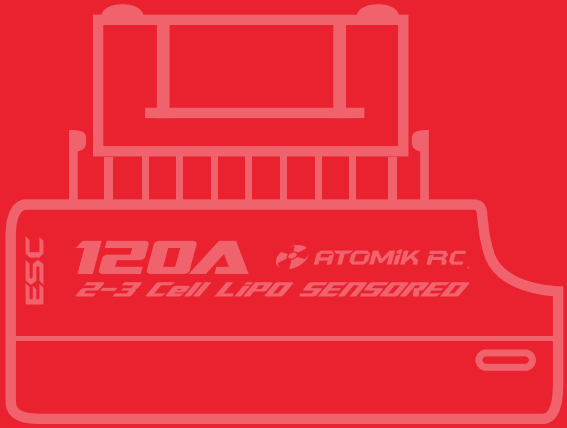
RED

ATOMIK RED 120A MOTOR/ESC COMBO

ATOMIK RED 120A ESC MANUAL



ATOMIK RED 120A ESC

MOTOR/ESC

COMBO

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WARNINGS

Thank you for purchasing the Atomik 120A Sensored Electronic Speed Control. High-powered systems for RC models can be very dangerous, please read this manual carefully. Due to the fact that we have no control over the correct use, installation, application, or maintenance of this product no liability shall be assumed nor accepted for any damages, losses or costs resulting from the use of this speed control.

FEATURES

- Compatible with all sensorless brushless motors and most sensored brushless motors.
- Seamlessly changes to sensorless mode should the sensor wire become damaged.
- Excellent start-up, acceleration and linearity features.
- Built-in BEC supplies electricity to all electronic components.
- Firmware can be updated through a USB adaptor with the optional LCD programming box. Compatible with Hobbywing Multifunction LCD Program Box (P/N 30502 000014) and USB Link Software (P/N 80000000).
- User programmable. Easily configured with the “SET” button on the ESC
  - 3 Running modes (Racing, Basher, Rock Crawler).
  - 4 different levels of reverse force.
  - Proportional ABS brake function with 4 levels of brake force adjustment, 8 steps of drag-brake force adjustment and 4 steps of initial brake force adjustment.
  - Adjustable start modes (also known as “Punch” control.) Level 1= very soft, 9=very aggressive.
  - Adjustable steps of timing to suit all brushless motors.
  - Multiple protection features: Low voltage cut-off/Over-heat protection/Throttle signal loss protection/Motor blocked protection.

SPECIFICATIONS

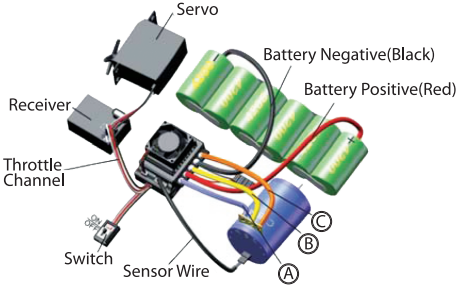
MODEL		
Cont./Burst Current		120A / 760A
Resistance		0.0003 ohm
Suitable Vehicle		1/10, 1/12 on road & off road, 1/8th, 1/10th scale rock crawler
Suitable Motor	5-6 NiMH or 2 Lipo	Sensored and sensorless Brushless Motors
		≥3.5T (on road), ≥5.5T (off road)
	8-9 NiMH or 3 Lipo	≥5.5t (on road), ≥8.5T (off road)
Battery		4-9 cells NiMH or 2-3 cells Li-Po
BEC Output		5.75V@3A Built-in BEC
Dimensions		43mm(L) * 36mm(W) * 33mm(H)
Weight		105g
Fan Working Voltage *		12V@ 0.18A, maximum 12V. (The fan gets power directly from the battery.)

USING THE SENSORED MODE

1 Connect the ESC, Motor, receiver, battery and servo and sensor wire correctly.
(See diagram for example.)

⚠ **NOTE:** To take full advantage of your sensored brushless motor, you must connect the "Sensor Wire" to the motor and ESC. If this wire is not used, the vehicle will likely run, but it will only be functioning in sensorless mode.

⚠ **WARNING!**
When using a sensored motor, the A,B, & C wires of the motor must be connected to the A, B, & C wires of the ESC respectively. Swapping two leads to reverse direction of the motor will not work and may cause damage to the motor or ESC.



USING THE ESC IN SENSORLESS MODE

When using a brushless motor without the hall sensor wire, the A, B, & C wires of the ESC can be connected with the motor wires in any sequence. If the motor runs in the opposite direction desired, simply swap any two connections.

⚠ **NOTE:** For SENSORLESS motors you can also set the throttle channel of your transmitter to "REVERSE" to run the motor in the opposite direction. Always recalibrate your throttle ranges after doing so. You CANNOT reverse motor direction via transmitter settings when using a SENSORED motor.

2 How to Calibrate the Throttle Range:

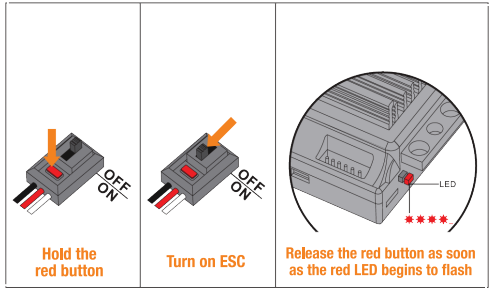
Anytime you begin to use a new ESC, transmitter or change transmitter settings such as the neutral position of the throttle, ATV or EPA parameters, etc. you must recalibrate the throttle range for optimal performance.

There are 3 points that need to be set: 100% throttle, 100% brake and the neutral point. Use the following example to set your throttle range:

A) Switch off the ESC, turn on the transmitter and set the direction of the throttle channel to "REV" and set the throttle trim to "0". Also, set the "EPA/ATV" Value of the throttle channel to 100% and disable the ABS function of your transmitter if available.

B) Use a pen or screw driver to hold down the "SET" button near the power switch of the ESC, then switch the ESC on. Release the "SET" button as soon as the red LED light on the ESC begins to flash.

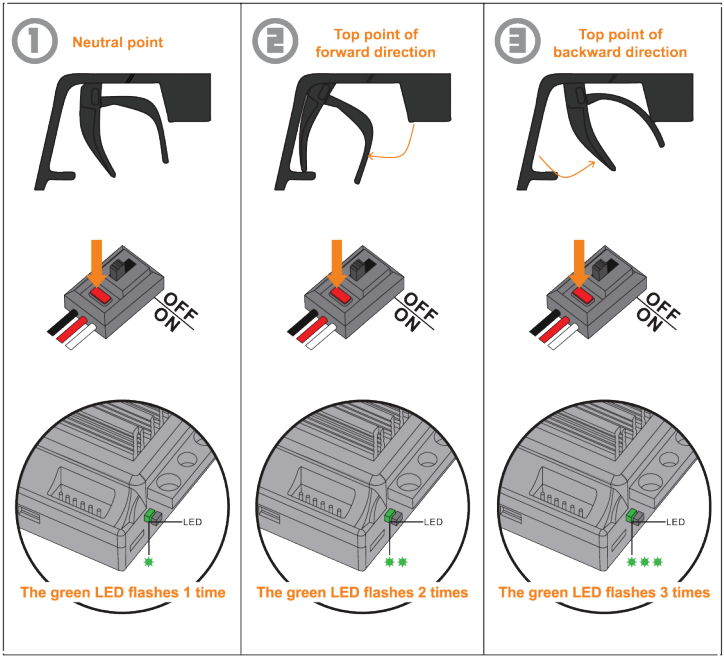
⚠ **NOTE:** If you don't release the "SET" button as soon as the red LED begins to flash, the ESC will enter programming mode. Should this happen when trying to set the throttle range, switch of the ESC and start the process over.



C) Set the neutral point first by letting the throttle trigger rest at neutral and press the “SET” button on the ESC.

- A green LED on the ESC will flash once.
- Next, move the throttle to 100% and press the “SET” button and the green LED on the ESC will flash two times.
- Finally, move the throttle to 100% brake and press the “SET” button a third time. The green LED will flash three times.

  (See graphic for details.)



PROGRAM THE ESC

1 Programmable Items List (The blue color text in the form are the default settings.)

Programmable Items	Options								
	1	2	3	4	5	6	7	8	9
Basic Items									
1. Running Mode	Forward with Brake	Forward/Reverse with Brake	Foward/Reverse (For Rock Crawler)						
2.Drag Brake Force	0%	5%	10%	20%	40%	60%	80%	100%	
3.Low Voltage Cut-Off Threshold	No-Protection	2.6V /Cell	2.8V /Cell	3.0V /Cell	3.2V /Cell	3.4V /Cell			
4.Start Mode(Punch)	Level1	Level2	Level3	Level4	Level5	Level6	Level7	Level8	Level9
Advanced Items									
5.Max Brake Force	25%	50%	75%	100%					
6.Max Reverse Force	25%	50%	75%	100%					
7.Initial Brake Force	= Drag Brake Force	0%	20%	40%					
8.Neutral Range	6% (Narrow)	9% (Normal)	12% (Wide)						
9.Timing	0.00 °	3.75 °	7.50 °	11.25 °	15.00 °	18.75 °	22.50°	26.25°	
10.Over-heat Protection	Enable	Disable							

2 Explanation of programmable items:

2.1. Running Mode: With “Forward and Brake” mode, the model will have forward and brake, but not reverse. This mode is suitable for competition. “Forward/Reverse with Brake” mode provides reverse function, which is suitable for recreational driving.

⚠ **NOTE:** “Forward/Reverse with Brake” mode will use the brake when reverse is engaged the first time. When the throttle returns to neutral and the motor has stopped, then the throttle is re-engaged into reverse, the vehicle will then go backwards. This allows you to use the brake without engaging reverse if desired.

⚠ **NOTE:** Damage may occur in some vehicles if this mode is used as some vehicles cannot engage forward to reverse quickly without damaging the drivetrain.

2.2. Drag Brake Force: Set the amount of drag brake applied when the throttle is set to neutral to simulate the slight braking effect of a neutral brushed motor while coasting.

2.3. Low Voltage Cut-Off: This function prevents Lithium battery packs from over discharging. The ESC monitors the battery's voltage constantly. If the voltage is lower than the threshold that has been set, the output power is reduced to 70%. After 10 seconds the output power will be completely shut off and the red LED on the ESC will flash twice, repeatedly. Please discontinue use and recharge your battery at this time. For most hobbyists, we recommend a cutoff of 3.0V per cell (Factory preset)

Please note that the cutoff threshold is calculated for each LITHIUM (LiPO) battery cell. For NiMH battery packs, if the voltage of the whole NiMH pack is higher than 9.0V, it will be considered a 3 cell Lithium pack; if it is lower than 9.0v, it will be considered a 2 cell Lithium pack. For example, a NiMH pack with a voltage of 8.0v, and the threshold is set to 2.6V per cell it will be considered a 2 cell Lithium pack and the low voltage cut-off threshold for this NiMH pack is (2.6 X 2=5.2V). There are six preset options for this programmable item. You can customize the cutoff threshold by using the optional LCD Programming Box (sold separately) to customize the cutoff to be more suitable for battery types other than LiPO packs. (NiMH, NiCd, Li-ion, etc.)

Please keep in mind that the customized value is NOT for each LiPO cell, but for the OVERALL voltage of the WHOLE battery pack.

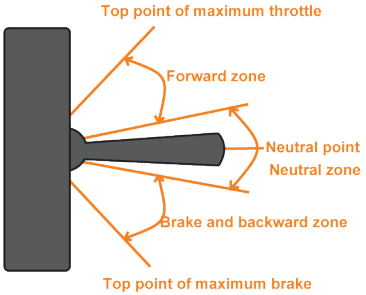
2.4 Start Mode (Also called "Punch"): Select from 9 different adjustment levels. Level 1 is a very soft start, whereas Level 9 is a very aggressive start. Please not using level 7 and higher you MUST use a battery pack with a high discharge rate. Should your vehicle stutter or "cog" you may need a higher "C rated" battery pack or may need to change your gear ratio.

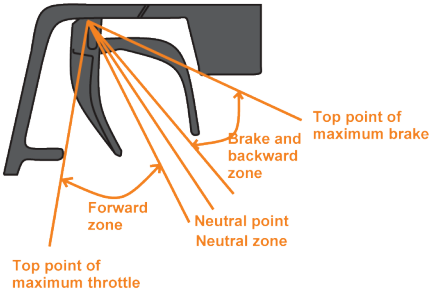
2.5 Maximum Brake Force: The ESC provides proportional brake function. The brake force is related to the position of the throttle stick. Maximum brake force refers to the force when the throttle stick is located at "100% reverse throttle". A very large brake force can shorten the brake distance, but may damage the drivetrain of the model.

2.6 Maximum Reverse Force: Sets how much power will be applied in the reverse direction. There are 4 presets available: 25%, 50%, 75% and 100%.

2.7 Initial Brake Force: Also called "minimum brake force", this refers to the force when the throttle stick is initially engage into reverse. The default value is equal to the "drag brake force" ensuring that braking will be smooth.

2.8 Throttle Neutral Range: Please refer to the following picture to adjust the neutral range to your liking.





2.9 Timing: The “timing” item is usable for both sensored and sensorless brushless motors. Please select the most suitable timing value according to the motor you are using. Generally, higher timing values will give a higher power output at the sacrifice of efficiency and added heat.

⚠ **Note:** For an ESC firmware later than 091218A, if the ESC is used with a “Modified” motor, do not choose timing values larger than 18.75 otherwise the motor may overheat and become damaged.

2.10 Over-Heat Protection: If the temperature of the ESC or the internal temperature of the sensored brushless motor is higher than the factory preset value for 5 seconds the vehicle will shut down.

- If the ESC overheated, the green LED on the ESC will give three “single” flashes. 
- If the motor overheats, the green LED will give three “double” flashes. 

⚠ **Note:** The motor over-heat protection function is only available for sensored brushless motors with a specific heat sensor monitored by the sensor wire. This function may not be available for your motor.

3 Programming Methods

A) Program the ESC with the SET button using the flow chart listed below.
B) Program the ESC using the optional LED Programming Box. (Sold Separately)

Note:

In the programming process, when the LED is flashing, the motor will emit a “beep” tone at the same time.
If the number “N” is bigger than “5” the ESC will use a long flash and beep to represent “5” so it is easy to identify the items with a bigger series of numbers.

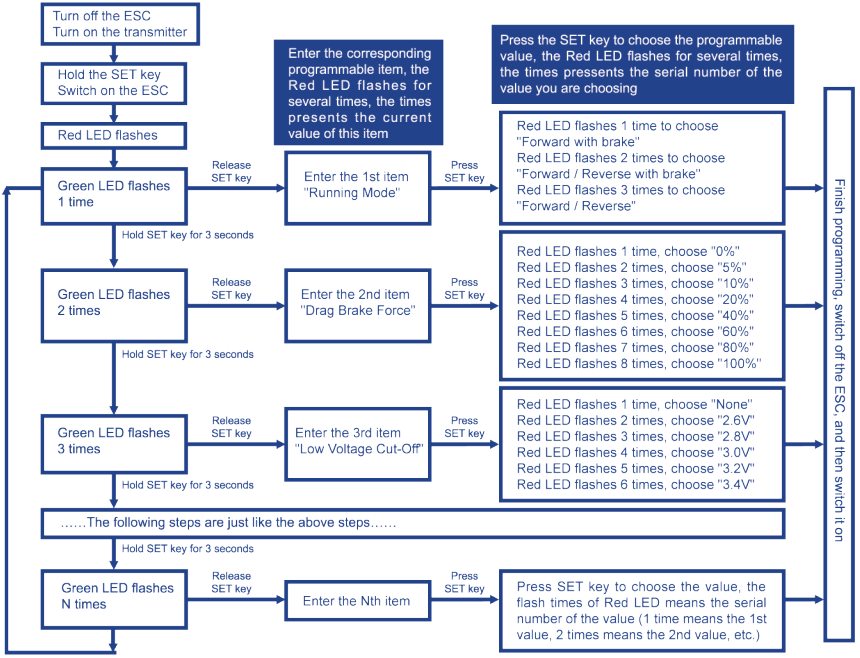
For Example:

A long flash and long beep indicates “5”.
A short flash and short beep indicates a “1”.

Long flash/beep + short flash/beep = “6”.
Long flash/beep + short flash/beep + short flash/beep= “7”.

4 Reset All Items to Default Values

At any time when the throttle is located in neutral zone (except in the throttle calibration process or program mode), hold the “SET” key more than 3 seconds, the red LED and green LED will flash at the same time, which means each programmable item has to be reset to its default value.


Turn off the ESC
Turn on the transmitter
Hold the SET key
Switch on the ESC
Red LED flashes
Green LED flashes
1 time
Release
SET key
Enter the corresponding programmable item, the Red LED flashes for several times, the times presents the current value of this item
Enter the 1st item
"Running Mode"
Press
SET key
Press the SET key to choose the programmable value, the Red LED flashes for several times, the times pressents the serial number of the value you are choosing
Red LED flashes 1 time to choose "Forward with brake"
Red LED flashes 2 times to choose "Forward / Reverse with brake"
Red LED flashes 3 times to choose "Forward / Reverse"
Hold SET key for 3 seconds
Green LED flashes
2 times
Release
SET key
Enter the 2nd item
"Drag Brake Force"
Press
SET key
Red LED flashes 1 time, choose "0%"
Red LED flashes 2 times, choose "5%"
Red LED flashes 3 times, choose "10%"
Red LED flashes 4 times, choose "20%"
Red LED flashes 5 times, choose "40%"
Red LED flashes 6 times, choose "60%"
Red LED flashes 7 times, choose "80%"
Red LED flashes 8 times, choose "100%"
Hold SET key for 3 seconds
Green LED flashes
3 times
Release
SET key
Enter the 3rd item
"Low Voltage Cut-Off"
Press
SET key
Red LED flashes 1 time, choose "None"
Red LED flashes 2 times, choose "2.6V"
Red LED flashes 3 times, choose "2.8V"
Red LED flashes 4 times, choose "3.0V"
Red LED flashes 5 times, choose "3.2V"
Red LED flashes 6 times, choose "3.4V"
Hold SET key for 3 seconds
……The following steps are just like the above steps……
Hold SET key for 3 seconds
Green LED flashes
N times
Release
SET key
Enter the Nth item
Press
SET key
Press SET key to choose the value, the flash times of Red LED means the serial number of the value (1 time means the 1st value, 2 times means the 2nd value, etc.)
Finish programming, switch off the ESC, and then switch it on

ALERT TONES AND LED STATUS

1) Input voltage warning tone: The ESC begins to check the input voltage when the ESC is powered up. If the voltage if out of the normal range, the alert tone will be “beep-beep-, beep-beep-, beep-beep-“ (There is a one second interval between every group of tones.)

2) Throttle signal incorrect: When the ESC can’t detect the normal throttle signal, the alert tone will be “beep-,beep-,v“ (There is a 2 second interval between each tone.)

3) The LED Status under normal operations. Normally, when the throttle is in the neutral range, the red and green LED lights WILL NOT be lit.

The red LED light will come on when the car is running in forward or reverse and will flash quickly when braking.

The green LED light will only light up when the throttle is at 100% forward.

Motor	KV/ Power	Gear Rate	Gear Rate	Suitable ESC	Application
		1/10 On Road	1/10 Off Road		
3.5T	9100KV/600W	9.6-11.0		120A	1/10, 1/12 On-road competitive racing (Modified group)
4.5T	7300KV/500W	8.4-10.0		120A	
5.5T	6000KV/400W	8.0-9.4	10.0-12.0	120A	1/10 On-Road sportful racing 1/10 Off-road competitive racing (Modified group)
6.5T	5200KV/350W	7.4-8.4	9.0-11.0	120A	
8.5T	4000KV/300W	6.0-7.0	8.0-9.6	120A/60A	1/10, 1/12 On-Road sportful racing 1/10, 1/12 Off-Road sportful racing
10.5T	3300KV/250W	5.0-6.0	7.5-8.5	120A/60A	
13.5T	2700KV/200W	4.5-5.5	7.0-8.0	120A/60A	
17.5T	1900KV/150W	4.5-5.5	6.0-8.0	120A/60A	

TROUBLE SHOOTING

Trouble	Possible Reason	Solution
After power on, motor doesn't work, no sound is emitted	The connections of battery pack are not correct The switch is damaged	Check the power connections, replace the connectors or switch
After power on, motor can't work, emits "beep-beep-, beep-beep-" alert tone. (Every group "beep-beep-" has time interval of 1 sec)	Input voltage is abnormal, too high or too low.	Check the voltage of the battery pack
After power on, the red LED lights, but motor cannot run	Throttle signal is abnormal	Check the transmitter and the receiver, and check the signal wire connection of your ESC
The motor runs in the opposite direction	1) The wire connections between the ESC and the motor need to be changed 2) The chassis is not suitable for this ESC	1) Swap any two wire connections between the ESC and the motor. (Note: This method is ONLY available for SENSORLESS motor) 2) Please don't use the ESC for this special chassis.
The motor stops running while in working state	The ESC has entered the "Low voltage protection mode" or the "Over-heat protection mode"	The red LED flashes means Low voltage protection, please replace the battery pack The green LED flashes means Over-heat protection, please wait for some minutes to cool the ESC
When accelerating quickly, the motor stops or trembles	1) The battery hasn't a good discharge performance 2) The gear rate is not suitable, so the motor load is too heavy	1) Use a better battery 2) Use lower KV motor or change the gear rate or set the "Start Mode" more softly
When the throttle stick is in the neutral range, the red LED and the green LED flashes synchronously	The motor is a sensored motor, but the ESC detects abnormal signal from the sensor, so it changes to sensorless mode automatically	1) Check the connection of Hall sensor cable to make it firmly connecting the motor with the ESC 2) The Hall sensors in the motor are damaged, please change the motor
The motor trembles but cannot start smoothly	1) The connctions are not A-A, B-B and C-C 2) The ESC is damaged	1) Check the connections 2) Contact the dealer for after-sales service

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Customer Service
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