ESC FOR CARS MANUAL V1.0

Features:

- Full protection feature including low voltage, over-heat, throttle signal lost, startup protection and self-check
- Excellence low speed and start character can start softly. Quick respond and linear throttle curve.
- Support highest motor speed 240,000RPM(2 poles), 80,000RPM(6 poles) and 40,000(12 poles)
- Build-in linear BEC
- Easy configure with LCD program card
- Low voltage threshold and startup power can be accurately quantified.
- Throttle range is configurable.
- Car mode and airplane mode are selectable.
- In car mode , system can atomically recognize throttle mid position and mid range is adjustable
- Mono direction, bi-direction and conditional bi-direction can match different requirement.
- Quick and smooth direction switch(<0.5s without load)
- Support 1 cell operation (min voltage: 3V, only available for XC-6A and XC-10A)

Specification

P/N	Constant current	Battery Cell		Dimension (mm) L×W×H	Weight （g）	BEC （Linear）	Programmable
		Li-XX	Ni-H				
XC-6A	6A	1–2	3–8	12×20×5	4	1A	Yes
XC-10A	10A	1–2	3–8	22×17×7	7	1A	Yes
XC-25A	25A	2–3	4–9	44×24×8	18	2A	Yes
XC-40A	40A	2–4	4–12	58×27×12	25	3A	Yes
XC-60A	60A	2–4	4–12	58×27×18	40	3A	Yes
XC-80A	80A	2–4	4–12	58×27×22	45	3A	Yes
XC-100A	100A	2–4	4–12	58×27×22	50	3A	Yes

Max load of Built-in BEC（5V/3A）:

Cells of Li-XX battery	2 cells	3 cells	4 cells	5 cells
Qty of standard servo（max）	5	5	4	3

Using ESC

1, **Power on Steps**

Unplug the wire to battery before connecting the PPM cable to the receiver.

A. In aircraft mode

Put the throttle stick to bottom position → Power or transmitter then the ESC → A long 'beep' tone indicates bottom position is recognized → Battery check times of 'beep' tone indicates cell quantity

→ A long 'beep' tone indicates self-check pass → Ready for start

B. In car mode

Put the throttle stick to middle position	→ Power on transmitter then the ESC	→ A long 'beep' tone indicates middle position is recognized	→ Battery check, times of 'beep' tone indicates cell quantity

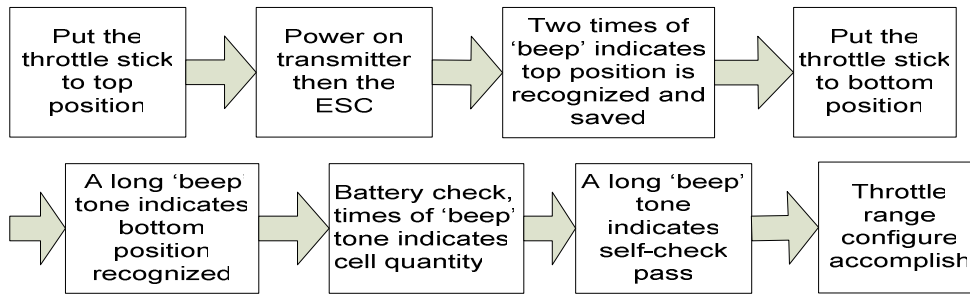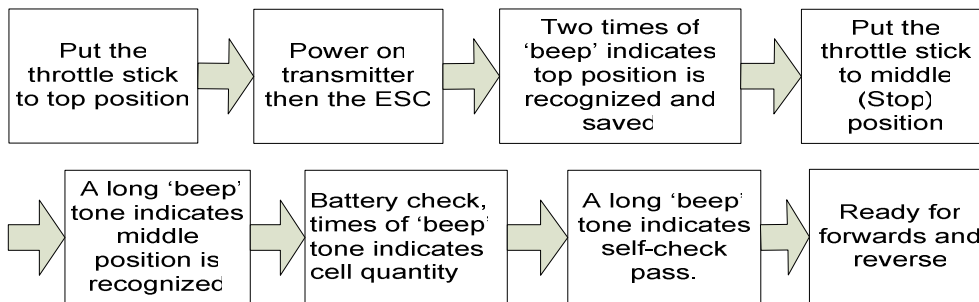|	
→ A long 'beep' tone indicates self-check pass	→ Ready for start

2. **Configure throttle range.** (When connected to new RC system, re-calibration is recommended)

    A.   In aircraft mode

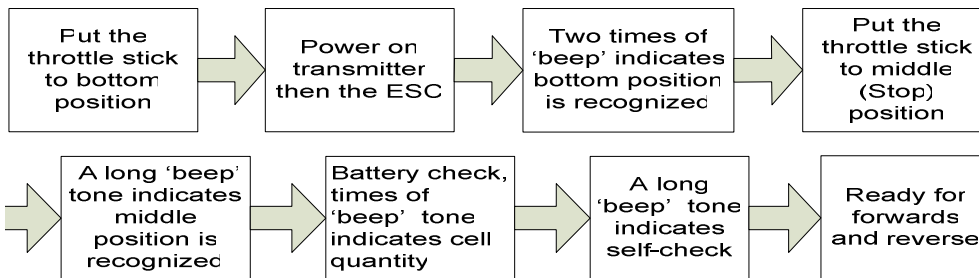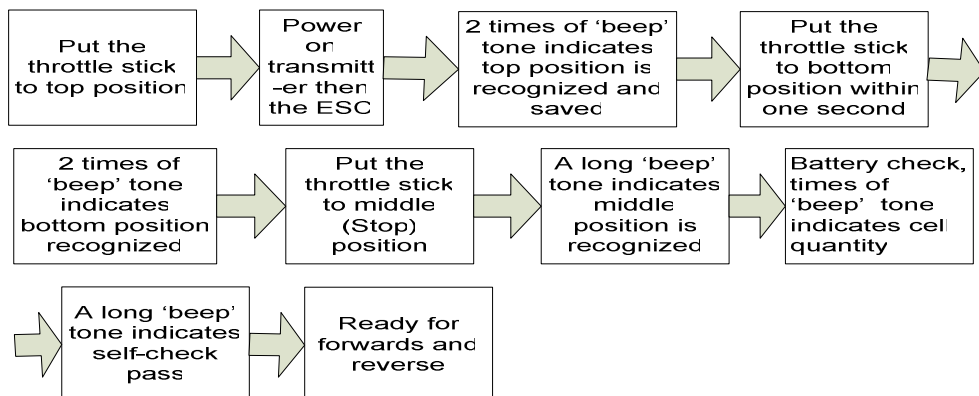|			
Put the throttle stick to top position	→ Power on transmitter then the ESC	→ Two times of 'beep' indicates top position is recognized and saved	→ Put the throttle stick to bottom position

→ A long 'beep' tone indicates bottom position recognized	→ Battery check, times of 'beep' tone indicates cell quantity	→ A long 'beep' tone indicates self-check pass	→ Throttle range configure accomplish

    B.   In car mode

        i.   Set top position

Put the throttle stick to top position	→ Power on transmitter then the ESC	→ Two times of 'beep' indicates top position is recognized and saved	→ Put the throttle stick to middle (Stop) position

→ A long 'beep' tone indicates middle position is recognized	→ Battery check, times of 'beep' tone indicates cell quantity	→ A long 'beep' tone indicates self-check pass.	→ Ready for forwards and reverse

        ii.   Set bottom position

Put the throttle stick to bottom position	→ Power on transmitter then the ESC	→ Two times of 'beep' indicates bottom position is recognized	→ Put the throttle stick to middle (Stop) position

→ A long 'beep' tone indicates middle position is recognized	→ Battery check, times of 'beep' tone indicates cell quantity	→ A long 'beep' tone indicates self-check	→ Ready for forwards and reverse

        iii.   Set the top and bottom position synchronously

Put the throttle stick to top position	→ Power on transmitt–er then the ESC	→ 2 times of 'beep' tone indicates top position is recognized and saved	→ Put the throttle stick to bottom position within one second

2 times of 'beep' tone indicates bottom position recognized	→ Put the throttle stick to middle (Stop) position	→ A long 'beep' tone indicates middle position is recognized	→ Battery check, times of 'beep' tone indicates cell quantity

→ A long 'beep' tone indicates self-check pass	→ Ready for forwards and reverse

Note:

Top throttle position can be saved while bottom position can not. If necessary, set the bottom throttle position each time when power on, otherwise, it will use default setting.

When throttle signal lost, continue 'beep' will occur. If self check fails, it will alarm with 20 times of 'beep'

**LED will emit according to 'beep' tone.**

3, **Protection**

A. Low voltage protection: default threshold is recognized atomically by system against voltage of battery package. When power voltage is lower than this threshold, ESC will reduce output power or cut off. Action is decided by '**OffType**' item set via program card.

B. Throttle signal lose protection: 3 second later after losing throttle signal, output power will reduce to 20% and will recover if signal is detective in airplane mode. In car mode, ESC will cut off motor.

C. Over heat protection: ESC will reduce output power if there is over heat, and will ramp up after temperature gets low.

D. Self-check: ESC will start self-check when power on. If self-check fail, ESC will continue emits short 'beep' tone for 5 seconds.

WIRIING DIAGRAM
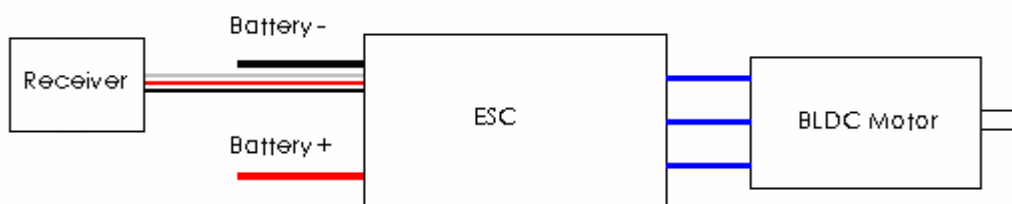
CONFIGRABLE PARAMETER WITH PROGRAM CARD

1. OffVolt: (Low voltage threshold **),** user can set proper voltage threshold according to cell quantity in range of 00.0-49.9V, the default is 00.0V.

Note: System will calculate battery cells and set proper threshold atomically if this setting is 00.0V, Protection voltage for each Li-XX cell is 2.75V.

2．BrakeType: Off, soft brake and hard brake. Default is off. Soft brake works like an ABS system, hard brake means keep breaking till stop.

3．AdvanceT: (Timing**),** low, middle and high, default is middle.

4．Start :(Startup mode), fast, soft and ultra soft. Fast applies to low inductance and start-load motor, ultra soft apply to high inductance and start-load motor. Soft applies to case between above two.

5．OffType: (Protection action), reduce power or cut off for selecting, default is 'reduce' power. In default mode when over heat or low voltage occurs, output power will keep reducing against temperature increasing and voltage decreasing. If protection is activated by over heat, output power will ramp up after temperature gets low. If it is activated by low voltage, it will keep low output. When running under 50% of power, this protection will not be activated.

6．Freq=: (PWM frequency), 13KHz and 8KHz, default is 8KHz. 13KHz is an option for low inductance motor

7．NeutRange : (Throttle mid range),0-29%, default is 5%. This setting applies to car mode to configure loose range of throttle range and is unavailable in airplane mode.

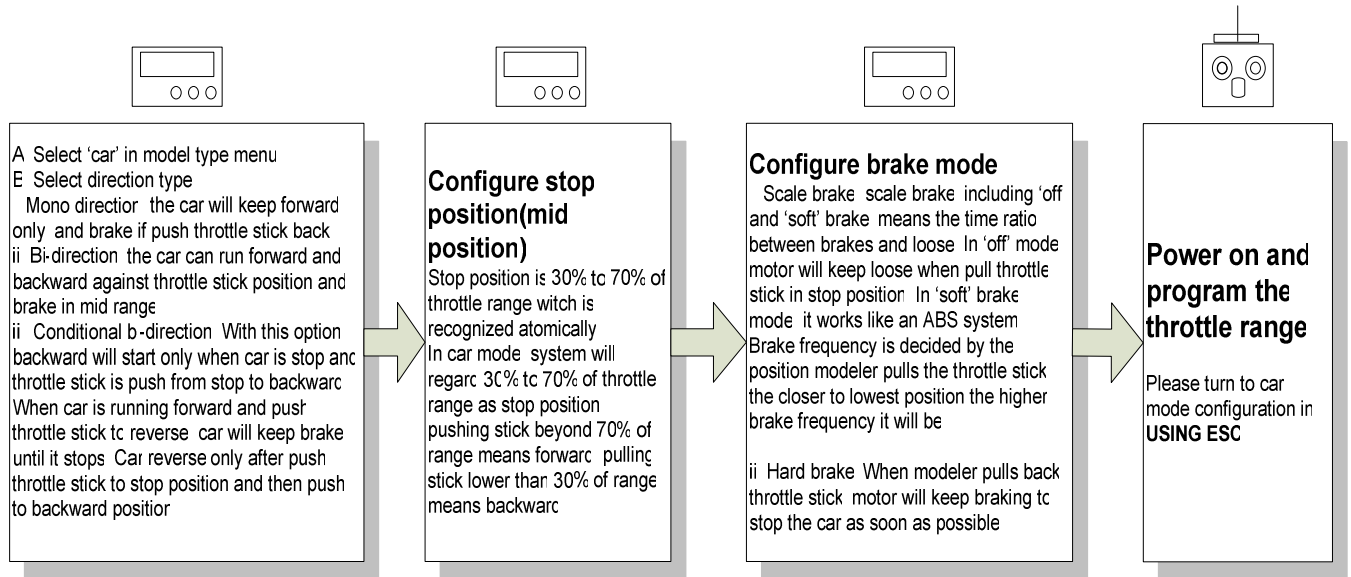**8．Governor**: To set the constant speed for RC helicopter.

9．StPercent: (Start power), to set the ratio of output power when starting in range of 00% - 49%, default is 00%. Under default setting, output power is decided atomically by system according to throttle stick position.
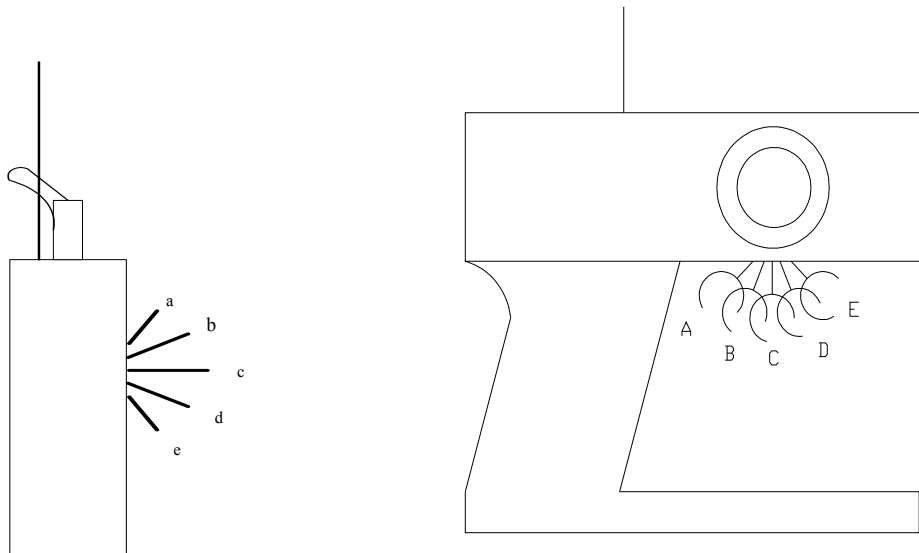
10．Model : (Model type),airplane mode and car mode

11．Neutral: (Forwards and reverse scale), to set the proportion of throttle ranges for forwards and reverse. Default is 50%:50%

12．CarDir : (Direction type), Mono-direction, Bi-direction and conditional Bi-direction. This setting is unavailable in airplane mode.

CONFIGURE EXAMPLE FOR RC CAR

A Select 'car' in model type menu
E Select direction type
  Mono direction the car will keep forward only and brake if push throttle stick back
ii Bi-direction the car can run forward and backward against throttle stick position and brake in mid range
ii Conditional bi-direction With this option backward will start only when car is stop and throttle stick is push from stop to backward When car is running forward and push throttle stick to reverse car will keep brake until it stops Car reverse only after push throttle stick to stop position and then push to backward position

Configure stop position(mid position)
Stop position is 30% to 70% of throttle range witch is recognized atomically In car mode system will regard 30% to 70% of throttle range as stop position pushing stick beyond 70% of range means forward pulling stick lower than 30% of range means backward

Configure brake mode
  Scale brake scale brake including 'off and 'soft' brake means the time ratio between brakes and loose In 'off' mode motor will keep loose when pull throttle stick in stop position In 'soft' brake mode it works like an ABS system Brake frequency is decided by the position modeler pulls the throttle stick the closer to lowest position the higher brake frequency it will be

ii Hard brake When modeler pulls back throttle stick motor will keep braking to stop the car as soon as possible

Power on and program the throttle range

Please turn to car mode configuration in **USING ESC**

Definitions for throttle stick position and range on transmitter

Position a: Top position, for forward direction or run forward in top speed (This function is programmable)

Position e: Bottom position: for backward direction or run backward in top speed.

Position c: Middle position(recognize by system atomically)

Loose range: range b to d;   Within this range, motor will keep loose (00-29% programmable)

Range b to a: Forward accelerate range.

Range d to e: Reverse accelerate range or scale brake range. (This function is programmable)