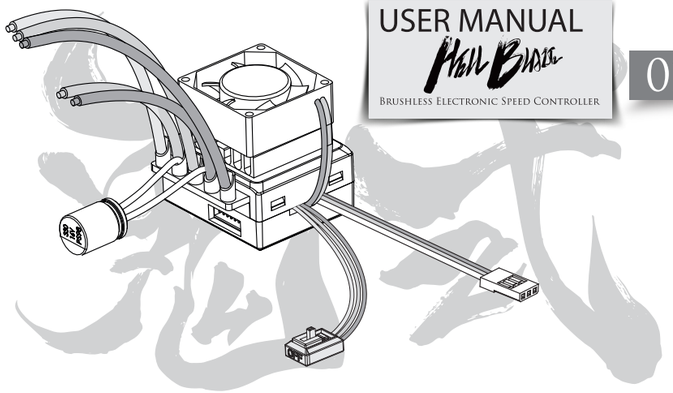
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USER MANUAL

HELL BLAZE

BRUSHLESS ELECTRONIC SPEED CONTROLLER

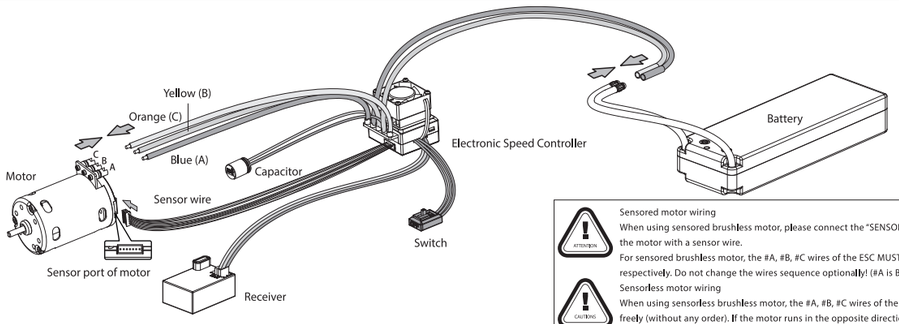
Congratulations and thanks for purchasing the HELL BLAZE series electronic speed controller (ESC). The power system for RC model can be very dangerous, so please read this manual carefully. Since we have no control over the installation, application, use or maintenance of this product, in no case shall we be liable for any damages, losses or costs.

01 Features

- High performance but low price, users can own this reliable race-ready ESC at an affordable cost.
- Compact size, suitable for various car chassis.
- Auto identification system can recognize sensored / sensorless brushless motors automatically.
- Excellent operating feelings and plentiful adjustment options, suitable for most kinds of competitions.
- 8 steps of timing adjustment greatly increase the output power of the motor, and unlock its maximum potential.
- Proportional brake with 4 steps of Maximum Brake Force adjustment, 8 steps of Drag Brake Force adjustment and 4 steps of Initial Brake Force adjustment.
- 9 steps of acceleration (punch) adjustment, from "soft" to "very aggressive" to fit for different kinds of cars, tires and tracks.
- Multiple protections: Low voltage cut-off protection for Lipo or NiMH battery / Over-heat protection / Throttle signal loss protection / Motor Lock-up protection.
- One-button (the "SET" button on the ESC) to set the ESC, and easy to reset all parameters to the factory default settings.
- Compatible with the optional device - the portable Digital LED Program Card, especially convenient for outdoor use.

02 Begin to Use a New Brushless ESC

1 Connections



Sensored motor wiring
When using sensored brushless motor, please connect the "SENSOR" port of the ESC and the the "SENSOR" port of the motor with a sensor wire.
For sensored brushless motor, the #A, #B, #C wires of the ESC MUST be connected with the motor wire #A, #B, #C respectively. Do not change the wires sequence optionally! (#A is Blue, #B is Yellow, #C is Orange.)

Sensorless motor wiring
When using sensorless brushless motor, 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. Please disconnect the battery from the ESC after running the car!

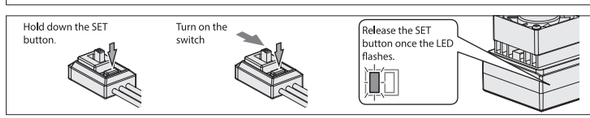
Specifications

Model		HELL BLAZE BRUSHLESS ELECTRONIC SPEED CONTROLLER
Cont. / Peak Current / Resistance		60A / 380A / 0.0008Ω
Motor Type Supported		Sensored / Sensorless Brushless Motor
Car Applicable		1/10 & 1/12 On-road / Off-road / F1 / Drift car race / Street race for fun / Club racing / Daily practice / STOCK race with 0 timing
Motor Limit	4-6 cells NiMH / 2S Lipo	≥8.5T(1/10 On-road), ≥13.5T(1/10 Off-road) Note
	8-9 cells NiMH / 3S Lipo	≥13.5T(1/10 On-road), ≥17.5T(1/10 Off-road) Note
Battery		4-9 cells NiMH, 2-3S Lipo
BEC Output / Operating Voltage of the Cooling Fan		6V@2A, Linear Mode / 6V (The cooling fan gets its power supply from the built-in BEC)
Dimensions / Weight		33 x 28 x 31.5mm (with cooling fan) / 59g (with wires, without cooling Fan)

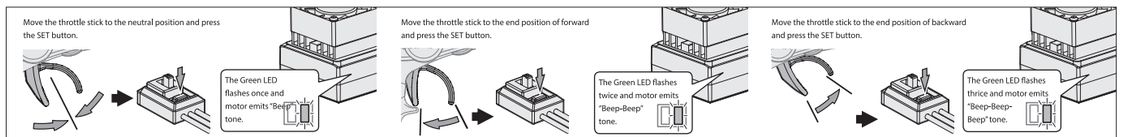
Note: "T" indicates the limit value of motor turns when the ESC timing is set to 0 degree. The larger the timing, the more turns the motor needs. Please pay close attention to temperatures of the motor and the ESC to avoid any damage to these two equipments.

2 Set the Throttle Range

In order to make sure the ESC fits the throttle range of your transmitter, you must calibrate it when begin to use a new ESC, or a used transmitter if some of its settings have been changed, like the Throttle Trim, D/R, EPA or other parameters. Otherwise, the ESC cannot work properly. Besides, we strongly recommend users to enable the "failsafe" function of the transmitter, set the "F/S" of the throttle channel to the Shutdown mode or set the protection value to the neutral position, so the car can be stopped if the receiver fails to get the radio signals from the transmitter. Please calibrate the throttle range according to the following steps.



1. Turn on the transmitter, and set parameters (of the throttle channel) like "D/R, "EPA", "ATL" to 100% (if there is no LCD display on the transmitter, please adjust the corresponding knob to its limit). Set the throttle trim to 0 (if there is no display, then adjust the knob to the neutral position). For FUTABA™ and similar transmitters, set the throttle direction to "REV", while the throttle direction of others to "NOR". Please disable the built-in ABS brake function in your transmitter.
2. Hold the SET button while sliding the switch to the ON position, and then release the "SET" button the moment when the Red LED starts to blink. (If you don't release the SET button in 3 seconds, 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 1.)



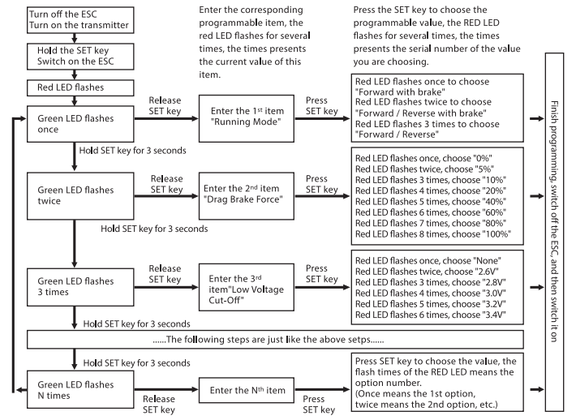
Set the 3 points according to pictures
• The neutral point. • The end point of the forward direction. • The end point of the backward/brake direction.
When the process of calibration is finished, the motor can be started after 3 seconds.

3 Check 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 end 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 end position and the maximum reverse force is set to 100%.

03 Program the ESC

1 Set the ESC by the SET button



- In the ESC setting 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 with the big serial number.

For example, if the LED flashes as the following:
"A long time flash + 1 short time flash" (Motor sounds "B—B") = the No. 6 item,
"A long time flash + 2 short time flash" (Motor sounds "B—BB") = the No. 7 item,
"A long time flash + 3 short time flash" (Motor sounds "B—BBB") = the No. 8 item,
and so on.

2 Set the ESC by Program Card

The Program Card is optional equipment which needs to be purchased separately. It has 3 digital LEDs to display the programmable items' number and the options' number. It is portable and very easy to use.
(For detailed information, please refer to the user manual of the program card).

04 Reset All Items to Default Values

At any time when the throttle is located at neutral position (except in the throttle calibration or parameters program process), press and hold the "SET" key for over 3 seconds, the red LED and green LED will blink simultaneously , which means each programmable item has be reset to its default value. It needs to be restarted to complete the whole process.

05 Programmable Items

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 has reverse running function, which is suitable for daily training.
   Note: "Forward/Reverse with Brake" mode uses "Double-click" method to make the car go backward. When you move the throttle stick from forward zone to backward zone for the first time (The 1st "click"), the ESC begins to brake the motor, the motor slows down but it is still running, not completely stopped, so the backward action is NOT happened immediately. 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 happen. The "Double-Click" method can prevent mistakenly reversing action when the brake function is frequently used in steering. By the way, in the process of braking or reversing, if the throttle stick is moved to forward zone, the motor will run forward at once. "Forward/Reverse" mode uses "single-click" method to make the car reverse. When moving the throttle stick from neutral zone to backward zone, the vehicle reverses immediately, so this mode is usually used by rock crawler.
2. Drag Brake Force: Set the amount of drag brake applied at neutral throttle to simulate the slight braking effect of a brushed motor while coasting.
3. Low Voltage Cut-Off: The function mainly prevents the Lipo battery from over discharging. The ESC detects the battery voltage at any time, if the voltage is lower than the threshold for 2 seconds, the output power will be reduced 70%, after 10 seconds the output power will be completely shut off and the red LED flashes in such a way: "☆-, ☆-, ☆-". Please stop your car at the track side as soon as possible to avoid obstructing other racing cars.
   Note: For NiMH battery, if the voltage of the whole NiMH battery pack is higher than 9.0V, it will be considered as a 3 cells Lipo battery pack; If it is lower than 9.0V, it will be considered as a 2 cells Lipo battery pack. For example, if a NiMH battery pack is 8.0V, and the threshold is set to 2.6V/Cell, so it will be considered as a 2 cells Lipo battery pack, and the low-voltage cut-off threshold for this NiMH battery pack is 2.6x2=5.2V.
4. Start Mode (Also called "Punch" or "Acceleration"): Level 1 has very soft start acceleration, while level 9 has very quick start acceleration. From Level 1 to Level 9, the start force is increasing. If you choose "Level 7" to "Level 9", you should use good quality battery with powerful discharge ability, otherwise you cannot get the burst start effect as you want. If the motor cannot run smoothly (the motor is cogging), sometimes it is caused by the weak discharge ability, please use a better battery or increase the gear ratio.
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 end point of the backward zone. A very large brake force can shorten the brake time, but it may damage the gears.
6. Maximum Reverse Force: Sets how much power will be applied in the reverse direction.
7. Initial Brake Force: It is also called "minimum brake force", which 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, so the brake action can be very smoothly.
8. Throttle Neutral Range: This setting adjusts the width of the neutral range.
9. Timing: This function can be used to fine-tune the output power of the motor, the bigger the timing, the faster the motor runs or the larger output power of the motor. As the Boost Timing technology has been introduced into this ESC, so under the sensored mode, adjust the ESC timing can greatly increase the motor speed. Therefore, please remember to enlarge the gear ratio of the chassis and carefully check temperatures of the motor and the ESC after increasing the timing.

Parameter List of HELL BLAZE:
(Italics in the form below indicate factory defaults)

Basic Items	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
1.Running Mode Note	Fwd/Br (For Racing)	Fwd/Rev/Br (For Training)	Fwd/Rev (For Crawling)						
2.Drag Brake Force	0%	5%	10%	20%	40%	60%	80%	100%	
3. Low Voltage Cutoff	Disable	2.6V/Cell	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell			
4. Start Mode (Punch)	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9
Advanced Items									
5. Max.Drag Brake Force	25%	50%	75%	100%					
6. Max. Reversing Force	25%	50%	75%	100%					
7. Initial Brake Force	Equals Drag Brake Force	0%	20%	40%					
8. Throttle Range	6% (Narrow)	9% (Normal)	12%(Wide)						
9. Timing	0.00 deg	3.75 deg	7.50 deg	11.25 deg	15.00 deg	18.75 deg	22.50 deg	26.25 deg	

Note: Fwd= Forward, Rev=Reverse, Brk=Brake

Recommended Power System

Motor	KV	Gear Ratio (1/10 on-road)	Gear Ratio (1/10 off-road)	Main Application
HELL BLAZE -10.5T-Sensored	3300	5.0 - 6.5	6.5 - 8.0	1:10 STOCK race / Drift car
HELL BLAZE -13.5T- Sensored	2500	4.0 - 5.5	5.5 - 7.5	1:10 STOCK race
HELL BLAZE -17.5T- Sensored	1900	3.5 - 5.5	5.0 - 7.0	1:10 STOCK race / F1
HELL BLAZE -21.5T- Sensored	1600	3.5 - 5.5	4.0 - 6.0	1:10 STOCK race / F1 / Crawler

The reference gear ratios in the above form are based on the 1/10 RC cars with 2S Lipo and 0 timing ESC. If the ESC timing is increased, then the gear ratio needs to be increased accordingly. Besides, please pay attention to the temperature of the ESC and the motor to avoid any damage to the equipments.

06 Trouble Shooting

Trouble(s)	Possible Causes	Solution(s)
Turn on the switch, no LED lights up, and neither the motor nor fan works.	No battery voltage is input to the ESC. The switch of the ESC is damaged	Check the connections between the battery and the ESC, re-solder the connectors if needed. Change the switch.
After power on, motor doesn't work but emits "beep-beep-, beep-beep-" alert tone. (there's 1-second pause between 2 "beep-beep-").	The voltage of the battery pack is not in the normal range, it's too high or too low.	Check the voltage of the battery pack.
After power on, the Red LED turns solid red but the motor doesn't work.	The throttle signal wire is oppositely inserted or into the incorrect channel.	Plug the signal wire (Rx lead) correctly into the throttle channel (usually Channel #2) of the receiver.
The car runs backwards when accelerating forward on radio.	The wire connections between the ESC and the motor need to be changed. The ESC is not suitable for the chassis.	Swap any two wire connections between the ESC and the motor. (Note: This method is ONLY available for SENSORLESS motor) Please don't use the ESC for this special chassis.
The car suddenly slows down, then stops about 15 seconds later.	Low voltage cutoff protection (Red LED blinks) Thermal protection (Green LED blinks)	Check the battery voltage. If still has some capacity, lower the cut-off threshold voltage; if not, replace a new battery. Wait several minutes to cool the ESC. Increase the gear ratio or the T number (Turns) of the motor.
The motor stuttering under heavy acceleration.	Low battery discharge rate. The motor RPM is too high (i.e. the motor runs too fast), and the gear ratio is too small. The "Punch" setting is too high.	Use a battery pack with better discharge ability. Use a low-speed motor, or increase the gear ratio. Set the acceleration (punch) to the softer mode.
The car slows down and then stopped. The Red and Green LEDs blink rapidly and synchronously when throttle stick in neutral.	ESC detects abnormal signals from the sensor port of the motor and the ESC changes to sensorless driving mode automatically.	Check the sensor wire connection. The Hall sensors in the motor are damaged, please change the motor.
The motor stutters and can't start up.	The connections between the motor and ESC are not A-A, B-B and C-C; The ESC is damaged	Check wiring & connections. Contact the distributor for sales-after service.