



User's Instruction Manual

BL Electronic Speed Controller (For 1/8 scale buggies and trucks)



Electronic Speed Controller

This series of electronic speed controllers has the following features and functions:

- Full protection feature including low voltage cutoff, over-heat protection, throttle signal loss protection, startup protection and self-check.
- Compatible with sensorless brushless motor.
- Excellent startup performance, great throttle linear and quick throttle response.
- Support highest motor speed 240,000 RPM (2 poles), 80,000 RPM (6 poles) and 40,000 RPM (12 poles).
- The parameters of ESC can be configured via program card or through the keys on ESC panel.
- The low-voltage threshold and start-up power can be programmed quantitatively and precisely by program card.
- System can automatically detect throttle neutral point and neutral range is adjustable.
- Three work modes match different requirements, four steps of maximum reverse force adjustment.
- Three steps of maximum brake force adjustment, five steps of drag brake force adjustment, four steps of initial brake force adjustment.
- With connectors for external lighting. Users can assemble car light. (Refer to the wiring diagram).

ESC specifications

ESC Model#	Continuous current	Battery cell		Dimension (mm)LxWxH	Weight (g)	BEC	Program by card	Program by key
		Li-XX	Ni-Mh					
H101	80A	2-4S	4-14S	47x41x29	89	3A/5.5V (switch)	Yes	Yes
H104	60A	2-4S	4-14S	47x41x29	82	3A/5.5V (switch)	Yes	Yes
H107	100A	2-4S	4-14S	47x41x29	95	3A/5.5V (switch)	Yes	Yes

Using ESC

1.Startup Procedure

Move transmitter throttle trigger to neutral position > Switch on the transmitter > Connect battery pack to ESC > System detects the neutral throttle signal, and makes a long "Beep" tone > System detects battery voltage and makes several short "beep" tones, which denote the number of battery cells > when self-check is finished > " 🎵 1 2 3" tone should be emitted > ready for start.

2. Setting Throttle Range

Throttle range should be setup when a new transmitter is being used. "SET" key is to be used for throttle range.

Turn off the ESC > Switch on the transmitter > Press and hold the "SET" key > Switch on the ESC > Push the throttle trigger to the top point of forward within two seconds > Wait for one second > System detects maximum throttle signal, and makes two "beep-" tones. This denotes that max throttle has been confirmed and saved.

Now pull the throttle trigger to the top point of backward > System detects minimum throttle signal with two "beep-" tones. This indicates that min throttle has been confirmed and saved > Release the "SET" key > Setting is finished. Throttle trigger goes back to neutral position. When neutral position is checked, there is a long "beep-" tone, it detects the battery voltage. After several short beeps, number of Lipo battery cells is detected. This indicates that the system is working well. After a short music "♪ 1 2 3" is heard, then the vehicle is ready to run.

3. Protection functions

A) Low voltage protection: The default voltage is 0.0V. The system automatically checks number of Lipo cells and calculates low voltage value. When the power voltage is lower than the cutoff threshold, ESC will cut off power output automatically.

B) Throttle signal loss protection: The ESC will cut off the motor power within 0.5 second once the throttle signal is lost.

C) Overheat protection: Power output will be reduced to 20% if temperature of the CPU gets to 100°C, and the power will resume after temperature gets back to normal (usually below 100°C).

D) Self-check: ESC will start self-check when power is on. If self-check fails, ESC will continuously emit 20 times of short "beeps".

4. LED indicators:

i) Green LED is on when the vehicle runs. Red LED turns on at reverse. Green and red LEDs are on during brake. When the vehicle stops, both green and red LEDs are off.

ii) During over voltage, low voltage or over heat, both red and green LEDs flash. At over voltage or low voltage, the motors stops, both red and green LEDs flash.

Parameter configuration with LED program card

1. Brake force: There are three options here, 50%, 75%, and 100%. The default is 75%. The ESC provides proportional brake function. The brake force is related to the position of the throttle trigger. It refers to the maximum brake force when the throttle trigger is pushed to the end of the backward zone.

2. Drag brake force: Five options. 0%, 5%, 10%, 15%, and 20%. The default is 0%. When the throttle trigger is located at the neutral zone, the ESC provides a slight brake force.

3. Run mode: Three options, One, Two and Two2. The default is Two2.

i) One: The vehicle can go forward and brake. It will brake continuously if the throttle trigger is placed at backward zone.

ii) Two: This is a bi-directional mode. The vehicle goes forward when the throttle trigger is located at the forward zone. When the throttle trigger is located at the backward zone, the vehicle will go backward and the brake will occur when direction is changed. No need to change to neutral position.

iii) Two2: This is the conditional bi-directional mode. The vehicle goes backward only when it is stopped and throttle trigger is pushed from neutral zone to backward zone. When the vehicle is running forward, push throttle trigger to backward zone, then the vehicle will keep brake until it stops, the throttle stick return the neutral zone, and push the throttle stick to the backward zone, then the car will go backward.

4. Startup power percent (Start Force): The percentage of output power can be set up as 00%-29% when the vehicle starts. The default value is 20% (automatic detection). Under default setting, output power is decided automatically by the system according to throttle position. The more powerful the startup power is, the more current the motor generates. At normal situation, try to choose relatively small startup power to reduce motor current. This will greatly protect the ESC.

5. Please refer to < 5. Li-xx cell numbers > in Step 3 for detail.

6. Cut off voltage (low voltage protection threshold): The range is 00.0V to 49.4V. User can set proper cutoff voltage according to cell quantity. The default is 3.1V.

Note: The system will detect battery cells and calculate proper threshold automatically if the setting is 3.1V. The protection threshold for each Li-XX cell is 3.1V. For example, if the Li-XX battery pack is 3 cells, then the cutoff voltage is $3.1V \times 3 \text{ cells} = 9.3V$.

7. Advance timing: There are four options, they are Low, Middle, High and Highest. The default is Middle. Low advance timing is recommended for high inductance and low KV motors. High advance timing is recommended for low inductance and high KV motors.

8. Neutral range: Three options. 6%, 8%, and 10%. The default is 8%. At this zone, the motor will be turned off. Refer to the throttle diagram.

9. Initial brake force: Four options. 5%, 10%, 20%, and 30%. The default is 5%. It refers to the brake force when the throttle stick is located at the initial position of the backward zone.

10. Reverse force: Four options. 25%, 50%, 75%, and 100%. The default is 25%. It refers to force ranges of the vehicle in reverse direction.

Programming the ESC with key

Step 1 Enter program mode

1. Turn off the ESC, Switch on transmitter, keep throttle stick to the neutral position.
2. Press and hold the "SET" KEY, Switch on the ESC.
3. Wait for 4 seconds, a music tone like "♪ i3i3" should be emitted, which means program mode is entered.

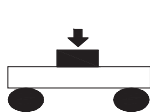
Step 1

Step 4 Exit program

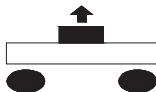
There are two ways to exit program mode:

1. In step 2, after 3 long tone (The item #11), release the **KEY** within 2 seconds.
2. In step 3, after special tone "♪ 5 6 5 6", release the **KEY** within 2 seconds.

Step 4



Step 1



Step 4

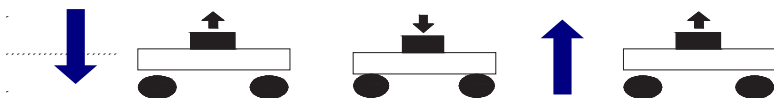


Step 2 Select programmable items

After entering program mode, hold the "SET" KEY continuously, you will hear 11 tones and red LED flashes in a loop in the following sequence. Release the "SET" KEY within 2 seconds after one tone, this item will be selected, and enter step 3.

- | | | |
|--|---|-----------------------------|
| (1) "beep-" | (1 short tone, red LED flashes 1 short time) | Brake Force |
| (2) "beep- beep-" | (2 short tones, red LED flashes 2 short times) | Drag Brake |
| (3) "beep- beep- beep-" | (3 short tones, red LED flashes 3 short times) | Run Mode |
| (4) "beep- beep- beep- beep-" | (4 short tones, red LED flashes 4 short times) | Start Force |
| (5) "beep-----" | (1 long tone, red LED flashes 1 long time) | Li-xx cells |
| (6) "beep---- beep-" | (1 long 1 short tones, red LED flashes 1 long time and 1 short time) | Cutoff Threshold |
| (7) "beep---- beep- beep-" | (1 long 2 short tones, red LED flash 1 long time and 2 short times) | Timing |
| (8) "beep---- beep- beep- bee" | (1 long 3 short tones, red LED flashes 1 long time and 3 short times) | Neutral Range |
| (9) "beep---- beep- beep- beep- beep-" | (1 long 4 short tones, red LED flashes 1 long time and 4 short times) | Initial Brake Force |
| (10) "beep---- beep----" | (2 long tones, red LED flashes 2 long times) | Reverse Force |
| (11) "beep---- beep---- beep----" | (3 long tones, red LED flashes 3 long times) | Restore to default and Exit |

Note: One long "beep----" = 5 short "beeps-", one long flash = 5 short flashes



Step 3 Set item value

After entering the items, you will hear several tones and **green LED** flashes in loop. Press the "**SET**" **KEY** within 2 seconds after one tone is heard, you will hear "♫ 5 6 5 6". This indicates that the value is set and saved. Hold the **SET KEY** for 3 seconds, you will go back to step 2, which allows you to continue the setup. If the "SET" key is released within 2 seconds, you will exit the program right away.

Tone	Beep-, 1 short tone, green LED flashes 1 short time	Beep-beep-, 2 tones, green LED flashes 2 short times	Beep-beep-beep-, 3 tones, green LED flashes 3 short times	Beep-beep-beep-beep-, 4 tones, green LED flashes 4 short times	Beep----, 1 long tone, green LED flashes 1 long time	Beep-----, N tones, green LED flashes N times
Items						
1. Brake Force	50%	75%	100%	N/A	N/A	N/A
2. Drag Brake	0%	5%	10%	15%	20%	N/A
3. Run Mode	ONE	TWO	TWO 2	N/A	N/A	N/A
4. Start Force	10%	15%	20%	23%	25%	N Cells
5. Li-xx cell numbers	Self-check	2 Cells	3 Cells	4 Cells	5 Cells	N/A
6. Cutoff threshold	2.5V/cell	2.8V/cell	3.1V/cell	N/A	N/A	N/A
7. Timing	Low	Mid	High	Highest	N/A	N/A
8. Neutral Range	6%	8%	10%	N/A	N/A	N/A
9. Initial Brake Force	5%	10%	20%	30%	N/A	N/A
10. Reverse Force	25%	50%	75%	100%	N/A	N/A

Note:

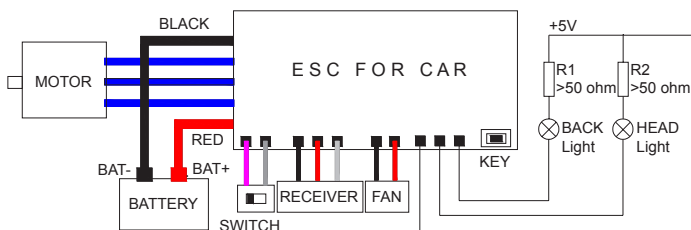
1- 1 long "beep----" equals 5 short "beeps-". For example, in "Li-xx Cells Number" setting, 1 long "beep----" plus 1 short "beep-" (5+1=6), which means a 6-cell Li-xx battery pack.

2- The boldface in above table refers to default value.

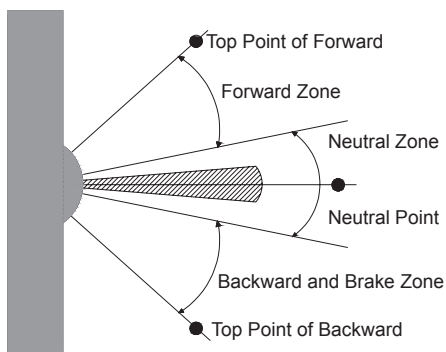
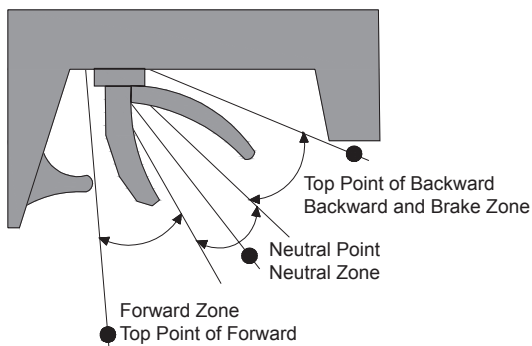
3- Low voltage Protection threshold (Cutoff voltage) equals Li-xx Cells Number multiplied by Cutoff threshold. Cutoff threshold is protection threshold for one cell Li-xx. For example, if Li-xx number is 3 cells, and Cutoff threshold is 3.1V, the cutoff voltage will be 3.1V per cell*3 cells=9.3V.

4- In Step 2, after 3 long tones (Item# 11), if the "SET" key is released within 2 seconds, you will exit the program mode. If no other item value is selected, the ESC will restore all items to default value, and makes two "beep-" tones. When other item value is selected, it will not get back to default values.

Wiring diagram



Throttle Diagram



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