

EMAX User Instruction for SimonK Series ESC

A. Features

- A1: Based on Simon K firmware, further optimized to the perfect drive performance.
- A2: Low-voltage protection, over-heat protection and self-check functions.
- A3: Separate power supply for MCU and BEC, enhancing the ESC's ability of eliminating magnetic interference.
- A4: Parameters of the ESC can be set via program card or transmitter.
- A5: Throttle range can be set to be compatible with different receivers.
- A6: Equipped with built-in linear BEC or switch BEC.
- A7: Max speed: 210,000 rpm for 2-pole, 70,000 rpm for 6-pole, 35,000 rpm for 12-pole.

B. Product specification

Item	Continuous Current	Burst current (10S)	Li-xx Battery (cell)	Dimension L*W*H(mm)	Weight (g) wires Included	BEC Mode	BEC Output	Programmable
Simon-12A	12A	15A	1-3	22*17*7	8	Linear	1A/5V	YES
Simon-20A	20A	25A	2-3	55*28*7	28	Linear	2A/5V	YES
Simon-25A	25A	30A	2-3	55*28*7	28	Linear	2A/5V	YES
Simon-30A	30A	40A	2-3	55*28*7	28	Linear	2A/5V	YES
Simon-40A-UBEC	40A	50A	2-6	73*28*12	41	Switch	3A/5V	YES

C. Instructions

C1. Normal startup procedures

Move throttle stick to the bottom position and then switch on transmitter	Connect battery pack to ESC	The long "beep" sound should be emitted, means the bottom point of throttle range has been detected	Several "beep" tones should be emitted to present the amount of battery cells	When self-test is finished, a "♪ 1 2 3" tune should be emitted	Move throttle stick upwards to go flying
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C2. Throttle range setting procedures (when users change a transmitter, throttle range setting is recommended.)

Switch on the transmitter, move throttle stick to the top position	Connect battery pack to ESC	Two "beep" sounds should be emitted, means the top point of throttle range has been confirmed and saved	Move throttle stick to the bottom position (within 2s), a long "beep" sound should be emitted, means the bottom point of throttle range has been detected	Several "beep" tones should be emitted to present the amount of battery cells	When self-test is finished, a "♪ 1 2 3" tune should be emitted, Move throttle stick upwards to go flying
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If the throttle stick is neither at the bottom position nor the top position after powered on, it will constantly make "beep" sounds.

If you hold the throttle stick on top position for more than 2 seconds after the top point of throttle range has been confirmed and saved, you will be led to transmitter programming mode.

D. Programmable parameters

- D1. Brake Type:** There are six brake types including **OFF**, Low, Mid-low, Middle, Mid-high and High. The default is OFF.
- D2. Timing Mode:** There are five options: Low: 0°, Mid-low: 8°, **Middle:15°**, Mid-high:23° and High:30°. The default is Middle: 15°. Low advance timing is recommended for high inductance and low KV motors. High advance timing is recommended for low inductance and high KV outrunner motors. For some high KV motors, if it shakes while rotating in high speed, the High timing mode is recommended.
- D3. Start Force:** There are 13 options: 0.03、0.05、0.06、0.09、0.13、0.19、0.25、0.38、0.50、**0.75**、1.00、1.25、1.50. The default is 0.75. Select the corresponding start force according to the load of motor.
- D4. Curve Mode:** There are four options: **Off**, Low, Middle, High. The default is off.
- D5. Control Frequency :** 2 options: **8KHz** and 22KHz. The default is 8KHz. This option is the drive frequency of the motors.
- D6. Low-voltage Protection:** 3 options: 2.8V/cell、**3.0V/cell**、3.2V/cell (If there are four options, the fourth option is off the low voltage protection). The default is 3.0V/cell. the system will automatically identify the battery cell. E.g. suppose there're 3 cells, if the voltage is lower than 9V, the system will work according to the current cutoff option.
- D7. Cutoff Mode:** There are two options: **Soft-Cut** and Cut-Off. The default is Soft-Cut. Soft-Cut option: Gradually reduce throttle power to 31% of the current power when the voltage is lower than the programmed low-voltage protection threshold. Cut-Off Option: immediate motor shutdown occurs in low-voltage.

When low-voltage protection, Push the throttle stick to the bottom position and then to the top position, the motor will be restarted. But since it is low-voltage condition, the output power is low or stopped at once.

E. Protection setting

- E1. Low-voltage Protection:** Whether to shut down the motor immediately or to lower the power when the input voltage drops below the programmed low-voltage protection threshold depends on the values set as Cutoff Mode. (Please refer to D7 for Cutoff Mode)
- E2. Loss of Signal Protection:** Power will be gradually lower to 0 when signal lost, and motor stops. Motor will resume to the current power when the signal is detected again.
- E3. Over-heat Protection:** When the temperature increases to above 100 Celsius degree, power will be lowered gradually to less than 75% of the full power. When the temperature increases to above 105 Celsius degree, power will be lowered gradually to less than 50% of the full power. When the temperature increases to above 110 Celsius degree, power will be lowered gradually to less than 25% of the full power. When the temperature increases to above 115 Celsius degree, power will be lowered gradually to less than 6.25% of the full power, and will resume when the temperature decreases.

F. Programming via program card

- Step 1. Pull the PPM signal wire out from the receiver, and plug it into the program card jack. Please pay attention to the direction.
- Step 2. Connect the ESC to the battery, after 2 seconds you will hear "♪ 2 3 1" tune.
- Step 3. The program card automatically reads parameters from the ESC and the corresponding LED will be on.
- Step 4. Button 1 is for choosing program items. Button 2 is for choosing different parameters for each item. Button 3 is 'write' button. All parameters can be viewed and modified by pressing corresponding and press button 3 to write the new parameters to the ESC.
- Step 5. Cut off the power.

G. Programming via Transmitter

Step 1: Enter program mode

Switch the transmitter on→Pull the throttle stick to the top position→Switch the ESC on, wait 2 seconds, you will hear two "beep" sounds, which denotes that Max. throttle has been confirmed→Hold the throttle stick at the top position, and then wait 2 seconds until you hear tune "♪ 1 2 3 ♪ 1 2 3", that means you have entered the transmitter programming mode.

Step 2: Select program parameters

Hold the throttle stick on top position, there're 7 parameters can be set by using your transmitter. You would hear 7 different indicating sounds which correspond to 7 different parameters. Pull the throttle stick to the bottom position (full Off throttle) within 2 seconds after you hear the correspondent sound will brings you to the correspondent parameter setting status. The indicating sounds will repeat in turn as follow.

- "beep-" (a short sound) which indicates the Brake Type
- "beep-beep-" (two short sounds) which indicates the Timing Mode
- "beep-beep-beep-" (three short sounds) which indicates the Start Force
- "beep-beep-beep-beep-" (four short sounds) which indicates the Curve Mode
- "beep-----" (a long sound) which indicates the Control Frequency
- "beep-----beep-" (a long sound and a short) which indicates the Low-voltage Protection
- "beep-----beep-beep-" (a long sound and two short) which indicates the Cutoff Mode

Step 3: Select program values

After entering parameter setting status, hold the throttle stick on the bottom position, you will be led to the repeat selection of that parameter setting status. Each sound likes 4 short sounds and one long sound, and by that analogy. After some sound, pull the throttle stick to the top position in 2 seconds, after you hear a tune "♪ 3 2 1 ♪ 3 2 1", which means the correspondent value has been chosen and saved. Hold the stick on the top position, return to the second step and continue programming.

Step 4: Exit program

Pull the throttle stick to the bottom position within 2 seconds and hold on after saving parameters, until you hear a tune "beep---- beep-beep-beep- ♪ 1 2 3". Set the Min. Throttle at this moment and exit program and operate as normal.(beep----means Loading parameter. beep- beep- beep-means numbers of cells and ♪1 2 3 means ready.)