REDS Racing

REDS TX 120 ESC STOCK & MOD MANUAL

Technical Specifications

	Stock (Blinking mode) and Modified
Current Continuous	120 A
Current Burst	760 A
Input	4-8 cells NiMh/NiCd or 2S LiPo, 2S LiFe
Supported Motors	540 size 2 pole sensored brushless
Suitalble Motor	Over 3.0T
BEC Output	6V @ 3A
Size (LxWxH)	31x38x19mm
Weight	45g

1. INTRODUCTION

Congratulations for the purchase of REDS TX 120 sensored brushless competition electronic speed controller. REDS TX 120 is specifically designed for 1/10 scale electric R/C racing.

This speed controller has been projected, developed and tested by REDS Racing in cooperation with the best drivers in the world. The most advanced technologies and materials have been used to get the best performance and reliability.

To get the best performance and reliability, read this manual carefully before using the speed controller. Always follow the safety precautions.

2. SAFETY PRECAUTIONS

This product is a sophisticated hobby product and not a toy. It is not suitable for any other purpose.

It must be operated with caution, common sense and some basic mechanical ability is required.

Failure to operate this product in a safe and responsible manner could result in injury or damage to the product or property.

This product is not intended to be used by children without direct adult supervision.

It is essential to read and follow all instructions and warnings found in this manual prior to installation, set-up and use in order for the product to operate properly and to avoid damage or injury.

3. WARNINGS

- Never let children use this product without the strict supervision of an adult.
- Always unplug the battery from the ESC when not in use or while in storage.
- Never leave this product unattended while it is connected to a power source.
- Always power ON your transmitter before the ESC and power OFF the ESC before the transmitter.
- Always disconnect the battery and slop using the ESC if it begins lo act abnormally
- Make sure all cables are in good condition end securely fastened.
- Keep in mind that vibration during operation may loosen connections and cause loss of control.
- Do not connect in reverse polarity.
- Make sure that all cables and connectors are properly insulated to prevent short circuits .
- Keep this product away from water, oil, fuel or other conductive liquid.
- If this product becomes damp, immediately stop using it and let it dry completely.
- Avoid using excessive force when tightening the cooling fan screws. Over tightening them may permanently damage the aluminum housing.
- Make sure to use suitable gear ratios for your track condition. Unsuitable gear ratios may overload and damage your speed controller and motor.
- Always use caution when handling your ESC as it may become extremely hot during use.
- Never operate with throttle when the motor has no load. Running the motor without load may cause damage and risk of fire or bum.

4. INSTALLATION

A. Soldering Battery Wires, Motor Wires, and Capacitor

Make sure to use a soldering iron with sufficiently high temperature. Never leave the soldering iron on the mounting point for longer than 5 seconds. If it takes more than 5 seconds to melt the solder between the joints, switch to a higher temperature solder iron. Overheating the mounting points will damage the ESC.

We recommend using a red color wire for the positive (+) battery input terminal, and a black color wire for the negative (-) terminal. Connecting a battery in reverse polarity will damage the ESC.

Pay special attention to the polarity marking below the mounting point. Make sure you connect each phase (A,B,C) of the motor to the corresponding (A,B,C) mounting point on the ESC.

Remember to solder the included power capacitors to the battery input mounting point. Running the motor without connecting capacitor will damage the ESC.

B. Connection and Mounting

Connect one end of the sensor cable to the motor's sensor port, and the other end to the ESC's sensor port.

Mount your ESC and Capacitor unit securely using high quality double-sided tape.

Connect the Rx connector to the throttle channel (CH2) of your radio receiver.

If necessary, install the included cooling fan on top of the ESC with screws, and make sure to check for correct polarity when connecting to the cooling fan power port.
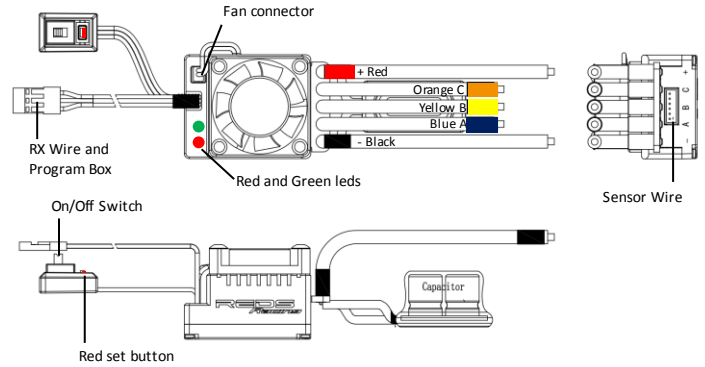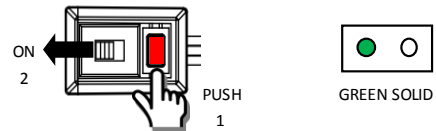

5. ESC/RADIO CALIBRATION

Plug the ESC into a charged battery and place your vehicle on a stand with the wheels off the ground.
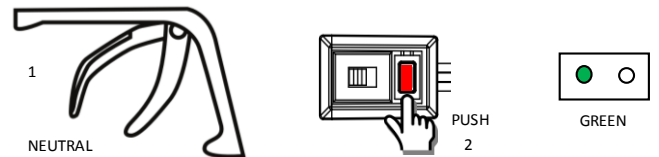
Turn on the transmitter making sure the throttle is at neutral.

Press and hold the set red button and then turn on ESC switch. Release the set button when Green LED solid on. Then, the ESC is ready for calibration.


Neutral Calibration. Quick press set red button. The green LED will blink to indicate position is memorized, then green led solid on.

Full Throttle. When green and red LED light up solid, pull the lever or trigger to full throttle and press red set button once. The LED will blink to Indicate full throttle position is memorized. Make sure to hold full throttle until the LED changes to red color.
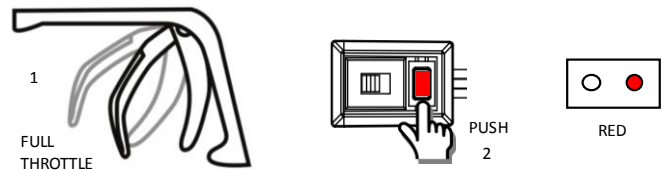
Full Brake. When red LED light up solid, hold full brake and press the set button once. The LED will blink to indicate full brake position is memorized, and return to green. Finished the calibration. Make sure to hold full brake until the LED changes to red color.
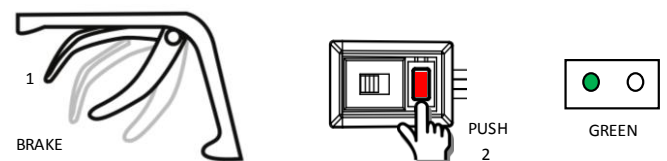
IMPORTANT. ESC/Radio calibration must be completed with new ESCs, when changing transmitters, after repair service and when updated firmware has been installed.

6. LED STATUS INDICATOR

Description		LED Status
Neutral Throttle	🟢	Green Solid
Full Throttle / Reverse	🟢🔴	Green and Red solid
Full Brake	🔴	Red Solid
Zero Timing Mode	🟢	Green Flashing
Motor connection error (A, B, C)	🔴	Red flashing
Over temperature protection activated	🟢🔴	Green solid / red flashing
No sensor cable detected	🟢🔴	Green and Red LEDs flashing
Low Voltage Protect Alert	🟢🔴	Green flashing / red solid
Power ON without signal from receiver		Off the LED

7. ESC SET-UP AND FIRMWARE UPDATE

REDS Racing TX 120 ESC has 19 different programmable functions. Functions set-up can be made with REDS Multifunction Program Box or with REDS Racing ESC SET-UP PC software.
Firmware for both ESC and Program Box can be updated after downloading the appropriate firmware and PC software installation file.
The PC software and firmware can be downloaded at www.reds-racing.com.
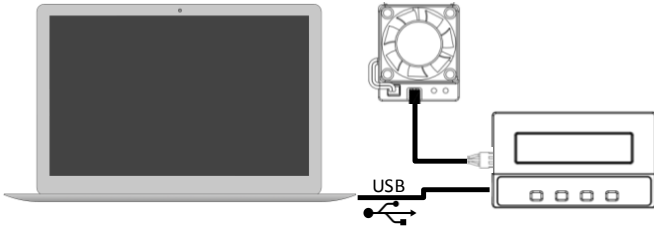
8. PROGRAMMABLE FUNCTIONS

STOCK / MOD
This setting allows you to select between Stock blinking mode and Modified mode. Boost and Turbo are both disabled in Stock blinking mode.

Drag brake
The Drag Brake is a percentage of the maximum brake available and provides automatic braking when the throttle trigger is returned to neutral. The Drag Brake value may require small adjustments when changes to the Brake Frequency are made.
You can set it to: 0%, 4%, 8%, **10%**, 12%, 15%, 20%, Custom:35%

Initial brake
This setting adjusts the initial (or minimum) brake level. Set a higher level for more initial bite. You can setup same to the drag brake value or adjust: **Drag Brake**, 0%, 6%, 12%, 15%, Custom: 25%

Full Brake (Brake Strength)
This setting adjusts the maximum brake level at full brake position. Set a higher level for stronger brake force. Note the motor will also run hotter if brake force is set too high. The actual brake force will also be affected by gear ratio and rotor size.
You can set it to: 75%, **80%**, 85%, 90%, 95%, 100%

Brake frequency
This setting adjusts the brake PWM frequency. The brake feel and efficiency will depend on the frequency and motor RPM. Set a tower frequency for more progressive brake feel and higher frequency for more initial bite.
You can set it to: **1kHz**, 2kHz, 4 kHz, 8 kHz, 16 kHz, 32 kHz.

Power level
This setting tunes the throttle response. Set a higher value for more immediate throttle response. Set a lower value for smoother response. You may lower your motor temperature by using a lower setting. For modified motor.
You can set it to Level: 1, 2, 3, 4, 5, 6, **7**, 8, 9
1-3 → soft start, ideally with very little grip;
4-6 → slightly stronger start, ideal for modified engines with medium grip;
7-9 → very aggressive start-up behavior, ideal for stock classes with high handle (carpet).

Drive frequency
This setting adjusts the throttle feel at partial throttle by changing the PWM frequency for forward drive. A lower frequency will provide a more aggressive throttle feel. A higher frequency will provide a smoother and more precise throttle fell but may also result in higher ESC temperatures.
You can set it to 2kHz, 4kHz, **8kHz**, 6kHz, 32kHz, 64kHz.

Neutral dead band
This setting adjusts the width of neutral dead band suitable for your radio. Set a lower value for high quality 2.4GHz radio system. Set a higher value for low cost 2.4GHz or FM/AM radio system. Smaller value gives you more immediate response. If the value is set too small for your radio, the brake may be engaged accidentally at neutral.
You can set it to: 0%, 3%, **6%**, 9%, 12%.

Boost timing – (not for stock blinking mode)
This setting adjusts the level of boost timing available at the maximum boost timing. Set a higher boost timing to increase the overall available torque and rpm. Setting the boost too high will result in excessive current draw and high operating temperature of ESC and motor. We suggest to set boost between 10-30 deg for stock class motors and 0-20 for modified motors. The total combination total of Boost timing and Turbo timing should be below 60deg to reduce risk of overloading the motor.
You can set it from **0deg** to 60deg.

Boost RPM – (not for stock blinking mode)
Boost RPM indicates at which motor speed boost timing is activated. Boost timing is injected incrementally starting from the boost RPM.
Set a lower RPM for more low end torque and smoother boost engagement. Set a higher RPM to lower motor temperature.
We suggest to set minimum Boost RPM over the 3000 for stock class motors and over the 12000 for modified motors.
Booster timing will not engage if the minimum Booster RPM is higher than motor rated rpm.
You can set it to: 500, 1000, **1500**, 2000, …, 15000.

Boost acceleration – (not for stock blinking mode)
Boost acceleration is the RPM increment of boost timing. The lower the value it is, the more torque the motor will produce but but this will increase the motor temperature of the.
We suggest to set it aver the 350 RPM/deg for stock class motors and over the 14000 RPM/deg for modified motors.
You can set it to: **50RPM/deg**, 100RPM/deg, …, 700RPM/deg.

Turbo timing – (not for stock blinking mode)
This setting is the additional timing that is added to the Boosting Timing and is ONLY effective when the throttle is at 100% end point of activation. The combine total of Boost timing an d Turbo timing should be below 60 deg to reduce risk of overloading the motor.
You can set it from **0deg** to 60deg.

Turbo slope – (not for stock blinking mode)
This setting refers to the Turbo Timing increasing rate. The higher it is, the faster Turbo Timing increases, and together with a quicker acceleration and higher motor temperature.
You can set it to: 3deg/0.1s, 6deg/0.1s, 12deg/0.1s, **18deg/0.1s**, 24deg/0.1s, fastest.

Turbo delay – (not for stock blinking mode)
This setting is the amount of time full throttle must be held before the turbo function engages. If the full throttle time is less than the setting value, the turbo function will not be activated.
You can set it to: Off, 0.05sec, 0.1sec, 0.15sec, **0.2sec**, 0.25sec, 0.3sec, 0.35sec, 0.4sec.

Low volt cut
This setting adjusts the desired threshold for battery low voltage cut-off. Battery voltage may drop significantly during high current discharge depending on the booster and turbo settings. If you need to change the value in detail, use the custom value.
You can set it to: None, 2.9V/cell, 3.0V/cell, **3.2V/cell**, Custom: 6.2.

Temperature cut set
This setting adjusts the thermal protection shut down temperature. Note: internal temperature sensor requires a brief moment to detect temperature change, in case of sudden current overload.
You can set it to: off, **176F/80°C**, 212F/100°C.

Operating mode
This setting allows selection between Forward/Brake or Forward with Brake and Reverse or Forward with Reverse.
If you plan to use reverse drive, make sure to adjust the motor end bell timing to zero degrees advance.
You can set it to: **For/Brake**, For/Rev/Brake.

Reverse speed
This setting adjusts the limit of maximum reverse speed.
You can set it to: **25%**, 50%, 75%, 100%.

Rotation mode
This setting reverses the spinning direction of the motor. Use reverse setting if your chassis requires a reverse spinning direction.
You can set it to: **Normal**, Reverse.

Restore default
Selecting this setting will erase and reset all settings to factory default values.
You can set it to: ***No**, Yes.

9. WARRANTY

Your REDS Racing ESC is warranted to the original purchaser for 120 days from the date of purchase, verified by the sales receipt, against defects in material and workmanship. Products that has been mishandled, abused, used incorrectly, used for an application other than intended or damaged by the user such as reverse polarity connection, physical damage of case, physical damage of the electronic component and the circuit board, receiver wire and/or switch wire damaged and humidity/water inside the ESC, are not covered under warranty.
In order to obtain the warranty please refer to your dealer or local REDS Racing distributor and provide the following information: contact, address, phone number, email address, sales receipt and a description of the defect.
No liability will be accepted for any damage or injury resulting from the use of this product. By the act of operating this product, the user accepts all resulting liability.