REDS Z8 220A 1/8 ESC MANUAL

1. Technical Specifications

	Stock (Blinking mode) and Modified
Current Continuous	220 A
Peak Current	1500 A
Input	3-6S LiPo
Supported Motors	2, 4, 6 poles Sensored/Sensorless Brushless Motor
Suitalble Motor	4S LiPo/ 12cell NiMH: 3000KV for 4274 size 6S LiPo/ 18cell NiMH: 2400KV for 4274 size
BEC Output	6V-7.4V @ 8A
Size (LxWxH)	55x40x34mm
Weight	140g

2. INTRODUCTION

Congratulations for the purchase of REDS Z8 220 sensored brushless competition electronic speed controller. REDS Z8 220 is specifically designed for 1/8 scale electric R/C racing.
This speed controller has been designed, 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.

3. 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 and electronic 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.

4. 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 stop 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.

5. INSTALLATION

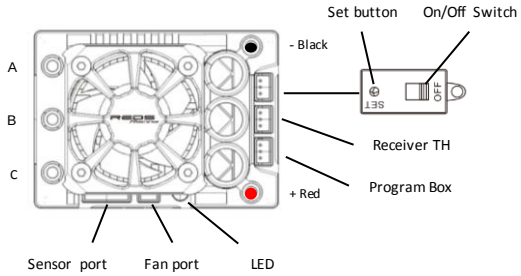
5.1. Soldering Battery Wires, Motor Wires, and Capacitor

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.

5.2. 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 securely using high quality double-sided tape with a minimum thickness of 3mm.
Connect the receiver connector to the throttle channel (CH2) of your radio receiver.

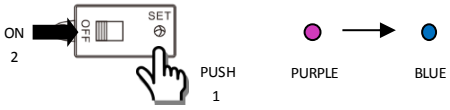
If necessary, install the included cooling fan on top of the ESC with screws, and make sure to check for correct polarity when connecting to the cooling fan power port.



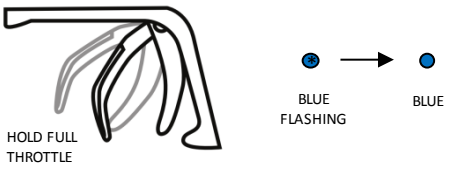
6. ESC/RADIO CALIBRATION

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



Full Throttle. Pull the lever or trigger to full throttle. The blue LED will blink until full throttle position is memorized, then blue LED solid on. The red LED will blink.



Full Brake. Pull the lever or trigger to full brake. The red LED will blink until full brake position is memorized, then red LED solid on.

Neutral Calibration. Leave the lever or trigger to neutral position. The purple LED will blink until neutral position is memorized, then red LED solid on. Then turn the ESC off and on again. Finished the calibration.

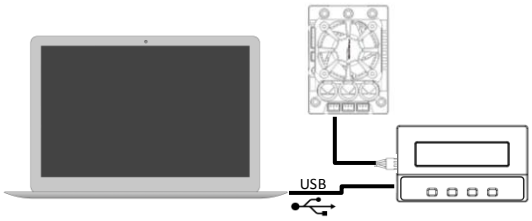
IMPORTANT. ESC/Radio calibration must be completed with new ESCs, when changing transmitters, after repair service and when updated firmware has been installed.

7. LED STATUS INDICATOR

Description	LED Status
Neutral Throttle at Turbo Mode	Blue Solid
Full Throttle / Reverse	Purple solid
Full Brake or No signal from receiver	Red Solid
Neutral Throttle at Zero Timing Mode	Blue Flashing
Low Voltage Protect Alert	Red flashing
Over temperature protection activated	Purple flashing

8. ESC SET-UP AND FIRMWARE UPDATE

REDS Racing Z8 220 ESC has 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.



9. PROGRAMMABLE FUNCTIONS

9.1. GENERAL

RUNNING MODE
This setting allows selection between Forward and Brake, Forward with Brake and Reverse and Forward with Reverse.
Note: if you plan to use Reverse drive, make sure to adjust the motor end bell timing to zero degrees advance.

LOW VOLTAGE CUTOFF
This setting adjusts the desired threshold for battery Low Voltage Cutoff. Battery voltage may drop significantly during high current discharge depending on the boost and turbo settings. If you need to change the value in detail, use the custom value.

ESC OVERHEAT PROTECTION
This setting adjusts the ESC thermal protection shut down temperature.
Note: The internal temperature sensor requires a moment to detect temperature change in case of sudden current overload.

MOTOR ROTATION
This setting reverses the spinning direction of the motor.
Use Reverse setting if your chassis requires a reverse spinning direction.

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 systems. Set a higher value for low cost 2.4GHz or FM/AM radio systems. Smaller values give you a more immediate response.
Note: If the value is set too small for your radio, the brake may be engaged accidentally at neutral.

BEC OUTPUT
BEC output voltage supports 6V and 7.4V, and supports maximum 6A continuous, and 8A pulse.

9.2. THROTTLE

IP-LIMITER
This setting controls the Initial Power to the motor. Higher value settings give more Initial Power delivery to the motor. Recommended settings:
- high traction tracks you can adjust this to a higher value;
- low traction tracks it should be set to a lower value.

THROTTLE RATE
This setting tunes the throttle power feeling. Set a higher value for a more immediate throttle response. Set a lower value for a smoother response. You may lower your motor temperature by using a lower setting. For a low traction track it should be set to lower value.

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 feel, but may also result in higher ESC temperatures.

RPM LOCK
This setting limits the maximum motor rpm. Higher values limit the rpm less. Lower values limit the rpm more.

THROTTLE CURVE
You can select either Linear or Custom throttle curve. It is suggested to use a Linear curve for a more consistent power delivery. Custom curve settings change the throttle curve to adjust the initial power delivery to the motor based on your throttle trigger position. This can give you a more aggressive power delivery for more punch, or a less aggressive power delivery for a smooth feel and more control on loose or slippery surfaces.

9.3. BRAKE

INITIAL BRAKE
To control the instant brake force to the motor. A higher value has more Initial Brake force to the motor when the brake is triggered.

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.

BRAKE FORCE
The Brake Force controls the motors brake force. A higher value gives a higher motor brake force.

I-BRAKE RESPONSE
I-Brake Response controls the initial brake power response to the motor. A higher value has higher initial brake response to the motor. Higher values can be used with higher traction tracks. For low traction tracks it should set to lower value.

BRAKE RATE
To control the overall brake power feeling. A higher value has more brake power feeling. For high traction tracks this can be adjusted to a higher value. For low traction tracks it should set to lower value.

BRAKE FREQUENCY
This setting adjusts the brake PWM frequency. The brake feel and efficiency will depend on the frequency and motor RPM. Set a lower frequency for a more progressive brake feel, and higher frequency for more initial bite.

BRAKE CURVE
To select the Linear or Custom brake curve settings. For higher rpm motors the brake may not be strong enough, and it is suggested to use Custom settings to change the brake curve to increase the brake power delivery to the motor.

9.4. BOOST

BOOST TIMING
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 the ESC and Motor. Set boost between 10-30 degrees for stock class motors and 0-20 degrees for modified motors. The total timing amount as combination of Motor Timing, Boost timing should be below 60 degrees to reduce risk of overloading the motor.

BOOST TRIGGER LEVEL
This parameter sets where to trigger the boost timing position. Having a higher value will be more advance to trigger the boost timing start up.

BOOST TRIGGER RATE
This parameter sets how fast to open all boost timing up.
Having higher value will be more advance to open all boost timing up.

9.5. TURBO

TURBO TIMING
This setting is the additional timing that is added to the Boost Timing and is ONLY effective when the throttle is at 100% end point of activation. The total timing amount as combination of Motor Timing and Turbo Timing should be below 60 degrees to reduce the risk of overloading the motor.

TURBO DELAY
This setting represents the delay time to start up the Turbo Timing after the activation condition is achieved. A higher value will give more delay to engage the Turbo Timing function.

ACTIVATION METHOD
If "start rpm + full throttle" is selected, it means that the turbo timing boost will be activated when rpm is arrived and throttle is in full position. If "full throttle" is selected, it means that the turbo timing boost will be activated only when the throttle is in full position and the turbo delay time is achieved.

TURBO ON RATE
To control how fast to open all Turbo Timing up. Having a higher value will be more advance to open all turbo timing up.

TURBO OFF RATE
To control how fast to reduce the motor rpm when the throttle is returned to the neutral position. A higher value will reduce the motor rpm more quickly.

9.6. DATA

MIN BATTERY VOLTAGE
This data shows the minimum battery voltage when in the running.

MAX ESC TEMP
This data shows the esc maximum temperature when in the running.

MAX MOTOR RPM
This data shows the motor maximum rpm when in the running.

10. 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.

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