ESC -10A 10A Cont 15A max Cells 1-3 Dim22×17×7 weight 7gr BEC-1A/5V

C.1 Normal Startup procedures

Step1: Pull the throttle stick to the bottom position (full Off throttle),
Step2: Switch the transmitter on,
Step3: Switch the ESC on (normally by connecting batteries).
Step4: System detects the Min. throttle signal, and makes a long "beep" sound.
Step5: System detects battery voltage and makes several short "beep" sounds, which denotes the number of battery cells.
Step6: System conducts self-check. If it is normal, you will hear a "♪ 1 2 3" tune, push the throttle stick to start up. (LED on the ESC will flash along with the tune.)

C.2 Throttle range setting procedures

Step1: Push the throttle stick to the top position (full On throttle),
Step2: Switch the transmitter on,
Step3: Switch the ESC on (normally by connecting batteries)
Step4: System detects the Max. throttle signal, and makes two "beep" sounds, which denotes that Max. throttle has been confirmed and saved.
Step5: Pull the throttle stick to the bottom position (full Off throttle) within 5 seconds,
Step6: System detects the Min. throttle signal and makes a long "beep" sound.
Step7: System detects battery voltage and makes several short "beep" sounds, which denotes the number of battery cells.
Step8: System self-check occurs. If it is normal, you will hear a "♪ 1 2 3" tune, push the throttle stick to start up.
If the system doesn't detect the throttle signal, it will constantly make "beep" sounds without stopping.
Any fault in self-check, it will make 20 short "beep" sounds.

C.3 Protection setting

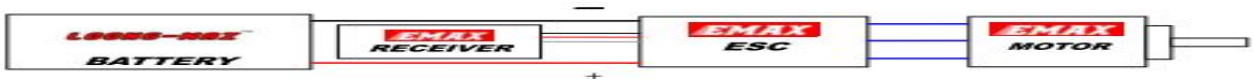
Low-voltage protection: Whether to shut down the motor immediately or to lower the power when the input voltage drops below the programmed low-voltage protection voltage depends on the values set as **Cutoff Type.**

Loss of signal protection: Power will automatically lower to 20% or less when signal is lost for 1 second, and resume when detecting the signal.

Over-heat protection: When the temperature increases to above 110 Celsius degree, power will be lowered gradually to less than 35% of the full power, and will resume when the temperature decreases.

Hardware self-check: The system will check by itself when the battery is connected. Any hardware fault, it will make 20 short "beep" sounds.

D. Wiring your ESC



E. Programmable parameters

A number of the performance parameters for the ESC are set as Default values. By using a Program Card (available separately) or a transmitter these default values can be set to meet the users' particular performance requirements. The following section will deal with these factors

E.1 **Brake Type:** There are three brake types including **OFF** (brake disable), **Soft** brake and **Hard** brake. The default is **OFF** (brake disable). **Soft** brake: less forceful and lasts longer. **Hard** brake: more forceful and lasts a shorter time.

E.2 **Timing Mode:** There are three options: **Low**, **Mid** and **High**. The default is **Mid**. **Low** advance timing is recommended for high inductance and low KV motors. **High** advance timing is recommended for low inductance and high KV motors, e.g. high KV outrunner motors. For some high KV motors, if it shakes while rotating in high speed, the **High** timing mode is recommended.

E.3 **Cutoff Mode:** There are two options: **Soft-Cut** and **Cut-Off**. The default is **Soft-Cut**.
Cut-Off option: immediate motor shutdown occurs in low-voltage.
Soft-Cut option: Gradually reduce throttle power to 50% of the current power at low-voltage.

E.4 **Start Mode:** There are three options: **Fast** start, **Soft** start and **very Soft** start. The default is **Fast** start. **Fast** start is recommended for low inductance and low start loading motors. **Very Soft** start is recommended for high inductance and high start loading motors. **Soft** start is recommended for those motors with medium inductance and medium start loading.

E.5 **Throttle Curve Mode:** Three options: **CURVE1, CURVE2, AND CURVE3** (corresponds to the **OFF, Gov-low, Gov-high** of **GOVERNOR** mode in the program card). The default is **CURVE1.**

E.6 **Li-XX Cells:** It is used to choose cells of Li-xx battery packs. Range : 0—12 cells. The default is 0 cell. If the battery cell is 0, the system will automatically identify the battery cell as 0 and calculate the Low-voltage cutoff voltage. E.g. suppose the low-voltage cutoff voltage is 2.85V per cell (under Mid Low-voltage cutoff type), if there're 3 cells, the total Low-voltage cutoff voltage would be 2.85*3=8.55V.

E.7 **Cutoff voltage:** There're three options: **Low**, **Middle**, and **High**. The default is **Middle**.
Low: Low-voltage cutoff voltage is 2.6V per cell.
Middle: Low-voltage cutoff voltage is 2.85V per cell.
High: Low-voltage cutoff voltage is 3.1V per cell.

E.8 **Motor Rotation:** Options: **Normal** and **Reverse**. The default is **Normal**. (Programmable via using

transmitter only)

F. Programming via program card

F.1 Programming the ESC

1. Disconnect the ESC from the battery
2. Pull the PPM signal wire out from the receiver, and plug it into the program card jack. Please pay attention to the direction
3. Connect the ESC to the battery (the first row of LED on the program card will flash)
4. The program card automatically reads parameters from the ESC and the corresponding LED will be on.
5. All parameters can be viewed and modified by pressing corresponding buttons.
6. Press the "**Write**" button to write the new parameters to the ESC
7. Cut off the power

F.2 Functions of each button

◆ Button: Choose different parameters (7 in total). The corresponding LED will flash given the values chosen.

◆ Button: Choose the value of the parameter which is currently set

Write Button: when all the parameters are set, press this button to permanently save the new parameters to the ESC. "**Write**" LED will flash 3 times which indicates the setting is successfully written in.

●Li-xx battery cells

4 LED compound indication, 0-12 cells of Li-xx batteries

LED indicator				Li-xx battery (cell)
D	C	B	A	
○	○	○	○	0(system automatic detection)
○	○	○	●	1
○	○	●	○	2
○	○	●	●	3
○	●	○	○	4
○	●	○	●	5
○	●	●	○	6
○	●	●	●	7
●	○	○	○	8
●	○	○	●	9
●	○	●	○	10
●	○	●	●	11
●	●	○	○	12

● Indicates that LED is on

G. Programming via Transmitter

1. Enter program mode

Push the throttle stick to the top position (full On throttle), turn on the transmitter, connect the ESC, wait 2 seconds, you will hear two "beep" sounds which means the full On throttle is confirmed. Wait another 6 seconds, it will make "♪ i 3 i 3" tune, then you can start programming via transmitter.

2. Select program parameters

There're 9 parameters can be set by using your transmitter. You would hear 9 different indicating sounds which correspond to 9 different parameters. Pull the throttle stick to the bottom position (full Off throttle) within 3 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 (1 long sound~5short sounds):

1. "beep-" (a short sound) which indicates the **Brake Type**
2. "beep-beep-" (two short sounds) which indicates the **Timing Mode**
3. "beep-beep-beep-" (three short sounds) which indicates the **Start Mode**
4. "beep-beep-beep-beep-" (four short sounds) which indicates the **Cutoff Mode**
5. "beep------" (a long sound) which indicates the **Throttle Curve Mode**
6. "beep------beep-" (a long sound and a short) which indicates the **Li-XX Cells**
7. "beep------beep-beep-" (a long sound and two short) which indicates the **Cutoff Voltage**
8. "beep------beep-beep-beep-" (a long sound and three short) which indicates **Motor rotation reversible.**
9. "beep------beep------beep------"(three long sound) **EXIT.**

3. Select program values

After entering parameter setting status, you will hear the ESC making sounds in cycle. Different sounds indicate different values. Push the throttle stick to the top position (full On throttle) within 3 seconds after you hear the correspondent sound, then you will hear a special tune "♪ 5 6 5 6", which means the correspondent value has been chosen and saved. If you don't want to continue setting other values, just pull the throttle stick to the bottom position (Full Off throttle) to exit. Or wait 3 seconds to return to the second step and continue programming.

sound / Parameter	"beep-" 1sound	"beep-beep-" 2 sounds	"beep-beep-beep-" 3 sounds	"beep-beep-... "x sounds
Brake Type	OFF	Soft	Hard	
Timing Mode	Low	Mid	High	
Start Mode	Fast	Soft	Very soft	
Cutoff Mode	Soft-Cut	Cut-Off		
Throttle Curve	Curve1	Curve2	Curve3	
Li-XX Cells	Automatic	2 cells	3cells	xx cells
Cutoff Voltage	Low (2.6V)	Middle (2.85V)	High (3.1V)	
Motor rotation	Normal	Reverse		

Remarks: Under **Li-XX Cells** value status, when the number of Li-xx battery cell is more than 4, the ESC will indicate by making long "beep" plus short "beep" sounds, a long "beep" sound equals 5 short "beep" sound. E.g. you will hear "beep------beep-" (a long sound + a short sound) if there is a 6-cell Li-xx pack and you will hear "beep------beep------beep-" (two long sounds + a short sound) for a 11-cell Li-xx pack.

4. Exit program

Exit programming: Two ways as shown in step2 and step3.