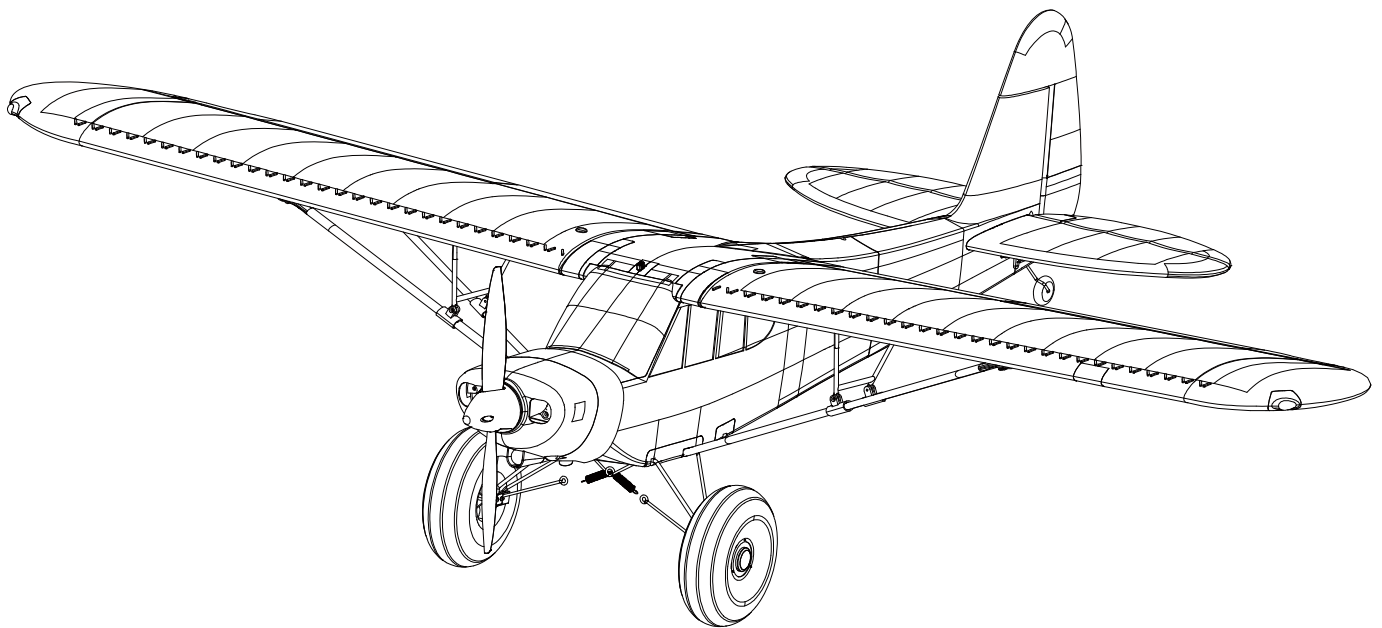




# 1300mm PA-18 Super Cub



*Instruction Manual*  
*Bedienungsanleitung*  
*Manuel d'utilisation*  
操作手册

MAN-G0191

**FLOAT**  
• Optional float

**RIGID**  
• Strong durable EPO

**STABLE**  
• Smooth flying performance

**FMSMODEL.COM**



**WARNING**

**WARNING:** Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product and NOT a toy. It must be operated with caution and common sense and failure to do so could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision.

This manual contains instructions for safety operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual prior to assembly, setup or use, in order to operate and avoid damage or serious injury.

**Safety precautions and warnings**

As the user of this product, you are solely responsible for operating in a manner that does not endanger yourself and others or result in damage to the product or the property of others. This model is controlled by a radio signal subject to interference from many sources outside your control. This interference can cause momentary loss of control so it is advisable to always keep a safe distance in all directions around your model, as this margin will help avoid collisions or injury.

Age Recommendation: Not for children under 14 years. This is not a toy.

- Never operate your model with low transmitter batteries.
- Always operate your model in an open area away from cars, traffic or people.
- Avoid operating your model in the street where injury or damage can occur.
- Never operate the model in populated areas for any reason.
- Carefully follow the directions and warnings for this and any optional support equipment you use (chargers, rechargeable battery packs, etc.)
- Keep all chemicals, small parts and anything electrical out of the reach of children.
- Moisture causes damage to electronics. Avoid water exposure to all equipment not specifically designed and protected for this purpose.
- Never lick or any place of any your model in your mouth as it could cause serious injury or even death.

**Safety****Lithium Polymer (Li-Po) Battery Warning**

**CAUTION:** Always follow the manufacturer's instructions for safe use and disposal of batteries. Fire, property damage, or serious injury can result from the mishandling of Li-Po batteries.

- By handling, charging or using a Li-Po Battery you assume all risks associated with lithium batteries. If at any time the batteries begin to swell or balloon, discontinue use immediately!
  - Always store the batteries at room temperature in a dry area to extend the life of the battery. Always transport or temporarily store the battery in a temperature range of 40-120F. Do not store the battery or model in a car or in direct sunlight. If stored in a hot car, the battery can be damaged or even catch fire.
  - Never use a Ni-Mh Charger to charge Li-Po Batteries. Failure to charge the battery with a Li-Po compatible charger may cause fire resulting in personal injury and property damage.
  - Never discharge Li-Po Cells below 3V.
  - Never leave charging batteries unattended.
  - Never charge damaged batteries.
- Charging the Flight Battery Warning**
- Use a battery charger that is designed to safely charge the Li-Po Battery. Read the charger instructions carefully before use. When charging the battery, make certain the battery is on a heat resistant surface. It is also highly recommended to place the Li-Po Battery inside a fire resistant charging bag readily available at hobby shops or online.

## Introduction

The Piper PA-18 Super Cub is a two-seat, single-engine mono-plane. It was developed from the Piper PA-11. In close to 40 years of production, over 9,000 were built. Super Cubs are commonly found in roles such as bush flying, banner towing and glider towing.

The FMS 1700mm PA-18 was launched in 2019, and its stable, easy-to-fly and easy-to-operate features have brought full surprises to both new and old pilots. While this trainer has been widely praised, FMS has been constantly asked whether it is possible to reduce the size of the aircraft, including the aircraft itself and the packaging, while maintaining its stability and operating controllability as much as possible, so that it can be picked up like a boarder suitcase.

With the 1300mm PA-18, FMS has answered the above question. The 1300mm PA-18 also adopts a two-section main wing and horizontal stability structure, but at the same time, the fuselage is also two-section, which greatly facilitates players' transportation and carrying. It can be hidden in the corner of a car trunk, ready to be used at any time.

Thanks to its functional flaps, high-lift airfoil, rugged landing gear and oversized pneumatic rubber tires- the 1300mm PA-18 Super Cub has impressive short take-off and landing (STOL) performance, allowing it to operate from just about any terrain.

In addition, the assembly steps of the 1300mm PA-18 are still simple and convenient, and the assembly and disassembly of the entire aircraft can be completed with just a few screws.

For pilots wanting to get the genuine bush-plane experience, the PA-18 Super Cub can be equipped with floats.

The latest 1300mm PA-18 could be a great start to enjoying versatile, fun and exceptionally relaxing flight.

### Features:

- Preinstalled ball-linked pushrods for increased precision

- Powerful 3536-850KV motor with 40A ESC provides adequate thrust for any situation
- CNC metal landing gear structure for less-than-perfect landings
- Oversized pneumatic rubber tires for all-terrain operations
- STOL capable (Takes off in less than 3m/10ft)
- Preinstalled navigation and landing lights
- Two-section fuselage
- Two-piece wing and horizontal stabilizer for easy transportation
- High-strength carbon fiber wing spars
- Screw-together assembly
- Large battery bay
- Tough two-blade nylon propellers
- Functional flaps
- Optional floats

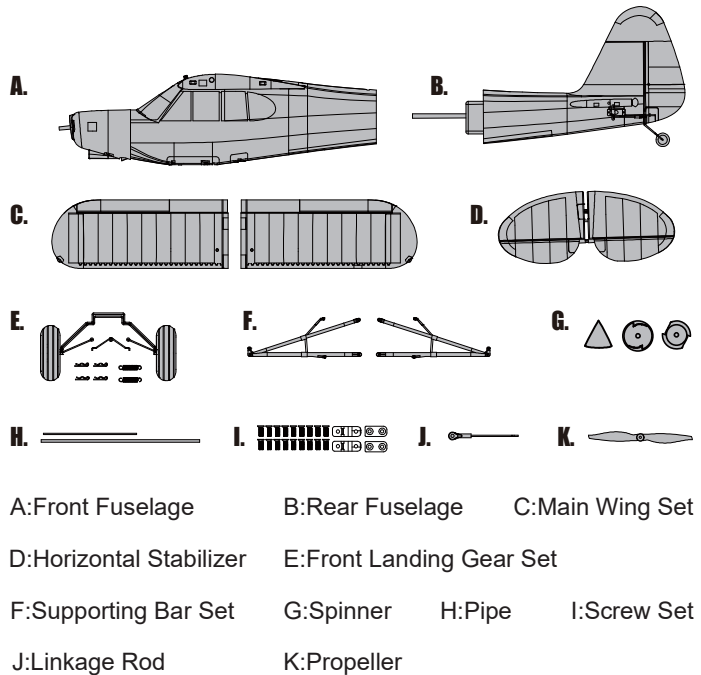
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## Kit contents

Before assembly, please inspect the contents of the kit. The photo below details the contents of the kit with labels. If any parts are missing or defective, please identify the name or part number (refer to the spare parts list near the end of the manual) then contact your local shop or email us: @fmsmodel.com.

| <b>Specifications</b>   |
|---|
| <b>Wingspan: 1300mm(51.2in)</b>                               |
| <b>Overall length: 986mm(38.8in)</b>                          |
| <b>Flying weight: ~ 1450g</b>                                 |
| <b>Motor size: 3536-KV850</b>                                 |
| <b>Wing load: 48g/dm<sup>2</sup> (0.096oz/in<sup>2</sup>)</b> |
| <b>Wing area: 30dm<sup>2</sup> (464.7sq.in)</b>               |
| <b>ESC: 40A</b>   |
| <b>Servo: 9g x 6</b>  |
| <b>Recommended battery: 11.1V 2200mAh 25C</b>                 |



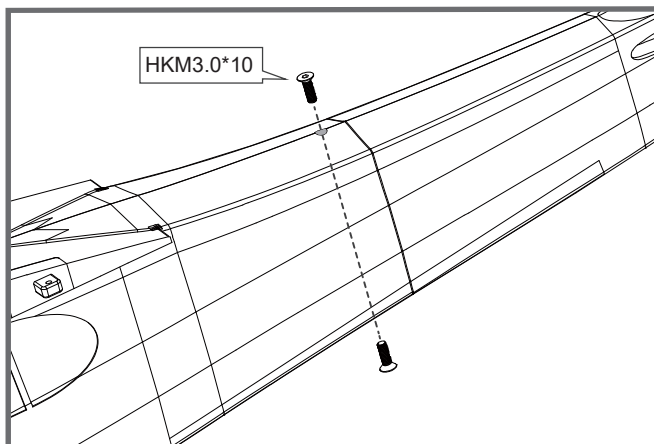
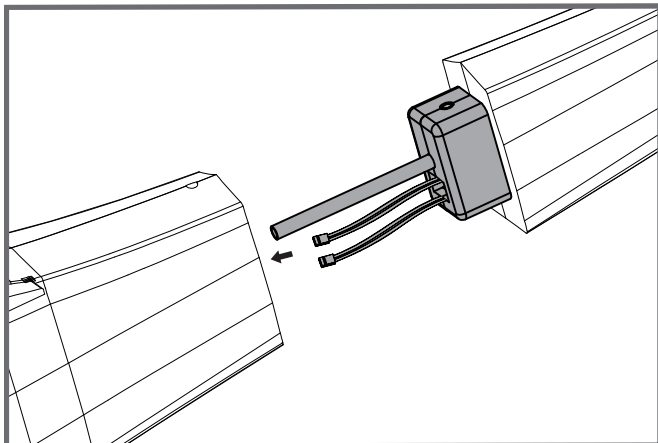
## Model assembly

### Fuselage installation

1. Pass the servo leads through the front fuselage as shown in the figure, and insert channels CH2 and CH4 into the corresponding channels of Reflex.

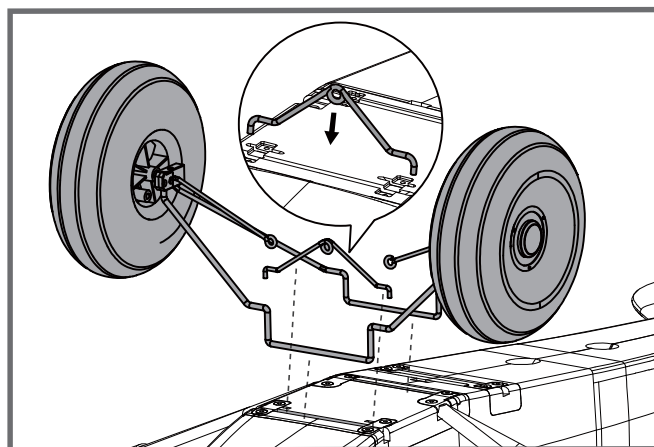
2. Use the attached screws to fix the front and rear fuselage.

NOTE: The connectors on both side should be attached precisely and firmly.

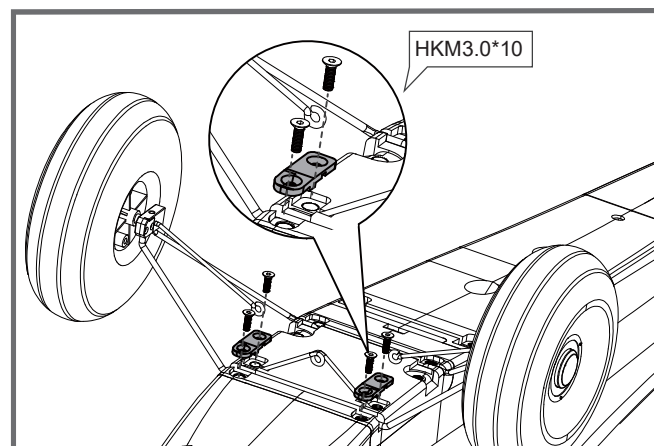


### Landing gear installation

1. With the bottom of the fuselage facing up and the tires facing forward, install the landing gear set to the fuselage. (Fit the hook into the slot as shown.)

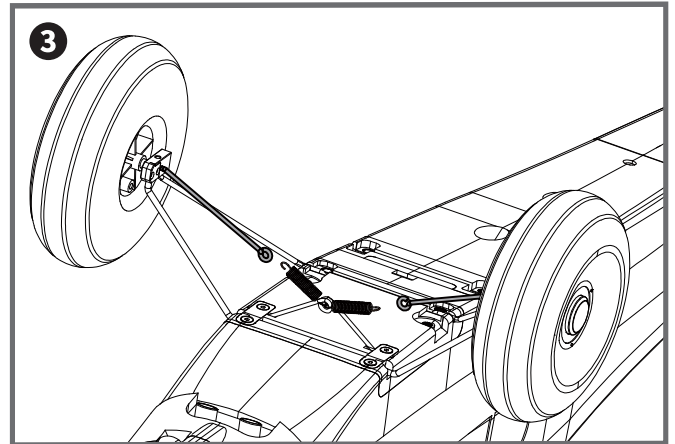


2. Secure the landing gear with the included screws and tabs.



## Model assembly

3. Install the tension spring as shown.



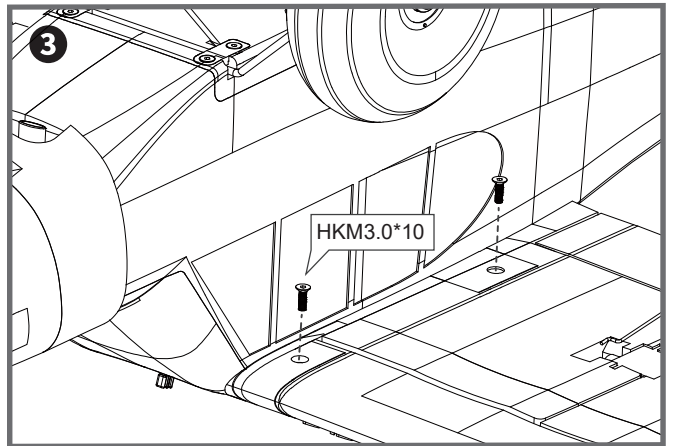
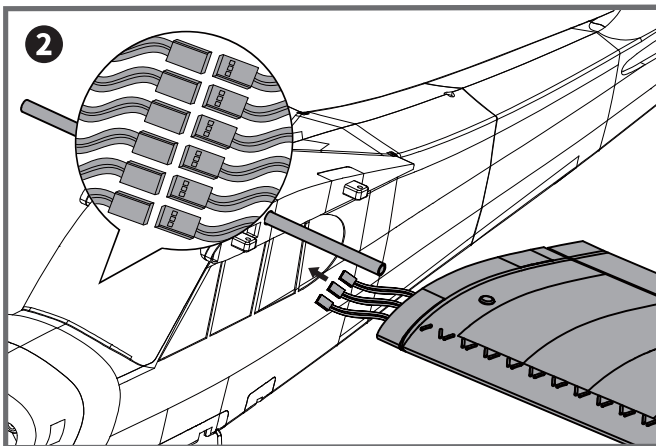
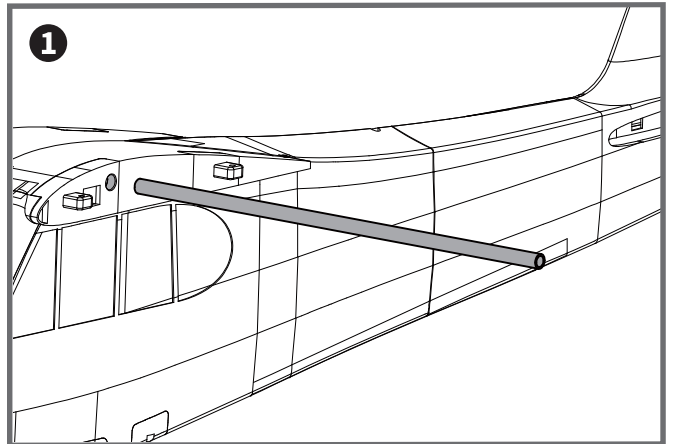
### Main wing installation

1. Slide the tube into the fuselage.

2. Install both wing halves over the wing tube and into the wing slot of the fuselage.

**NOTE:** Connect CH1, CH6, LED leads to Y harness.

3. Secure the wings on the fuselage using the included screws as shown.

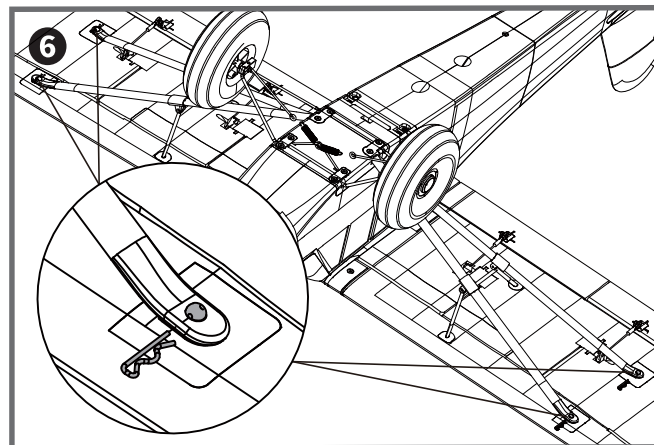
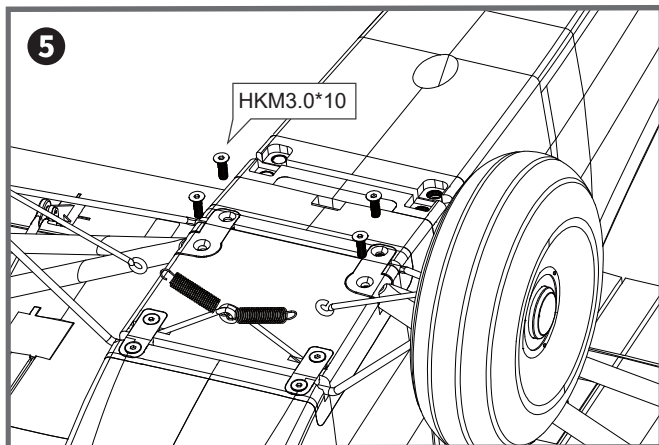
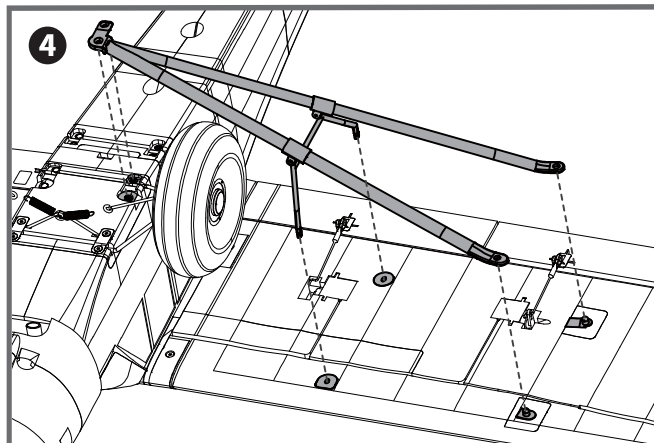


## Model assembly

4. Lock up the fasteners of supporting bars on fuselage and main wing slots as shown.

5. Secure the supporting bars on the fuselage using the included screws.

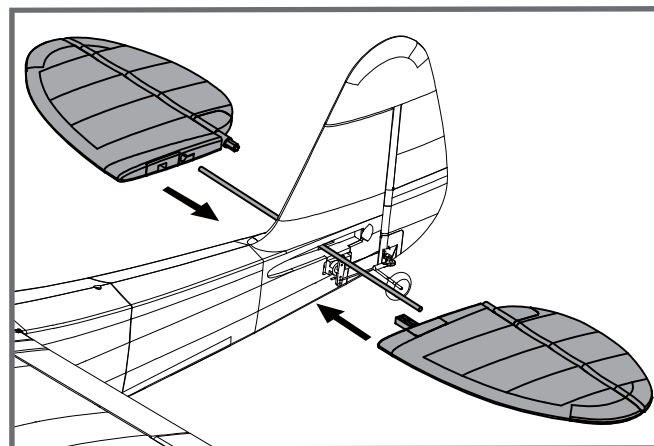
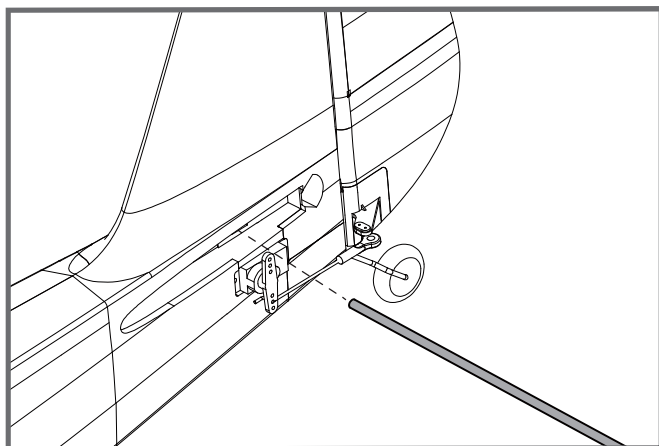
6. Secure the supporting bars on the main wing using the included R clasps.



### Horizontal stabilizer installation

1. Slide the horizontal stabilizer spar into the fuselage.

2. Align and install the horizontal stabilizer over the spar and into the horizontal stabilizer slot of the fuselage.

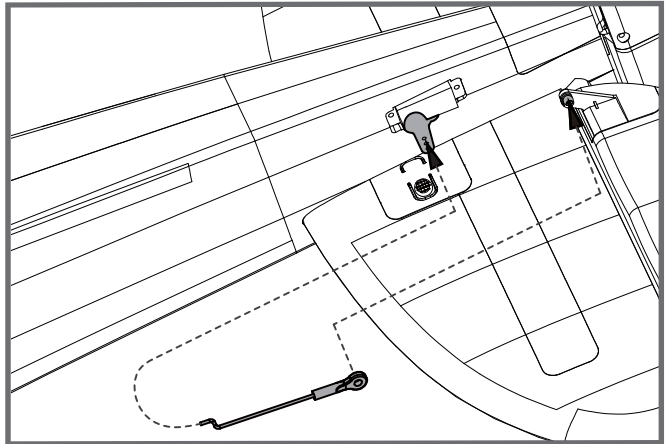


## Model assembly

### Linkage rod installation

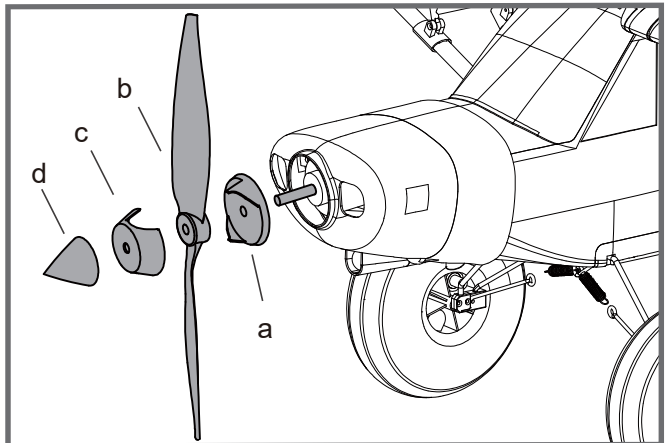
1. Make sure the servos are in the neutral position. Install the linkage rod to elevator control horn as shown.

Note: Please refer to the control horn and servo arm settings in page 10.



### Propeller installation

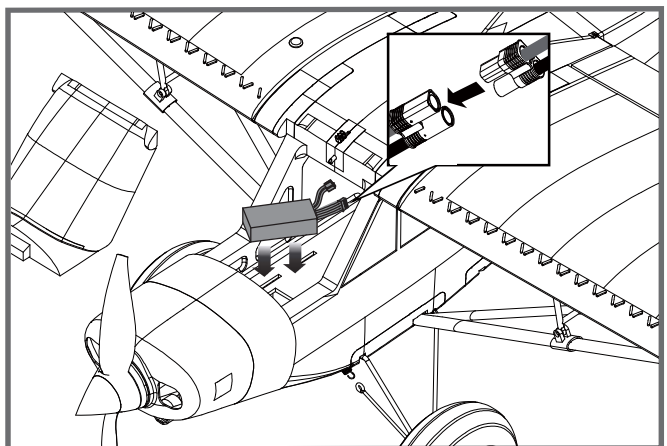
1. Install the propeller in the order as shown.



### Battery installation

1. Pull back on the latch and remove the battery hatch.
2. Apply the hook tape to the cable end of the battery.
3. Slide the full charged battery into the battery compartment with the power supply cable toward the rear end of the plane.

Note: The center of gravity can be adjusted by moving the battery forward or aft. Having the correct center of gravity is critical to achieving proper flight characteristics.





## Receiver diagram

The cables from the servo connector board should be connected to your receiver in the order shown. Note that the LEDs can be powered by any spare channel on the receiver. Tuck the wire leads into the recessed cavity towards the rear of the battery hatch.

|          |   | Receiver            |
|----------|---|---------------------|
| Aileron  | 1 | Channel-1<br>— Aile |
| Elevator | 2 | Channel-2<br>— Elev |
| Throttle | 3 | Channel-3<br>— Thro |
| Rudder   | 4 | Channel-4<br>— Rudd |
| Gear     | 5 | Channel-5<br>— Gear |
| Flap     | 6 | Channel-6<br>— Flap |

## Preflight check

### Important ESC and model information

1. The ESC included with the model has a safe start. If the motor battery is connected to the ESC and the throttle stick is not in the low throttle or off position, the motor will not start until the throttle stick is moved to the low throttle or off position. Once the throttle stick is moved to the low throttle or off position, the motor will emit a series of beeps. Several beeps with the same tune means the ESC has detected the cells of the battery. The count of the beeps equals the cells of the battery. The motor is now armed and will start when the throttle is moved.
2. The motor and ESC come pre-connected and the motor rotation should be correct. If for any reason the motor is rotating in the wrong direction, simply reverse two of the three motor wires to change the direction of rotation.
3. The motor has an optional brake setting. The ESC comes with brake switched off and we recommend that the model be flown with the brake off. However, the brake could be accidentally switched on if the motor battery is connected to the ESC while the throttle stick is set at full throttle. To switch the brake off, move the throttle stick to full throttle and plug in the motor battery. The motor will beep one time. Move the throttle stick to low throttle or the off position. The motor is ready to run and the brake will be switched off.
4. Battery Selection and Installation. We recommend the 11.1V 2200mAh 25C Li-Po battery. If using another battery, the battery must be at least a 11.1V 2200mAh 25C battery. Your battery should be approximately the same capacity, dimension and weight as the 11.1V 2200mAh 25C Li-Po battery to fit the fuselage without changing the center of gravity significantly.

# Preflight check

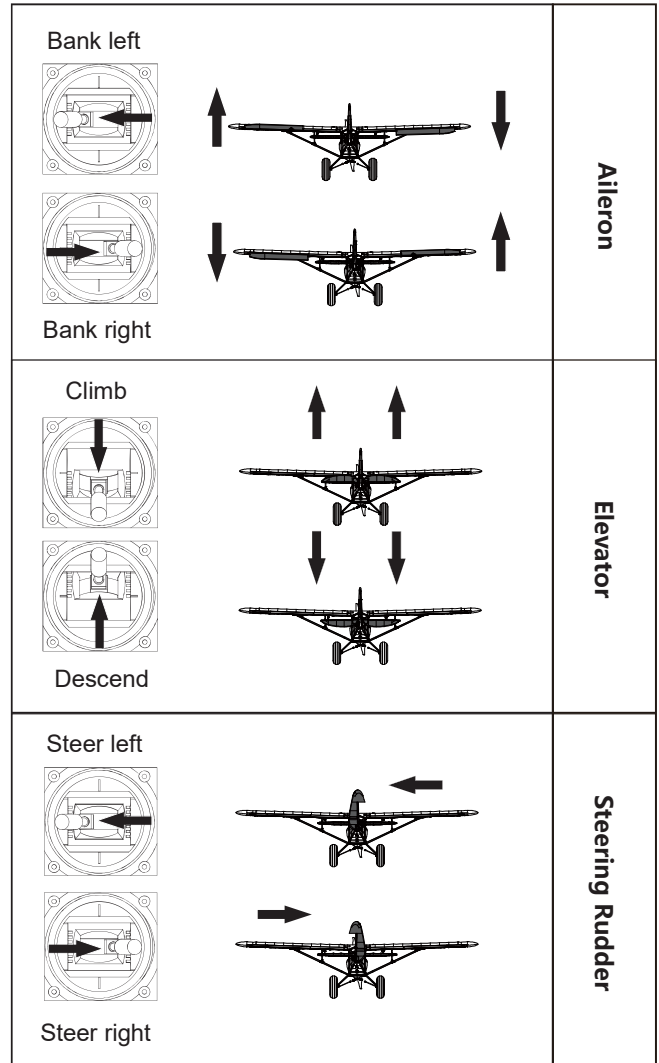
## Transmitter and model setup

Before getting started, bind your receiver with your transmitter. Please refer to your transmitter manual for proper operation.

**CAUTION:** To prevent personal injury, DO NOT install the propeller assembly onto the motor shaft while testing the control surfaces. DO NOT arm the ESC and do not turn on the transmitter until the Transmitter Manual instructs you to do so.

Tips: Make sure all control sticks on your radio are in the neutral position (rudder, elevator, ailerons) and the throttle is in the OFF position. Make sure both ailerons move up and down (travel) the same amount. This model tracks well when the left and right ailerons travel the same amount in response to the control stick.

Move the controls on the transmitter to make sure the aircraft control surface moves correctly. See diagrams right.



## Control throws

The suggested control throw setting for the PA-18 super cub are as follows (dual rate setting):

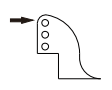

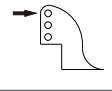

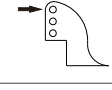

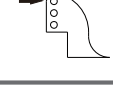

Tips: On the first flight, fly the model in low rate. The first time you use high rates, be sure to fly at low to medium speeds. High rate, as listed, is only for EXTREME maneuvering.

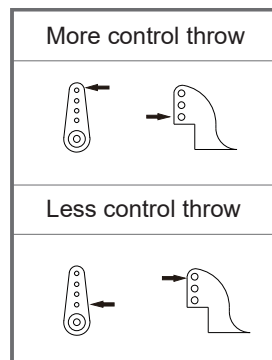
|          | High Rate        | Low Rate        |
|----------|------------------|-----------------|
| Elevator | 18mm up/down     | 14 mm up/down   |
| Aileron  | 16mm up/down     | 12 mm up/down   |
| Rudder   | 18 mm left/right | 14mm left/right |

## Control horn and servo arm settings

The table shows the factory settings for the control horns and servo arms. Fly the aircraft at the factory settings before making changes.

After flying, you may choose to adjust the linkage positions for the desired control response.

|          | Horns   | Arms  |
|----------|---|---|
| Elevator |  |  |
| Rudder   |  |  |
| Ailerons |  |  |
| Flaps    |  |  |

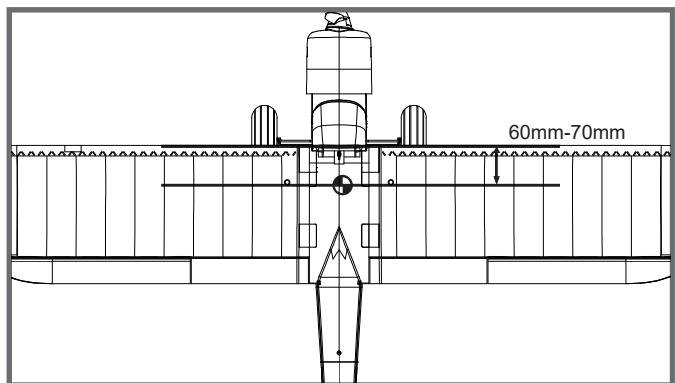


## Check the C.G. (Center of gravity)

When balancing your model, adjust the battery as necessary so the model is level or slightly nose down. This is the correct balance point for your model. After the first flights, the CG position can be adjusted for your personal preference.

1. The recommended Center of Gravity (CG) location for your model is (60-70mm) from the leading edge of the main wing (as shown) with the battery pack installed. Mark the location of the CG on top of the wing.

2. When balancing your model, support the plane at the marks made on the bottom of the main wing with your fingers or a commercially available balancing stand. This is the correct balance point for your model. Make sure the model is assembled and ready for flight before balancing.



## Before flying the model

### Find a suitable flying site

Find a flying site clear of buildings, trees, power lines and other obstructions. Until you know how much area will be required and have mastered flying your plane in confined spaces, choose a site which is at least the size of two to three football fields - a flying field specifically for R/C planes is best. Never fly near people - especially children, who can wander unpredictably.

### Perform the range check for your plane

As a precaution, an operational ground range test should be performed before the first flight each time you go out. Performing a range test is a good way to detect problems that could cause loss of control such as low batteries, defective or damaged radio components, or radio interference. This usually requires an assistant and should be done at the actual flying site you will be using.

First turn on the transmitter, then install a fully-charged battery into the fuselage. Connect the battery and install the hatch.

Remember, use care not to bump the throttle stick. Otherwise, the propeller/fan will turn and possibly cause damage or injury.

Note: Please refer to your Transmitter Manual that came with your radio control system to perform a ground range check. If the controls are not working correctly or if anything seems wrong, do not fly the model until you correct the problem. Make certain all the servo wires are securely connected to the receiver and the transmitter batteries have a good connection.

### Monitor your flight time

Monitor and limit your flight time using a timer (such as on a wristwatch or in your transmitter if available). When the batteries are getting low you will usually notice a performance drop before the ESC cuts off motor power, so when the plane starts flying slower you should land. Often (but not always) power can be briefly restored after the motor cuts off by holding the throttle stick all the way down for a few seconds. To avoid an unexpected dead-stick landing on your first flight, set your timer to a conservative 4 minutes. When your alarm sounds you should land right away.

## Flying course

### Take off

While applying power, slowly steer to keep the model straight. The model should accelerate quickly. As the model gains flight speed you will want to climb at a steady and even rate. It will climb out at a nice angle of attack (AOA).

### Flying

Always choose a wide-open space for flying your plane. It is ideal for you to fly at a sanctioned flying field. If you are not flying at an approved site always avoid flying near houses, trees, wires and buildings. You should also be careful to avoid flying in areas where there are many people, such as busy parks, schoolyards, or soccer fields. Consult laws and ordinances before choosing a location to fly your aircraft. After takeoff, gain some altitude. Climb to a safe height before trying technical manoeuvres, including high speed passes, inverted flight, loops, and point rolls.

### Landing

Land the model when you hear the motor pulsing (LVC) or if you notice a reduction in power. If using a transmitter with a timer, set the timer so you have enough flight time to make several landing approaches.

The model's three point landing gear allows the model to land on hard surfaces. Align model directly into the wind and fly down to the ground. Fly the airplane down to the ground using 1/4-1/3 throttle to keep enough energy for proper flare. Before the model touches down, always fully decrease the throttle to avoid damaging the propeller or other components. The key to a great landing is to manage the power and elevator all the way to the ground and set down lightly on the main landing gear. After a few flights you will find the model can be set down lightly on the mains and you can hold the nose wheel off balancing the model on the mains until it slows and gently settles the nose.

### Maintenance

Repairs to the foam should be made with foam safe adhesives such as hot glue, foam safe CA, and 5min epoxy. When parts are not repairable, see the Spare Parts List for ordering by item number.

Always check to make sure all screws on the aircraft are tightened. Pay special attention to make sure the spinner is firmly in place before every flight.

## Trouble shooting

| Problem  | Possible Cause   | Solution   |
|--|--|--|
| Aircraft will not respond to the throttlebut responds to other controls. | -ESC is not armed.<br>-Throttle channel is reversed.   | -Lower throttle stick and throttle trim to lowest settings.<br>-Reverse throttle channel on transmitter.   |
| Extra propeller noise or extra vibration.                                | -Damaged spinner, propeller, motor or motor mount.<br>-Loose propeller and spinner parts.<br>-Propellor installed backwards. | -Replace damaged parts.<br>-Tighten parts for propeller adapter, propeller and spinner.<br>-Remove and install propeller correctly.                              |
| Reduced flight time or aircraft underpowered.                            | -Flight battery charge is low.<br>-propeller installed backward.<br>-Flight battery damaged.                                 | -Completely recharge flight battery.<br>-Replace flight battery and follow flight battery instructions.  |
| Control surface does not move, or is slow to respond to control inputs.  | -Control surface, control horn, linkage or servo damage.<br>-Wire damaged or connections loose.                              | -Replace or repair damaged parts and adjust controls.<br>-Do a check of connections for loose wiring.  |
| Controls reversed.   | Channels are reversed in the transmitter.  | Do the control direction test and adjust controls for aircraft and transmitter.  |
| -Motor loses power<br>-Motor power pulses then motor loses power.        | -Damage to motor, or battery.<br>-Loss of power to aircraft.<br>-ESC uses default soft Low Voltage Cutoff(LVC).              | -Do a check of batteries, transmitter, receiver, ESC, motor and wiring for damage(replace as needed).<br>-Land aircraft immediately and recharge flight battery. |
| LED on receiver flashes slowly.  | Power loss to receiver.  | -Check connection from ESC to receiver.<br>-Check servos for damage.<br>-Check linkages for binding.   |

## Spare parts list content

|          |                        |              |                                |
|----------|------------------------|--------------|--------------------------------|
| FMSTD101 | Front Fuselage         | FMSTD116     | Screw Set                      |
| FMSTD102 | Rear Fuselage          | FMSPROP021   | Propeller                      |
| FMSTD103 | Main Wing Set          | FMSDZ007     | Motor Shaft                    |
| FMSTD104 | Horizontal Stabilizer  | FMSDJ009     | Motor Mount                    |
| FMSTD105 | Battery Hatch          | FMSBM045     | Motor Board                    |
| FMSTD106 | Wheel Set              | PRKV850      | Brushless Motor                |
| FMSTD107 | Front Landing Gear Set | PRESC001     | 40A ESC                        |
| FMSTD108 | Supporting Bar Set     | FMS9GDP      | 9g Digital Gear Servo Positive |
| FMSTD109 | Cowl                   | FMSCHR01     | Charger                        |
| FMSTD110 | Spinner                | PE3S2200/25C | Battery 11.1V 2200mAh 25C      |
| FMSTD111 | Pipe                   |              |                                |
| FMSTD112 | LED                    |              |                                |
| FMSTD113 | Lamp Cover             |              |                                |
| FMSTD114 | Sticker                |              |                                |
| FMSTD115 | Linkage Rod            |              |                                |

Visit our website: [www.fmsmodel.com](http://www.fmsmodel.com) to see photo of this product. Enter the key word "ESC" in the search bar for the stock ESC instruction manual.

## Brushless ESC Introduction

### Important warnings

- ZTW is not responsible for your use of this product, or any damage or injuries you may cause or sustain as a result of its usage.
- Always place safety as priority when you use the product.
- An electric motor that is connected in combination with a battery and/or ESC may start unexpectedly and cause serious damage and so should always be used with care and respect.
- We recommend you always remove the propeller when working on a model with the power source connected.
- Follow and observe all local laws and by-laws relating to model flying when flying RC planes.
- Never fly over others or near crowds.

### Key features

1. Utilizes powerful next generation MOSFET with a low thermal signature, high peak current threshold and reliability.
2. Features high performance 32bit microprocessor as standard. Stronger computing ability and faster processing rates.
3. Super smooth start up and throttle throughout the power range.
4. Higher driving efficiency and more energy-saving.
5. Adjustable SBEC output voltage, 5V/6V. (40A/50A/60A/80A/100A have SBEC adjustable)
6. Multiple protection protocols: start-up, over-heat, low-voltage cutoff, signal loss, phase loss etc.
7. Supports wide range of high RPM type motors commonly found in today's market.
8. Fully programmable via optional ZTW mobile app or ZTW LCD programming card.

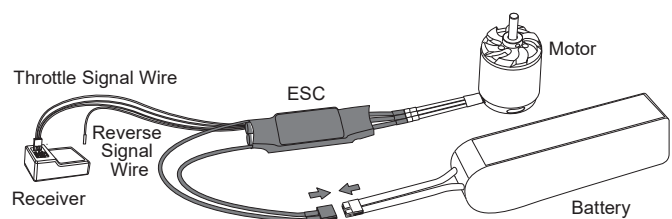
### Specification

| Type                 | PN#Model | Cont./Burst Current(A) | Battery cell NiXXLipo | Weight (g) | BEC Output | Size(mm) L*W*H | User Program |
|----------------------|----------|------------------------|-----------------------|------------|------------|----------------|--------------|
| Beatles 20A SBEC G2  | 3020211  | 20A/30A                | 5-12NC/2-4Lipo        | 25         | 5.5V/4A    | 60*25*10       | Yes          |
| Beatles 30A SBEC G2  | 3030211  | 30A/40A                | 5-12NC/2-4Lipo        | 25         | 5.5V/4A    | 60*25*10       | Yes          |
| Beatles 40A SBEC G2  | 3040211  | 40A/55A                | 5-12NC/2-4Lipo        | 37         | 5V/6V 4A   | 68*25*10       | Yes          |
| Beatles 50A SBEC G2  | 3050211  | 50A/65A                | 5-12NC/2-4Lipo        | 37         | 5V/6V 4A   | 68*25*10       | Yes          |
| Beatles 60A SBEC G2  | 3060211  | 60A/80A                | 5-18NC/2-6Lipo        | 50         | 5V/6V 8A   | 70*34*10       | Yes          |
| Beatles 80A SBEC G2  | 3080211  | 80A/100A               | 5-18NC/2-6Lipo        | 75         | 5V/6V 8A   | 90*37*10       | Yes          |
| Beatles 100A SBEC G2 | 30100211 | 100A/120A              | 5-18NC/2-6Lipo        | 80         | 5V/6V 8A   | 90*37*10       | Yes          |

### Wires Connection:

The speed controller can be connected to the motor by soldering directly or with high quality connectors. Always use new connectors, which should be soldered carefully to the cables and insulated with heat shrink tube. The maximum length of the battery pack wires shall be within 6 inches.

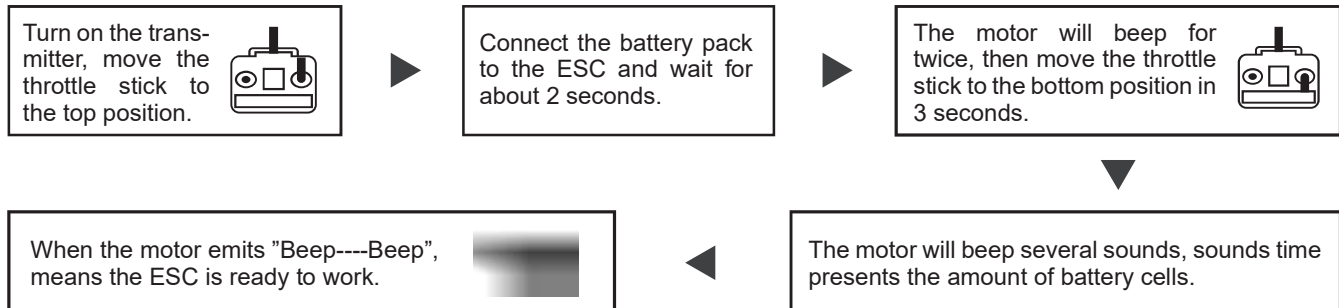
- Solder controller to the motor wires.
- Solder appropriate connectors to the battery wires.
- Insulate all solder connectors with heat shrink tubes.
- Plug the "JR" connector into the receiver throttle channel.
- Controller Red and Black wires connects to battery pack Red and Black wires respectively.



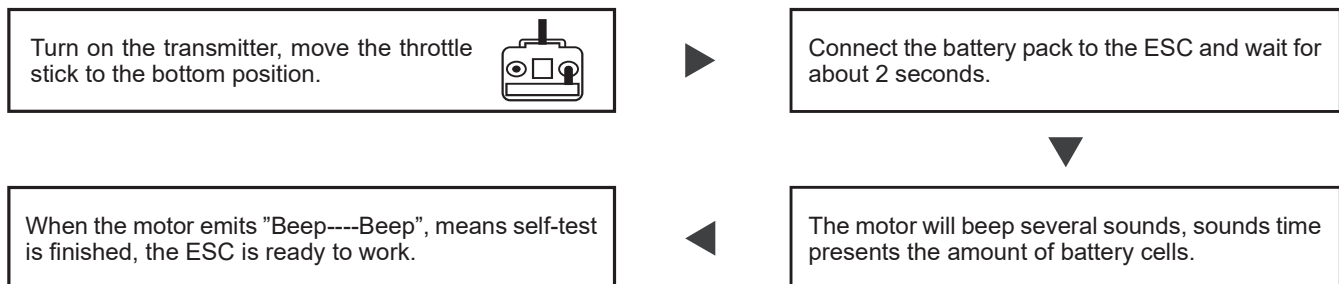
## Brushless ESC Introduction

### Throttle calibration

(Important: Please make the throttle calibration for the first time using ESC!!!)



### Normal startup procedure



### Programming items(the option written in bold font is the default setting)

#### 1. SMR Function: **OFF**/ON

This function supports switching the motor rotation to decelerate when the airplane landing to the ground. The factory default is OFF, the 1Pin signal wire is completely invalid at this time. If you need to turn it on, using Phone App or transmitter to program it "ON", plug the 3Pin signal wire into the throttle channel, and plug the 1Pin signal wire into any 2-stage switch channel of the receiver, then turn on the transmitter 2-stage switch. The SMR function is turned on now, you can change the forward and reverse directions of the motor by flipping the 2-stage switch of the transmitter.

**Warning:** This function can only be effective when the throttle is below 50%, and it is only allowed to be used when the airplane is landing on the ground, otherwise it may cause the ESC to burn!

#### 2. Brake Type: **OFF**/Soft/Mid/Hard

#### 3. Timing: **Auto**/Low/Mid/High(5°/15°/25°)

#### 4. Motor Rotation: **CW**/CCW

#### 5. SR function: ON/**OFF**

The synchronous rectification function makes ESC with higher driving efficiency and more energy-saving.

#### 6. Battery cells: **Auto**/2S/3S/4S/5S/6S

#### 7. Low Voltage Cutoff Threshold: OFF/NIMH50%/NIMH60%/**3.0V**/3.2V/3.4V/3.6V

For example: using 3 lithium batteries and setting 3.0V as the low voltage cutoff value, then the low voltage protection threshold is:  $3 \times 3.0 = 9.0V$

#### 8. Low Voltage Cutoff Type: **Reduce Power**/Cut Off Power

Reduced power: When the voltage drops to the set low-voltage protection threshold, the ESC will reduce power to 70%.

## Brushless ESC Introduction

Cut Off power: When the voltage drops to the set low-voltage protection threshold, the ESC will cut off the power immediately. 9.40A\50A\60A\80A\100A ESCs have adjustable SBEC 5V/6V, the default set is **5.0V**.

10.Acceleration: **Normal**/Soft

### Entering the programming mode

1. Turn on the transmitter, move the throttle stick to the top position.
2. Connect the battery pack to ESC.
3. Wait for 2 seconds, the motor will emit special tone like "beep-beep beep"
4. Wait for another 3 seconds, the motor will emit special tone like "123", which means program mode entered.

### Programmable items

After entering program mode, you will hear 11 tones in a loop with the following sequence.

| Tones                             | Programmable items             |                  |
|-----------------------------------|--------------------------------|------------------|
| 1). "beep"                        | SMR Function                   | (1 short tone)   |
| 2). "beep.beep"                   | Brake Type                     | (2 short tone)   |
| 3). "beep.beep.beep"              | Motor Timing                   | (3 short tone)   |
| 4). "beep.beep.beep.beep"         | Motor Rotation                 | (4 short tone)   |
| 5). "beep- -"                     | SR Function                    | (1 long tone)    |
| 6). "beep- -.beep"                | Battery cells                  | (1 long 1short)  |
| 7). "beep- -.beep.beep"           | Low Voltage Cutoff Threshold   | (1 long 2 short) |
| 8). "beep- -.beep.beep.beep"      | Low Voltage Cutoff Type        | (1 long 3 short) |
| 9). "beep- -.beep.beep.beep.beep" | BEC Voltage                    | (1 long 4 short) |
| 10). "beep- -beep- -"             | Acceleration                   | (2 long tone)    |
| 11). "beep- -beep- -.beep"        | Restore Factory Setup Defaults | (2 long 1 short) |

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

### Set item value

Moving the throttle stick to the bottom position within 2 seconds after one kind of following tones, this item will be selected. After the programmable item selected, then you will hear several tones in loop as follows on each programmable item, set the value matching to a tone by moving throttle stick to top position when you hear the tone, then the motor will emit special tone like "123", means this value is set and saved.

For example: If you want to set the motor rotation, when you hear four short tones of "Beep", moving the throttle stick to the bottom position within 2 seconds, means you enter the motor rotation menu. One short tone of "Beep" is forward direction(CW), two short tones of "Beep" is reverse direction(CCW). If you want to set to reverse direction(CCW), moving the throttle stick to the top position when you hear the two short tones of "Beep", then you will hear a special confirmation tone like "123", which means the "CCW" is set and saved.

Keeping the throttle stick at top, you will go back to programming mode and you can select other items; or moving the stick to bottom within 2 seconds will exit program mode directly).



## Brushless ESC Introduction

### Programming tone reference table

| Items \ Tones                   | "beep"               | "beep.beep"   | "beep.beep<br>.beep" | "beep.beep<br>.beep.beep" | "beep- -" | "beep- -<br>beep" | "beep- -<br>beep.beep" |
|---------------------------------|----------------------|---------------|----------------------|---------------------------|-----------|-------------------|------------------------|
|                                 | 1short tone          | 2short tone   | 3short tone          | 4short tone               | 1long     | 1long 1short      | 1long 2short           |
| SMR Function                    | <b>*OFF</b>          | ON            |                      |                           |           |                   |                        |
| Brake Type                      | <b>*OFF</b>          | Soft Brake    | Mid Brake            | Mid Brake                 |           |                   |                        |
| Motor Timing                    | <b>*Auto</b>         | Low           | Mid                  | Mid                       |           |                   |                        |
| Motor Rotation                  | <b>*CW</b>           | CCW           |                      |                           |           |                   |                        |
| SR Function                     | ON                   | <b>*OFF</b>   |                      |                           |           |                   |                        |
| Battery Cells                   | <b>*Auto</b>         | 2S            | 3S                   | 4S                        | 5S        | 6S                |                        |
| Low voltage<br>Cutoff Threshold | OFF                  | NIMH50%       | NIMH60%              | <b>*3.0V</b>              | 3.2V      | 3.4V              | 3.6V                   |
| Low Voltage<br>Cutoff Type      | <b>*Reduce Power</b> | Cut off Power |                      |                           |           |                   |                        |
| SMR Function                    | <b>*5V</b>           | 6V            |                      |                           |           |                   |                        |
| Brake Type                      | <b>*Normal</b>       | Soft          |                      |                           |           |                   |                        |
| Restore Factory<br>Default Sets | Restore              |               |                      |                           |           |                   |                        |

Note: " \* " value means default settings.

### Protection function

1. Start-up protection: If the motor fails to start normally within 2 seconds after pushing the throttle to start, the ESC will cut off the output power, and you need to make the throttle calibration again, then ESC can be restarted. Possible reasons: disconnection or poor connection between ESC and motor, the propeller or motor is blocked by other objects, the gearbox is damaged, etc.)
2. Over-heat protection: When the temperature of the ESC is over about 110℃, the ESC will automatically reduce the output power for protection, but will not fully shut down the power, reduce it to 70% of the full power at most to ensure the motor has enough power to avoid crashes.
3. Throttle signal loss protection: The ESC will reduce the output power if throttle signal is lost for 1 second, will cut off output to the motor if the throttle signal is lost over 2 seconds. If the throttle signal recovers during power down, the ESC will immediately resume throttle control. In this way, the ESC will not protect when the signal loss less than 2 seconds, only when the signal lost is over 2 seconds or longer time. And the ESC will reduce the output power gradually instead of cutting off it immediately, so the player has certain amount of time to save the plane, taking into account safety and practicality.
4. Over load protection: The ESC will cut off power or restart automatically when the load increased a lot suddenly, possible reason is the motor blocked.

## Brushless ESC Introduction

### Trouble shooting

| Trouble  | Possible Reason   | Action   |
|--|---|--|
| After powering up, ESC emits the sound of battery cells, but motor can't run.                                | ESC doesn't set throttle range.   | Set throttle range again.  |
| After powering up, motor doesn't run and doesn't emit any sound.   | <ol style="list-style-type: none"> <li>1.Bad connection between ESC and battery.</li> <li>2.Bad soldering cause bad contact.</li> <li>3.Low voltage of the battery.</li> <li>4.Quality problem of ESC.</li> </ol>   | <ol style="list-style-type: none"> <li>1.Clean the connectors or replace them, check the connection polarity.</li> <li>2.Solder the wires again.</li> <li>3.Check battery pack, use full-charged battery.</li> <li>4.Change ESC.</li> </ol>  |
| Motor does n't work and no audible tone emitted after connecting the battery. Servos are not working either. | <ol style="list-style-type: none"> <li>1. Poor/loose Connection between battery Pack and ESC.</li> <li>2. No power.</li> <li>3. Poor soldered connections.</li> <li>4. Wrong battery cable polarity.</li> <li>5. ESC throttle cable connected to receiver in the reverse polarity.</li> </ol>                         | Check all the connections make sure you are doing it right.  |
| Motor does not work but servos do.   | <ol style="list-style-type: none"> <li>1.Poor/loose connection between ESC and motor.</li> <li>2. Burnt motor coils.</li> <li>3. The battery pack voltage exceeds the acceptable range.</li> <li>4. Throttle stick is not at the lowest position.</li> <li>5. The ESC throttle calibration has not set up.</li> </ol> | <ol style="list-style-type: none"> <li>1. Check all the connections make sure you are doing it right.</li> <li>2. Change a new motor.</li> <li>3. Solder the wires again.</li> <li>4. Check the battery pack, use full-charged battery.</li> <li>5. Set throttle range again.</li> </ol> |
| When the ESC is powered on, the motor does not work and an alarm sound (continuously beeping) will sound.    | The throttle stick is not in the bottom position after power on.  | Move the throttle stick to the bottom position.  |
| Motor runs in reverse rotation.  | Wrong cables polarity between the ESC and the motor.  | Swap any two of the three cable connections between the ESC and the Motor or access the Motor Rotation function via the ESC programming mode and change the pre-set parameters.  |
| Motor stops running in flight.   | Lost throttle signal.   | <p>Check proper operation of the radio equipment.</p> <p>Check the placement of the ESC and the Receiver and check the route of the receiver's aerial and ESC.</p>   |