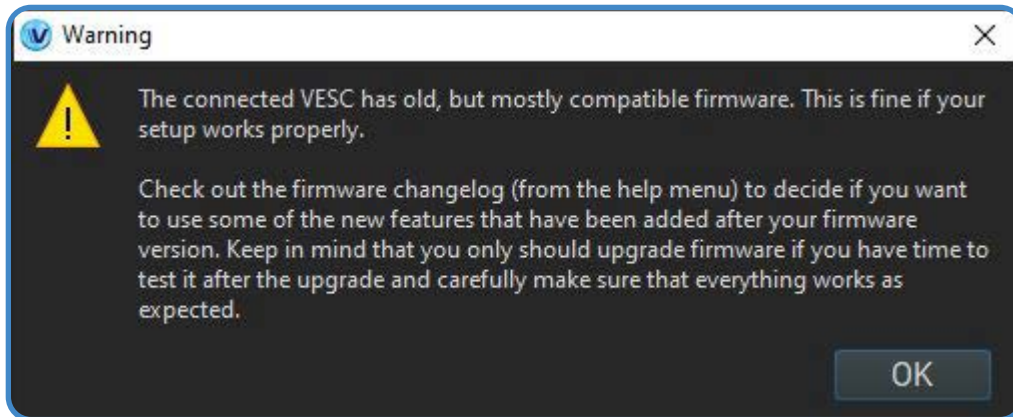


Pick your desired version, click extract, and choose a folder. There is always a file with the build date, use this for reference as the beta usually updates once a week. Make sure to keep up to date until there is an update for the released VESC-Tool to Version 6.

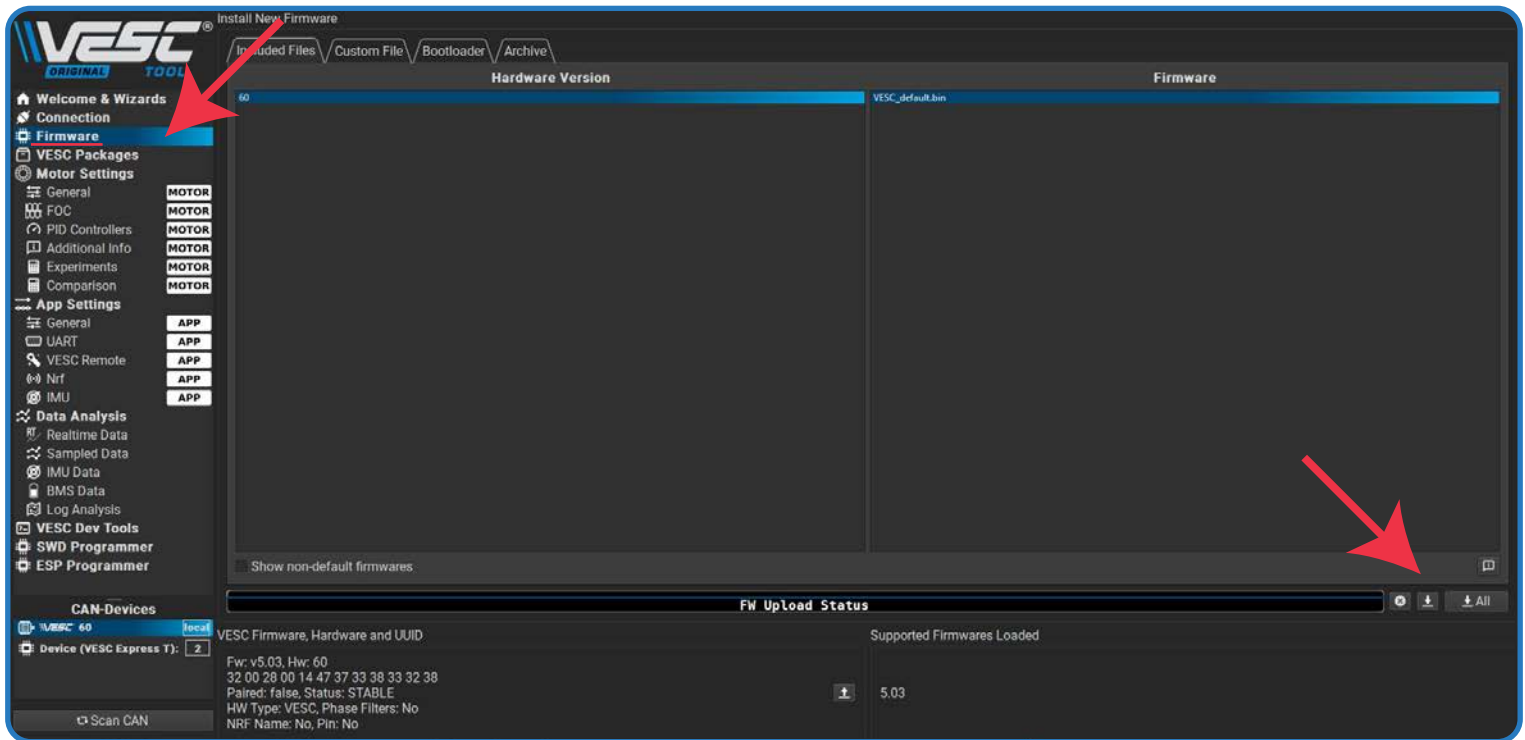


### 3. Firmware installation

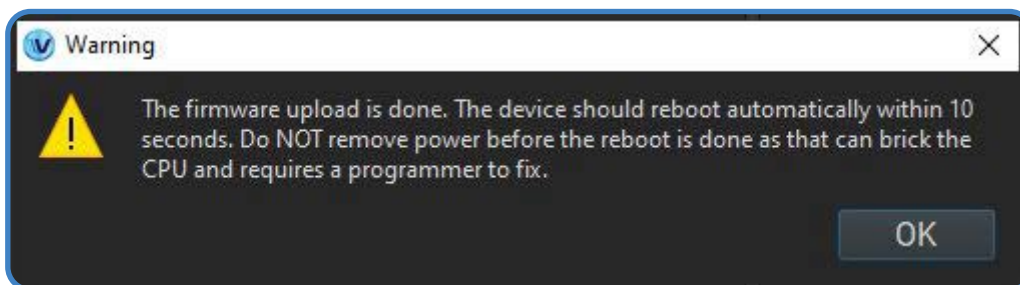
Now go to the beta VESC tool and open it up. You will get a pop up when you open it, warning you that this is a test version of the VESC tool. Click OK to continue. Then click AUTO CONNECT, don't worry if the VESC device takes a while to connect. This is because it is on old firmware. Once connection is established you will see a pop up telling you the device is on old firmware.



Click OK to continue. Now navigate to the firmware tab on the left.



Click on the upload arrow to start flashing. This will take around 30 seconds then the VESC controller will reset on its own. **DO NOT POWER OFF!**

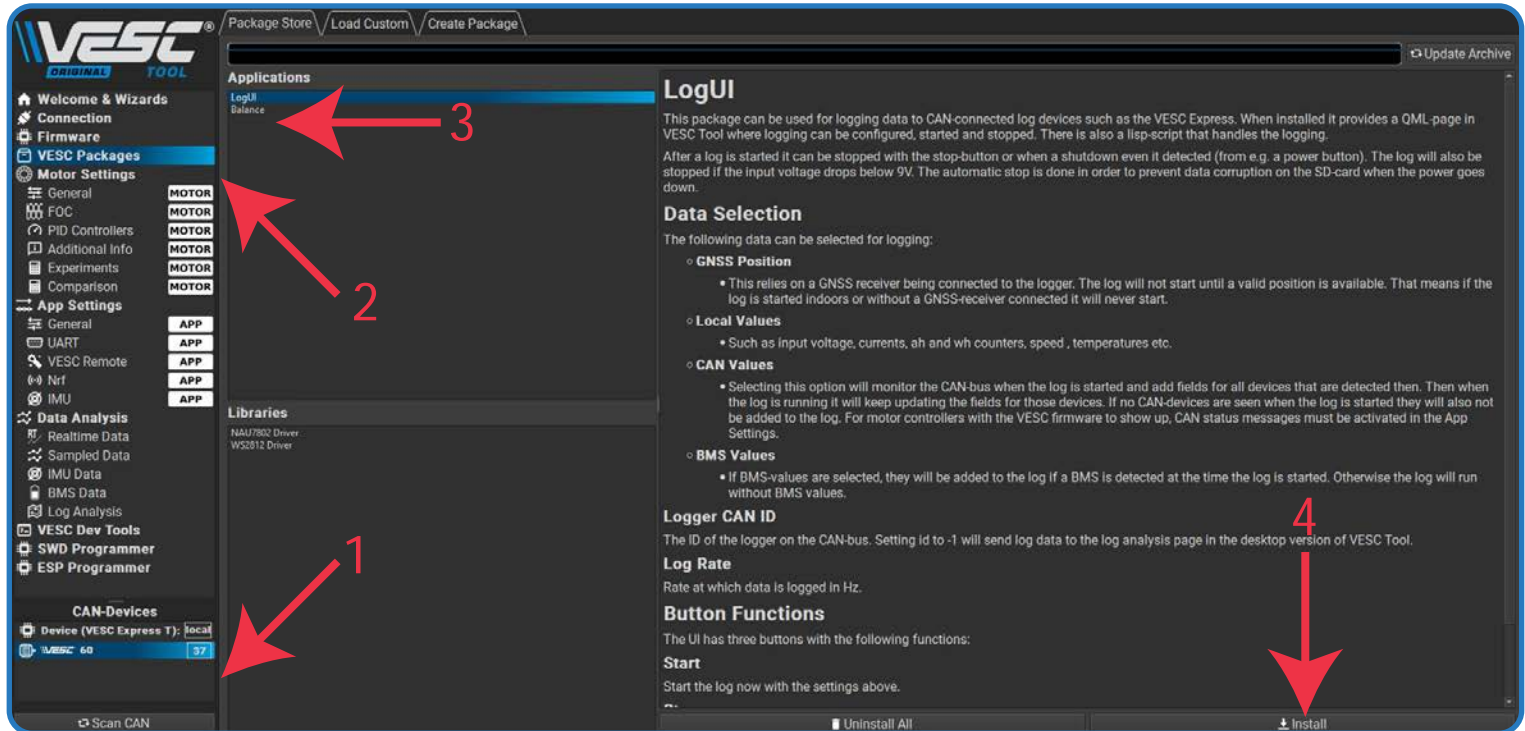


When the VESC controller reboots you should get the warning message above. Click OK then navigate to WELCOME AND WIZARDS and auto connect. NOTE If it you get the same 'old firmware' pop up then the firmware hasn't loaded correctly. If so, go back to the firmware tab and click BOOTLOADER tab at the top. Click the upload arrow to flash the bootloader, then go back to the firmware tab at the top and try the firmware upload again. If this doesn't fix the problem please contact [support@trampboards.com](mailto:support@trampboards.com)

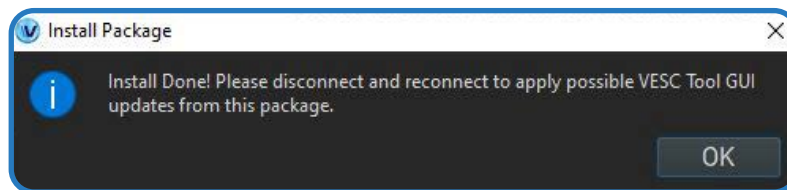
## 4. Logging setup

The VESC express has the ability to log continuously while the VESC controller is powered. This is a big step for logging as before you could only log data from the VESC device you were connected to. Now, the VESC-Express will be able to log every VESC device and BMS connected to CAN.

Start by installing an SD card (installation guide on page 1). The size of the SD card would depend on your project and how long you are logging for. More CAN devices and longer logs will result in large files. Now the card is installed, power on your VESC speed controller and connect to the VESC-Tool. If you have connected to the VESC-Express dongle then make sure you connect to your VESC speed controller in CAN-devices (1). Once VESC speed controller is selected click on the VESC packages tab (2).

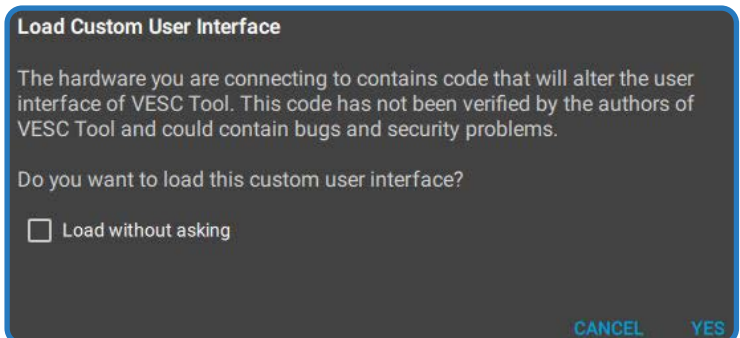


Click on LogUI (3), and information will appear on the right hand side. Please read this carefully as it explains what the logUI does and how to use its UI. Finally, click install to write the logUI package to your VESC speed controller. Once installed you should see a pop up like below. Click OK then power off the VESC speed controller and power it back on.



Click on LogUI (3), and information will appear on the right hand side. Please read this carefully as it explains what the logUI does and how to use its UI. Finally, click install to write the logUI package to your VESC speed controller. Once installed you should see a pop up like below. Click OK then power off the VESC speed controller and power it back on.

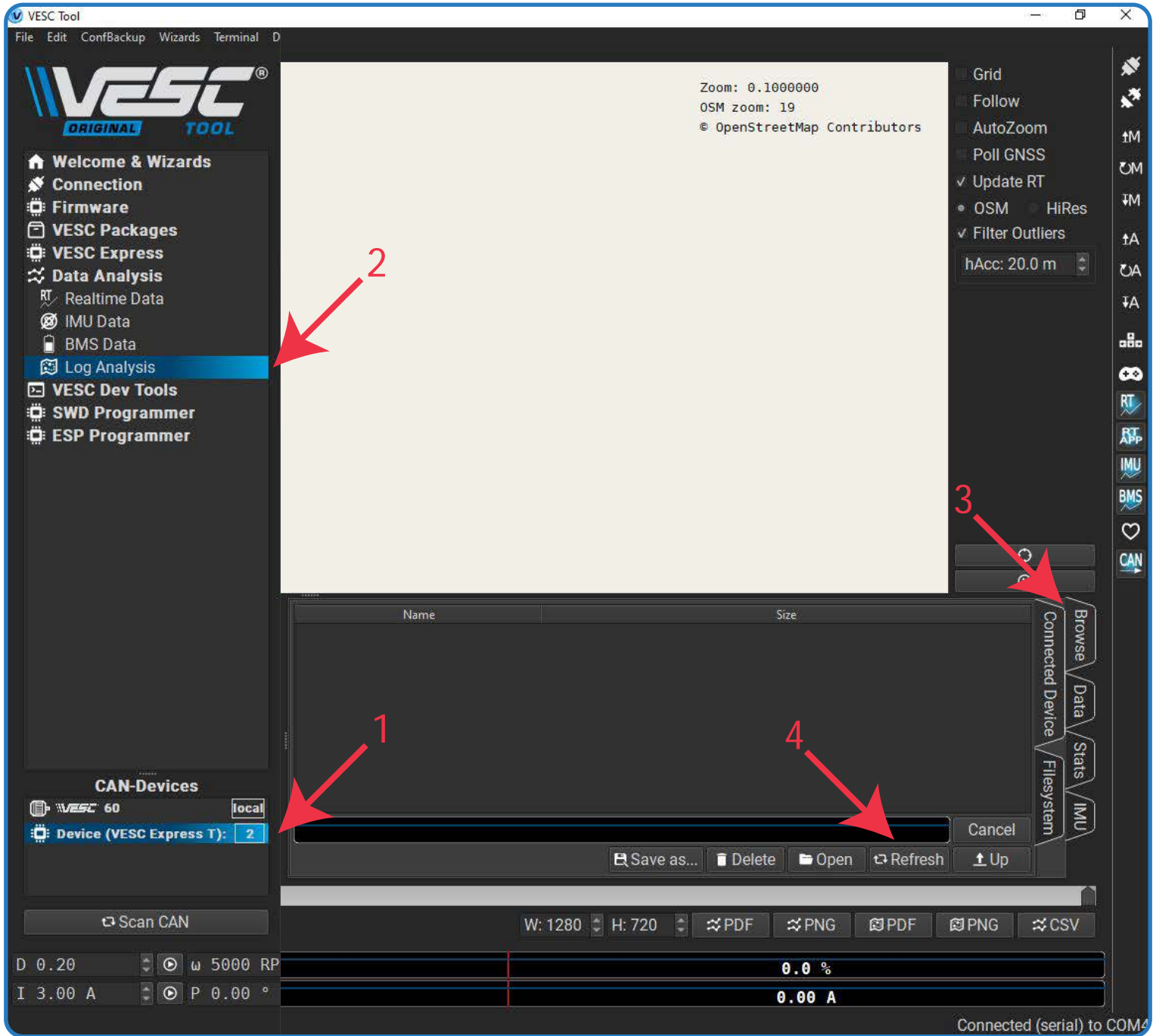
When reconnected, and the VESC speed controller is selected on CAN (1), you will see a pop up asking you to load the logUI. If you do not see a pop then the installation has failed, make sure the VESC speed controller is selected on CAN and retry the installation.



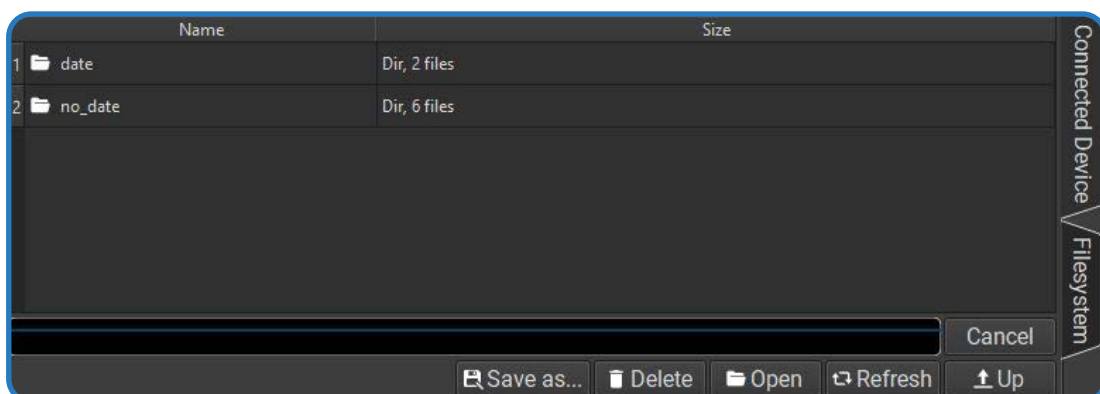
Now click yes and you will be shown the Log User Interface. The UI is easy to use, simply check the box of the values you wish to record, and click START. More detailed info can be found under VESC Package > LogUI. Please note that the permanent logging upon system start, incorporating GNSS position data will start once a sufficient number of satellites are found.

## 5. How to find your logs

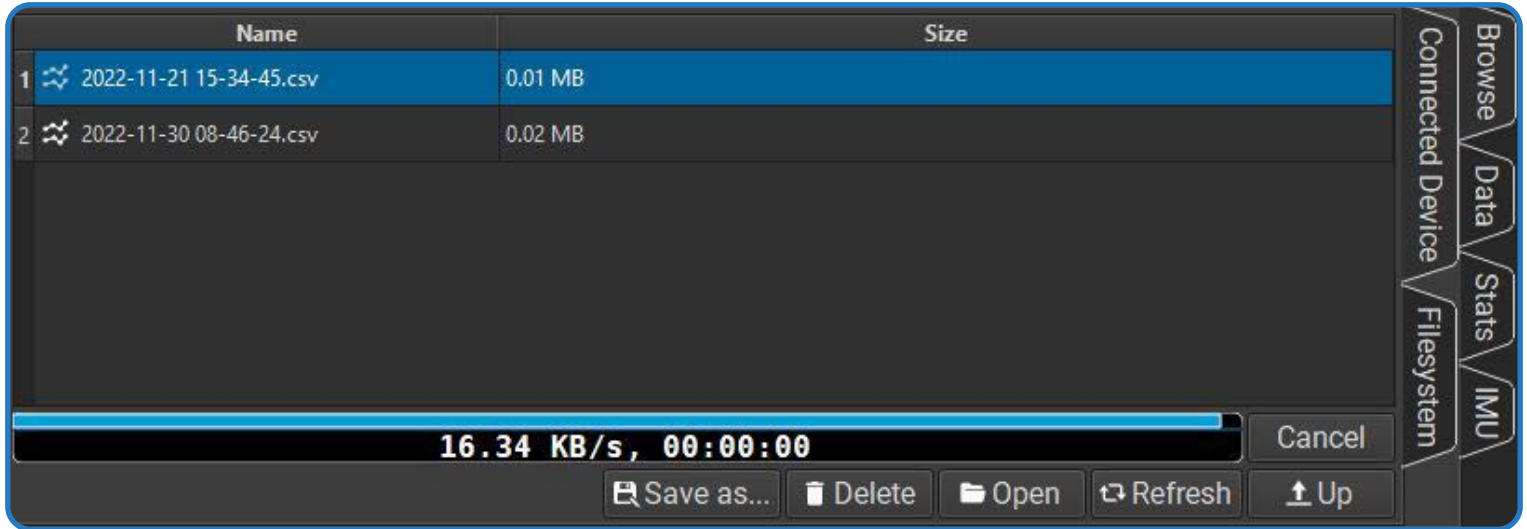
When you want to view a log file you will need to connect your VESC device to the desktop version of VESC-Tool (Windows/Linux/macOS). Once connected make sure to select the VESC Express dongle in CAN-devices (1), select Log analysis (2), make sure BROWSE and CONNECTED DEVICE are selected (3), now press refresh (4).



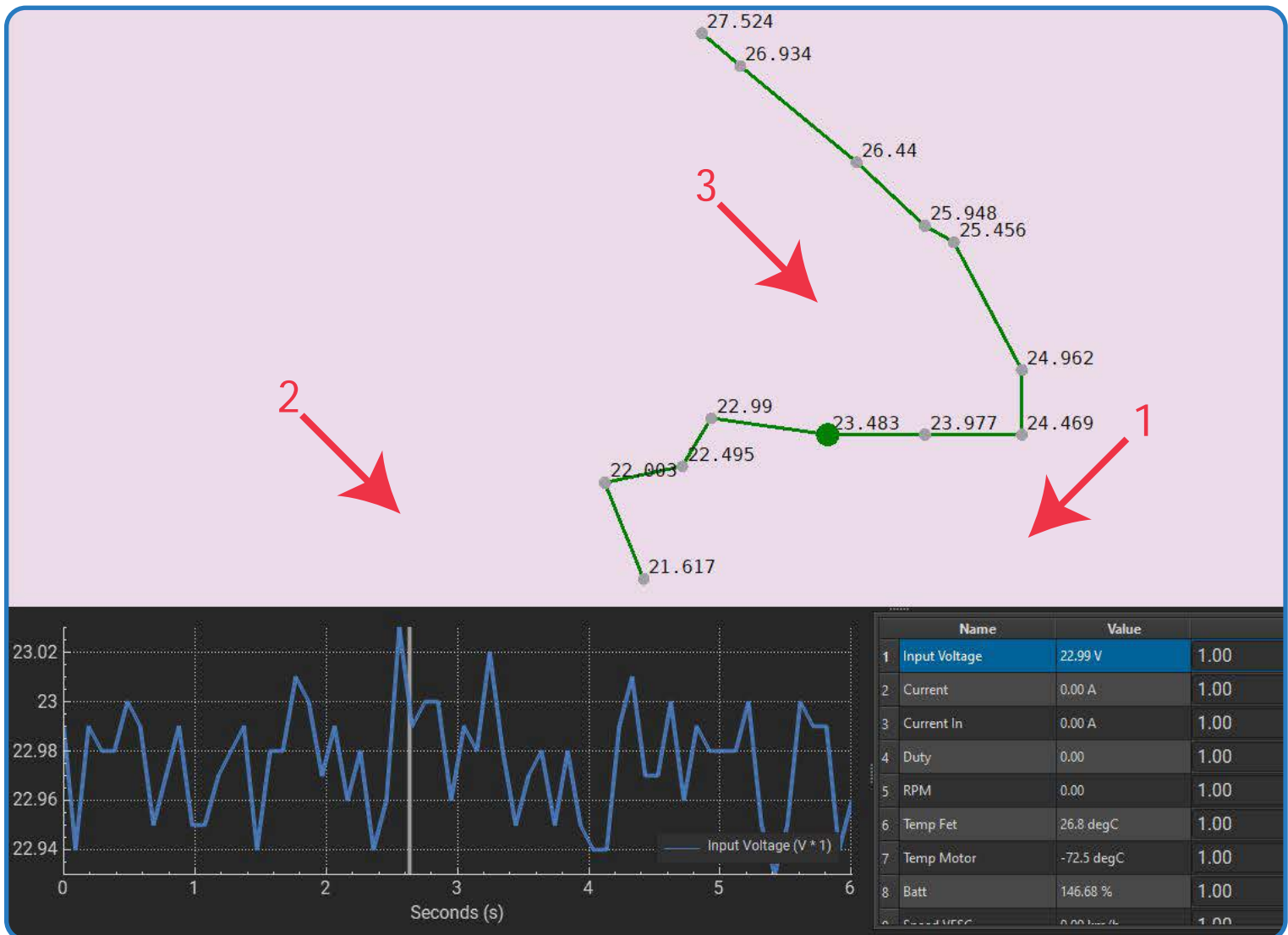
You should now see a folder called "log\_can". In here there will be a folder called "date" or "no\_date". If you record GNSS position data it will pick up time and date and save in the "date" folder. No\_date is data without GNSS information (GNSS data logging deactivated or no GPS Module installed)



Select a file and click open. If you have recorded GNSS data plot points will show on the map where the data was recorded. When the files have loaded click on the Data tab to view.



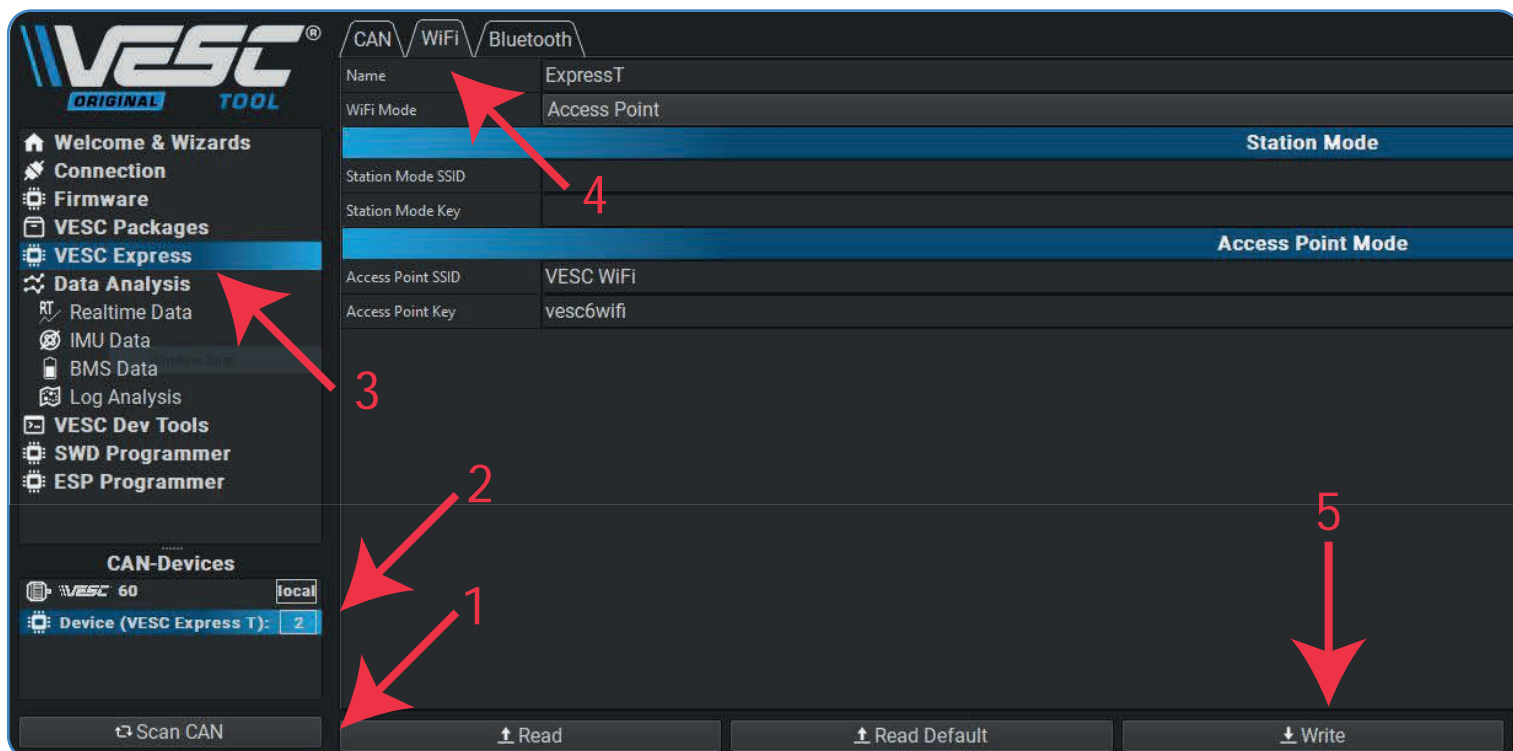
In the data tab you will need to click on a value for it to show(1). You can select multiple values. Click on the graph to move a slider (2) and accurately read the data at each plot point. If GNSS was recorded the plot points will move with this slider to show you exactly where the piece of data you are viewing occurred (3).





## 6. Wi-Fi® setup

To setup Wi-Fi®, first have your VESC-Express connected to your VESC speed controller and power on. Then, connect to the VESC-Tool and click SCAN CAN (1). When the VESC-Express shows up, click on it to connect (2). Once connected you should see VESC EXPRESS tab on the left (3), click here to access settings for the device. Click the Wi-Fi® tab at the top for Wi-Fi® settings (4).

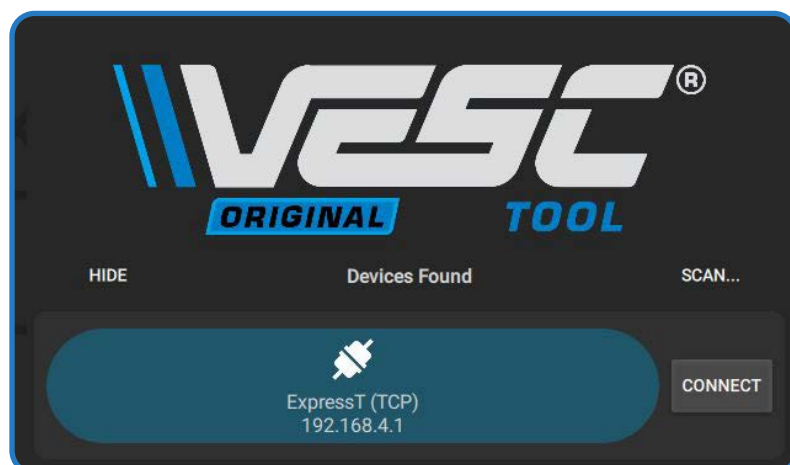


The Wi-Fi® on the VESC-Express has 2 modes, Station mode and Access point. Station mode will connect to your router at home (access through any device with the VESC-Tool connected to WLAN/LAN) and Access point will generate a Wi-Fi® Hotspot you can connect to.

**Station mode** requires you to enter your router SSID and Wi-Fi® password, these are usually found on a sticker on the router. Once this is entered into the VESC-Express settings you should make sure Wi-Fi® mode is set to 'Station mode' and then click write to save (5).

**Access point** only requires you to select Wi-Fi® mode 'Access point' and then click write to save (5) You can change the SSID and password to whatever you like but remember to write to save the setting. Once access point is active go to Wi-Fi® settings on your device and look for the access point SSID. Once found click connect and enter your chosen password. Once connected open the VESC-Tool.

Whether you have connected via your router (station mode) or via the express wifi (access point), you should see the express dongle pop up when you open the vesc tool. Right is an example of what it would look like.



## 7. Useful Information

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### Log rate

The log rate is limited by the CAN-Speed. For example, at 500k baud you can send around 1000 can-frames per second. If you then have one extra VESC device that sends status 1-5 at 50 Hz you have  $1000 - 50 \times 5 = 750$  frames/second left. Two fields in the log require one can-frame, if you want to log 20 values you get a maximum rate of  $(1000 - 50 \times 5) / (20 / 2) = 75$  Hz.

It is wise to use a lower rate, not maxing out the CAN bandwidth. A lower log rate also greatly reduces files size! The default value is 5 to 10Hz.

### Adjust log fields

The log fields can be adjusted easily in the VESC-Tool. With the device connected, go to VESC Dev Tools, select the Lisp tab, then click "read existing". This will display all fields recorded on the local VESC device, devices on CAN and BMS. Once you have edited the code to the fields you require, click upload to load your custom logging code to the VESC speed controller.

### Videos

Benjamin Vedder has done some demo/explanation videos on the VESC Express dongle. Please see below for channel link and relevant video links:

#### VESC Express Demo

[https://www.youtube.com/watch?v=wPzdzcfRJ38&ab\\_channel=BenjaminVedder](https://www.youtube.com/watch?v=wPzdzcfRJ38&ab_channel=BenjaminVedder)



#### Introduction to VESC Packages

[https://www.youtube.com/watch?v=R5OrEKK5T5Q&ab\\_channel=BenjaminVedder](https://www.youtube.com/watch?v=R5OrEKK5T5Q&ab_channel=BenjaminVedder)



#### Benjamin Vedder's Channel

<https://www.youtube.com/@BenjaminsRobotics>



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