PN Racing 500807A
V2 Micro Brushless 16A Speed Control Unit

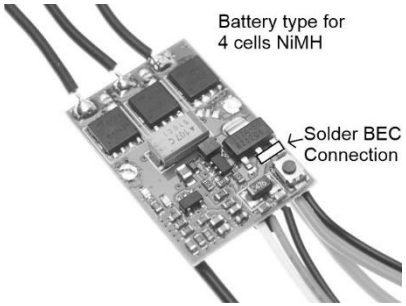
Designed for micro RC car
1/24 to 1/18 2WD or AWD
Sensorless Brushless Motor

• Specially designed for RC car and truck, with excellent starting up, acceleration and linearity features.
•Compatible with sensorless brushless motor.
•3 running modes suitable for different applications
•Forward with brake mode / Forward-Backward with Brake mode / Forward-Backward no Brake Mode
•4 steps of maximum reverse force adjustment.
•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.
•9 start modes from “Short” to “Smooth” to be suitable for different chassis, tires and tracks.
• 7 Multiple protection features: Low voltage cut-off protection for lithium or nickel battery / Over-heat protection / Throttle signal loss protection / Motor blocked protection.
• 8 steps of timing adjustment.
• User programmable. Supported as : The “SET” button on the ESC, the digital LED Programmer 500808

Electronic Speed Controller (ESC). High power system for RC model can be very dangerous, so please read this manual carefully. In that we have no control over the correct use, installation, application, or maintenance of our products, no liability shall be assumed not accepted for any damages, losses or costs resulting from the use of the product.

Specifications

Continues Current	**16A**
Burst Current	**48A**
Resistance	**0.01 ohm**
Battery	***4 cells NiMH or *2 cells Li-Po/Li-Ion**
BEC Output	**5 Volt 1A**
Motor Type	**Sensorless Brushless Motor**



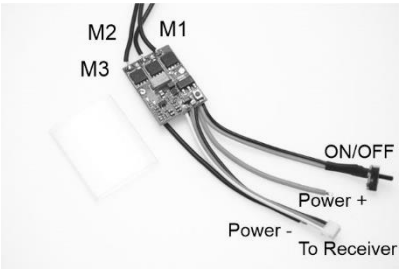
*Remark

For battery type 4 cells NiMH, need to be solder the BEC connection as left side picture.

For battery type 2 cells Li-Po / Li-Ion keep original open.

1. Begin to use the NEW ESC

Connect the ESC, motor, receiver, battery and servo according to the following diagram:
“+” and “-” wires of the ESC are connected with the battery, and “M1” “M2” and “M3” are connected with the motor wires.
The “SET” button is used for the programming the ESC.
The control cable (JST1.5 plug Black Red White) of the ESC is connected with the throttle channel of the receiver (Usually CH2).
The “M1’ “M2” “M3” wires of the ESC can connected with the motor wires freely. If the motor runs in the opposite direction, please swap the “M1” and “M3” wires.

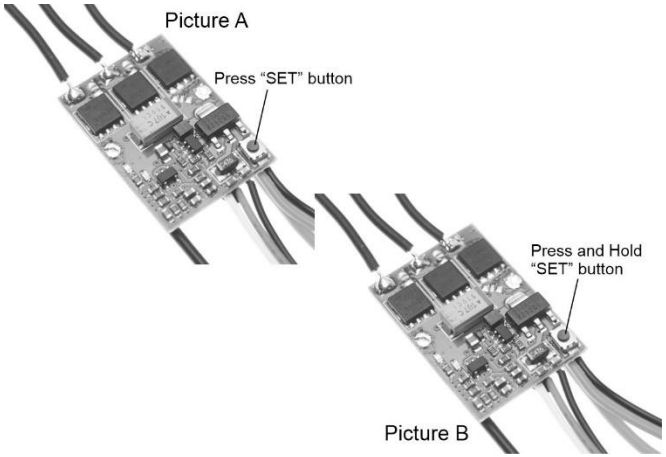


2. Throttle Range Setting (Throttle Range Calibration)

In order to make the ESC fit the throttle range, you must calibrate it for the following cases; otherwise the ESC cannot work properly.
1)Begin to use a new ESC
2)Begin to use anew transmitter
3)Change the settings of neutral position of the throttle stick, ATV or PA parameters, etc. There are 3 points need to be set, they are the top point of “forward”,” backward” and the neutral point.

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. (*Picture A)

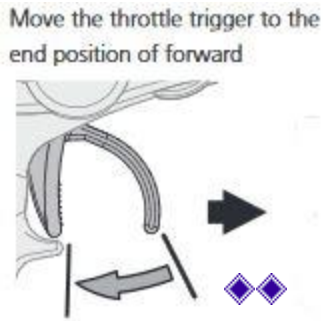
B) Hold the “SET” key and then switch on the ESC, when the red LED begins to flash, release the key immediately. (*Picture B)
(Please refer to the picture on the right side)



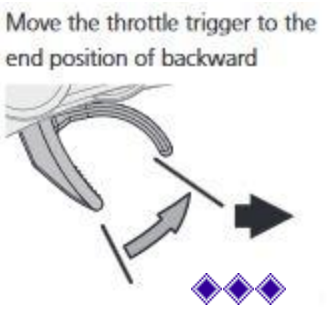
C) Set the THREE points according to the steps shown in the picture on the right side.
1. Neutral point
2. End point of forward direction
3. End point of backward direction

D) When the process of calibration is finished, the motor can be started after3 seconds.

Press “SET” button, the Green LED flashes once and “Beep” tone



Press “SET” button, the Green LED flashes twice and “Beep Beep” tone



Press “SET” button, the Green LED flashes thrice and “Beep Beep Beep” tone

Note2: If you don’t release the “SET” button 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.

3. The LED Status in Normal Running

a) When the throttle stick is in the neutral range, neither the Red LED nor the Green LED lights up.
b) When the car moves forward, the Red LED solidly lights; the Green LED also lights up when the throttle stick is at the top position (100%throttle).
c) When the car brakes, the Red LED solidly lights; the Green LED also lights up when the throttle stick is at the bottom position and the maximum brake force is set to 100%.
d) When the car reverses, the Red LED solidly lights; the Green LED also lights up when the throttle stick is at the bottom position and the maximum reverse force is set to100%.

Program MENU	Programmable Value								
	1	2	3	4	5	6	7	8	9
1. Running Mode	**Forward with Brake**	**Forward / Reverse with Brake**	**Forward / Reverse**						
2. Drag Brake Power	**0%**	**5%**	**10%**	**20%**	**40%**	**60%**	**80%**	**100%**	
3. Low Volt Cutoff	**No Cutoff**	**2.6V / cell**	**2.8V / cell**	**3.0V / cell**	**3.2V / cell**	**3.4V / cell**			
4. Throttle Punch	**LOW**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**	**Level 8**	**Level 9**
5. Brake Power	**25%**	**50%**	**75%**	**100%**					
6. Reverse Power	**25%**	**50%**	**75%**	**100%**					
7. Initial Brake Power	**= Drag Brake**	**0%**	**20%**	**40%**					
8. Throttle Neutral Range	**6% (Narrow)**	**9% (Normal)**	**12% (Wide)**						
9. Acceleration Timing	**Short**	**Level 2**	**Level 3**	**Level 4**	**Level5**	**Level 6**	**Level 7**	**Smooth**	
10. Over Heat Protection	**Enable**	**Disable**							

Attention: The italics texts in the above form are the default settings.

4. Programmable Menu

4.1. Running Mode: With “Forward with Brake” mode, the car can go forward and brake, but cannot go backward, this model is suitable for competition; “Forward/Reverse with Brake” mode provides backward function, which is suitable for training. The “Forward/Reverse” 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 he throttle stick from forward zone to backward zone for the first time, the ESC begins to rake 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 stick 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 stick is moved to backward zone. Please set the “Drag Brake Force” to 100% if you choose the “Rock Crawler” mode.

4.2.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.

4.3.Low Voltage Cut-Off: The function is mainly to prevent the lithium battery pack from over discharging. When using lithium battery pack, please set the suitable value for low-voltage protection as your like. The ESC monitors the battery’s voltage at any time, if the voltage is lower than the threshold, the output power ill be reduced to 50% in 2 seconds. Please drive and stop the car at the side of the acing rack as soon as possible, the ESC will completely cut off the output power in 10 seconds.

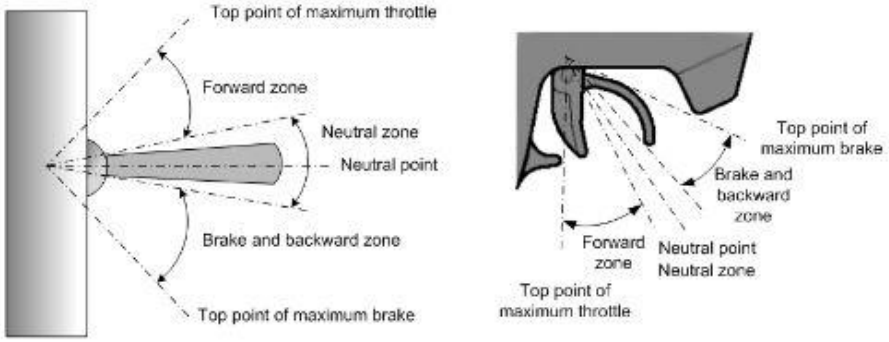
4.4.Start Mode(Also called “Punch”): Select from “Level1 (Soft)”to “Level 9 (Very aggressive)”start mode as your like. Please note that if you choose “Level 7”to “Level 9”, you’d better use good quality battery pack with powerful discharge ability, otherwise these modes cannot get the bursting start 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, please choose a better battery or increase the gear rate.

4.5.Maximum Brake Force: The ESC provides proportional brake function. The brake force is related to the position of the throttle stick. Maximum brake force refers to the force when the throttle stick 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.

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

4.7.Initial Brake Force: It is also called “minimum brake force”, and it refers to the force when the throttle stick is located at the initial position of the backward zone. The default value is equal to the drag brake force, o the brake effect can be very smooth.

4.8. Throttle Neutral Range: Please see the following illustrations to adjust the neutral range as your like.



4.9.Timing:There are many differences among structures and parameters and different brushless motors, so a fixed timing ESC is difficult to compatible with all brushless motors. 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 value brings out higher power output, but the whole efficiency of the system will be lightly power down.

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

5. Reset All Items

To Default Values At any time when the throttle is located in neutral zone (except in the throttle calibration or parameters program process), hold the “SET ”key forover3seconds, the red LED and green LED will flash at the same time , which means each programmable tem has be reset to its default value. It needs to be restarted to complete the whole process.