

# Manual of H Brushless Motor Speed Controller Features:

## Specifications:

type	cont. Current	Burst Current	BEC Mode	BEC Output	Battery Li-ion /Li-poly	Cell NiMH/NiCd
H12A	12A	15A	Linear	1A	2-3	5-10
H18A	20A	30A	Linear	1.5A	2-3	5-10
H20A	22A	30A	Linear		2-3	5-10
H25A	25A	35A	Linear		2-3	5-10
H30A	30A	40A	Linear		2-3	5-10
H40A	40A	50A	Linear		2-3	5-10
H60A	60A	70A	OPTO	2A	2-5	5-15

## VERY IMPORTANT !

Because different transmitter has different throttle range, we strongly suggest You using the "Throttle Range Setting Function" to calibrate throttle range. Please read the instruction -----"Throttle range setting".

Throttle range retting: (Throttle Range should be reset whenever a new transmitter is being used)

Program the ESC with your transmitter(4 Steps):

1. Enter Program mode

a. Switch on transmitter, move throttle stick to top, connect the battery pack to ESC

b. Wait for 2 seconds, the motor should emit special tone like "beep-beep"

c. Wait for another 5 seconds, special tone like "BSLCDL" should be emitted, which means program mode is entered

Programmable Items:

1. Brake Setting: Enabled / Disabled, default is Disabled

2. Battery Type: Li-xx(Li-ion or Li-poly) / Ni-xx(NiMH or NiCd), default is Li-xx.

3. Low Voltage Protection Mode(Cut-Off Mode): Soft Cut-Off (Gradually reduce the output power) or Cut-Off (Immediately stop the output power). Default is Soft Cut-Off.

4. Low Voltage Protection Threshold(Cut-Off Threshold): Low / Medium / High, default is Medium.

1) For lithium batteries, the number of battery cells is calculated automatically. Low / medium / high cutoff voltage for each cell is: 2.6V/2.85V/3.1V. For example: For a 3 cells lithium pack, when "Medium" cutoff threshold is set, the cut-off voltage will be:  $2.85 \times 3 = 8.55V$ .

2) For nickel batteries, low / medium / high cutoff voltages are 0%/45%/60% of the startup voltage (i.e. the initial voltage of battery pack), and 0% means the low voltage cut-off function is disabled. For example: For a 10 cells NiMH battery, fully charged voltage is  $1.44 \times 10 = 14.4V$ , when "Medium" cut-off threshold is set, the cut-off voltage will be:  $14.4 \times 45\% = 6.5V$ .

5. Startup Mode: Normal / Soft / Super-Soft, default is Normal.

Normal is preferred for fixed-wing aircraft. Soft or Super-soft are preferred for helicopters. The initial acceleration of the Soft and Super-Soft modes are slower in comparison, usually taking 1 second for Soft startup or 2 seconds for Super-Soft startup from initial throttle advance to full throttle. If the throttle is closed (throttle stick moved to bottom) and opened again (throttle stick moved to top) within 3 seconds of the initial startup, the restart-up will be temporarily changed to normal mode to get rid of the chances of a crash caused by slow throttle response. This special design is very suitable for aerobatic flight when quick throttle response is needed.

6. Timing: Low / Medium / High, default is Low. Note2

Usually, low timing value can be used for most motors. We recommend the Low timing value for 2 poles motor and Medium timing value for motors with more than 6 poles to get a high efficiency. For higher speed, High timing value can be chosen.

Note2: After changing the timing setting, please test your RC model on ground prior to flight!

## Begin To Use Your New ESC

Please start the ESC in the following sequences:

1. Move the throttle stick to the bottom position and then switch on the transmitter.

2. Connect the battery pack to the ESC, the ESC begins the self-test process, a special tone "DLM" is emitted, which means the voltage of the battery pack is in normal range, and then N "beep" tones will be emitted, means the number of lithium battery cells. Finally a long "beep-----" tone will be emitted, which means self-test is OK, the aircraft/helicopter is ready to go flying. If nothing is happened, please check the battery pack and all the connections; If a special tone "BSLCDL" is emitted after 2 beep tones ("beep-beep-"), means the ESC has entered the program mode, it is because the throttle channel of your transmitter is reversed, please set it correctly; If the very rapid "beep-beep-, beep-beep-" tones is emitted, means the input voltage is too low or too high, please check your battery's voltage.

3. "VERY IMPORTANT !" Because different transmitter has different throttle range, we strongly suggest you using the "Throttle Range Setting Function" to calibrate throttle range. Please read the instruction on page 4-----"Throttle Range Setting". Alert Tone

1. Input voltage is abnormal: The ESC begins to check the voltage when the battery pack is connected, if the voltage is not in the acceptable range, such an alert tone will be emitted: "beep-beep-, beep-beep-, beep-beep-" (Every "beep-beep-" has a time interval of about 1 second.)
2. Throttle signal is abnormal: When the ESC can't detect the normal throttle signal, such an alert tone will be emitted: "beep-, beep-, beep-". (Every "beep-" has a time interval of about 2 seconds)
3. Throttle stick is not in the bottom position: When the throttle stick is not in bottom (lowest) position, a very rapid alert tone will be emitted: "beep-, beep-, beep-". (Every "beep-" has a time interval of about 0.25 second.)

#### Protection Function

1. Abnormal start up protection: If the motor fails to start within 2 seconds of throttle application, the ESC will cut-off the output power. In this case, the throttle stick MUST be moved to the bottom again to restart the motor. (Such a situation happens in the following cases:

The connection between ESC and motor is not reliable, the propeller or the motor is blocked, the gearbox is damaged, etc.)

2. Over-heat protection: When the temperature of the ESC is over 110 Celsius degrees, the ESC will reduce the output power.

3. Throttle signal loss protection: The ESC will reduce the output power if throttle signal is lost for 1 second, further loss for 2 seconds will cause its output to be cut-off completely.

#### Normal startup procedure:

Step 1. Move throttle stick to bottom and then switch on transmitter

Step 2. Connect battery pack to ESC, special tone like "bi bi bi" means power supply is OK.

Step 3. Several "bi" tones should be emitted. Pressing the number of lithium battery cells.

Step 4. When self-test is finished, a long "bi" tone should be emitted.

Step 5. Move throttle stick upwards to go flying

#### Throttle range setting:

(Throttle range should be reset whenever a new transmitter is being used)

Program the ESC with your transmitter (4 Steps):

#### 1. Enter program mode

a. Switch on transmitter, move throttle stick to top, connect the battery pack to ESC

b. Wait for 2 seconds, the motor should emit special tone like "beep-beep"

c. Wait for another 5 seconds, special tone like "BSLCDL" should be emitted, which means program mode is entered

#### 2. Select programmable items

After entering program mode, you will hear 8 tones in a loop with the following sequence. If you move the throttle stick to bottom within 3 seconds after one kind of tones, this item will be selected.

- |                          |                    |                  |
|--------------------------|--------------------|------------------|
| 1. "beep"                | brake              | (1 short tone)   |
| 2. "beep-beep"           | battery type       | (2 short tone)   |
| 3. "beep-beep-beep"      | cutoff mode        | (3 short tone)   |
| 4. "beep-beep-beep-beep" | cutoff threshold   | (4 short tone)   |
| 5. "beep-----"           | startup mode       | (1 long tone)    |
| 6. "beep-----beep"       | timing             | (1 long 1 short) |
| 7. "beep-----beep-beep"  | set all to default | (1 long 2 short) |
| 8. "beep-----beep-----"  | exit               | (2 long tone)    |

Note: 1 long "beep-----" = 5 short "beep-"

#### 3. Set item's value (Programmable value)

You will hear several tones in loop. Set the value matching to a tone by moving throttle stick to top when you hear the tone, then a special tone " " emits, means the value is set and saved. (Keeping the throttle stick at top, you will go back to step 2 and you can select other items; Moving the stick to bottom within 2 seconds will exit program mode directly)

Tones	"beep"	"beep-beep"	"beep-beep-beep"
Items	1 short tone	2 short tones	3 short tones
Brake	Off	On	
Battery type	Li-ion / Li-poly	NiMH / NiCd	
Cutoff mode	Soft-Cut	Cut-Off	
Cutoff threshold	Low	Medium	High
Start mode	Normal	Soft	Super soft
Timing	Low	Medium	High

#### 4. Exit program mode

There are 2 ways to exit program mode:

- a. In step 3, after special tone "BSLCDL", please move throttle stick to the bottom position within 2 seconds.
- b. In step 2, after tone "beep-----beep-----" (ie. The item #8), move throttle stick to bottom within 3 seconds.