



## RGZM2400 80A

### WATERPROOF SENSORLESS BRUSHLESS ELECTRONIC SPEED CONTROLLER

The **RC Gear Shop** brushless systems are great for installing into newly built kits or upgrading existing RTR brushed and brushless systems. Ideal for off-road platforms, their range of popular kV sizes makes the **RC Gear Shop** systems a select choice for buggies, trucks and short course vehicles. The ESCs feature a waterproof case, enabling them to go just about anywhere. Each system comes pre-installed with bullet connectors to make installation a breeze. The ESC has many adjustable features that can be manually programmed or programmed with the optional **RC Gear Shop Programming Card** which simplifies this process.

### FEATURES

1. Splash-proof and dust-proof. The ESC can work on the tracks with small amount of water. (After running the ESC on wet track, please clean and dry it to avoid the oxidation to copper connectors)
2. Specially designed for RC car and truck, with excellent start-up, acceleration and linearity features.
3. Compatible with sensorless brushless motor.
4. 3 running modes suitable for different applications ("Forward with brake" mode, "Forward/Backward with brake" mode and "Rock crawler" mode).
5. 4 steps of maximum reverse force adjustment.
6. Proportional ABS brake function with 4 steps of maximum brake force adjustment, 8 steps of drag-brake force adjustment and 4 steps of initial brake force adjustment.
7. 9 start modes ("Punch") from "Soft" to "Very aggressive" to be suitable for different chassis, tires and tracks.
8. Multiple protection features: Low voltage cut-off protection for LiPo or NiMH battery / Over-heat protection / Throttle signal loss protection / Motor blocked protection.
9. 8 steps of timing adjustment.
10. Several programming methods are supported, such as: The "SET" button on the ESC, the LED Program Card.

### SPECIFICATIONS

**NOTE:** For information about the high voltage cooling fan, please refer to the brief introduction on page 4.

		Waterproof-80A
<b>Cont. Current</b>		80A
<b>Burst Current</b>		540A
<b>Resistance</b>		0.0004 ohm
<b>Suitable Car</b>		1/10 scale On-road /Off-road/SCT/Monster
<b>Suitable Motor</b>	2S LiPo 6 cells NiMH	<b>On-road/Off-road:</b> ≥ 5.5T, 3650 size motor <b>SCT/Monster:</b> KV ≤ 6000, 3656/3660 size motor
	3S LiPo 9 cells NiMH	<b>On-road/Off-road:</b> 8.5T, 3650 size motor <b>SCT/Monster:</b> KV ≤ 4000, 3656/3660 size motor
<b>Battery</b>		<b>4-9 Cells NiMH or 2-3S LiPo</b> <b>For 4-6 cells NiMH or 2S LiPo:</b> You needn't change the 5V cooling fan on the ESC. <b>For 7-9 cells NiMH or 3S LiPo:</b> You must change the original 5V cooling fan to a 12V cooling fan, or supply the 5V cooling fan from the receiver (5-6V). (*Note1)
<b>BEC</b>		6V/2A (Linear mode built-in BEC)
<b>Motor Type</b>		Sensorless Brushless
<b>Dimension</b>		46*34*35
<b>Weight</b> (with all wires)		82g

### BEGIN TO USE THE NEW ESC

**Connect the ESC, Motor, Receiver, Battery and Servo**



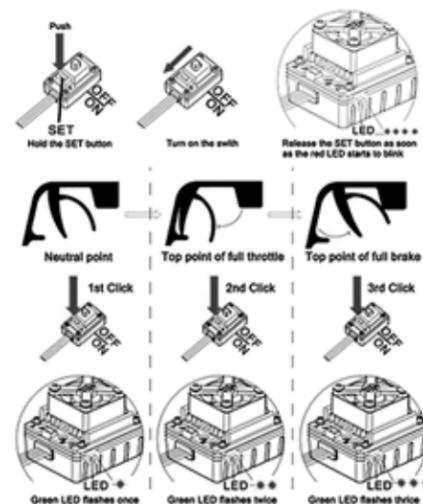
"+" and "-" wires of the ESC are connected with the battery pack, and #A, #B and #C are connected with the motor wires. The "SET" button is used for programming the ESC.

The control cable of the ESC (trio wires with black, red and white color) is connected with the throttle channel of the receiver (Usually CH2). The #A, #B, #C wires of the ESC can be connected with the motor wires freely (without any order). If the motor runs in the opposite direction, please swap any two wire connections. **NOTE: You can use the transmitter to set the throttle channel to the "Reverse" direction, and then the motor will run oppositely. Please calibrate the throttle range again after changing the direction of throttle channel.**

### Throttle Range Setting (Throttle Range Calibration)

In order to make the ESC match the throttle range, you must calibrate it when you begin to use a new ESC, or a new transmitter, or after changing the settings of the neutral position of throttle channel, ATV or EPA parameters, otherwise the ESC cannot work properly. There are 3 points need to be set, they are the top point of "forward", "backward" and the neutral point.

The following pictures show how to set the throttle range with a Futaba transmitter.



- A) Switch off the ESC, turn on the transmitter, set the direction of throttle channel to "REV", set the "EPA/ATV" value of throttle channel to "100%", and disable the "ABS" brake function of your transmitter.
- B) Hold the "SET" key and then switch on the ESC, when the red LED begins to flash, release the key immediately.
- C) Set the THREE points according to the steps shown in the picture on the right side.
  - 1) Neutral point
  - 2) End point of forward direction
  - 3) End point of backward direction
- D) When the process of calibration is finished, the motor can be started after 3 seconds.

**NOTE:** If you don't release the "SET" key after the red LED begins to flash, the ESC will enter the program mode, in such a case, please switch off the ESC and re-calibrate the throttle range again from step A to step D.

### The LED Status in Normal Running

- a) In normal use, if the throttle trigger is in the neutral range, neither the red LED nor the green LED lights.
- b) The red LED lights when the car is run forward or backward and it will flash quickly when the car is braking.
- c) The green LED lights when the throttle trigger is moved to the top point of the forward zone (that is: full throttle).

### ALERT TONES

1. Input voltage abnormal alert tone: The ESC begins to check the input voltage when power on, if it is out of the normal range, such an alert tone will be emitted: "beep-beep-, beep-beep-, beep-beep-" (There is 1 second time interval between every "beep-beep-" tone).
2. Throttle signal abnormal alert tone: When the ESC can't detect the normal throttle signal, such an alert tone will be emitted: "beep-, beep-, beep-" (There is 2 seconds time interval between every "beep-" tone).

### PROTECTION FUNCTION

#### Low Voltage Cut-Off Protection

If the voltage of a LiPo battery pack is lower than the threshold for 2 seconds, the ESC will cut off the output power. Please note that the ESC cannot be restarted if the voltage of each LiPo cell is lower than 3.5V. For NiMH battery packs, if the voltage of the whole NiMH battery pack is higher than 9.0V but lower than 12V, it will be considered as a 3S LiPo; If it is lower than 9.0V, it will be considered as a 2S LiPo. For example, if the NiMH battery pack is 8.0V, and the threshold is set to 2.6V/Cell, it is considered as a 2S LiPo, and the low-voltage cut-off threshold for this NiMH battery pack is 2.6\*2=5.2V.

#### Over-Heat Protection

When the temperature of the ESC is over a factory preset threshold for 5 seconds, the ESC will cut off the output power. You can disable the over-heat protection function for competition race.

#### Throttle Signal Loss Protection

The ESC will cut off the output power if the throttle signal is lost for 0.2 second.

### PROGRAM THE ESC

**Program Method** – See chart A on page 2.

#### Programmable Items List

See chart B on page 2.

#### Programmable Values

**3.1. Running Mode:** With "Forward with Brake" mode, the car can go forward and brake, but cannot go backward, this mode is suitable for competition; "Forward/Reverse with Brake" mode provides backward function, which is suitable for training. The "Rock Crawler" mode is only used for rock crawler.

**NOTE:** "Forward/Reverse with Brake" mode uses "Double-Click" method to make the car go backward. When you move the throttle trigger from forward zone to backward zone for the first time, the ESC begins to brake the motor, the motor speeds down but it is still running, not completely stopped, so the backward action is NOT happened now. When the throttle trigger is moved to the backward zone again (The 2nd "click"), if the motor speed is slowed down to zero (i.e. stopped), the backward action will be occurred. The "Double-Click" method can prevent mistakenly reverse when the brake function is frequently used in steering.

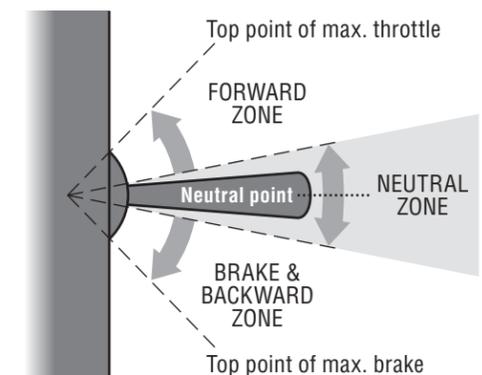
With "Rock Crawler" mode, the reverse action will be happened immediately when the throttle trigger is moved to backward zone. Please set the "Drag Brake Force" to 100% if you choose the "Rock Crawler" mode.

**3.2. Drag Brake Force:** Set the amount of drag brake applied at neutral throttle to simulate the slight braking effect of a neutral brushed motor while coasting.

**3.3. Low Voltage Cut-Off:** The function is mainly used to prevent the LiPo battery from over discharging. The ESC monitors the battery's voltage at any time, if the voltage is lower than the threshold, the output power will be reduced to 50% in 2 seconds. Please drive to the side of racing track as soon as possible and then stop the car, the ESC will completely cut off the output power in 10 seconds.

**3.4. Start Mode (Also called "Punch"):** Select from "Level 1 (Soft)" to "Level 9 (Very aggressive)" start mode as your like. Please note that if you choose "Level 7" to "Level 9", you'd better use good quality battery pack with powerful discharge ability, otherwise these modes cannot get the bursting start effect as you want. If the motor cannot run smoothly (the motor is trembling), it may caused by the weak discharge ability of the battery pack, use a better battery or increase the gear rate.

**3.5. Maximum Brake Force:** The ESC provides proportional brake function. The brake force is related to the position of the throttle trigger. Maximum brake force refers to the force when the throttle trigger is located at the top point of the backward zone. A very large brake force can shorten the brake time, but it may damage the gears.



**3.6. Maximum Reverse Force:** Sets how much power will be applied in the reverse direction. Different value makes different reverse speed.

**3.7. Initial Brake Force:** It is also called "minimum brake force", and it refers to the force when the throttle trigger is located at the initial position of the backward zone. The default value is equal to the drag brake force, so the brake effect can be very smooth.

**3.8. Throttle Neutral Range:** Please see the following illustrations to adjust the neutral range.

**3.9. Timing:** There are many differences among structures and technical features of different brushless motors; an ESC with fixed timing cannot be compatible with all brushless motors, so it is necessary to make the timing value programmable. Please select the most suitable timing value according to the motor you are just using. Generally, higher timing creates bigger power output, but the whole efficiency of the system will be slightly lower.

**3.10. Over-Heat Protection:** If the function is activated, the output power will be cut-off when the temperature of the ESC is higher than a factory preset threshold for more than 5 seconds. When the protection happens, the Green LED flashes.

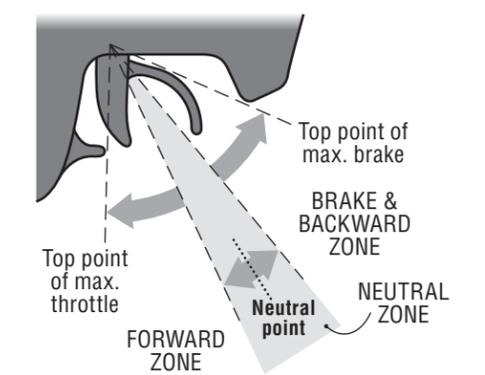
### Reset All Items To Default Values

At any time when the throttle is located in neutral zone (except in the throttle calibration or programming mode), hold the "SET" key for over 3 seconds, the red LED and green LED will flash at the same time, which means each programmable item has been reset to its default value.

### OPTIONAL ACCESSORIES FOR UPGRADE

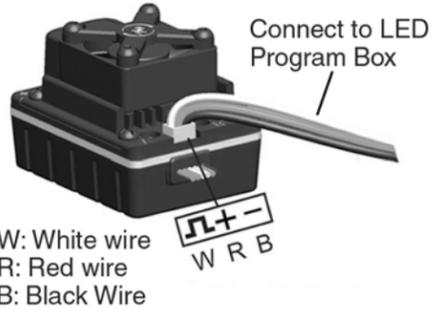
We provide the following optional accessories for upgrade your power system:

**WARNING!** Please note the original cooling fan (5V) can only work with 2S LiPo or 4-6 cells NiMH battery. DON'T use it with a 3S LiPo or NiMH battery more than 6 cells. Please check the label of the cooling fan carefully to confirm its working voltage before using it.

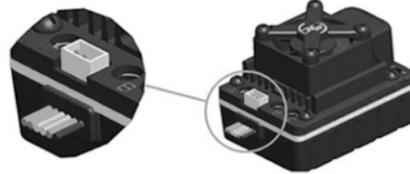




**NOTE:** Please connect the ESC to LED Program Card via the cooling fan port. (Please check the picture for reference.)



**Cooling Fan Port**



The cooling fan port is also a program port for the ESC.

**30 DAY REPLACEMENT POLICY**

Go to [www.rcgearshop.com/warranty](http://www.rcgearshop.com/warranty)

**LED Program Card (Digital LED Display) RGZM3000**

The Program card is an optional accessory which needs to be purchased separately. It has a friendly user interface. The process of programming the ESC becomes quite easy and fast with this pocket sized device.

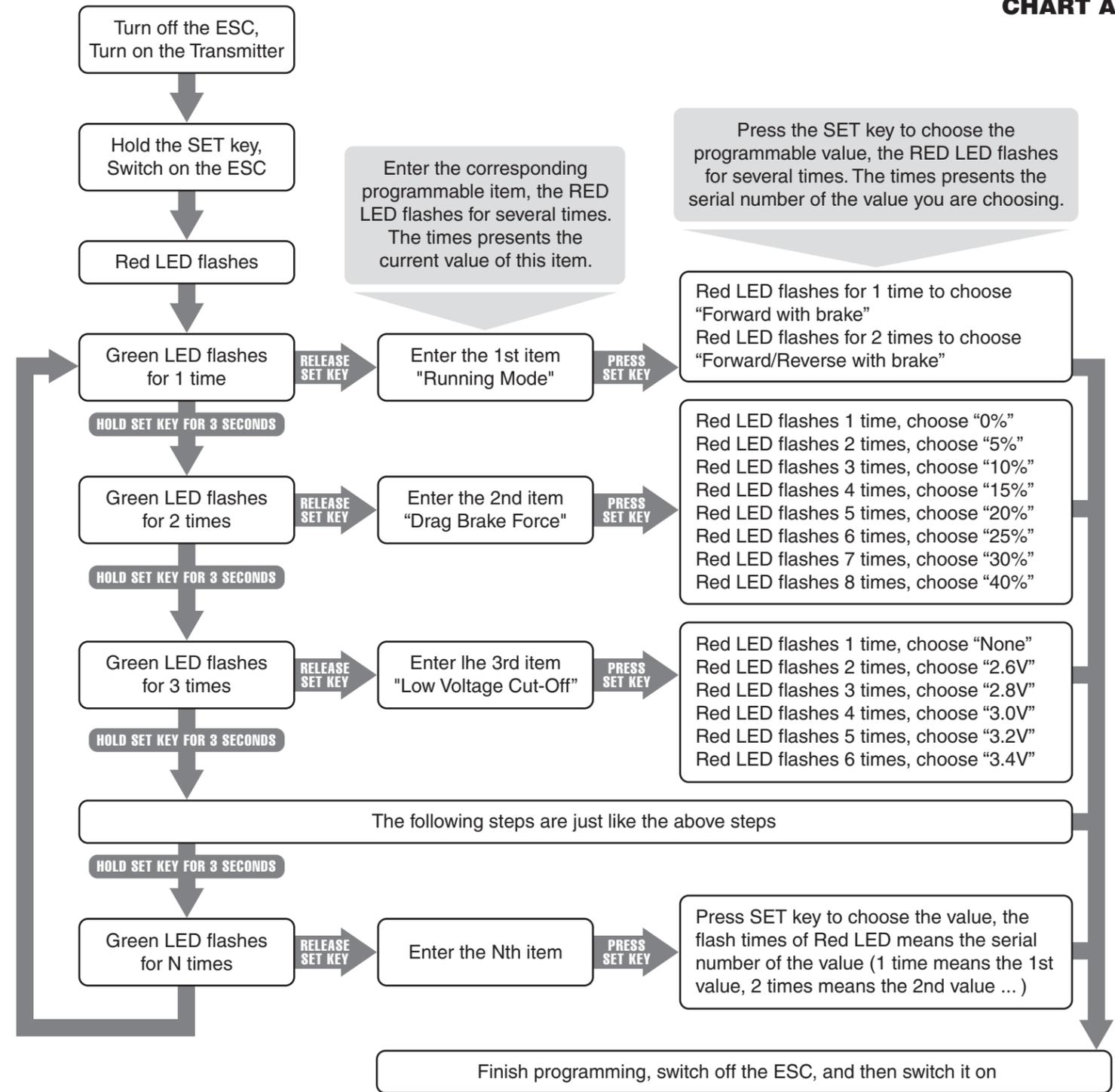
**CHART B**

*ATTENTION: The italics texts in this form are the default settings.*

	PROGRAMMABLE VALUE									
	1	2	3	4	5	6	7	8	9	
<b>Basic Items</b>	1. Running Mode	Forward with Brake	<i>Forward/Reverse with Brake</i>	Rock Crawler						
	2. Drag Brake Force	0%	5%	<b>10%</b>	20%	40%	60%	80%	100%	
	3. Low Voltage Cut-Off Threshold	Non-Protection	2.6V /Cell	2.8V /Cell	<b>3.0V /Cell</b>	3.2V /Cell	3.4V /Cell			
	4. Start Mode (Punch)	Level 1 (Soft)	Level 2	L3	L4	L5	L6	<b>L7</b>	L8	L9 (Very Aggressive)
<b>Advanced Items</b>	5. Maximum Brake Force	25%	50%	75%	<b>100%</b>					
	6. Maximum Reverse Force	25%	<b>50%</b>	75%	100%					
	7. Initial Brake Force	<i>= Drag Brake Force</i>	0%	20%	40%					
	8. Neutral Range	6% (Narrow)	<b>9% (Normal)</b>	12% (Wide)						
	9. Timing	0.00°	3.75°	7.50°	11.25°	<b>15.00°</b>	18.75°	22.50°	26.25°	
	10. Over-heat Protection	<b>Enable</b>	Disable							

**TROUBLE SHOOTING**

TROUBLE	POSSIBLE REASON	SOLUTION
After power is on, motor won't work, no sound is emitted.	The connections between battery pack and ESC are not correct.	Check the power connections. Replace the connectors.
After power is on, motor won't work, but emits "beep-beep, beep-beep" alert tone. (Every "beep-beep" has a time interval of 1 second.)	Input voltage is abnormal, too high or too low.	Check the voltage of the battery pack.
After power is on, motor won't work, but emits "beep, beep, beep" alert tone. (Every "beep" has a time interval of about 2 seconds.)	Throttle signal is abnormal.	Check the transmitter and the receiver. Check the wire of the throttle channel.
The motor runs in the opposite direction.	The wire connections between ESC and the motor need to be changed.	Swap any two wire connections between the ESC and the motor.
The motor suddenly stops running while in working state.	The throttle signal is lost.	Check the transmitter and the receiver. Check the wire of the throttle channel.
	The ESC has entered the Low Voltage Protection Mode.	Replace the battery pack.
Random stop or restart or irregular working state.	Some connections are not reliable.	Check all the connections: battery pack connections, throttle signal wire, and motor connections, etc.
	There is strong electro-magnetic interference at the flying field.	Reset the ESC to resume normal operation. If the function could not resume, you might need to move to another area to run the car.



**NOTE:**

- In the program process, the motor will emit "Beep" tone at the same time when the LED is flashing.
- If the "N" is bigger than the number "5", we use a long time flash and long "Beep---" tone to represent "5", so it is easy to identify the items of the big number.

For example, if the LED flashes as the following:

"A long time flash + a short time flash" (Motor sounds "Beep---Beep") = the No. 6 item

"A long time flash + 2 short time flash" (Motor sounds "Beep---BeepBeep") = the No. 7 item

"A long time flash + 3 short time flash" (Motor sounds "Beep---BeepBeepBeep") = the No. 8 item, and so on.