Scorpion Power System

www.scorpionsystem.com

Scorpion User Guide for Scorpion Tribunus II 12-80A ESC SBEC

SAFETY

- ⚠ Scorpion and their re-sellers are not responsible for your use of this product, or any damage or injuries you may cause or sustain as a result of it's usage.
- ⚠ Understand that an electric motor that is connected to a battery and speed control may start unexpectedly and cause serious injuries. Always treat them with necessary respect. Keep the propeller away from your body and others at all times.
- ⚠ We suggest that you remove the propeller when you are working on the plane with the battery connected.
- ⚠ We suggest that you remove the pinion when working on a Helicopter with the battery connected.
- ⚠ Please observe all local laws regarding the flying of remote control aircraft.
- ⚠ Never fly over others or near crowds.

Included in the Box

- 1x Scorpion Tribunus II 12-80A ESC SBEC
- 1x Master and Slave cable
- 1x Diode adaptor cable for V-Link II Cable(optional)
- 1x Thank You Card

Tribunus II 12-80A ESC

Features of Tribunus II 12-80A ESC SBEC

1. Wide input voltage range 14 ~52V (4S-12S LiPo/HvLi)..
2. New PCB design for better heat dissipation and efficiency.
3. ESC included phase sensor (RPM sensor) (Slave cable) connect to external governor / V-bar.
4. High current, up to 80A continuous current, with current protection.
5. Airplane, Helicopter mode. Stored and unstored Governor, external governor.
6. The first ESC utilizes Morse code communication.
7. ESC setup can be set by Mikado VBar control Radio. Data Logging, Data export for external data logging device, such as Mikado V control / Vbar combinations. (More compatible device will be added gradually.)
8. Additional Scorpion V Link II cable for upgrading ESC firmware (sold separately).
9. A USB port for PC connection w/wo main power source Downloadable PC program.
10. PC connectivity, Vlink II Cable(optional) plus Diode adaptor cable(included) needed.
11. Aluminum heat sinks
12. Build- in temperature sensor with adjustable temperature protection.
13. True DC-DC 5.1V-8.1V BEC for servo and receiver with10A continues and 20A peak.
14. Changed BEC protection
15. Multiple protection features include: over current, over voltage, temperature protection
16. AutoDetect mode
17. Upgradeable Firmware.
18. Improved BEC current and voltage drop for high amps servos. 0.8v drop on 30a
19. Added futaba telemetry support without additional adaptor.
20. Added gear ratio and motor poles settings for jeti and futaba telemetry
21. Increased log size to 64kB
22. Improved current protection
23. Added PC motor control function

1.0 Connecting your ESC

* Please refer to the diagram on Page 3 to properly connect your ESC.

1.1 Add your battery connector

You must attach a quality battery connector of your choice to the red (positive) and black (negative) power wires. Solder the battery connector to the wires. ENSURE THAT THE POLARITY IS CORRECT (red wire (positive) to battery red wire (positive), black wire (negative) to battery black wire (negative)). Follow the instructions provided with the battery connector.

1.2 Connect Motor to ESC

We recommend using bullet connectors to connect your ESC to your motor as most of the Scorpion motors come with pre-installed bullet connectors that include a female set for your ESC. Solder the corresponding connectors for your motor to the wires coming from the ESC, or solder the motor wires directly to the motor leads. You may find it convenient to temporarily connect the motor leads to the ESC and test for proper rotation before you permanently solder them. Once connected DO NOT allow any exposed wire or connectors to contact each other! Ensure that a proper insulation material (such as heat shrink) is around each of the three wires. Failure to do so will cause the ESC to malfunction and void your warranty.

1.3 Connect to your receiver / External Governor

Connect the receiver lead (Master: the three colored small wires: brown, red, yellow) with a red plastic connector on the end to the throttle channel on your receiver and connect the black plastic connector (Slave) to an external governor, unplug the yellow (signal) wire if you do not use the RPM signal for telemetry or external govenor (e.g. VBar govenor). If you have external battery that you may need to disable the bec in programing. If you do not use the RPM signal for telemetry or external govenor (e.g. VBar govenor) just leave it unplugged.

1.4 Mounting the ESC

Mount the ESC with the Heatsink side of the controller facing outward. We recommend using a "Scorpion Fastening Strap" to attach the ESC to the airframe for easy removal. Double sided tape is acceptable for mounting as well. If zip ties are used, do not place them over any of the components on the ESC. Instead, zip tie around the metal heat sink, leaving some slack to allow some movement.

1.5 Tribunus ESC BEC

For safety reasons we recommend using a Scorpion backup guard or a backup battery. The Backup guard can be used on any BEC voltage from 5.1 to 8.1V. If the BEC voltage is set to 7.1V or 8.1V use a 2S LiPo. Connect the BEC backup parallel to the receiver or Flybarless system. Make sure that the Backup guard is charged or the 2S LiPo battery voltage matches to the set BEC Voltage before every flight. Also make sure all used RC-components are designed to run at the set BEC voltage. On the slave cable remove the signal cable when it use for extra bec only. The induction voltage cause by servos will activate the protection of the BEC, we highly recommend the BEC voltage set to 7.1V or below to avoid this.
http://www.scorpionsystem.com/blog/?p=7173

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2.0 Using your Scorpion Tribunus ESC

2.1 Ensure that the initial setup has been performed before using your ESC.

2.2 Ensure that the ESC is connected to the proper channel on your receiver.

2.3 Turn your transmitter ON and set the throttle stick to zero throttle.

2.4 Connect the main power battery to the ESC.

2.5 The ESC will beep the motor with Morse code when power up[Power On Sound(POS)].

⚠ Power On Sound - Voltage in Morse code.

⚠ To arm the ESC ready for use, you must disconnect the battery, then move the throttle stick to zero position and reconnect to power-up.

⚠ Always power your radio transmitter before powering up the receiver and/or the ESC. Some receivers with fail-safe features or Spektrum receiver units that are not bound on receiver power up are entirely capable of causing the arming sequence to occur and command the ESC to driver the motor. Always keep the aircraft restrained and clear of body parts when the ESC is powered.

⚠ If your ESC cannot sense any radio signal it will beep the motor and flash green on the LED with Morse code.

3.0 Scorpion Tribunus ESC Programming Feature

All Scorpion Tribunus Series ESC programming features are available though the use of the PC programming.

Scorpion ESC's come with default factory settings which are recommended for most applications. Programming options can be changed at the discretion of the user.

Safe Power up	To arm the controller, the throttle must be held in the "Zero" position (all the way down). If throttle is not at zero at startup, the ESC will not provide any power to the motor regardless of where the throttle stick is positioned when first powered up.
Loss of Signal (fail safe)	The Scorpion ESC will stop the motor as a safety feature when the throttle signal is lost or corrupt for 0.5 seconds.
LED*	The LED is used for indicate the status of your Scorpion Tribunus ESC. It show with Morse code that can let you know the status of the ESC
Low Voltage Cutoff	You can choose for your ESC to stop or reduce power when the input battery voltage drops to a pre-set/programmed cutoff voltage.
Current Limiting	Amp output limit, the output is rated at 10% over the rated Amp. At approximately 10% over the rated Amps it will automatically limit the output to the motor, as long as the motor is not rated too much over the ESC spec limits, this safety mechanism will prevent a over load to the ESC but if you install a motor for example rated at 100 Amps on a ESC that are rated for only 60 Amps, this mechanism will not work properly due to the instant surge of power demand from the motor, it may shutdown too early or simply fry the ESC, the only solution to this is to never use a Motor that has a rating bigger then the ESC, don't even think you can use it if you run the motor at a slower RPM or load, it will not work and void your warranty!!
Thermal Protection	At set value, the ESC will slowdown the power output to the motor to the set value of protection (the on board LED will flash Morse code T (Temperature Error), after the ESC has cool down to under set value you can then throttle up again.
Brake	Stops rotation of the motor when the throttle signal is moved to the lowest position.
Throttle	Airplane and Heli modes come pre-programmed and can be selected by the user.
Electronic Timing	Electronic Timing and drive frequency are Automatically and dynamically set that may improve the efficiency of the drive system!

4.0 Initial Setup

You MUST perform throttle range calibration before the first use of the ESC, except if you are using external governor mode, remove propeller/pinion from motor or back off pinion from main gear while performing initial throttle range calibration.

5.0 Throttle Calibration

5.1 Turn on transmitter and receiver, then set throttle to maximum position be sure that your throttle curve is set at 0% minimum throttle and 100% at maximum.

5.2 Connect the battery to the ESC. After few seconds you will hear one beep. Now move your throttle to the lowest position, then you will hear two beeps, and POS Morse code come from the motor, this mean your calibration is done. You only need to do this once as throttle range will be stored in the memory of the speed controller. You can reset the throttle range by performing steps 5.1 to 5.2 again.

6.0 Simple Morse digits

Simple Morse code Alphabet	0 = T = - 1 = A = •– 2 = U = ••– 3 = W = •–– 4 = V = •••– 5 = S = ••• 6 = B = –••• 7 = G = ––• 8 = D = –•• 9 = N = –• Z = ––•• I = •• P = •––•

7.0 ERROR code Morse digits

POS	Power on Sound , Voltage in Morse code 30.1V = WT.A = Morse code beep = •–– – .•–
Error	N = No Throttle signal Z = Throttle not in Zero position V = Voltage Error I = Current Error P = Power Error T = Temperature Error
1: Power up, No Throttle	Delay – POS – ERROR N = –•
2: Power up, Throttle not Zero	Delay – POS – ERROR Z = ––••
3: Power up, Throttle Zero Position	Delay – POS – No Sound
4: Power up, Voltage Error	Delay – POS – ERROR V = •••–
4: Power up, Throttle Calibration Full Throttle	Delay- 1 Beep – Lowest throttle – 2 beeps (confirmed)– POS – ready to fly.

8.0 Connecting the Scorpion ESC to Computer / Android Device

Scorpion provides the most advance PC/Android program for setup.
Download Scorpion Tribunus ESC program Installer with CH340 driver from http://www.scorpionsystem.com/files/download/ScorpionTribunusProgram.zip, it is available for Windows XP, Windows 7, Windows 8 and Windows 10.
Unzip it and double click the .ex file to start installation
Double click the "setup.exe" under "CH340 Driver" folder to install the USB driver.. If you have any problem installing the USB driver, please send email to support@spihk.com and ask for assistance.
Scorpion Tribunus II 12-80A ESC is programmed using the
1) Adaptor Diode Cable (Included in the box)
2) Scorpion "VLink Cablle II" (sold separately)
3) OTG (on the go) Cable (Excluded)
4) Micro USB cable connect to PC directly.(Excluded)

** Scorpion do not provide OTG (on the go) Cable for Android Device. OTG cable can be found in local electronic store.

9.0 Tribunus II 12-80A ESC Specification

Low Voltage cut	Low Voltage cut: 10V to 50V
Program cut type	from 0% to 100%
Cut off delay	1000ms ~65000ms
Drag Break	Available on Airplane only
BEC	From 5.1V ~8.1V
Protection	Temperature, Voltage, Current, Capacity
Airplane mode	Available
Rump Accel	100ms~1000ms
Active Free Wheeling (PWM mode)	Always on for Helicopter mode, can be change for Airplane mode
Heli Mode	Available
Soft Start	Only available on Heli Mode: Fast, Medium, Slow, Custom
Rump Accel	Fast, Medium, Slow, Custom
Bail out mode	Only available on Heli Mode: Fast, Medium, Slow, Custom
Governor	Only Available on Heli mode:Soft, Default, Hard, Custom
FREQ	8 kHz~32 kHz Dynamic Frequency
Rotation	yes
Timing	Auto Timing
P Gain	0.3~1.8
I Gain	1.5~2.5
Data Logging	RPM, Throttle %, Voltage, Current, Temperature

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SCORPION ESC PC CONNECTION

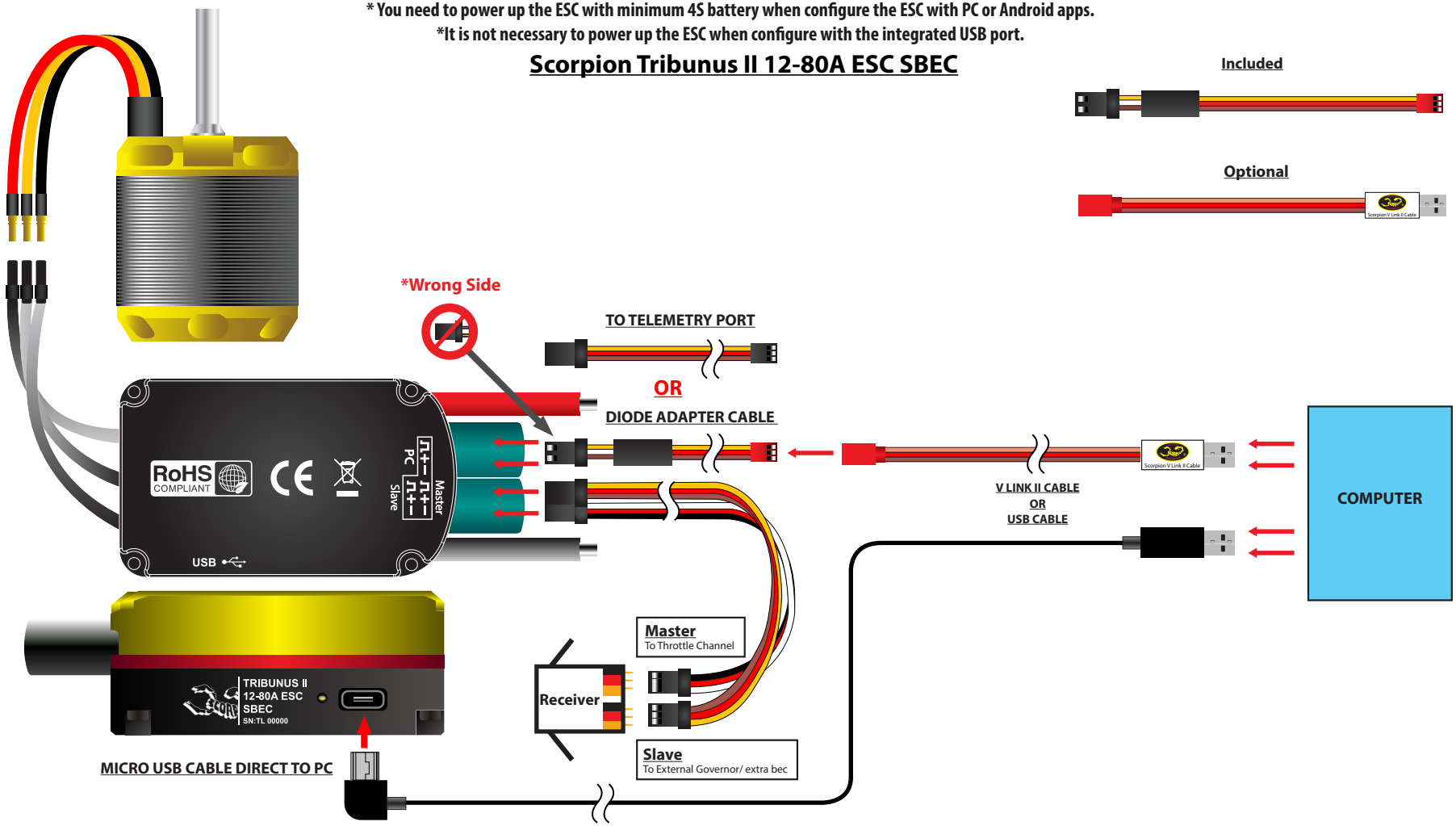
10.0 How to connect Scorpion V Link II Cable

• Follow the below diagram to connect the ESC to computer, using the Scorpion V-link II USB Cable (Optional)

*** You need to power up the ESC with minimum 4S battery when configure the ESC with PC or Android apps.**

***It is not necessary to power up the ESC when configure with the integrated USB port.**

Scorpion Tribunus II 12-80A ESC SBEC



** You can download the eManual, program, V Link II driver at this page.
http://www.scorpionsystem.com/downloads/
http://www.scorpionsystem.com/files/download/VLinkIICable.pdf

**You can download the Sproto Program at this link:
http://www.scorpionsystem.com/files/download/SprotoPlatform.install.zip

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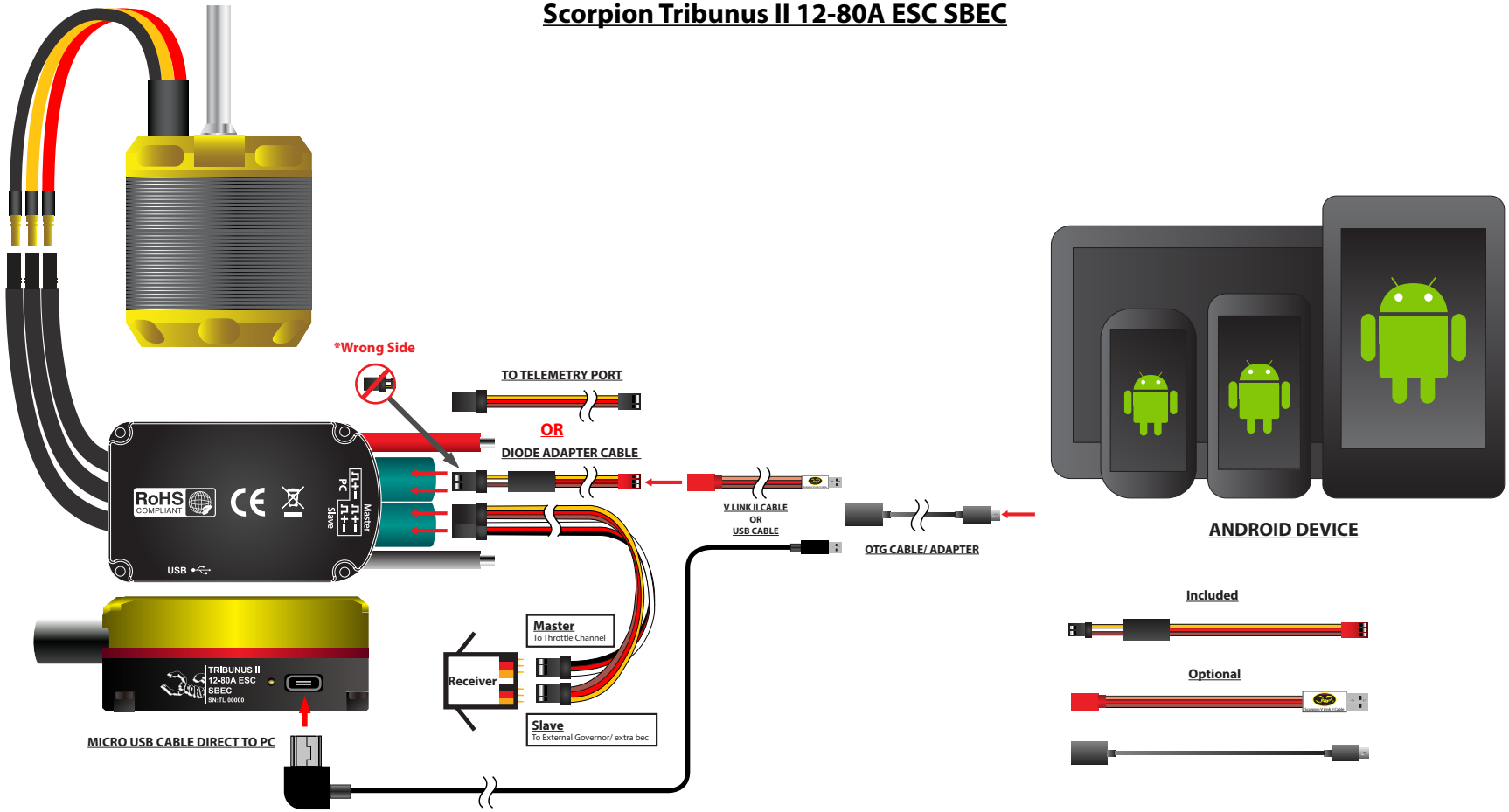
11.0 How to connect Scorpion ESC to Android device via OTG and V Link II Cable

Follow the below diagram to connect the ESC to Android device, using the Scorpion V-link II USB Cable & OTG cable(Optional)

*** You need to power up the ESC with minimum 3S battery when configure the ESC with PC or Android apps.**

***It is not necessary to power up the ESC when configure with the integrated USB port.**

Scorpion Tribunus II 12-80A ESC SBEC



** You can update the latest firmware through this apps.

The below is the link of Tribunus ESC cofigurator apps.

https://play.google.com/store/apps/details?id=en.scorpion.tribunusapp

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12.0 PC Software

IMPORTANT : Sproto is a new program supported all the Tribunus ESC, after download the program and install, you need to register an account for firmware update and configure the setting.

http://www.scorpionsystem.com/files/download/SprotoPlatform.install.zip

It will install the default apps. Click Connect to find the device you connected. IMPORTANT: After making a change on each page, ensure you click the SAVE button at the top to save your settings before navigating through the various

After login it will install the default apps, double click the app which device is need. For the Tribunus II 12-80, you need to launch the Tribunus II configurator.





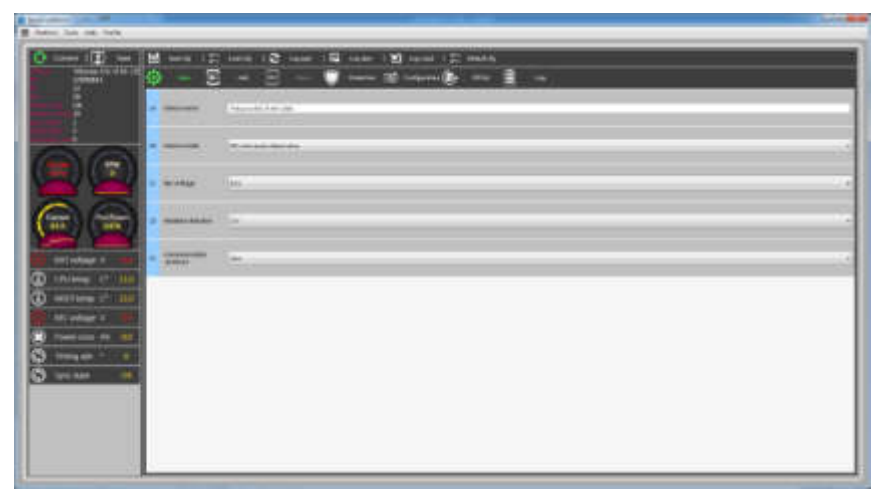


Click "Connect to device" to enter device setup page. You will see which device this app supported, the manuals, How-to and user guide at the below.

Profile: you can set your own profile icon, language and measuring.



NAME: Here you can change the name of the ESC



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MAIN PAGE

This is the page you can set up all the general setting like device mode selection, bec voltage, rotation direction and communication protocol.

12.1 General Setting

MENU

Connect: Click to connect or refresh the ESC to the PC Program

Save: Saves current settings to the ESC

Save cfg: Save current ESC settings to file

Load cfg: Load ESC settings from file

Log upd: Loads the log from the ESC

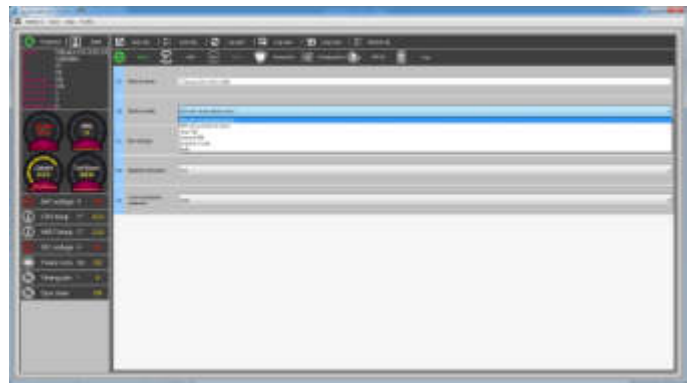
Log save: Save the log to a file

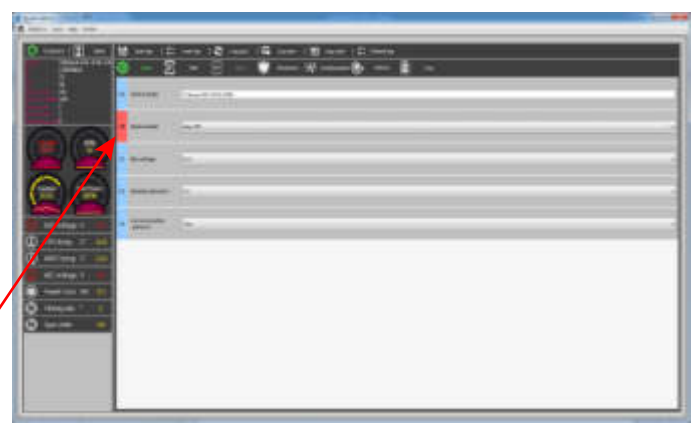
Log Load: Loads the log from a file

Default cfg: Default factory setting

NOTE: When the user changes a value in any dialogue box, the BLUE box will turn RED. Once the user clicks "SAVE", the RED box will turn BLUE once again to signal that the value has been stored to the ESC.

DEVICE MODE: If you would like to utilize the internal governor in the Tribunus ESC, select "Recalculated Value" for the first few flights with internal governor. Select the "Pre-stored value" after your first few flights. Select "VBAR PID" for VBAR governor. Select "External PID" for another external governor. Select "Airplane mode" for airplane use.
Default setting:
Device mode: PID with recalculated value. Communication protocol: Vbar.







Device:
Model with the modification name.

SN:
Serial Number

BL:
Boot Loader version

FW:
Firmware version

Reset code:
For engineer use.

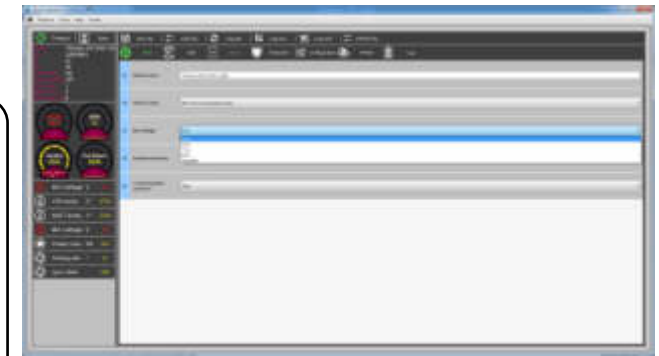
Power on time:
Currently ESC running time.

Run count:
How many times did motor run.

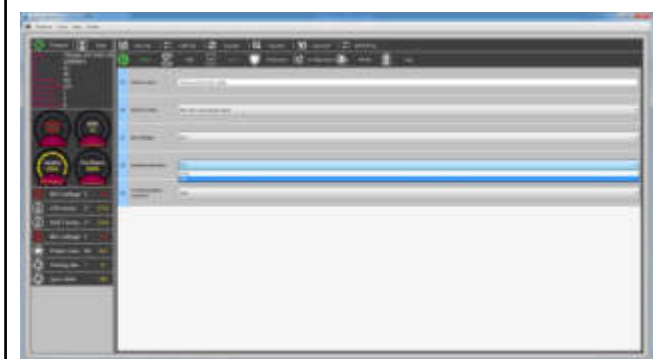
Motor time:
Total time of the motor run.

Discharge mAh:
Total capacity of battery did ESC discharge.

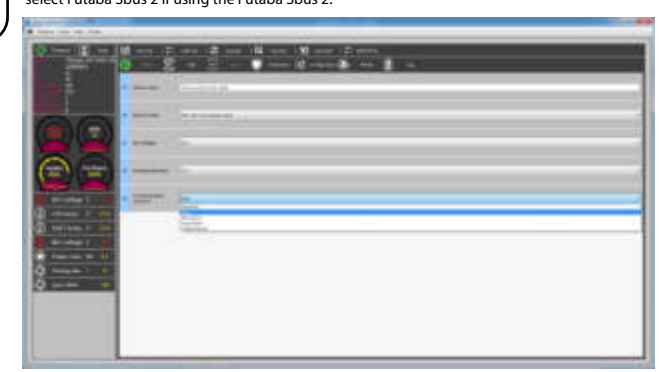
BEC VOLTAGE: The BEC can be adjusted from 5.1V to 8.1V.



Rotation: Adjusts the motor rotation direction.



Communication Protocol: Select "Standard" if using Scorpion Internal Governor or Airplane Mode.
Select VBar if using the Mikado VBar Control, Select "Jeti Exbus" if using a Jeti Exbus System, select Unsc Telem if using an Unspecified Telemetry System (Such as JLog or Brain FBL) or select Futaba Sbus 2 if using the Futaba Sbus 2.



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12.2 Helicopter mode

HELICOPTER MENU

The Spool-Up process of the Tribunus ESC, when using the Scorpion Internal Governor, is split into 2 separate adjustments. The "Soft Start Acceleration (2A)" adjusts the spool-up rate from 0-30% of Spool-Up process. The "Acceleration (2B)" adjusts the spool-up rate from 30-100% of the Spool-Up process. This seperation of the 2 acceleration sections allows you to customize the spool-up process to your own personal preference.

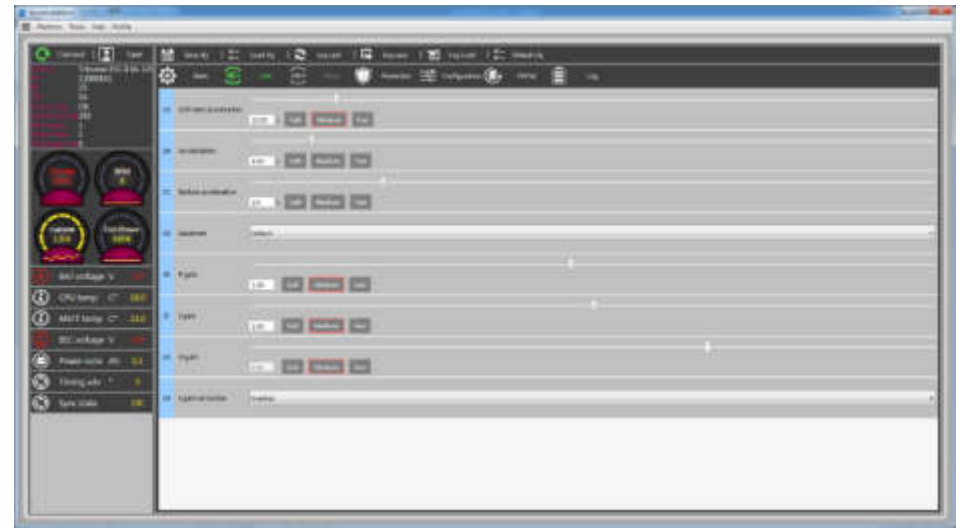
SOFT START:
2A - Soft Start Acceleration - This value adjusts the acceleration of the motor between 0-30% of the Spool-Up process. Adjust this value so that the spool up from 0 rpm to a few hundred rpm is as you like. You can adjust this to ensure your model does not yaw to one side due to torque, or that your blades do not fold during the initial spool-up.

ACCELERATION:
2B - Acceleration - This value adjusts the acceleration of the motor between 30-100% of the Spool-Up process. Adjust this value to your own personal preference. Normal pilots might like a faster spool up here after the initial soft start acceleration, so that the spool-up process does not take too long. While some scale or F3C pilots might like a much slower spool-up process. This value also effects the speed at which your model will change RPM's when switching between flight modes.

BAILOUT ACCELERATION:
2C - Bailout Acceleration - This value adjusts the acceleration of the motor when using the autorotation bailout feature of the ESC. It's allows the user to quickly spool up his blades when desired (for example, if an autorotation does not go as planned and the user immediately wants his rotor to spool up quickly). A lower number will cause the main rotors to spool up faster. A larger number will cause the main rotors to spool up slower.

GOVERNOR: Allows the user to adjust the Governor Gain Settings. It is recommended to begin with Default first, then change Gain settings to achieve the desired performance. "Soft" gains are pre-set lower than Default and "Hard" gains are pre-set higher than Default.

GAINS: Adjusts the P, I, and D Gain of the Governor.



SETTING UP AUTOROTATION BAILOUT

IMPORTANT! Before setting up Autorotation Bailout please remove your pinion, or remove both your main rotor and tail rotor blades!!!

Before assign the bailed out switch, you have to calibrate the throttle range to a precise throttle range.
In your transmitter, assign a switch to Bailed Out. Once assigned to a switch, adjust the Bailed Out value so that the Throttle % on the radio correlates to 20% (20% - 29% is OK) on the Scorpion Heli ESC value in the software. Congratulations, you have now activated Autorotation Bailout mode on your Tribunus ESC.

To confirm that you have indeed setup Autorotation Bailout Mode correctly, spool up your machine to Idle Up 1 or Idle Up 2, then switch to bailed out. Wait 1 or 2 seconds, then click back to Idle Up. The throttle should quickly come back up to your Idle Up 1/2 Headspeed.

NOTE: If you have flipped your Bailed Out switch and activated Autorotation Bailout and wish to have your Headspeed come up back slowly (as it should when first spooling up), you must first go to 0% throttle first, then spool up normally.

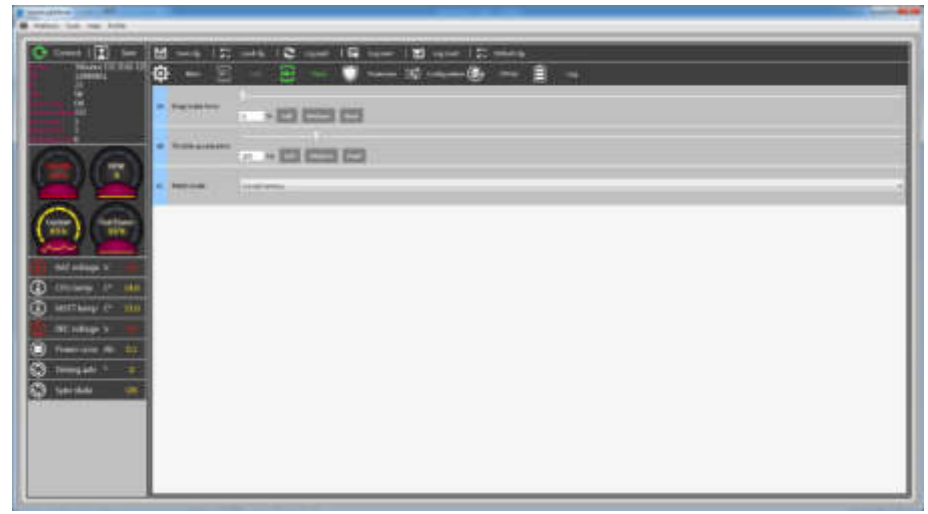
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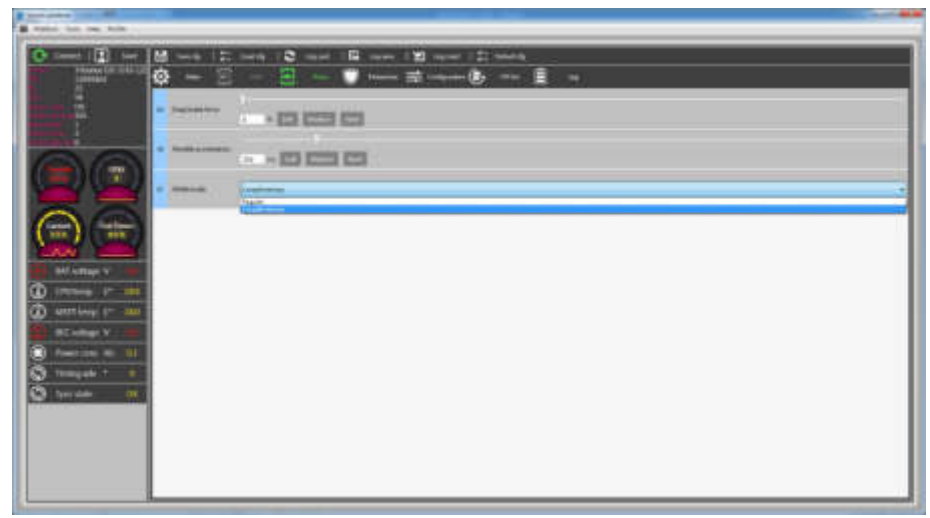
AIRPLANE



This is the page where you set up your Airplane Settings.
Only adjusts Airplane settings when the Airplane Mode is activated in the previous menu- Device Mode

12.3 Airplane mode





AIRPLANE MENU

DRAG BRAKE Adjusts the amount of brake enabled. If 0% is selected, the propeller will free-wheel in forward flight with the throttle at the 0% position. If 100% is selected, the propeller will not move in forward flight with the throttle at the 0% position.

THROTTLE ACCELERATION: Adjusts the overall time that it takes for the motor to spool up from 0% to 100%. For example, a larger aircraft such as a 50CC plane will require a value of about 500ms. A smaller aircraft with a 1 to 1.5 meter wingspan will require a smaller value of about 350ms or similar.

PWM MODE: Adjusts the way in which the ESC drives the motor.
Regular: Operates as a standard ESC would without regenerative braking
Complimentary: Actively slows down the motor when throttle is reduced
(best for Multirotors or aircraft that require regenerative braking)

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12.4 Protection settings

PROTECTION MENU

CUTOFF DELAY: Adjusts the amount of time that it takes for protection to engage if a lost signal is detected. Recommended value is 5,000ms.

MINIMUM VOLTAGE: Adjusts the minimum Voltage of the ESC. If the ESC detects the minimum voltage that is chosen, the ESC will reduce the overall RPM to the Cutoff Power % set below.

MAXIMUM TEMPERATURE: Adjusts the maximum temperature of the ESC during flight. If the ESC detects a temperature that it higher than the Maximum Temperature, the ESC will reduce the overall RPM to the Cutoff Power % set below.

MAXIMUM CURRENT: Adjusts the maximum Amperage of the ESC during flight. If the ESC detects a amperage that it higher than the Maximum Amperage, the ESC will reduce the overall RPM to the Cutoff Power % set below.

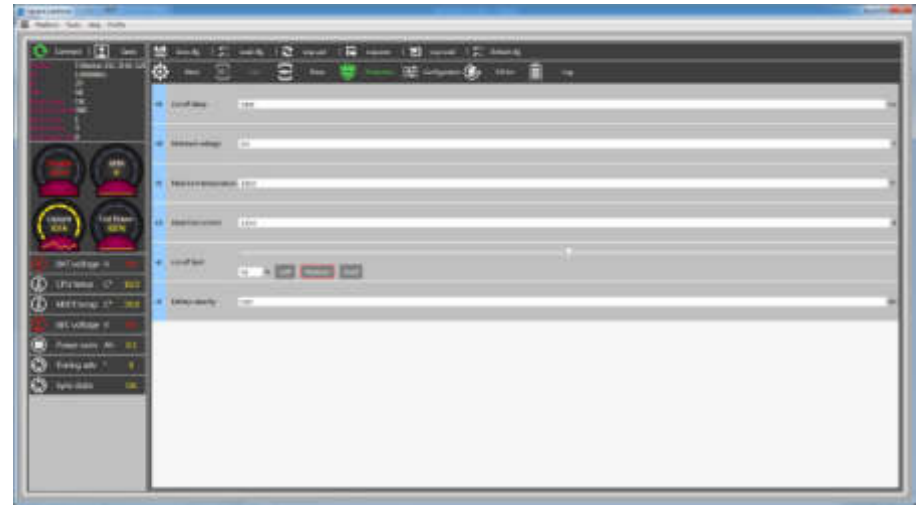
CUTOFF POWER : Adjusts the overall amount of RPM drop for when any of the following conditions are met: ***MIN VOLTAGE, MAX TEMPERATURE, MAX CURRENT, BATTERY MAX CAPACITY.*** (See below for clarity)

BATTERY MAX CAPACITY: Allows the user to enter a desired amount of battery capacity- which when met will trigger the BATTERY MAX CAPACITY protection, and then drop the RPM down by the CUTOFF POWER %. It is very useful to set this instead of a timer to know when your battery has been drained to a pre-set level.
(See below for clarity)

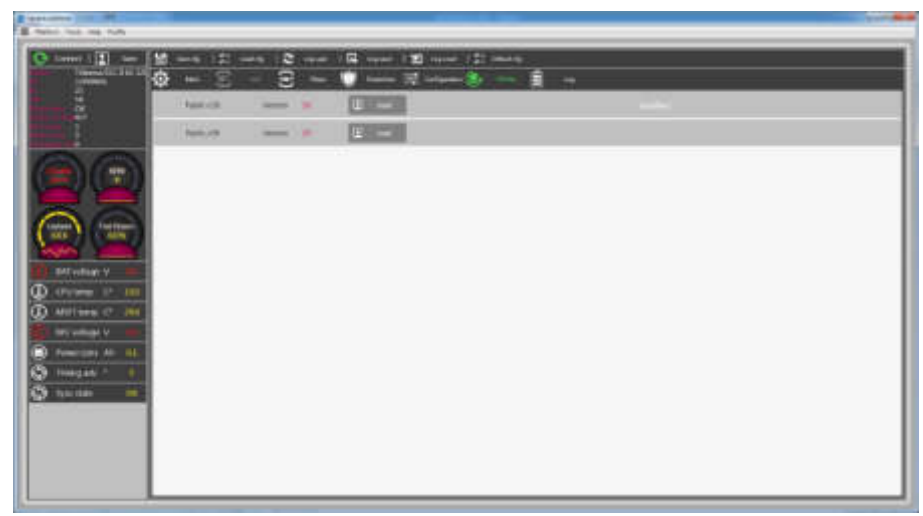
For example, let's say a user enters 3.7Ah into ***BATTERY MAX POWER***. When the ESC has detected that 3.7Ah (or 3,700 milliamp hours) of the battery has been consumed, the ESC will cut the main power down to the percentage that is entered in ***CUTOFF POWER.*** This means, if a pilot is flying with a headspeed of 2,000 RPM and enters 85% into ***CUTOFF POWER*** with 3.7Ah entered in ***BATTERY MAX CAPACITY***, after 3.7Ah has been consumed, the headspeed will immediately drop down to 1700 RPM and stay at that headspeed until the pilot lands and shuts down the ESC.

** Do not set the parameter "0" into ***CUTOFF POWER***, ***BATTERY MAX CAPACITY, MIN VOLTAGE, MAX TEMPERATURE*** or ***MAX AMPERAGE,*** this will not turn off the protection but conflict the internal setting **

FW List: Firmware update
Select the latest firmware to update the firmware. if it happen firmware corrupted, please unplug all cables and reconnect, then repower the ESC, now update the firmware again.
After few times it will process the update procedure as normal.



WARNING! *All ESC settings are erased upon Firmware update. Please be sure to save settings before upgrading Firmware.*

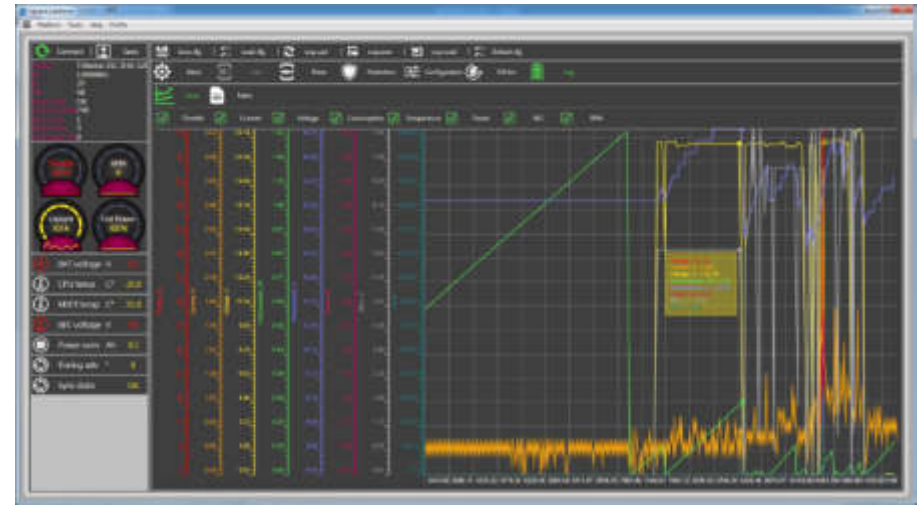


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12.5 Chart and Configuration

Chart

Chart shows a live view of your ESC. With the flight battery plugged in and the ESC connected, the user is able to see Throttle, RPM of the Motor, Voltage, Current, CPU Temperature, MOSFET Temperature, Power, and BEC Voltage of the ESC at any time. This can be helpful especially when troubleshooting a particular problem.
There has Chart and Table page of the logs.



Configuration

Configuration This allow you to config the setting like temperature degree, gear ratio and pole pairs, sound configuration, current sensitivity gain and rpm correction.

The below feature only available on Firmware V58 or higher.

5D: Enable/Disable the sound.

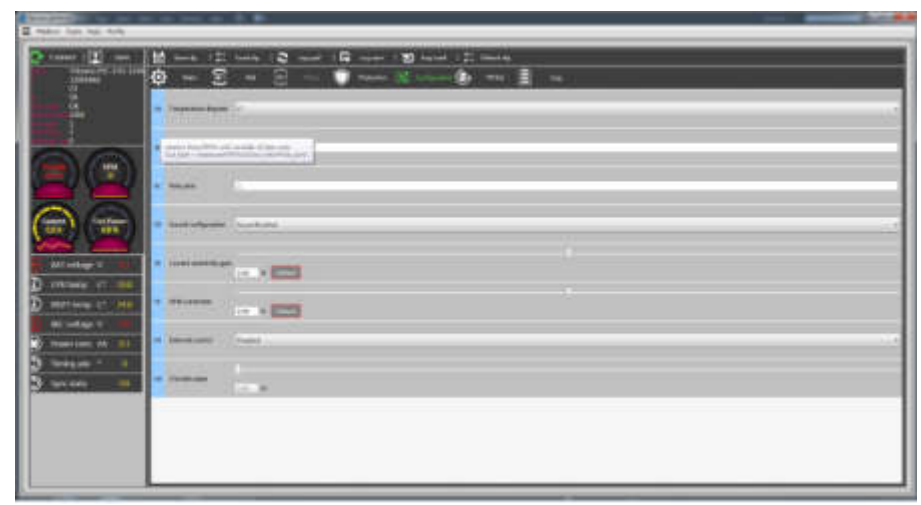
5E: Can be used to correct factory default calibration value for current measurement in case of wrong measurement found.

5F: Can be used in "PID with recalculated mode" to correct maximum RPM's detection.
It allows to set higher or lower maximum RPM's if automatic detection was not corrent.

5G: Allow you to control the motor when there is no throttle signal input.

5H: Adjust the throttle value, Enable/Disable by 5G.

Also there will display the tooltip when you point at the blue box.



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13 Tribunus ESC and VBar Control

Attention:
The cables from the ESC master and slave both have BEC output when it is enable.
DO NOT plug in the Vbar "SENSOR" port, this will kill the VBar and void the warranty.
The throttle cable only connect to Vbar ESC port, the rpm wire plugs into the RPM port.

13.1 Tribunus ESC telemetry/ setup cable for VBar

How to DIY your own Telemetry/setup cable for the Tribunus ESCs – Vbar NEO: http://www.scorpionsystem.com/blog/?p=6663
Cables are also available as a VBar Control Accessoire at Mikados onlineshop (no.: 05088 350mm and no.: 05089 500mm)

13.2 Tribunus ESC and VBar Control telemetry preparation before setup

After connecting the telemetry cable from Tribunus ESC PC port to your telemetry port of the VBar NEO do the following steps:
-Connect your VBar Control to VBar Control manager and download the "Scorpion ESC Support" App
-After that make sure the app is enabled with a "(X)" in your "application enable" menu of your radio.
-Install the latest firmware on your ESC (V52 or higher).
-On V52 or higher "VBar" is the standard communication protocol of your Tribunus ESC, communication to VBar Control is enabled

Once the previous steps are done there will be a Scorpion icon on VBar Control display, then setup of Tribunus ESC can start using VBar Control radio.



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13.3 Tribunus ESC and VBar Control ESC setup using VBar Govenor mode

-select "Edit Heli wizard" and click through the setup to govenor page when using NEO Express
-select "Setup / Governor Mode" panel when using NEO PRO/ PRO Rescue.
You will be directly in Scorpion automatic setup panel.





-by entering the Govenor Mode panel, the automatic setup will start directly
-after automatic setup is done, choose your BEC voltage and exit this menu
-depending on changes the ESC may restart when leaving the panel

-afterwards check gear ratio, motor pole and headspeed settings in ESC Setup panel
-for battery management using the "Battery Logbook App" is suggested as well as installing a Battery ID reader and the required App

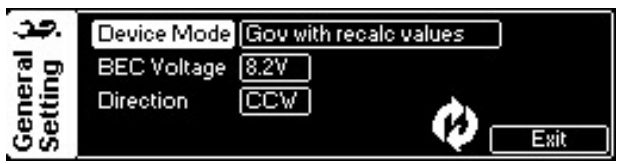
-after these automatic setup, check all parameters of step 13.5 e.g. motor direction and protection settings to match your usage

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13.4 Switching from VBar Govenor Mode to Tribunus govenor with Mikado VBar Control

If you want to use the internal Tribunus ESCs govenor and you was using VBar govenor before please follow these steps (please remove the blades first for safety reasons):

1) choose "Gov. with recalc values" in Tribunus ESC settings



2) restart the ESC (store), ESC will restart



3.1) disable Scorpion App in your VBar Control "application enable" menu
3.2) open model setup/ govenor/ govenor mode and choose "external Gov."



5) enable Scorpion App for telemetry features



After these steps a fixed trottle value can be set up in your govenor menu/ ESC output for each flight bank while using Tribunus ESC internal govenor.



Connect Tribunus Slave cable to "RPM" port of VBar NEO, set up your motor poles and gear ratio correctly to show your current headspeed on VBar control display in flight (step 13.5 gear settings).
Do not forget to install"RPM Telemetry Setup " app.

4) calibrate throttle endpoints of the ESC:
-open model setup/ setup tools/ ESC setup wizard and choose "other ESC, then go to full negative collective stick position turn off the ESC
-go to full collective stick position on VBar Control
-power up the ESC again, wait few seconds for one beep of the ESC and go to full negative collective stick position
-wait for two beeps and POS Morse code come from the motor, this mean calibration is done and throttle endpoint has been set up correctly, exit the panel





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13.5 Scorpion Support App functions and features

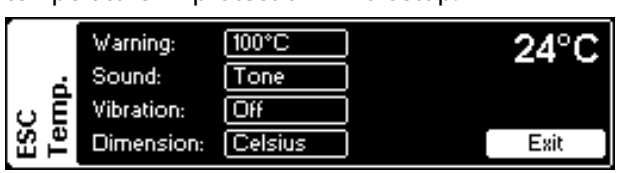
ESC setup panel at Application setup/ Scorpion ESC



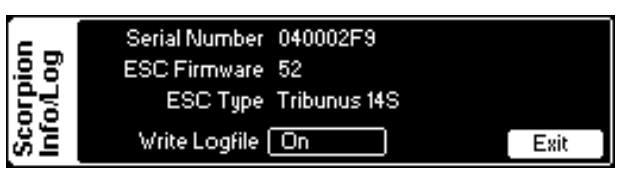
Status menu of Tribunus ESC



Temperature warning setup:
Set up a temperature and warning type, by exceeding this temperature VBar Control will inform about in flight. This value should be lower than cutoff temperature in "protection limit" setup.



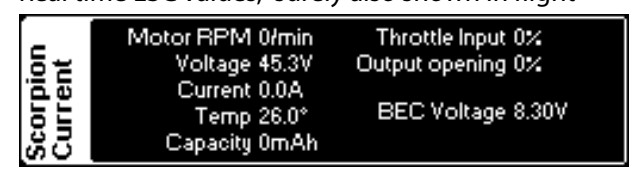
ESC Info: Serial number and firmware version
-choose write logfile of ESC data on VBC or not



Gear settings:
Motor Poles and gear ratio only need to set when using other govenor modes than VBar Govenor. This value will be set automatic during VBar govenor configuration.



Scorpion Current:
Real time ESC Values, surely also shown in flight



Scorpion Status:
If there is an error from the ESC the cause will be shown here.



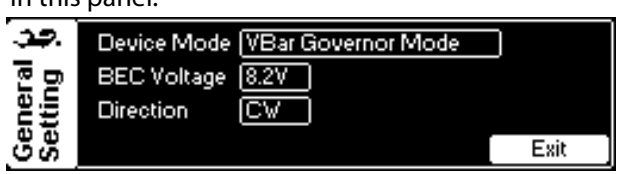
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13.5 Scorpion Support App functions and features

ESC Settings:
If there is a panel crossed out, it means that the settings are not used for the currently choosen ESC mode set up in "General" panel. In this case "VBar Govenor Mode" is activated, so there is no access to Aircraft specific and Tribunus internal Govenor settings. By changing the ESC mode, the needed panels will be available accordingly. All parameters of the PC software explained above are available in this menus depending on the choosen ESC mode.



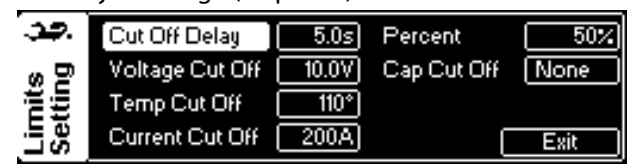
General Settings:
Set up ESC mode, BEC Voltage and motor direction in this panel.



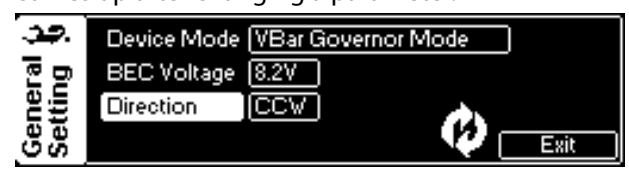
If "store" panel is not crossed out, it means that a parameter changed after last power up of the ESC.



Protection Limits: set up all protection limits to match your usage (step 12.3)

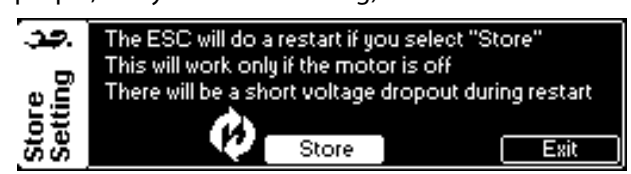


Additionally a round symbol next to the exit button comes up after changing a parameter.



After ESC setup or a change of a parameter, it is necessary to write the settings to the ESC.
By selecting the "Store" panel and pressing "Store" the ESC will restart and save all changed parameters accordingly.

Take note, that the ESC (as well as the BEC) will shut down for a short time. Sometimes you will notice a "Warmstart" of the VBar (LED flashing green/ purple, entry into the Eventlog).



-that's all! - Tribunus ESC are now ready to fly!

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14.0 Anti Spark DIY Kit manual

Scorpion Power System

www.scorpionsystem.com

Scorpion Anti Spark DIY kit

www.scorpionsystem.com/files/download/AntiSparkDIYkit.pdf

direct QR to online manual

This Anti Spark DIY can be used on 6S- 16S Lipo battery systems

Including parts:

1. PCT resettable fuse
2. plastic tube
3. heat shrink



PTC Resettable Fuse



plastic tube



heat shrink



How to install it:

1) remove the old heat shrink



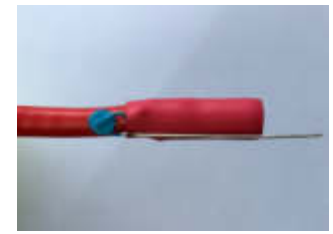
2) wind one leg of the PTC Resettable fuse around the positive (+) wire from your ESC as shown below



3) solder the of the PTC Resettable fuse to the positive wire



4) apply a heat shrink over the connector to isolate the other leg from the connector



5) modify the plastic tube (shorten it correctly and also cut it as shown in the picture)





6) slide the plastic tube over the leg of the PTC Resettable fuse and use CA to keep it in position



7) apply a heat shrink over it



8) bend the leg of the PTC Resettable fuse as shown in the picture like a “V”, cut the leg if it's too long



9) Anti Spark DIY ready to use!





Now connect the negative (-) wire first. Then connect the positive (+) battery wire to the PTC Resettable fuse for a second and move straight into the positive connector. There will be no spark during connecting your battery to the ESC.

Hope this DIY kit can help you on any spark issue during connecting a battery to an ESC.

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ANTI SPARK DIY FOR HOUSING CONNECTORS

14.1 Anti Spark DIY for housing connectors

Scorpion Power System

www.scorpionsystem.com

Scorpion Anti Spark DIY kit

www.scorpionsystem.com/files/download/housingConnectorAntiSparkDIY.pdf

direct QR to online manual

This Anti Spark DIY can be used on 6S- 16S Lipo battery systems

Required parts:

1. PTC Resettable Fuse
2. plastic tube
3. heat shrink
4. male and female connector that fit to your cable size and current



PTC Resettable Fuse



plastic tube



heat shrink



How to install it:

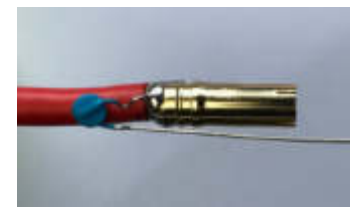
1) -cut the positive (+) wire that goes from housing connector to the ESC
-solder the female connector as shown on the housing connector side



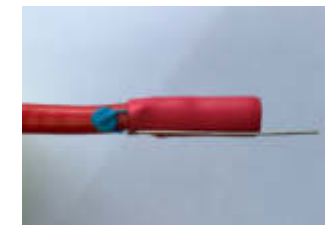
2) wind one leg of the PTC Resettable Fuse around the positive (+) wire as shown below



3) solder the leg of the PTC Resettable Fuse to the positive wire



4) apply a heat shrink over the connector to isolate the other leg from the connector



5) modify the plastic tube (shorten it correctly and also cut it as shown in the picture)



6) slide the plastic tube over the leg of the PTC Resettable Fuse and use CA to keep it in position



7) apply a heat shrink over it



8) bend the leg of the PTC Resettable Fuse as shown in the picture like a “V”, cut the leg if it's too long



9) solder the male connector to the ESC side and apply a heat shrink



10) Anti Spark DIY ready to use!





Now disconnect the Anti Spark wire first. After that connect the battery to the housing connector. Then connect the positive (+) cable coming from the ESC side to the PTC Resettable Fuse for a second and move straight into the positive female connector.
There will be no spark during connecting your battery to the ESC.

Hope this DIY kit can help you on any spark issue during connecting a battery to an ESC.

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15.0 Warranty and Service

All Scorpion Tribunus Speed Controller are covered by a 1-Year manufacturers warranty itemized sales receipt.
During the warranty period Scorpion will repair speed controller that are found to be defective, providing that it has no signs of damage or abuse. The user will be responsible for shipping charges back to an authorized Scorpion Repair Facility, and Scorpion will pay the return shipping charges. If the damage is the result of a crash or mis-use, the returned item will be repaired, but the cost of repairs will be billed to the user. Repairs will never exceed 50% of the cost of a new speed controller, and if the speed controller is badly damaged or non-repairable, a brand new ESC will be offered at 50% discount of the current retail price for the ESC, plus a nominal shipping charge.

If the speed controller returned is no longer in production, Scorpion reserves the right to substitute any other speed controller of equal or better quality. In any event, Scorpion shall not be responsible for the damage that may result from the overuse of products, for consequential or special damages, or for any amount that exceeds the product value. If the motor product is purchased in clearance section, crash and dent section from www.scorpionsystem.com and www.scorpion-team.com, then the items are sold “AS IS”. No refund or warranty policy will be covered with these products. It is because we do not have parts anymore to repair or replace. or replacement. Please obtain an RMA number by submitting a request by email to our RMA Department support@spihk.com or our distributors for the RMA number before sending. The RMA process normally takes around 3 - 4 weeks.

RMA form can be found and download from
http://www.scorpion-team.com/downloads/
https://www.scorpionsystem.com/files/download/RMA%20Form%20-%20V2.pdf

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