

## Stoke Solutions Plug n' Play VESC Kit



**Please consult this document and associated manufacturer datasheets before attempting to install, modify or otherwise use your Plug n' Play kit.**

The Stoke Solutions Plug N' Play kit is intended as a complete electronics replacement for the Onewheel+ XR. This is a DIY Kit and requires knowledge on Battery and Motor safety, furthermore, the electronics used in this kit are based on open-source hardware, firmware and applications which are subject to change at any time. Please conduct your own independent research to ensure the information you are reading is up to date and accurate.

**Improper installation, configuration or usage of this DIY kit can cause serious injury or death.**

**Controller:** \_\_\_\_\_

**Battery Type:** \_\_\_\_\_

**Cell configuration:** \_\_\_\_\_

**Charge Port:** \_\_\_\_\_

**BMS:** \_\_\_\_\_

**Power Button Colour:** \_\_\_\_\_

## Version History (Documentation)

Version Number	Date (Day-Month-Year)	Description
V0.6b	26-10-2023	Initial release.
V0.6	30-10-2023	Front page disclaimer updated. XLR options added to wiring diagram
V0.8b	11-01-2024	"Headlight Control" section created.
V0.8	12-01-2024	WLED control removed from Headlight Control
V0.9	11-01-2024	"Product Warranty and Disclaimer" section added
V1.1b	06-02-2024	"How to Tune" section created.
V1.1c	06-02-2024	"How to Tune" updated. "Version History" section created. 12TQ150/S replaces STPS20S100CT.
V1.1	21-02-2024	"How to Tune" updated.

## Version History (Hardware)

Version Number	Date (Day-Month-Year)	Description
V1.0	28-11-2023	Initial release.
V1.1	02-12-2023	Ugland WLED switched for rESCue S3. Include footpad vents for increased cooling.
V1.2	06-01-2024	Status LED's included to board handle.
V1.3	19-01-2024	Removed braiding shrink-wrap at glands for flexibility.

# How to Tune

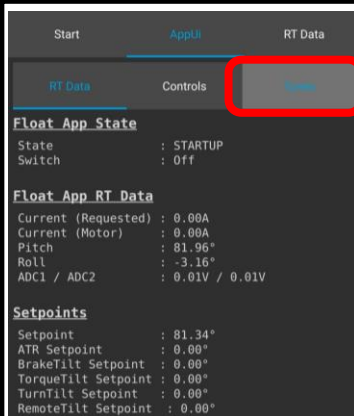
We ship the Plug n' Play kit with Ed's personal tune for the battery voltage. This may not be to your fancy, so here's a quick breakdown of the Tune Archive and how the Float Cfg works.

## BEGINNER: Using the "AppUI" tab & the "Tune Archive"

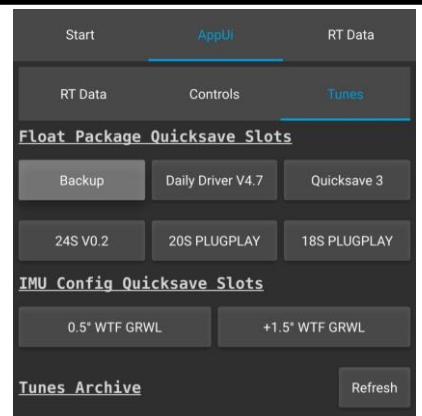
Since Float Cfg V1.0, there is a new "Tune Archive" containing a constantly updating library of rad tunes from the best riders in the world. It's super simple to back up your own tune and try out others.



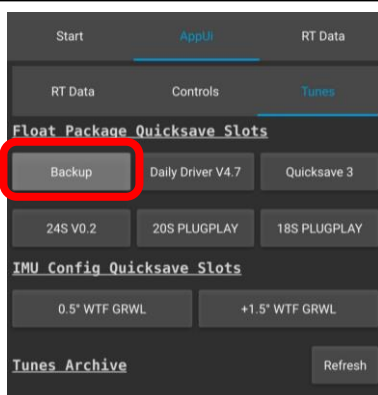
Navigate to the "AppUI" tab using the navigation bar. This may take a few seconds to appear after connecting to your VESC



When greeted with the Float Package Realtime Data screen, select the "Tunes" tab.

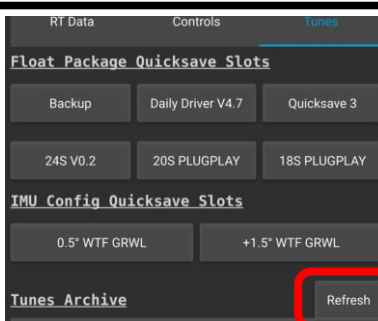
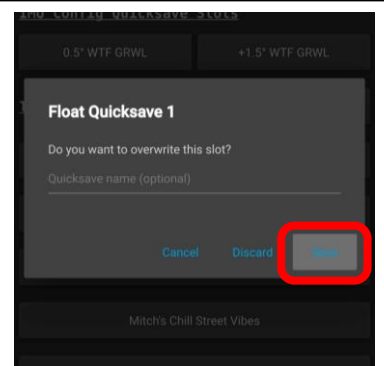


You will see a screen similar to this one. Ignore the names for now, the quicksave slots should say "Quicksave 1" etc...



Backing up and saving configurations is a key part of using a VESC, it is no different with tunes. Press and hold on a quicksave slot to save your tune so you don't lose it. Make sure to call it something funny. Press "save" to back up the tune.

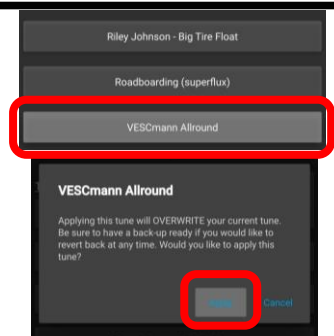
Note: Unlike Config backups, Quicksaves are NOT saved to the board, but are instead saved to the VESC Tool app. You may lose your backups if you reinstall!



Now that we have a backup of the tune, we can refresh the tune archive.

When the archive is finished downloading, you will see a list of all the available tunes to install onto your board. Select any you like the look of and choose "Apply" to install the tune.

You have successfully just tuned your VESC!

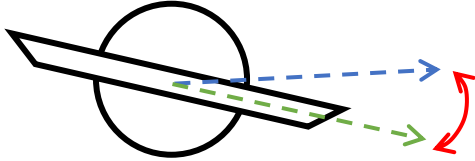


# INTERMEDIATE: Using the "Float Cfg" to tune

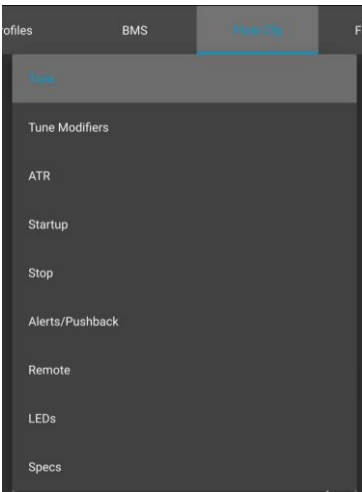
If you want to get a specific feel out of your VESC, you may want to get technical with the tune. This section will give a very brief overview of the key settings in the Float Cfg (V2.0).

## Float Cfg: Setpoint Explained

Quite often in the Float Cfg "help" sections, you will see the "Setpoint" mentioned. Here's a breakdown of what that means.



The "**Board Setpoint**" is where the board wants to be angled toward. The "**Board Angle**" is where it is actually angled toward. The "**Error**" is the angular difference between the **Board Setpoint** and the **Board Angle**. This number can be a negative or positive. Tuning the board is simply changing where this setpoint is and how the board responds to error



## Float Cfg: Sections

- **Tune:** Determines the primary characteristics of the board, here you can change how the board instantly and gradually reacts to **Error** from the **Setpoint**
- **Tune Modifiers:** Similar to the tune section but instead changes the **Setpoint Angle** rather than reactions to error from the setpoint.
- **ATR:** Adaptive Torque Response, how much and how aggressively **Setpoint Lifting** / **Setpoint Lowering** should be applied in reaction to changes in terrain angle.
- **Startup:** Parameters that determines when the board **STARTS**.
- **Stop:** Parameters that determines when the board **STOPS**.
- **Alerts/Pushback:** Warnings that are issued to the rider when nearing the duty cycle limit, overheating, low on battery etc...
- **Remote:** Settings for remote tilt controllers
- **LEDs:** Settings for Externally driven LEDs. Not entirely applicable for Drop-in Kits.
- **Specs:** The different values that your board uniquely has i.e. battery voltage, motor capabilities and footpad sensing

## Float Cfg: Primary PID loop

This PID loop will determine the primary feel of the board by reacting to changes in **Error** From the **Setpoint Angle** of the nose.

### Angle P

Determines how strongly the board responds to **Error** from the **Setpoint Angle**.

Recommended 10 - 35

### Rate P

Determines how strongly the board reacts to sudden changes in the **Board Angle**. This is **NOT** affected by the **Setpoint Angle**

Recommended 0.7-1.2

### Angle I

As time passes with the **Board Angle** away from the **Setpoint Angle**, Angle I increases response toward the **Setpoint Angle**.

Recommended 0.005 - 0.08



## Adaptive Torque Response Uphill/Downhill Strength

The primary multiplier for ATR. Determines the intensity of the **Board Setpoint** change in response to gradient change (e.g. hills).

### ATR Uphill Strength

Increases the **Setpoint Angle** in response to increases in terrain gradient.

$\theta \propto \theta$

Recommended 0.5-2.5

### ATR Uphill Strength

Decreases the **Setpoint Angle** in response to decreases in terrain gradient.

$\theta \propto 1/\theta$

Recommended 0.5-2.5

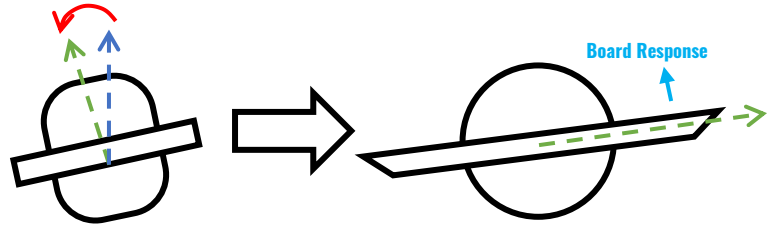
## INTERMEDIATE: Using the "Float Cfg" to tune

### Turn Tiltback

Similar to Angle P, Turn Tiltback reacts to **Error** from the **Angle Setpoint**, but on the roll axis.

The larger the strength, the more the board lifts the nose in response to **Error** from the **Angle Setpoint**. Results in sharper turning at low and high speeds, removing clearance issues.

Recommended 1.0-8.0



### Turn Tiltback

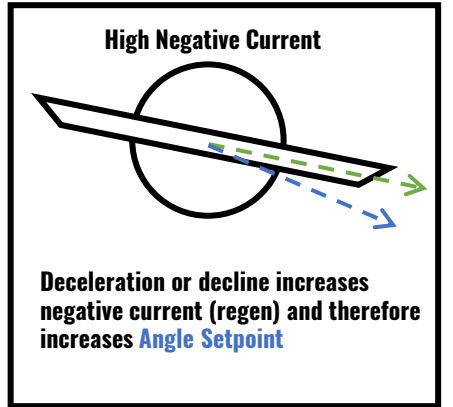
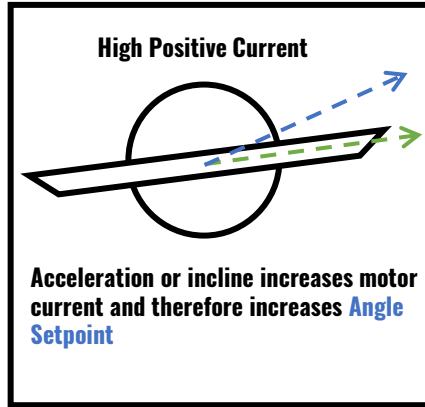
Increases or decreases the **Angle Setpoint** based on the output current.

This is very similar to ATR, but does not track gradient so applies to acceleration/deceleration and inclines/declines.

Increases the nose **Angle Setpoint** on Positive Current.

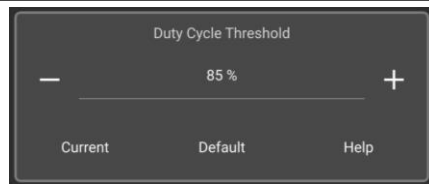
Decreases the nose **Angle Setpoint** on Negative Current (regen).

Recommended 0-0.35



## Duty Cycle & Haptic Buzz

Duty Cycle warning are necessary to safely operate a Self-balancing device. Make sure you configure your board properly to prevent serious injury or death.



### Duty Cycle Threshold

With VESC you can tune the Duty Cycle when pushback kicks in.

Lowering this value will result in a safer riding experience and provide more warning before a nosedive occurs. This setting also determines when Haptic Buzz starts if it is enabled.

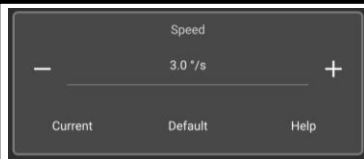
Recommended 75%-85%



### Pushback Angle

This value is added to the boards **Angle Setpoint** to raise the nose and provide pushback. Raising this value may cause tail drags, however lowering the value will make pushback unnoticeable. Use caution when changing this value.

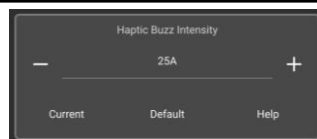
Recommended 4.0+



### Pushback Speed

This value determines the rate at which the nose will be lifted when at pushback. If you prefer a mellow feeling pushback, this can be lowered, however it can become unnoticeable on trails. Use caution when changing this value

Recommended 2.0+



### Haptic Buzz

Since Float Package 1.4beta, Haptic Buzz can be added to your ride. It is highly recommended to use this feature as it will prevent serious injury.

The intensity of the buzz can be configured using this value.

Set your board to a lower Duty Cycle Threshold to test out what the buzz feels like before testing it out at high speeds.

You can also change the type of buzz emitted from the motor using the "Haptic Buzz" dropdown menu

Recommended 75%-85%



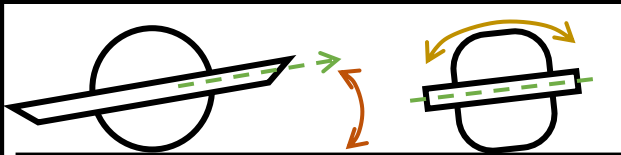
**Warning:** Lithium-ion batteries may explode or burn due to improper use. Stoke PEV Solutions UK LLP are not responsible for any death or damage caused to properties or persons because of improper usage or installation of the products provided by Stoke PEV Solutions UK LLP.

## ADVANCED: An intro to advanced usage

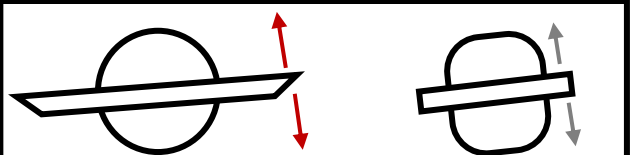
This section should give a glimpse into some of the more technical stuff that your VESC does behind the scenes. Only bother with this if you are a tinkerer and want to get an extremely precise tune.

### IMU: Accelerometer vs. Gyroscope

It may help to understand a few of the key concepts in how a VESC figures out the Board Angle. Here's a quick breakdown of how the board "figures out" the nose angle

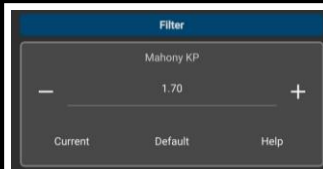


**The Gyroscope** provides **Nose Angle** (usually IMU "Pitch") and **Roll Angle** (Usually IMU "Roll") in relation to orientation of the earth where level is perpendicular to gravity.  
**This Value updates slowly**



**The Accelerometer** provides **Nose Velocity** (usually IMU "Acc Y") and **Roll Velocity** (Usually IMU "Acc X") in relation to the current true angle of the VESC.  
**This value updates nearly instantly**

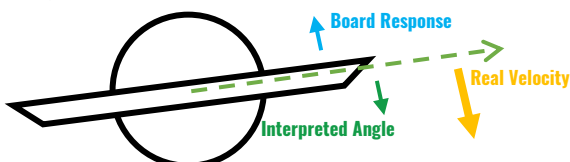
You may wonder, what do I do with this information? Well, let's look at the Mahony KP inside the Float Cfg.



### Mahony KP

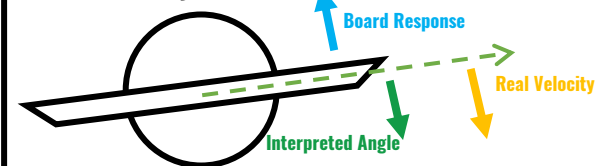
Mahony KP determines how much the Accelerometer is used in estimating the **Board Angle**. If we **lower** the value, the **Accelerometer** is used more to estimate the angle. If we **raise** the value, the **Gyroscope** is used more to estimate the angle. Let's look at a visual example of what this does:

#### High Mahony KP



High **Gyroscope** usage means the **Board Response** is smaller than the **Real Velocity** as the **Interpreted Angle** is updating slowly.  
**This results in a "looser" feel**

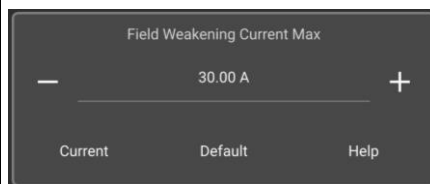
#### Low Mahony KP



High **Accelerometer** usage means the **Board Response** is proportionate to the **Real Velocity** as the **Interpreted Angle** is exaggerated.  
**This results in a "stiffer" feel**

### Field Weakening: High speeds and magnet compensation

The concepts of field Weakening, and motor theory is a tad too much for this document, but we can take a look at what the values do and how to use them in your setup. Make sure you backup before changing any of these settings.



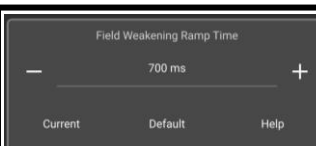
#### Field Weakening Current

Field weakening injects a current alongside the standard FOC motor current to reduce the effects of Back EMF. Increasing this value will **reduce** the amount of speed reduction that high strength magnets cause. Has diminishing returns on low strength magnets.  
**Recommended: 30 – Battery current max**



#### Field Weakening Duty Start

Field weakening only injects currents above a certain duty cycle, you may be able to feel this "ramping" effect when riding. Tune this number lower or higher to mitigate this feeling  
**Recommended: 50% – 75%**



#### Field Weakening Ramp Time

Field weakening requires time to kick in, otherwise you will get severe nose dips. A shorter ramp time can feel noticeable but will get higher speeds quicker. Tune to your preference.  
**Recommended: 500ms – 1000ms**

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## Headlight Control (rESCue)

For headlight control, we use the rESCue S3. The rESCue firmware has some powerful tools that allow for advanced lighting control and some fancy features. Accessing and tuning these different features as well as brightening and dimming your headlights is done through the “Thank the Maker” app designed and developed by Thank the Maker.

### Accessing the app

These QR codes will take you to the relevant app stores where you can find the Thank the Maker app.

You can also programme your rESCue from a PC with Bluetooth capabilities.



App Store



Google Play Store

### Customization and options

There are thousands of different options and combinations when configuring your rESCue, To find out what they all do, follow this link to go to the rESCue documentation.



<https://rescue.thank-the-maker.org/doc/rESCue-pcb-documentation-v3.pdf>

When connecting with the Thank the Maker app, you may be prompted with the setup wizard. If this is the case, you will need the following information for setup:

VESC-ID: \_\_\_\_\_

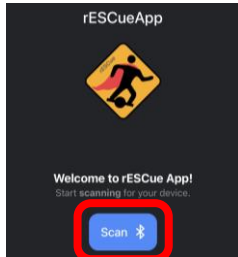
Number of pixel: 36

Lightbar Number of pixel: 5

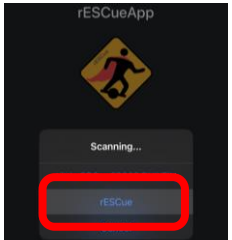
**WARNING:**  
The rESCue S3 is only rated for 2A current continuous.  
While it can temporarily peak at 3A current, it is highly discouraged to run your headlights at full brightness across all strips



Connection with the rESCue app can be rather arduous on first setup. Follow the below guide to ensure you do not remove any of the pre-configured settings for your headlights.



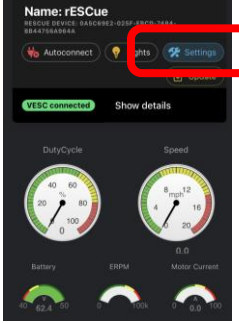
**Select "Scan" to scan for local Bluetooth devices.**



**Scan for local BT Devices. Restart app if device not found**



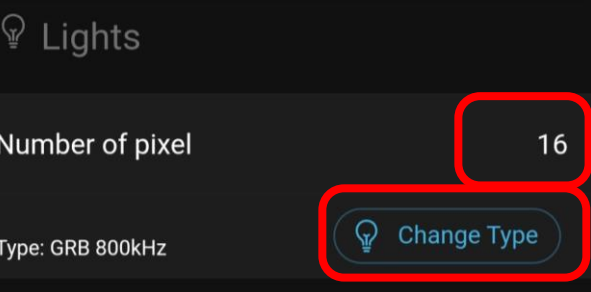
**Skip the setup wizard**



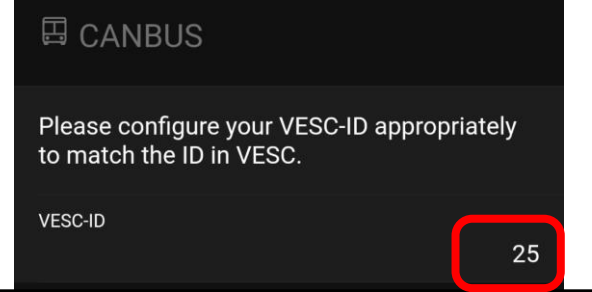
**Select the settings tab**

Now that you are connected, most of the settings are self-explanatory, however there are a few different variables that will need to stay the same in order to maintain proper operation.

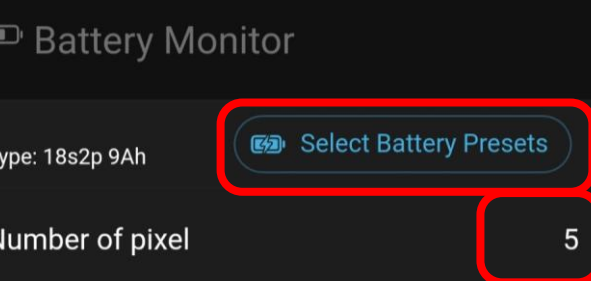
**Your Drop-in Kit should come with 36 LED's acting as the headlight and taillight array. These are composed of SK6812 LED strips which are configured as GRBW with a refresh rate of 800KHz**



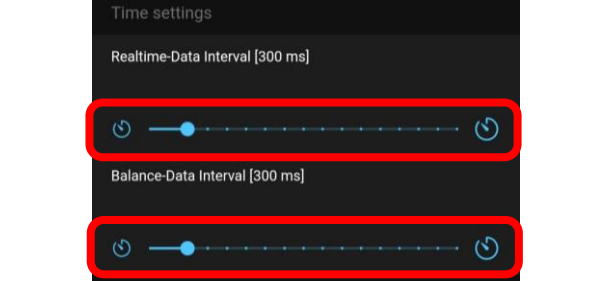
**Ensure that you set your VESC-ID back to the VESC-ID found on the previous page of this document. If you lose this document, the number can be found in the VESC Tool App Cfg tab**



**The battery monitor found inside the handle of your board uses the same SK6812 Strip used in the headlights. There are 5 LEDs. Information on battery Presets can be found on our website.**



**The time-intervals for your rESCue can be increased or decreased according to preference, however if the value becomes too high, it may damage the module. Stick to 300ms+ on both intervals.**



More information on how the rESCue works as well as what the different configuration settings do can be found on the rESCue documentation linked on the previous page.



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# Setting up your Motor

While the Plug n' Play system is entirely rideable without any configuring, it is highly recommended to tune your motor to the VESC. This will make your board ride much smoother than riding without configuring. Riding your Plug n' Play system without performing these steps may result in unpredictable and dangerous board behaviour.

Please follow the steps below to properly configure your VESC. For further details on how to configure your VESC, visit <https://pev.dev/>

If you are uncomfortable or unsure performing any of the steps in this section to setup your Plug n' Play kit, don't hesitate to contact us via: [info@stoke-solutions.co.uk](mailto:info@stoke-solutions.co.uk)

## Pre-configuration checks.

Before attempting to configure your motor, please ensure that:

1. The motor and hall sensor plugs are inserted into the appropriate connectors. Note that the hall sensor plug is on the LEFT. The footpad connector is on the RIGHT. Refer to the image below.
2. The footpad is disconnected and will not attempt to activate the board while the configuration is running.
3. The motor can rotate without obstruction or collision



**WARNING:**  
**DO NOT** force your motor plug, hall sensor plug or footpad plug into their respective ports. This may damage the controller box. There may not be a locking "Click" when inserting the Motor connector.

## Step 0: Download the VESC Tool App for Mobile

For this setup, we will be using the VESC Tool app for mobile.

You can download the app using the following links:

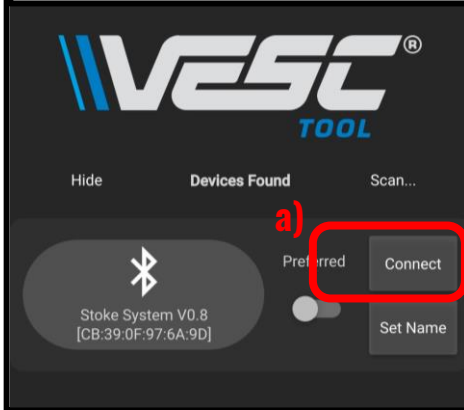


App Store



Google Play Store

## Step 1: Connect to your VESC using the VESC Tool App



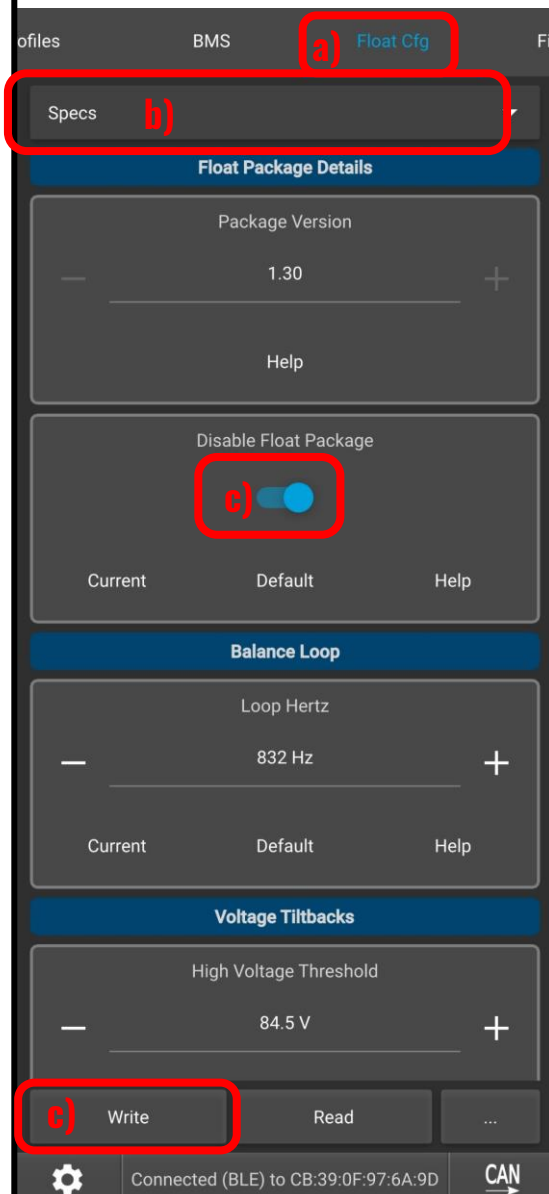
Power on your board using the power button on your controller.

Your board should appear on the Bluetooth menu like the left.

If your board does not appear, press “Scan” then “Scan BLE” to refresh your Bluetooth connections.

a) When your board appears on your “Devices Found” menu, press “Connect” on your VESC to continue.

## Step 2: Disable the Float Package



We start by disabling the Float Package, this way there is no application interference while calibrating the motor

- a) Scroll through the Navigation tabs at the top of the VESC Tool App until you find “Float Cfg”
- b) Select the drop-down menu and choose “specs”
- c) When greeted with the menu as seen to the left, toggle “Disable Float Package” to the ON position
- d) Press “Write” to append the values to your VESC\*

Please note, on iPhone and some other devices, the “Float Cfg” may take some time to load.

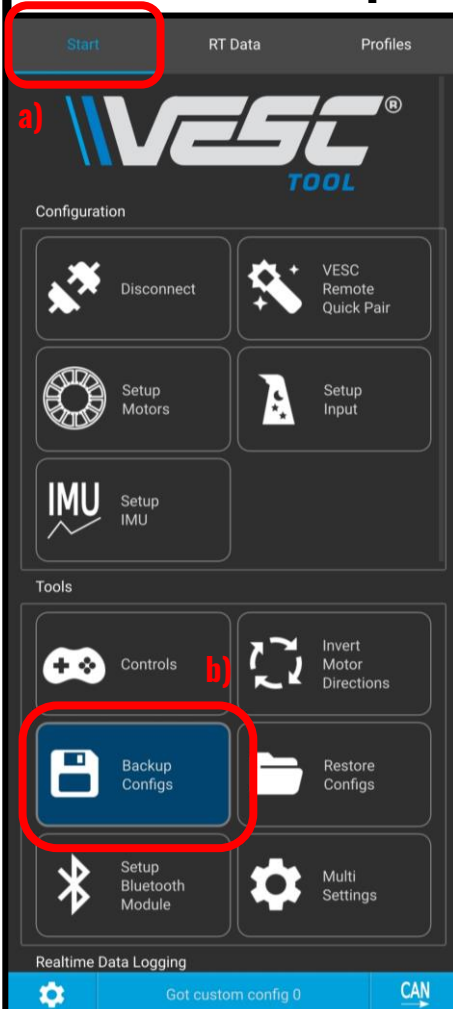
If you are having trouble running the VESC Tool app on mobile, you can download the desktop version and follow this guide.

\*VESC Tool will give you a confirmation message at the bottom of your screen every time you write something to the settings.

If the bar is blue, your setting change has been appended.

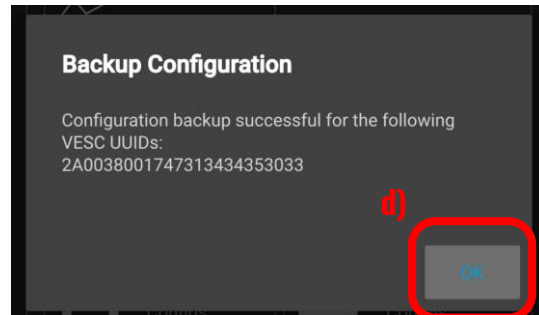
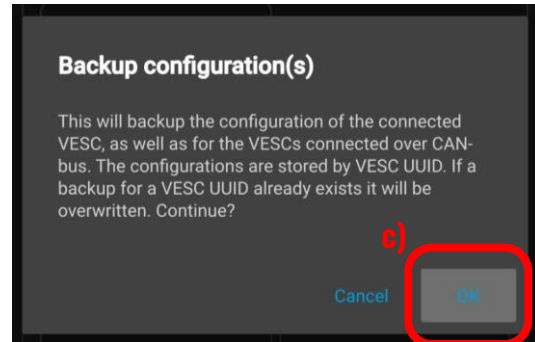
If the bar is red, your setting has been rejected, this may be because of a bad connection, unusual input value or other various reasons.

## Step 3: Backup your Config Settings



We start by backing up the current board settings so that we can revert our settings if something goes wrong.

- Navigate to the “Start” Tab. Your app should default to this page.
- Press the “Backup Configs” option under “Tools”
- Press “OK” to start Backing up your Configuration
- Press “OK” again to confirm a successful backup

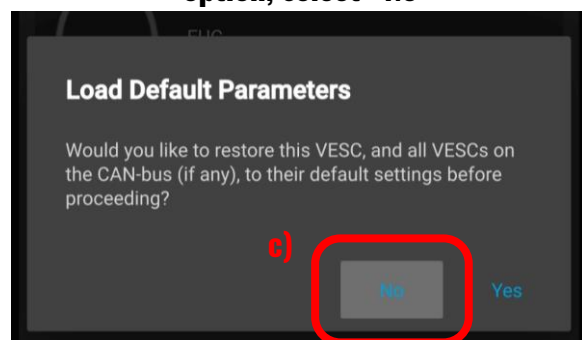


## Step 4: Start configuring your motor

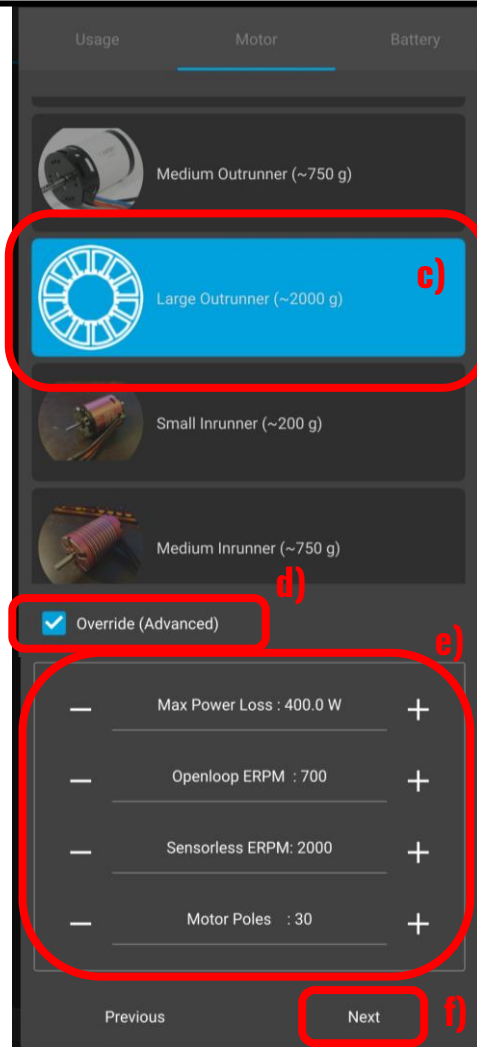
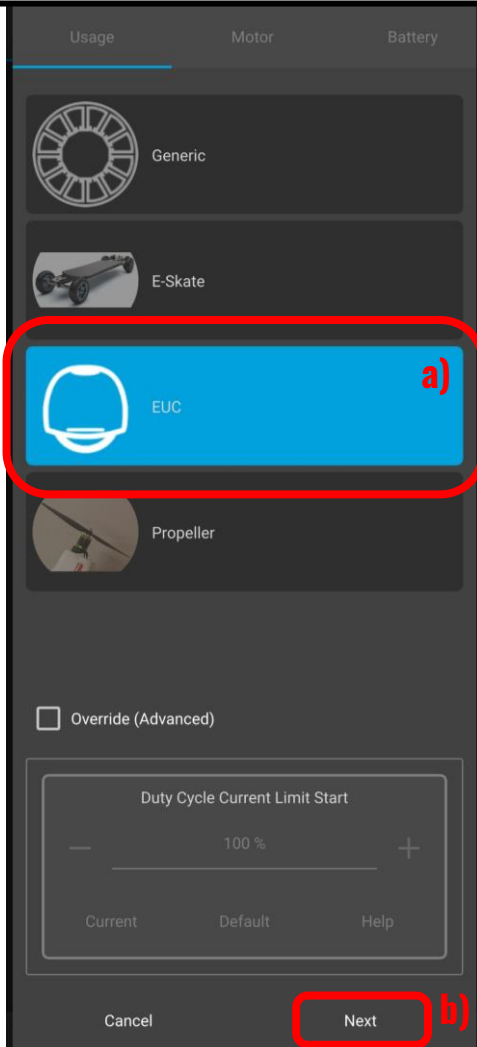


We start configuring the motor by using the VESC Tool Motor Configuration Tool

- Navigate to the “Start” tab. You should still be on this page after backing up configs
- Press the “Setup Motors” option under “Configuration”
- When greeted with the “Load Default Parameters” option, select “No”

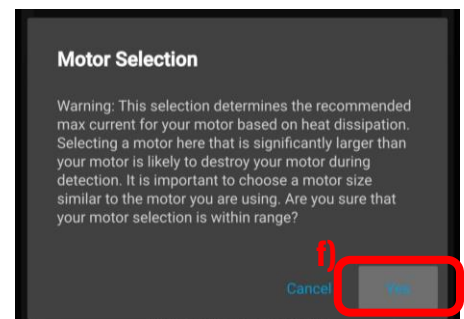


## Step 5: Choose your motor type



Now we can tell VESC Tool how we would like to configure our motor.

- a) Select the option “EUC”
- b) Continue to the next page by pressing “Next”
- c) Once on the next page, select the “Large Outrunner” motor
- d) Select the “Override” option to enable extra values at the bottom of the page
- e) Input the following values for a Hypercore motor:  
Max Power Loss: 400.0W  
Openloop ERPM: 700  
Sensorless ERPM: 2000  
Motor Poles 30
- f) Select “Next” to continue to the next page
- g) Select “Yes” to dismiss the warning



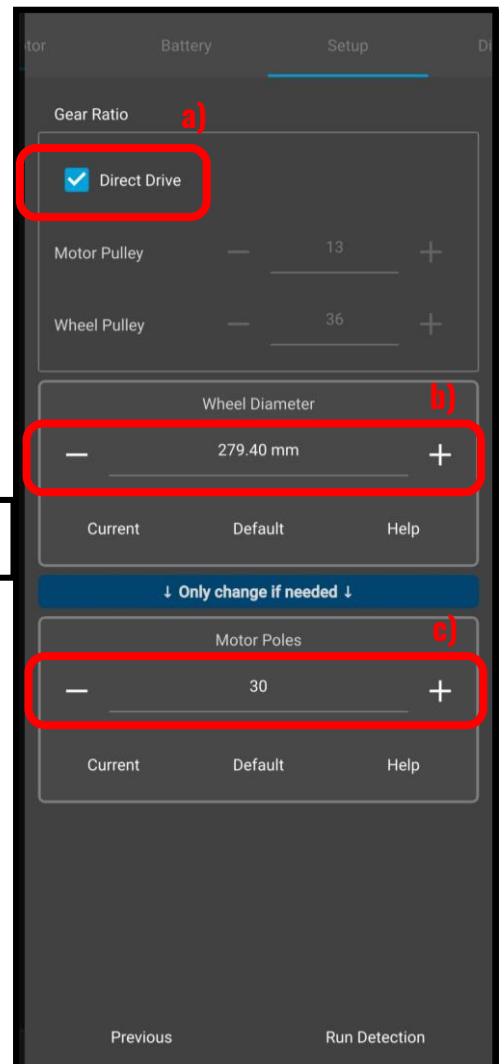
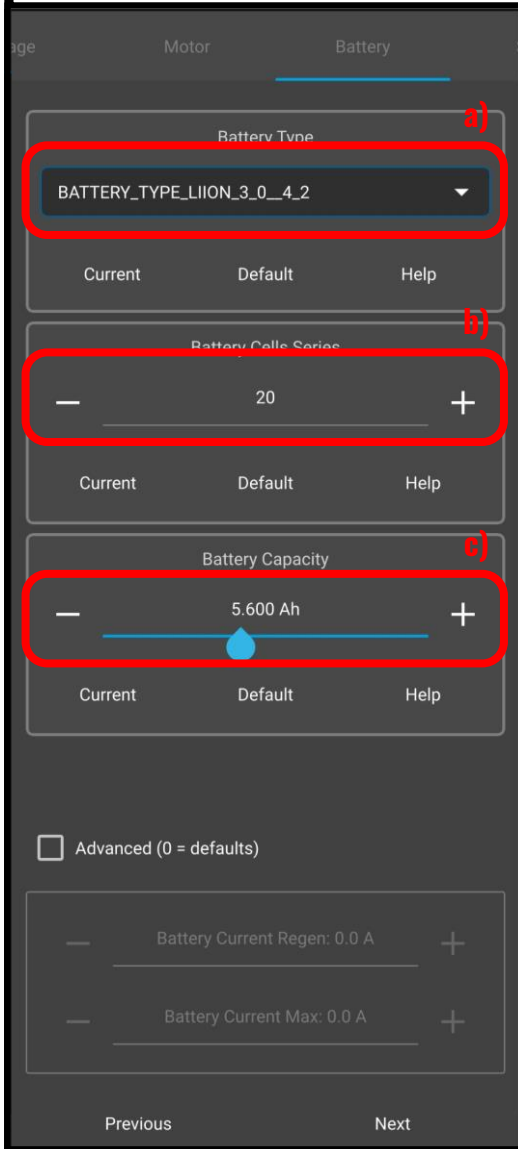
## Step 6: Setup your battery

We must now inform our VESC what battery we are using. For this section, you will need to refer to your batteries specifications.

a) Choose your battery type. This will be "BATTERY\_TYPE\_LIION\_3\_0\_4\_2"

b) Select the number of cells in series.  
**Speed pack (84V): 20**  
**Torque, Power, Range Pack (75.6V): 18**

c) Select your battery capacity  
**Speed pack (84V): 5.6Ah**  
**Torque Pack (75.6V): 8.4Ah**  
**Range Pack (75.6V): 10.0Ah**  
**Power Pack (75.6V): 9.0Ah**



## Step 7: Set your motor specs

We now setup some motor values

a) Select the checkbox "Direct Drive"

b) Input your wheel diameter, this depends on the tire you are using  
**10.5in = 266.7mm**  
**11in = 279.4mm**  
**11.5in = 292.1mm**  
**12in = 304.8mm**

c) Set Motor Poles to "30"

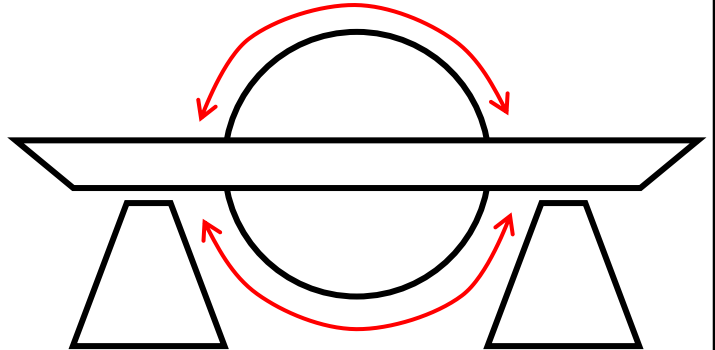
**DO NOT press "Run Detection" yet.**

**Warning:** Lithium-ion batteries may explode or burn due to improper use. Stoke PEV Solutions UK LLP are not responsible for any death or damage caused to properties or persons because of improper usage or installation of the products provided by Stoke PEV Solutions UK LLP.

## ! Step 8: Setup board for Motor Detection !

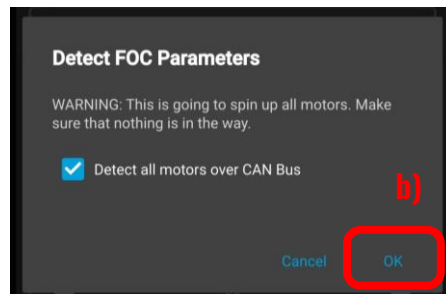
Before proceeding, setup your board where the motor can free-spin without resistance.

Consider setting up your board as can be seen on the right, this way the motor can spin freely, and the footpads can be weighed down to prevent the board from falling.

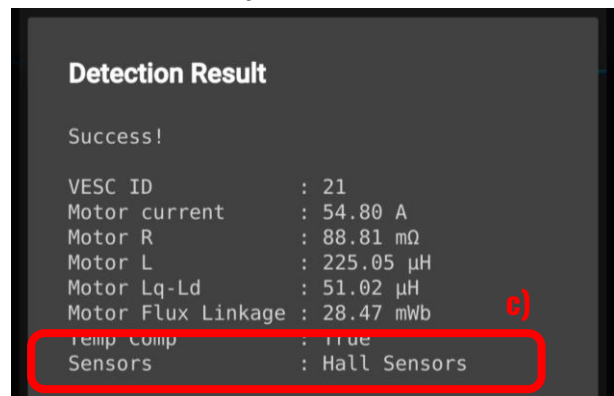


## Step 9: Run Motor Detection

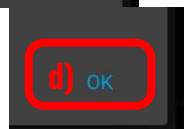
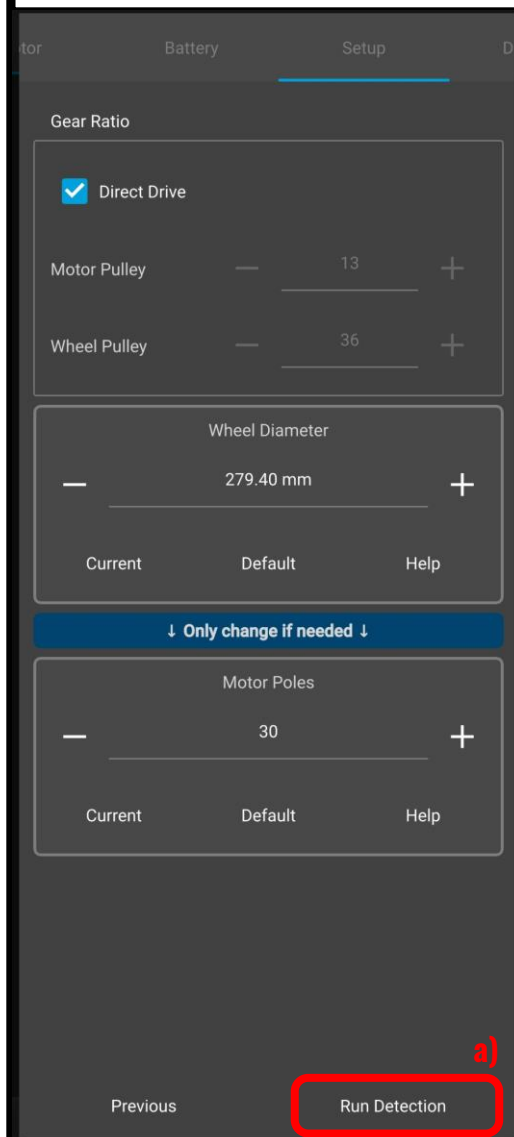
Now we must run the motor value detection programme.  
a) Press "Run Detection" at the bottom of the page.  
b) If prompted, press "OK" to start motor detection  
Your motor will now begin to start turning, do not worry if it makes some weird sounds. This is perfectly normal.



c) After detection is finished, ensure that the Detection Result says "Hall sensors"



d) Press "OK" at the bottom of the page to continue

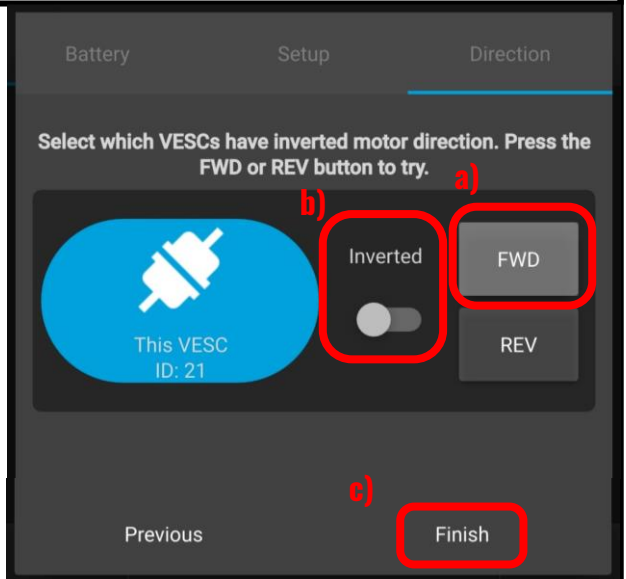


## Step 10: Determine Motor Direction

Now we must tell the VESC which direction our motor is facing

- Press the “FWD” button, your motor will now start rotating.
- If you motor rotates forward, DO NOT tick “Inverted”  
If your motor rotates backwards, select “Inverted”
- Press “Finish” to Finish Setup

If your motor makes a loud clicking noise and does not rotate when “FWD” is pressed, return to the Float Cfg, disable the Float Package and repeat the Motor Detection process from Step 2



## Step 11: Finalise motor values

We must now tell the VESC our preferred values for the motor rather than the auto-detected ones.

- Scroll to the “Motor Cfg” page at the top and select it.
- With the first Drop-Down Menu, Choose “General”
- With the Second Drop-Down Menu, Choose “Current”
- Input the following values for a Hypercore motor:

**Motor Current Max: 120 to 150A\***

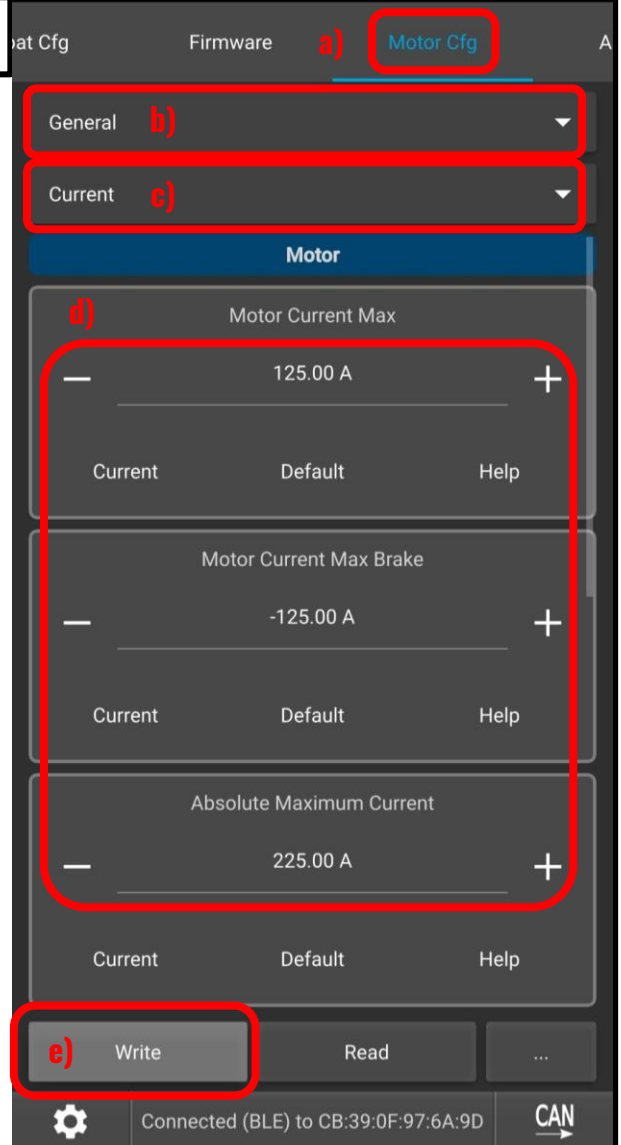
**Motor Current Max Brake: -120A to -150A\***

**Absolute Maximum Current: 225A\*\***

- Press “Write” at the bottom of the screen to update the values on your VESC

\*Motor current determines how quickly overheating will occur. Higher temperatures can damage the magnets inside your motor. Use with caution.

\*\*The Lil Focer V3.1 is capable of an absolute maximum current of 250A, It is recommended to keep this lower for safety.





## Step 12: Setup battery current

We must now safely configure the battery.

a) Remain on the same page as Step 10. Scroll down to the “Battery” section.

b) Input battery current values:

84V Speed Pack: 50A

75.6V Torque Pack: 60A

75.6V Range Pack: 40A

75.6V Power Pack: 80A

c) Input battery regen values:

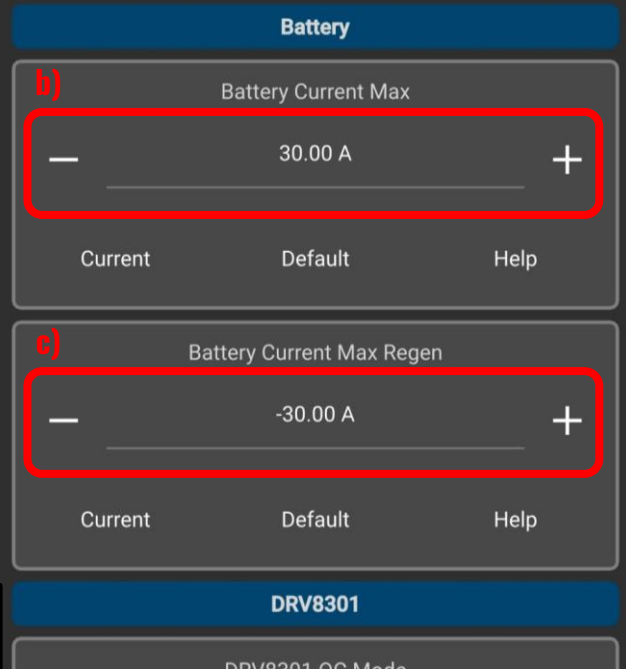
84V Speed Pack: -20A to -35A

75.6V Torque Pack: -20A to -40A

75.6V Range Pack: -20A to -30A

75.6V Power Pack: -30A to -50A

**Excessive battery currents can result in battery overheating**



## Step 13: Setup battery voltage

With the battery Current determined, we must determine the battery voltage

a) Navigate to the “Motor Cfg” tab

b) Use the first drop-down to navigate to the “General” tab

c) Use the second drop-down to navigate to the “Voltage” tab

d) Input the correct Battery Voltage Cutoff Start:

84V Speed Pack: 54V

75.6V Torque Pack: 48.6V

75.6V Range Pack: 48.6V

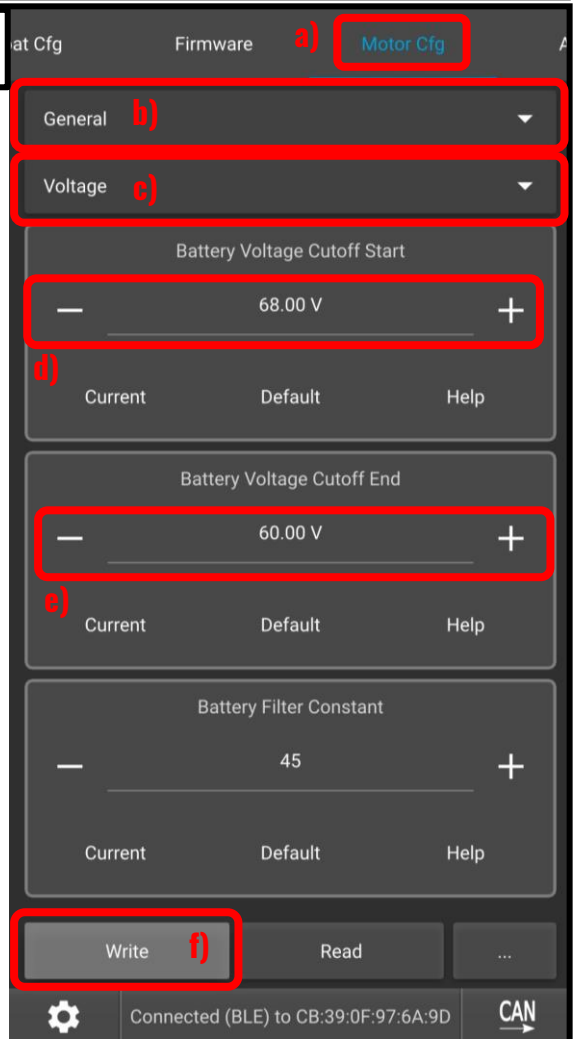
e) Input the correct Battery Voltage Cutoff End:

84V Speed Pack: 50V

75.6V Torque Pack: 45V

75.6V Range Pack: 45V

f) Press “Write” to append the values to your VESC

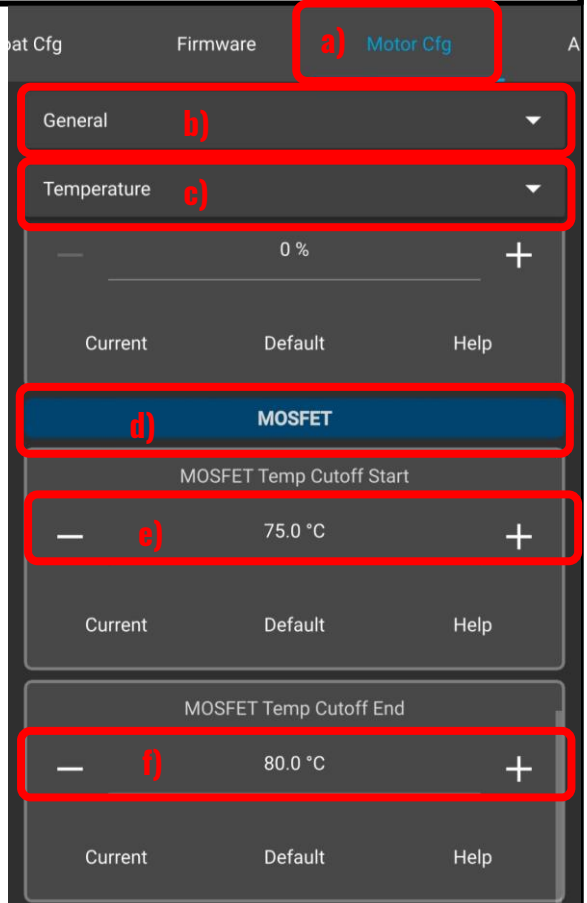


## Step 14: Setup VESC Temperature Cutoffs

We must now determine the values we will use to safely shut off the VESC when it becomes too hot

- a) Navigate to the “Motor Cfg” tab
- b) Use the first Drop-down to enter the “General” tab
- c) Use the second Drop-Down to enter the “Temperature” Tab
- d) Scroll down to the “MOSFET” Section
- e) Input the Value 75C for MOSFET Temp Cutoff Start\*
- f) Input the Value 80C for MOSFET Temp Cutoff End\*
- g) Press “Write” to append the values to your VESC

\*Configure at your own discretion.

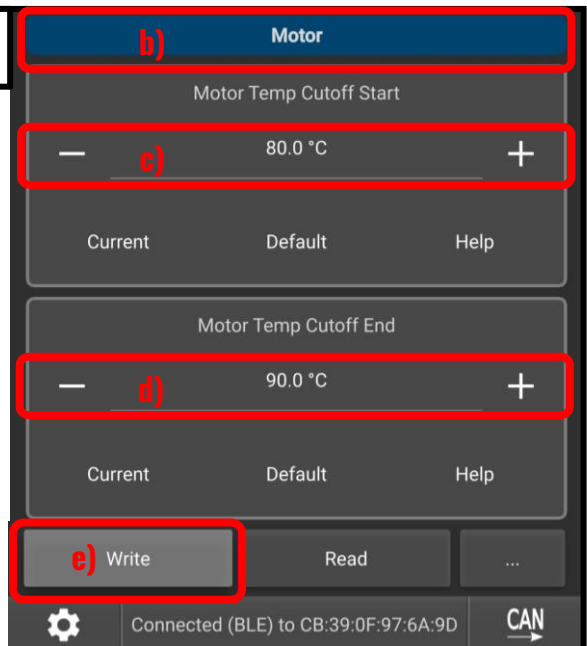


The screenshot shows the 'Motor Cfg' tab selected. The 'General' dropdown is set to 'General' and the 'Temperature' dropdown is set to 'Temperature'. The 'MOSFET' section is expanded, showing 'MOSFET Temp Cutoff Start' set to 75.0 °C and 'MOSFET Temp Cutoff End' set to 80.0 °C. The 'Write' button is visible at the bottom.

## Step 15: Setup Motor Temperature

- a) Navigate to the same tab as Step 14
- b) Scroll down to the “Motor” section
- c) Input the value “80C” for the Motor Temp Cutoff Start\*\*
- d) Input the value “90C” for the Motor Temp Cutoff End\*\*
- e) Press “Write” to append the values to your VESC

\*\*Configure at your own discretion.

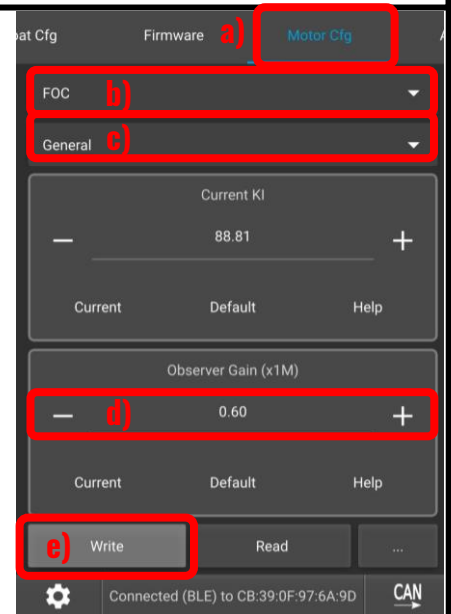


The screenshot shows the 'Motor' section selected. The 'Motor Temp Cutoff Start' is set to 80.0 °C and the 'Motor Temp Cutoff End' is set to 90.0 °C. The 'Write' button is highlighted at the bottom.

## Step 16: Setup Motor Control settings

Now that we have entered the specs for the motor and battery, we need to tell the VESC how to control the motor

- Navigate to the “Motor Cfg” tab
- Use the first Drop-down to enter the “FOC” tab
- Use the second Drop-down to enter the the “General” tab
- Set the Observer Gain to HALF of the existing value e.g. Default value 1.23 -> 0.61
- Press “Write” to append the values to your VESC



## Step 17: Re-enable the Float Package

Now that the motor has been configured, we can re-enable the Float Package and get ready to ride the board again.

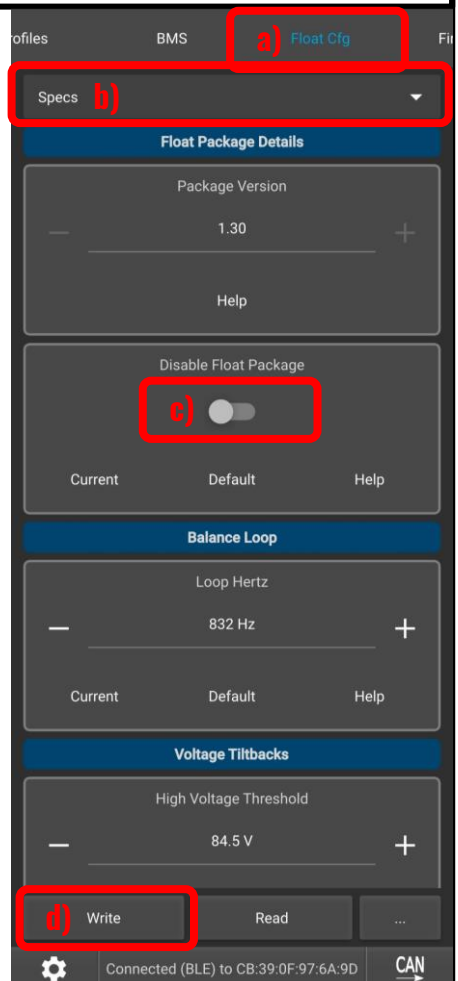
- Navigate to the “Float Cfg” tab
- Use the Drop-down to enter the “Specs” tab
- Toggle the switch so that the Float Package is NOT disabled. (OFF position)
- Press “Write” to append the values to your VESC

Your board should now be working!

Before riding, please do a hand test and move the board on the ground. Please also free-spin the motor to ensure that there are no unusual groaning or crunching sounds.











Please double check your settings before mounting the board, if the motor is still inverted you may severely injure yourself when trying to ride.

Shred on!



## Parts, Datasheets & More

The following list shows every primary component we use for the Drop-in Kit as well as the relevant datasheets and sources. We are enthusiastically Right to Repair, however if you don't feel comfortable working on your board, please get in contact.



<b>Lil Focer V3.1</b>	<ul style="list-style-type: none"> <li>• Translates discharge to FOC motor control</li> <li>• Customwheel.shop provides great EU shipping rates</li> <li>• The Lil Focer V3.1 has no official datasheet, the esk8 forum link is the best resource of information</li> </ul>	<b>Our Retailer</b>		<b>Datasheet</b>	
<b>Flipsky "ZBMS"</b>	<ul style="list-style-type: none"> <li>• Manages the battery cells temperature, voltage, charge rates etc...</li> <li>• Flipsky provide good rates from their online store</li> <li>• The Flipsky BMS has no datasheet, scroll down the main website for information.</li> </ul>	<b>Our Retailer</b>		<b>Datasheet</b>	
<b>rESCue s3</b>	<ul style="list-style-type: none"> <li>• Creates buzzer sounds and drives headlights and taillights</li> <li>• Support the rESCue firmware development by purchasing from their site.</li> <li>• rESCue datasheet shows information on hardware and software setup</li> </ul>	<b>Our Retailer</b>		<b>Datasheet</b>	
<b>Charge Diode</b>	<ul style="list-style-type: none"> <li>• Manages the charge port safety preventing electrical shorts or reverse polarity</li> <li>• DigiKey is a reliable source of microelectronic parts.</li> <li>• Datasheet provided by Schottky, can be accessed via digiKey site also.</li> </ul>	<b>Our Retailer</b>		<b>Datasheet</b>	
<b>Switchcraft 6-pin</b>	<ul style="list-style-type: none"> <li>• Footpad and Hall sensor plugs for Future Motion hardware.</li> <li>• DigiKey is a reliable source of microelectronic parts.</li> <li>• Datasheet provided by switchcraft, can be accessed via DigiKeys site also</li> </ul>	<b>Our Retailer</b>		<b>Datasheet</b>	



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<b>Molex 6-pin</b>	<ul style="list-style-type: none"> <li>• Connects the Motor to the VESC phase wires</li> <li>• DigiKey is a reliable source of microelectronic parts.</li> <li>• Datasheet is created by Molex but accessible through Digikey</li> </ul>	<b>Our Retailer</b> 	<b>Datasheet</b> 
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<b>GX16-3 port</b>	<ul style="list-style-type: none"> <li>• Alternative charge port for use in VESCs. Prevents accidental plugging wrong chargers</li> <li>• Amazon provides good rates on pairs, be aware of knock-offs</li> <li>• Mouser provide a GX16-3 datasheet</li> </ul>	<b>Our Retailer</b> 	<b>Datasheet</b> 
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<b>Power Button</b>	<ul style="list-style-type: none"> <li>• Turns on and off the VESC as well as other electronics being relayed by the VESC 5V.</li> <li>• Customwheel.shop provides power buttons pre-wired for use with a Focer.</li> <li>• There is no datasheet from customwheel, however a similar datasheet is listed.</li> </ul>	<b>Our Retailer</b> 	<b>Datasheet</b> 
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<b>LED Lights</b>	<ul style="list-style-type: none"> <li>• RGBW addressable lighting provide both headlights and taillights</li> <li>• Amazon provides fairly reliable real SK6812 LED strips. Ensure you test these strips before using them in your build.</li> <li>• Adafruit datasheet shows SK6812 specs</li> </ul>	<b>Our Retailer</b> 	<b>Datasheet</b> 
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There are several hundred more parts used in our builds, such as: Brass inserts, lids, thermal pads, connectors etc, however this list should provide you with the resources to replace any parts that become broken or damaged.



For a more comprehensive list of tools, parts and supplies that many use in their VESC builds, the above QR code is a comprehensive list made by: <https://pevdispensary.com/>



While some of the more difficult to find parts are listed on this page, our VESC Collection page lists (almost) all the parts that we use to make a VESC drop-in kit. <https://stoke-solutions.co.uk/collections/vesc>

# Troubleshooting

Here are some common problems when setting up the Plug n Play system. If your query is not answered here, please shoot us a message via email at: [info@stoke-solutions.co.uk](mailto:info@stoke-solutions.co.uk)

## Motor Crunch

If you have just set up your motors and it is making a “Crunching” Sound or you don’t like how it feels when you are riding it, follow this link:



<https://pev.dev/t/motor-crunch-troubleshooting/228>

## “Lightsabering”

(Your board will make beeping sounds when turned on)  
If your controller is making a loud or annoying high-pitched whine while riding, please follow this link:



<https://pev.dev/t/motor-making-constant-loud-noises-when-engaged-groaning-lightsabering-etc/613>

## Re-level for new rails

The drop-in kit comes tuned for stock rails, i.e. completely level. If you would like to change out the level set point, please follow steps A) 5.



<https://pev.dev/t/wiki-imu-calibration-wizard-guide-vesc-tool-6-02/699>

## How to tune

While we include a brief breakdown of how to tune your VESC, here’s a more comprehensive explanation of every value in the Float Cfg.

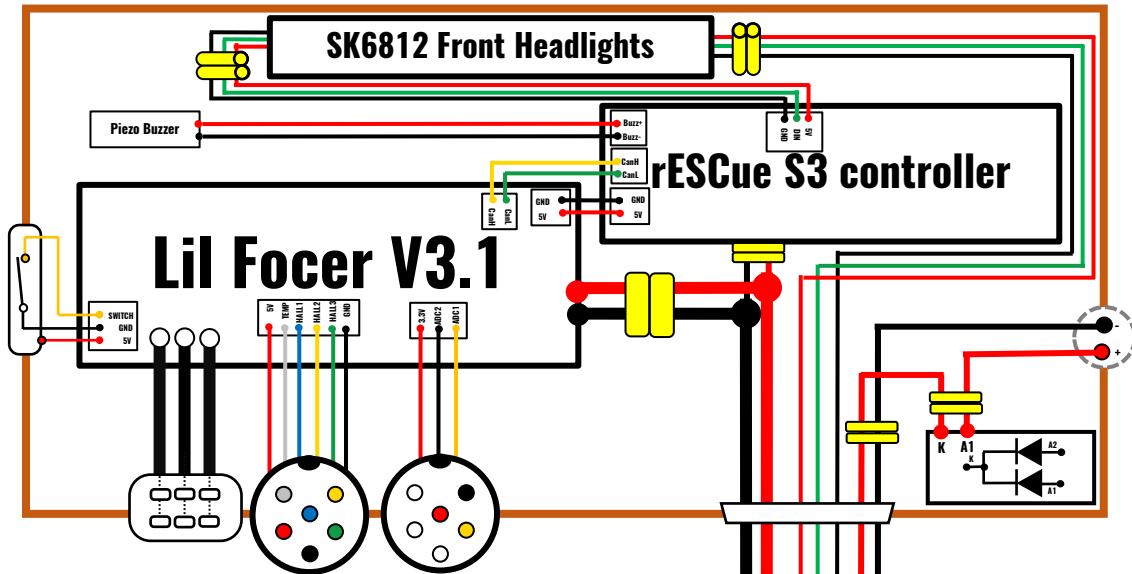


<https://drive.google.com/file/d/1C8udPCFWvSvqANmwBLocOsYXwja7bBYK/edit>

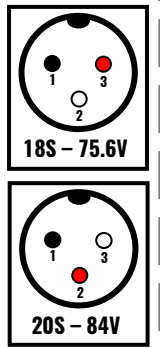
**Warning:** Lithium-ion batteries may explode or burn due to improper use. Stoke PEV Solutions UK LLP are not responsible for any death or damage caused to properties or persons because of improper usage or installation of the products provided by Stoke PEV Solutions UK LLP.

## General Wiring Diagram

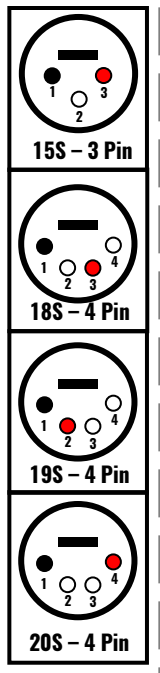
### Controller Box



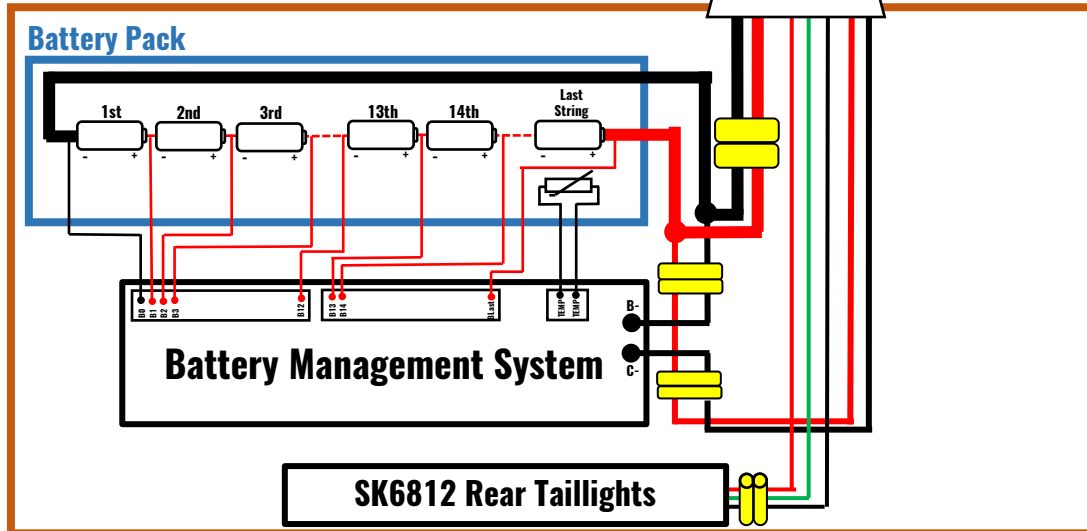
### GX16-3



### XLR



### Battery Enclosure



Please note, the Drop-in kit is designed to be a drop-in replacement for Onewheel+ XR hardware. The kit is not compatible with 3<sup>rd</sup> party motors such as the Superflux or Canoncore without re-termination and modifications to the pins.

Wiring diagram is intended for diagnostic use only. Please consult a qualified technician before modifying your wiring.

Please contact [info@stoke-solutions.co.uk](mailto:info@stoke-solutions.co.uk) for more details on the parts used, wiring methods or any general inquiries regarding the above diagram.





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# Product Warranty and Disclaimer

## 1. Warranty Coverage

The customer warrants the product(s) manufacturer, sold and delivered by Stoke PEV Solutions UK LLP to the customer shall be free from material defects in material and workmanship, conform to applicable specifications and perform in accordance with the product documentation under normal usage.

## 2. Remedy

In the event of a breach of the warranty, Stoke PEV Solutions UK LLP shall, at its sole option and expense, promptly repair or replace the defective products. Such remedy shall be the customers sole and exclusive remedy for any breach of warranty.

## 3. Warranty Exclusions

The warranty does not cover

- A) Consumable parts, such as batteries, unless Products damage has occurred due to a defect in materials or workmanship;
- B) Damage caused by accident, abuse, misuse, fire, liquid contact, earthquake or other external cause;
- C) Damage caused by operating the product outside published guidelines;
- D) Defects caused by normal wear and tear or otherwise due to the normal aging of the product.

## 4. Claim procedure

The customer must notify Stoke PEV Solutions UK LLP within 10 days of the discovery of any claimed defect, specifying the nature of the claimed defect. The customer must return the alleged defective product to the company at it's own cost for inspection

## 5. Warranty Duration

Stoke PEV Solutions UK LLP provides warranty from the date of fulfilment by the distributor.

The warranty duration for components (whichever is sooner)

- A) 3-months or 750 miles for the Battery, Battery Management System and peripherals;
- B) 6-months or 1250 miles for the Controller, Wiring harness and other Powertrain electronics.

Stoke PEV Solutions UK LLP does not extend warranty for externally sourced components.

## Usage Disclaimer

Single-wheeled self-balancing electric skateboards are not to be used on public footpaths, cycle lanes of roads in the UK. It is the complete responsibility of the customer to ensure that you operate your device within the boundaries set by country and local laws.

Single-wheeled self-balancing electric skateboard can be very dangerous if ridden in a reckless or inappropriate manner. The customer assumes all liability and risk associated with the use of products sold by Stoke PEV Solutions UK LLP and holds Stoke PEV Solutions UK LLP and it's partners free from any liability caused by their use. We also strongly encourage anyone riding this device to always wear a helmet at the very minimum, we recommend the use of other protective equipment alongside a helmet to minimise injury in the event of crash or other accident.