



# Red Dragonfly

## OPERATING MANUAL



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# 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 requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner 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 manual, prior to assembly, setup or use, in order to operate correctly 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 the street or in populated areas for any reason.
- Carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.) you use.
- 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 place any portion of your model in your mouth as it could cause serious injury or even death.



## *Kit contents*



### **Kit contents**

1. The fuselage (Motor, ESC, propeller, spinner, canopy, servos )
2. Main wing set (A set of main wing ailerons control servos installed)
3. Horizontal stabilizer (The tail with the servos)
4. Landing gear

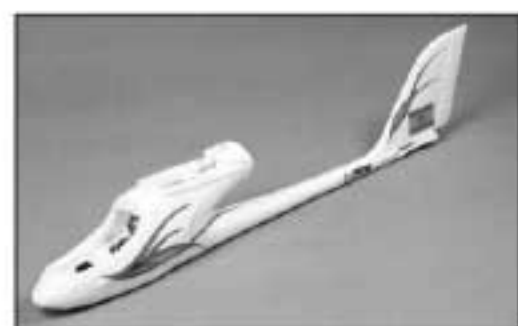
## The spare parts list

Replacement parts for the FMS Red dragonfly are available using the order numbers in the Spare parts list that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company.

### Spare parts list content

- SR 101 Fuselage (With all the plastic part installed)
- SR 102 Main wing (One piece of main wing)
- SR 103 Horizontal stabilizer
- SR 104 Canopy ( With plastic and the foam)
- SR 105 Main landing gear (Strut wheels and the pant)
- SR 106 Rear landing gear assembly
- SR 107 Spinner
- SR 108 Nose cone
- SR 109 Propeller adaptor
- SR 110 Propeller
- SR 111 Sticker
- SR 112 Servo (9g positive)
- SR 113 Motor (2805-KV2720)
- SR 114 ESC (12A)
- SR 115 Battery (7.4V 1300mAh)

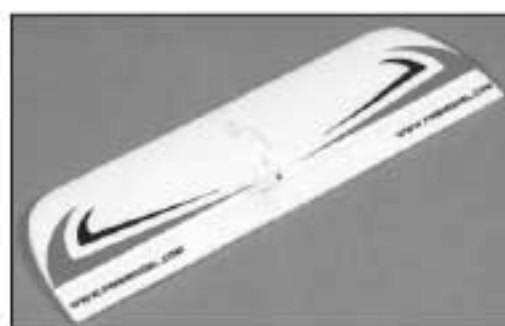
### The illustration of the spare parts



SR-101



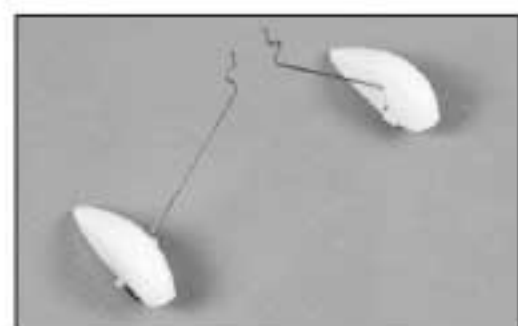
SR-102



SR-103



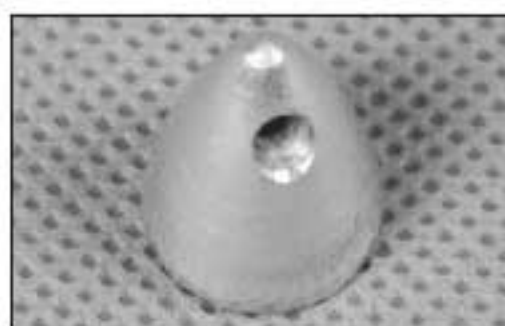
SR-104



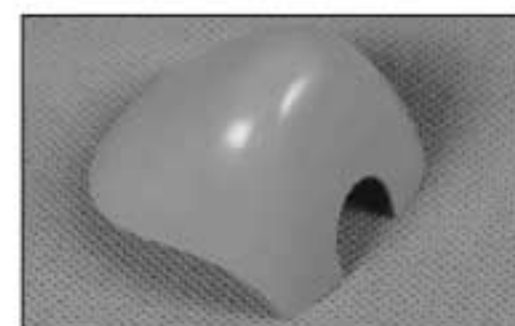
SR-105



SR-106



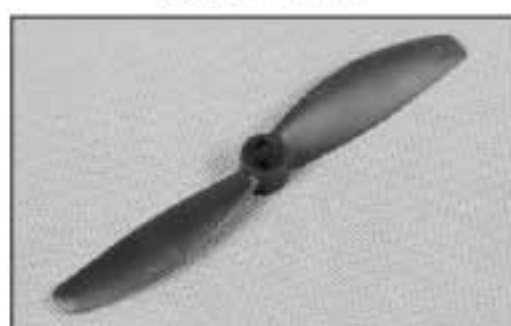
SR-107



SR-108



SR-109



SR-110



SR-111



SR-112



SR-113



SR-114



SR-115

## *Kit inspection*

Before starting to build, inspect the parts to make sure they are acceptable quality. If any parts are missing or are not in good shape or acceptable quality, or if you need assistance with setup and assembly, please feel free to contact FMSteam. Please write down the name of the parts when you are reporting defective or missing of them.

FMSteam Product Support

ADDRESS: 3/F, Building B, 3rd Industry Zone, Matigang, Dalingshan Town, Dongguan City, P.R.C

Ph: 0086-769-86976655

## *Charging the Flight Battery*

The Battery Charger included with your aircraft is designed to safely charge the Li-Po battery, **Caution:** All instructions and warnings must be followed exactly. Mishandling of Li-Po batteries can result fire, personal injury, or property damage.

### **Battery warning:**

By handling, charging or using the included 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.

Charge or discharge a swelling and ballooning battery can result fire.

Always store the batteries at room temperature in a dry area for the extensive use of the battery. **Always transport or temporarily store the battery in a temperature** range of 40-120°F. Do not store battery or model in a car of direct sunlight. If stored in a hot car, the battery can be damaged or even catch fire.

Never use a Ni-Mh charger. Failure to charge the battery with a compatible charger may cause fire resulting in personal injury and property damage.

Never discharge Li-Po cells to below 3V.

Never leave charging batteries unattended.

Never charge damaged batteries.

### **Charging the flight battery**

Your ARF aircraft comes with a DC balancing charger. You must charge the battery with a Li-Po specific charger only (such as the included **BC-3S10** DC charger). when charging the battery, make certain the battery is on a heat-resistant surface, charge the battery before the assemble. Install the fully charged battery to perform control tests and binding.

### **BC-3S10 Balance Charger**

To correctly use the charger, please read the instruction before use.

## Charging the Flight Battery

### Electrical Parameters

Parameter	Min	Type	Max	Unit
Working Voltage	9	12	16	V
Input Power	15			W
Work Temperature	-20		45	°C
Store Temperature	-20		65	°C
Charging Stop Voltage	4.19	4.20	4.21	V
Charging Current			1000	mA
Balancing Current	150		200	mA
Activate Current	80		120	mA

#### Using Steps:

1. Connect charger to adapter with enough voltage and wattage, then the Power LED lights on;
2. Connect 2S/3S battery pack to the corresponding balance port (**Do not connect two battery packs at the same time**), then the Charge LED flicker (1Hz) and start charging.
3. When the Charge LED stop flicker, charging is completed, the batteries can be unplugged.

#### Charging Function Description

1. All voltage of the installed battery pack is higher than 4.18V, charging will not start, Charge LED shine.
2. The voltage of one battery or some batteries is lower than 0.7V, charging will not start. If the voltage of the first battery of 3S battery pack is lower than 0.7V, charger will charge the battery pack regarding as 2S battery pack.
3. The voltage of one battery or some batteries is lower than 2.8V, charger will activate the battery pack with small current. If the voltage can't be increased above 2.8V after half an hour, charger will judge the battery pack is bad. Charge LED rapid flicker (0.5Hz), charging stop.

#### Self Checking Function

1. Charger will check charging function before charge every time. Charge LED will rapid flicker (0.5Hz) if the charging function is abnormal;
2. Accuracy checking Function: Connect one 3S battery pack which all voltage are just 4.2V, Charge LED will flicker twice then shine always. It means the accuracy is normal. (Maybe user's voltage measurement equipment exist accuracy error, this function only for reference)

## ***Charging the Flight Battery***

### ***Protection Function***

1. Reverse connection protection of input
2. Reverse connection protection of output
3. Short circuit protection of output
4. Over voltage protection of output

### ***Troubleshooting***

1. ***Power LED can't shine*** – Adapter isn't connected correctly. Please check the polarity and reconnect adapter.
2. ***Charging automatic stop and restart circularly during charging*** – Power of adapter is not enough, please replace the adapter.
3. ***Charge LED can't shine*** – Reconnect the battery pack; Check the voltage of batteries.
4. ***Charge LED rapid flicker*** – Battery is bad or charging function is abnormal. Please check the battery, or contact the maintenance point if the problem still can't be resolved.

## ***Low voltage cut off (LVC)***

When a Li-Po is discharged below 3V per cell, it will not hold a charge. The ESC protects the flight battery from over-discharge using Low Voltage Cutoff. Before the battery charge decreases too much, LVC removes power supply from motor in two ways as presetting:  
Reduce power: ESC reduces motor power when pre-set (recommended).  
Hard cutoff: ESC instantly cuts motor power when the pre-set Low Voltage Protection Threshold value is reached.

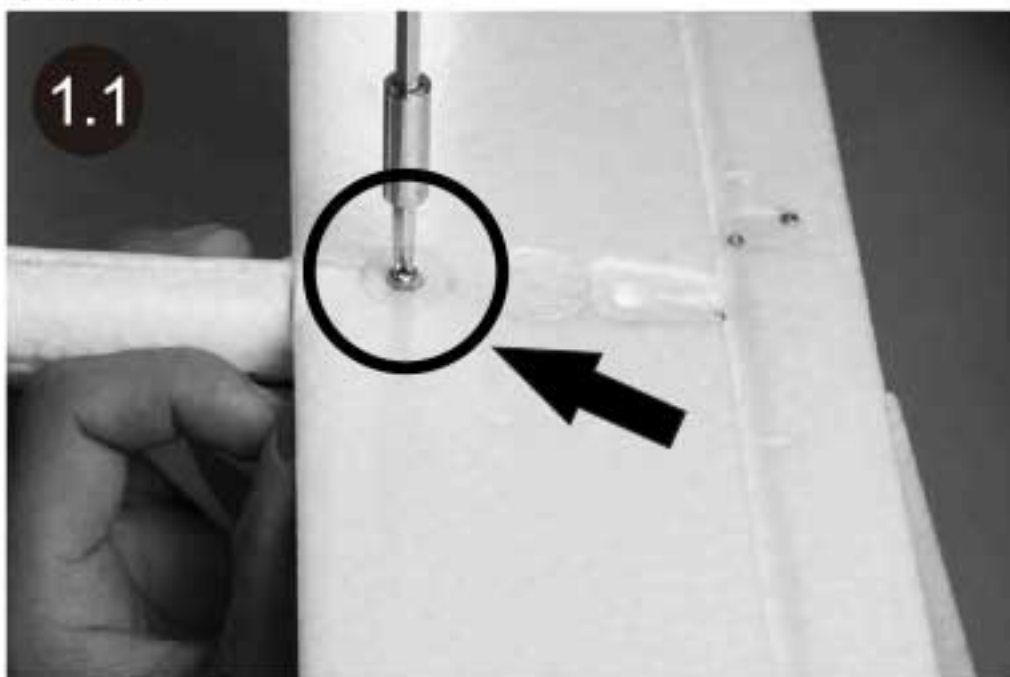


## Assemble the plane

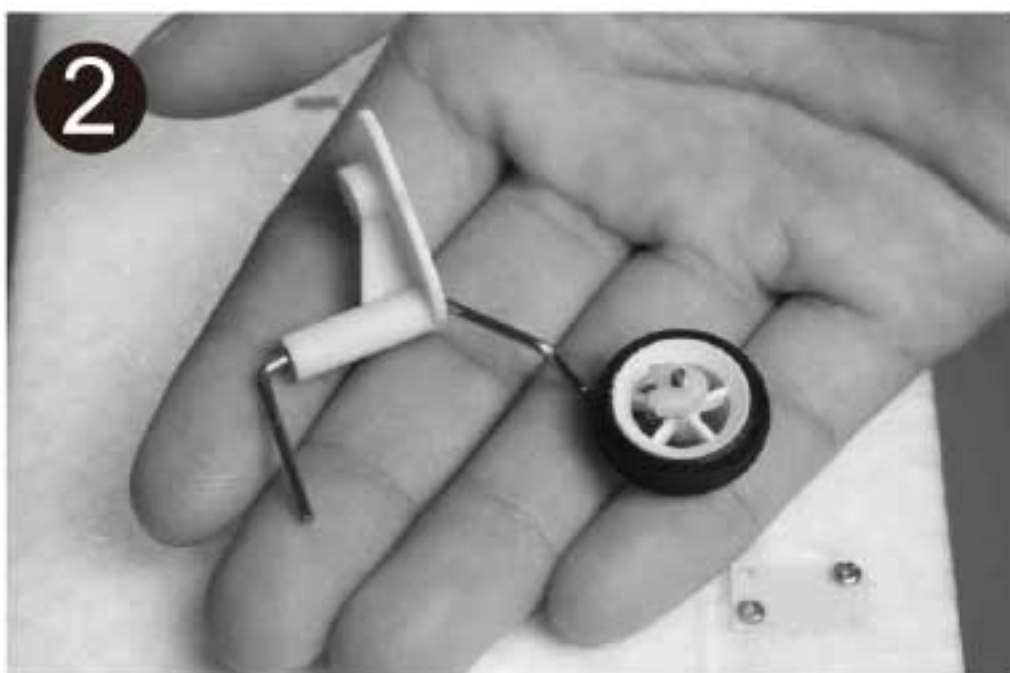
### The horizontal stabilizer and the rear landing gear installation

1. Turn over the fuselage so the bottom of the plane face up, mount the horizontal stabilizer into place with the control horn face down and secure the leading edge side screw. (**Screw PA 2.6\*25 1PC**)

**Note:** Hold the tail of the plane as the figure 1.2 shows when you secure the screws, do not force it straight on your stand.

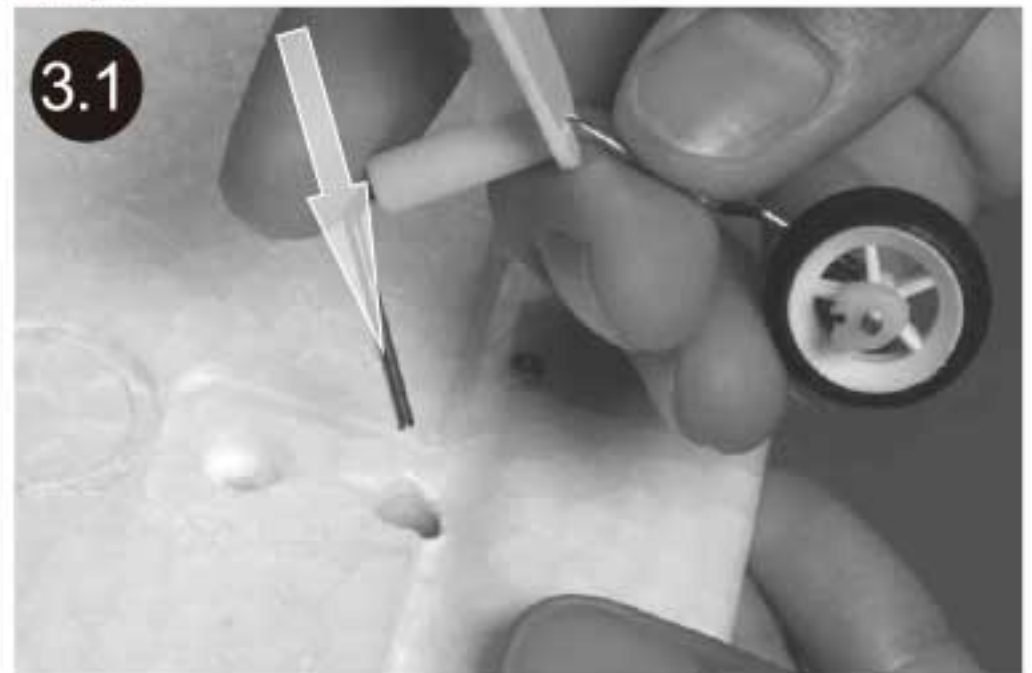


2. The rear landing gear assembly.



3. Insert the rear gear strut into the rear most hole on the stabilizer.

**Note:** There are no glue applied in this step.



4. Apply glue to the notch on the rudder where the control horn fitted together.

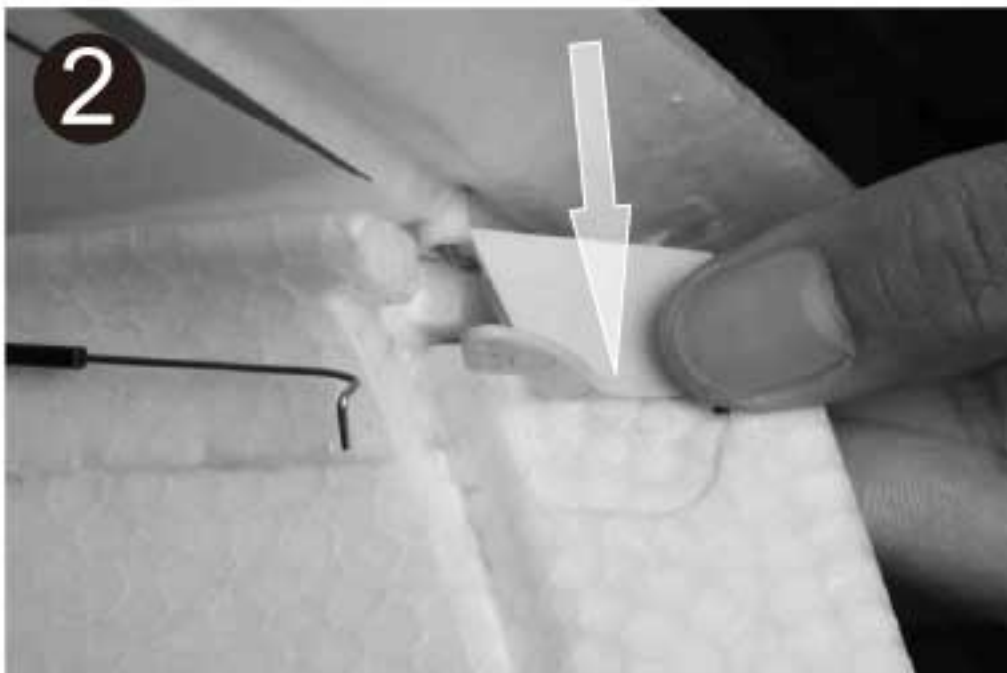


## Assemble the plane

1. Install the control horn to the landing gear strut wire with the horn toward the right direction.



2. Slide the horn into the notch properly and let dry at least 5 minutes.



3. Secure the trailing edge side screw the same with leading edge piece. (Screw: PA 2.6\*25 1PC)

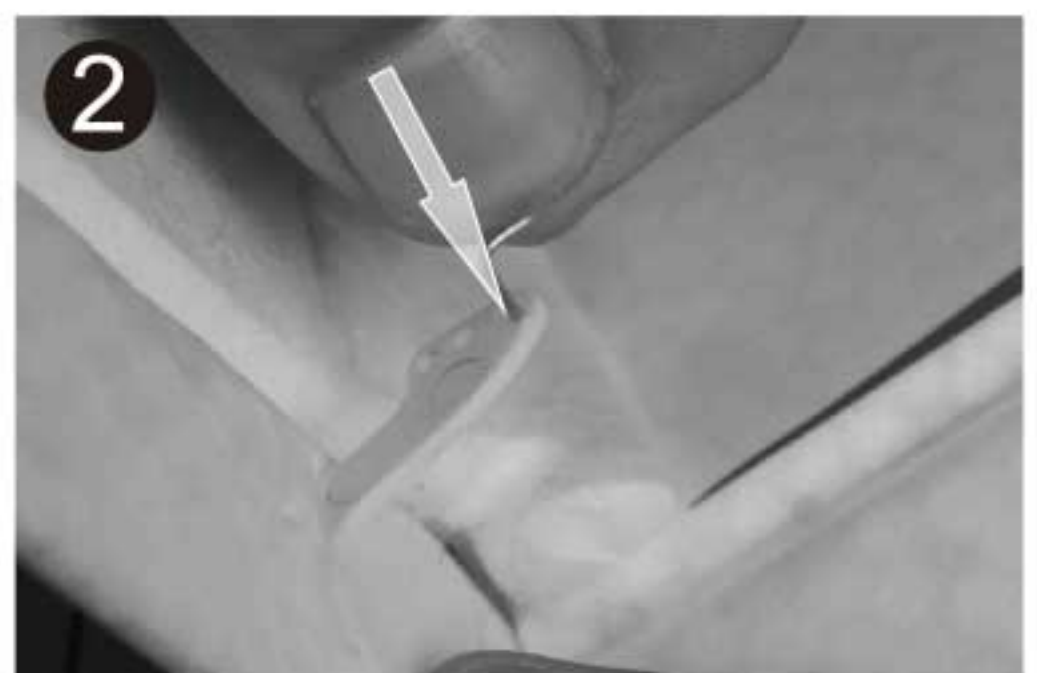


### Stabilizer control horns linking

1. Connect the elevator linkage to the horn.



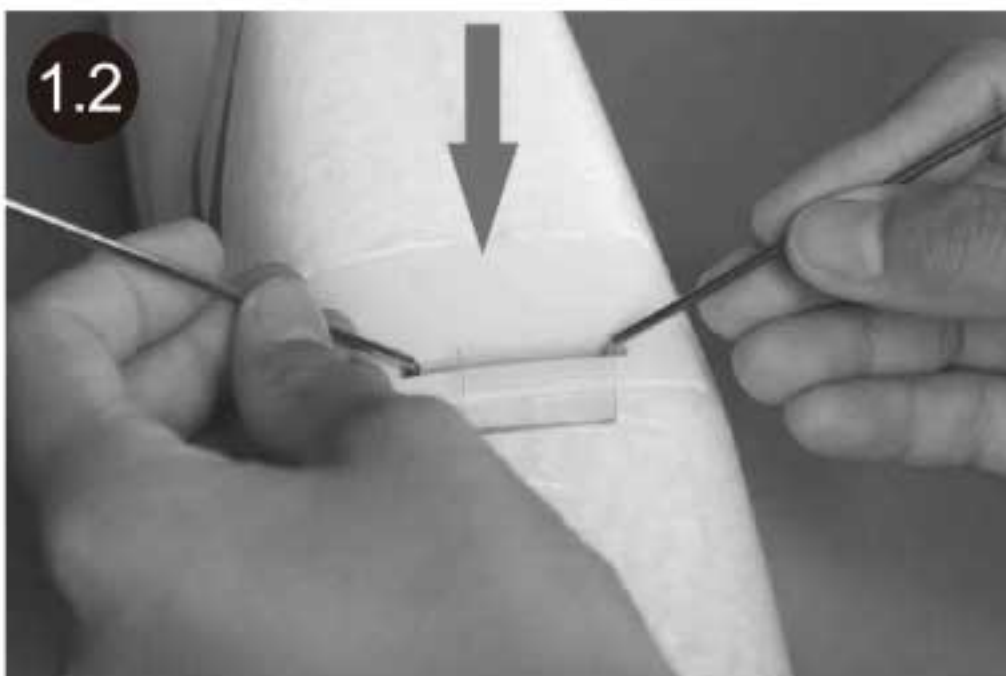
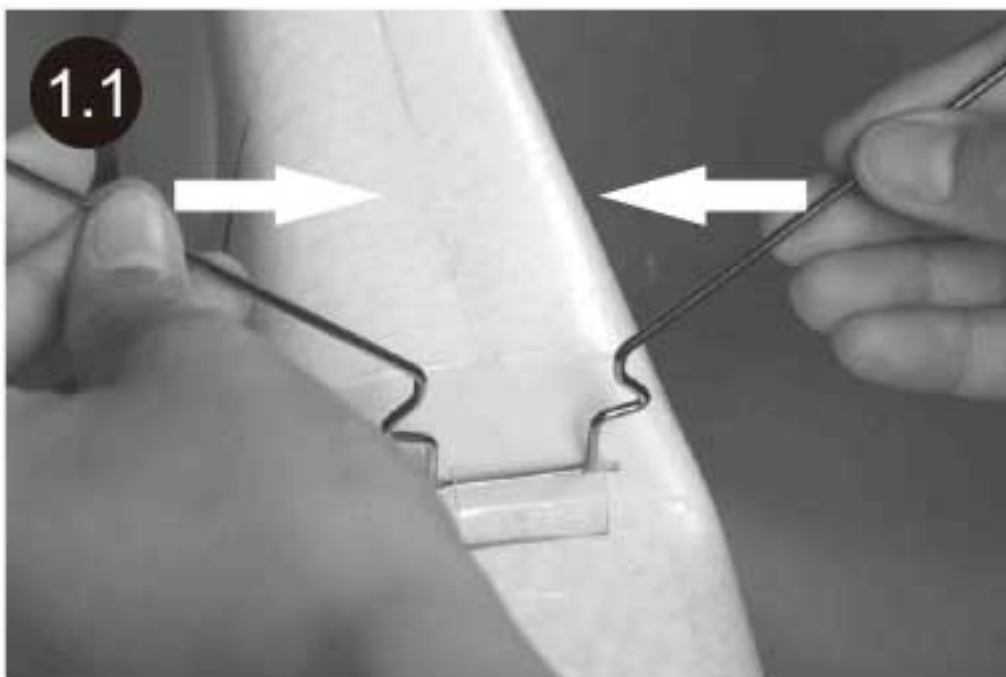
2. Connect the rudder linkage the same with the elevator from the top side of the horn



## Assemble the plane

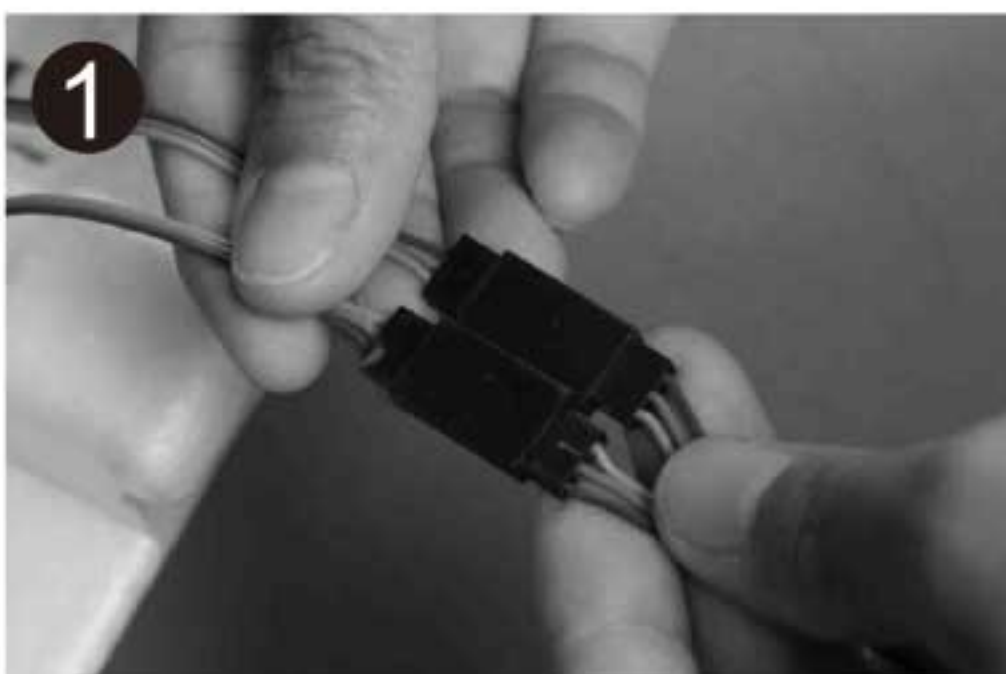
### The front landing gear installation

1. Install the main landing gear by push the strut as the picture shows the first. Then push downward to secure the strut. Make sure the gear be mounted in the right direction.

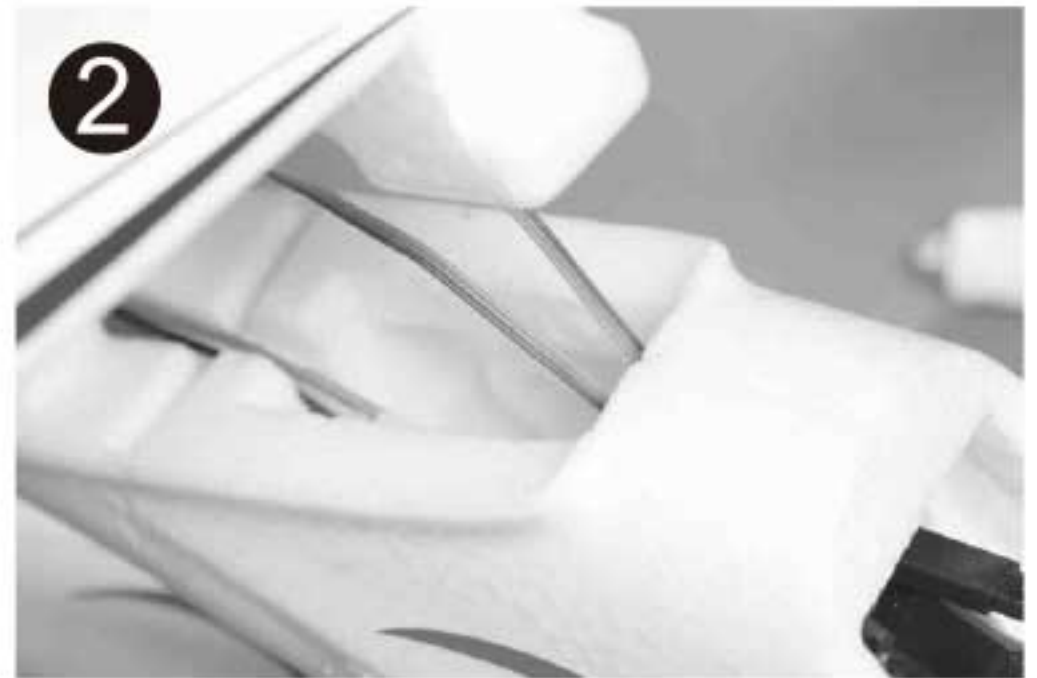


### Mount the main wing

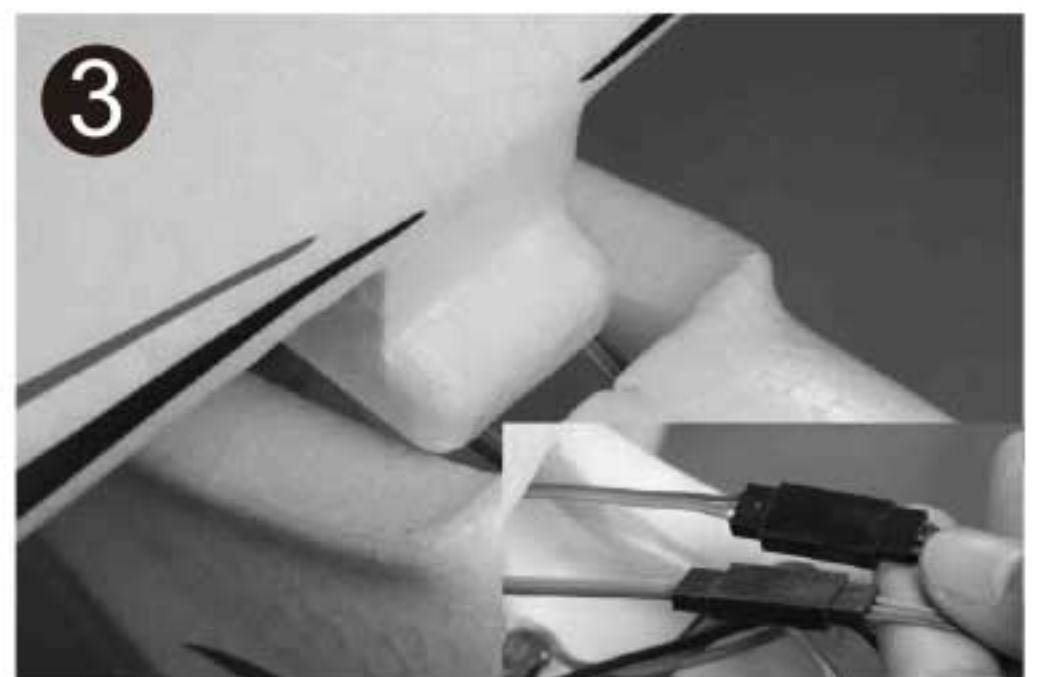
1. Connect the aileron wire leads to the harness. Make sure the signal wire (In Orange or White) on the same port.



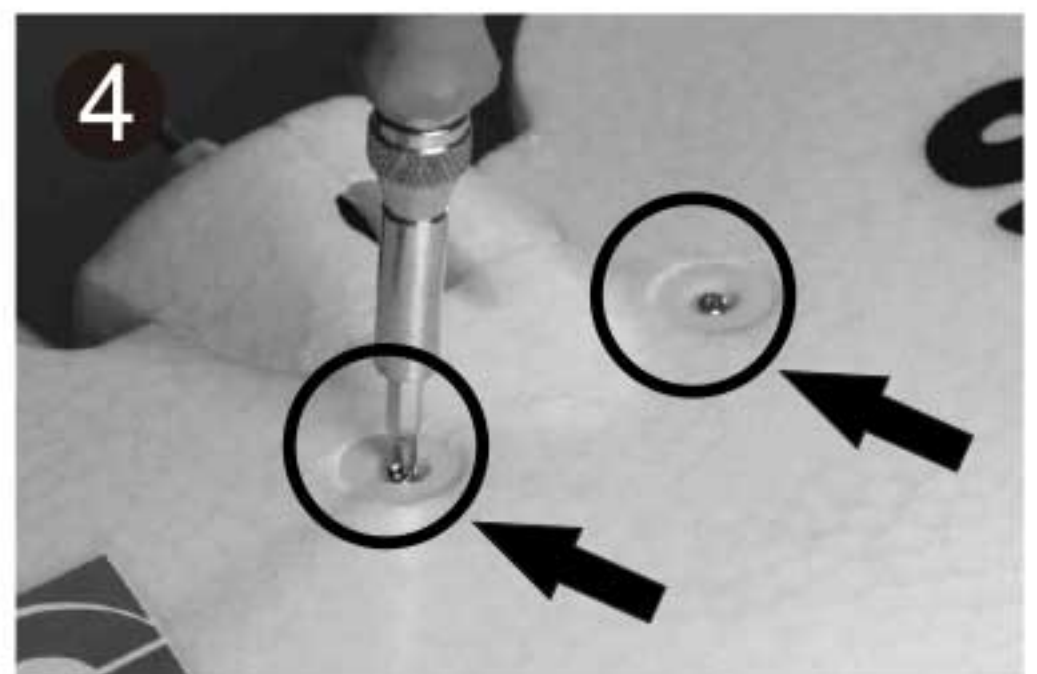
2. Insert the harness from the wing bay front hole to the cockpit hatch, the wing is secured into place by the foamy nose in leading edge side and the screws on the rear side.



3. Fit the nose into place and pull the harness from the cockpit side the same time to avoid the tangling of the wire to protect the main wing be fully mounted into place.



4. Secure the main wing using the provided screws. (**Screws: PA2.6\*30 2PCS**)

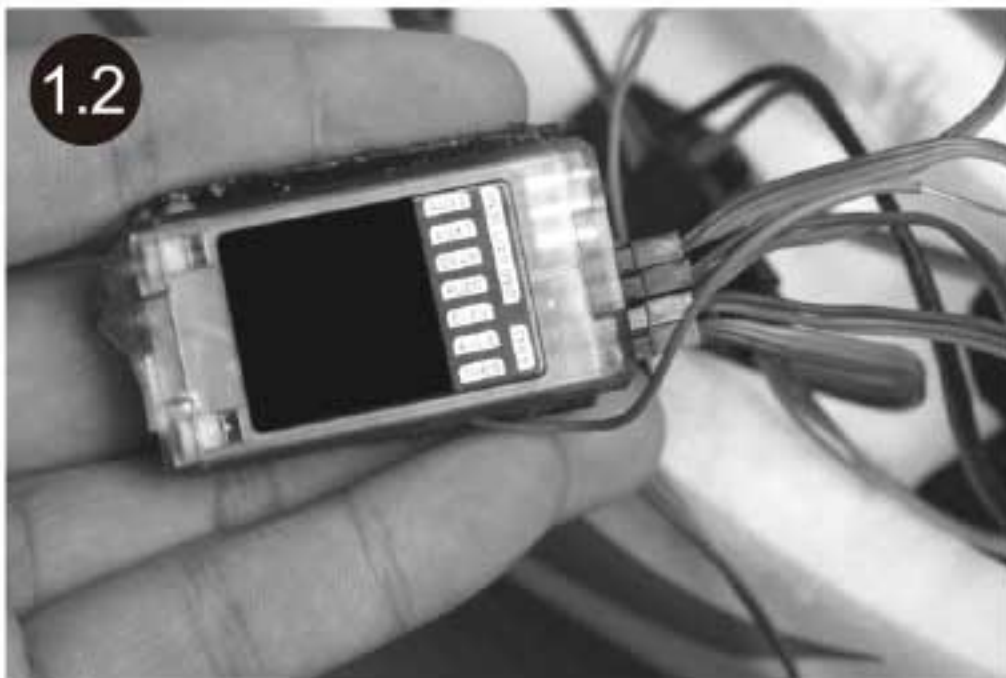


## Assemble the plane

### The receiver connection

1. Plug the leads from the servos to the receiver rightly, make sure the signal wire have been attached to the accordant port.

1.1		Receiver
Aileron	1	Channel-1 — Aile
Elevator	2	Channel-2 — Elev
Throttle	3	Channel-3 — Thro
Rudder	4	Channel-4 — Rudd



2. Settle the mess wire and the receiver to the recessed part at the rear end of the cockpit hatch. Or it will impede the canopy from fully seated into place.



### Install the battery

1. Slide the battery from the end of the hatch to the hook and loop strip.

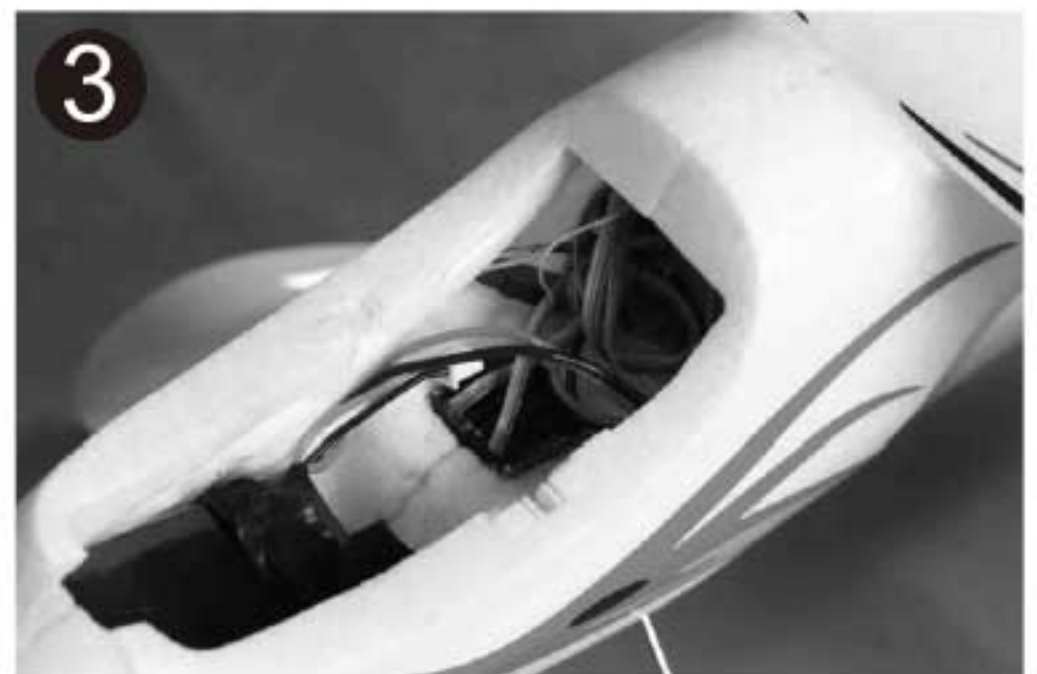


2. Secure the battery firmly into place use the strip.



3. The battery and receiver are neatly placed in the canopy hatch.

**Caution:** Do not arm the ESC in this step.



## Assemble the plane

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

#### Center of Gravity

When balancing your model, adjust the motor 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 (48mm/ 1.9in) back 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.



## Get your model ready to fly

### Important ESC information

1. The ESC included with the **Red dragonfly** 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 give a series of beeps. The first several beeps with the same tune means the ESC has detected the cells of the battery. The number of the same tune beeps equals the number of cells of the battery. The motor is now armed and will start when the throttle is moved.
2. The motor and ESC come already connected and the motor rotation should be correct. However, if you disconnected the ESC from the motor and when you reconnected it, the motor is rotating the wrong direction, reverse two of the three motor wires.
3. The motor has an optional brake setting. The ESC comes with the brake switched off and we recommend that the plane 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 7.4V 1300mAh 15C Li-Po battery. If using another battery, the battery must be at least a 7.4V 1300mAh 15C battery. Your battery should be approximately the same capacity, dimension and weight as the 7.4V 1300mAh 15C Li-Po battery to fit in the fuselage without changing the center of gravity too much.

### The model and transmitter setup

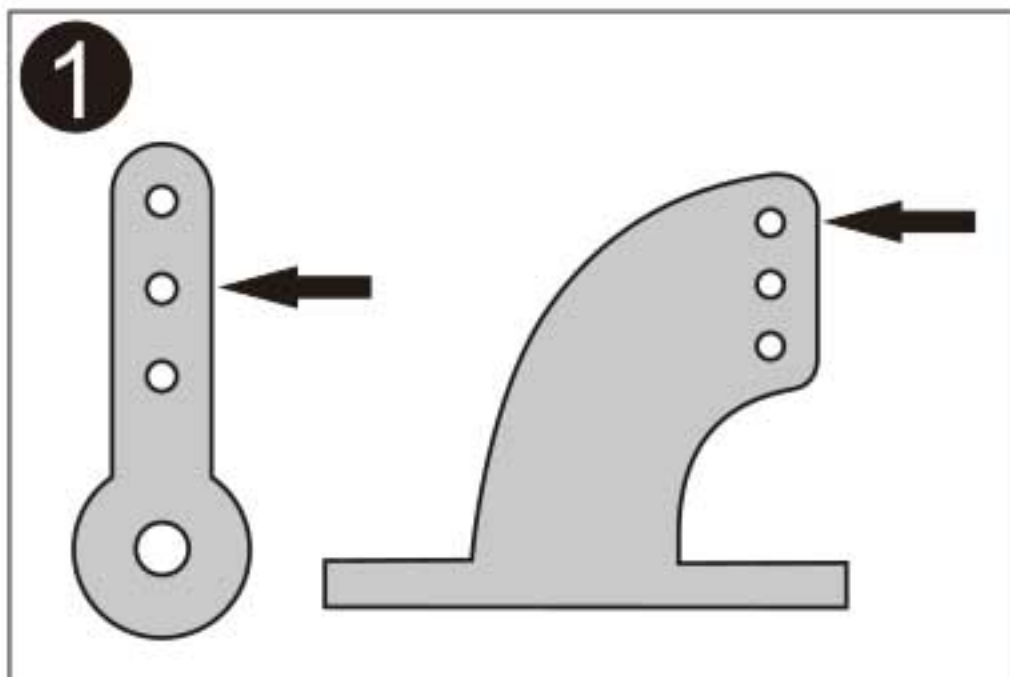
Before getting started, bind your receiver with your transmitter. Please refer to your **Transmitter Manual** for proper operation.

**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 that.

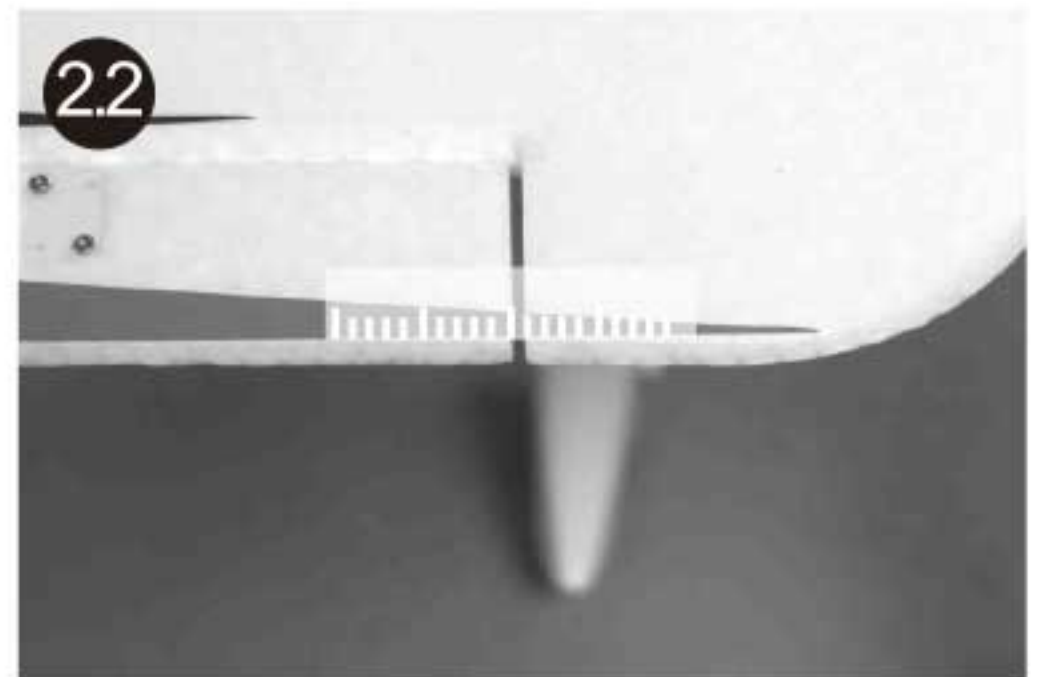
**Tips:** Make sure all control sticks on your radio are in the neutral position (rudder, elevator, ailerons) and the throttle in the OFF position. Make sure both aileron moves up and down (travel) the same amount. This model tracks well when the left and right ailerons travel the same amount in response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

## Get your model ready to fly

1. Fly the model at factory setting before making the connection changes, for pilot who wish to fly model for unlimited aerobatics, adjust position of linkages on servo arms and control horns for increased travel. Connect all the linkage the same as the picture shows.



2. Turn on the transmitter. Align the ailerons control surface with the wing tip trailing edge by turning the clevis clockwise and counterclockwise on the linkage, carefully open the clevis fork and put the clevis pin in the desired hole of the control horn. Snap the clevis into the surface control horn.

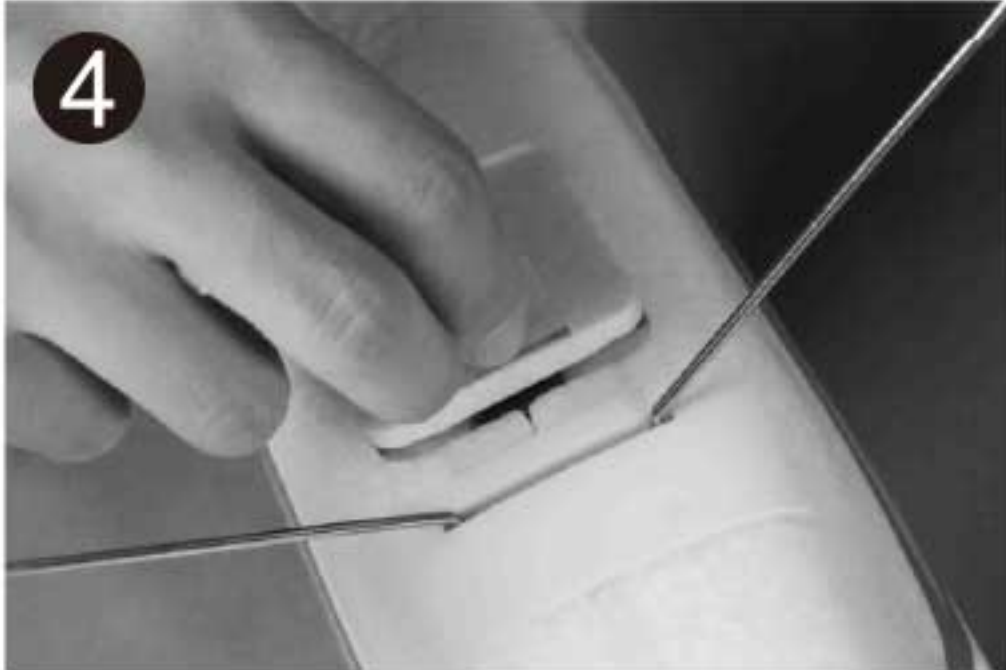


3. The provided piece of fuel tubing keeps the clevis closed during flight.  
**Note:** Do not over slide the securing tube or it will impede the agile movement of the surface control horn.

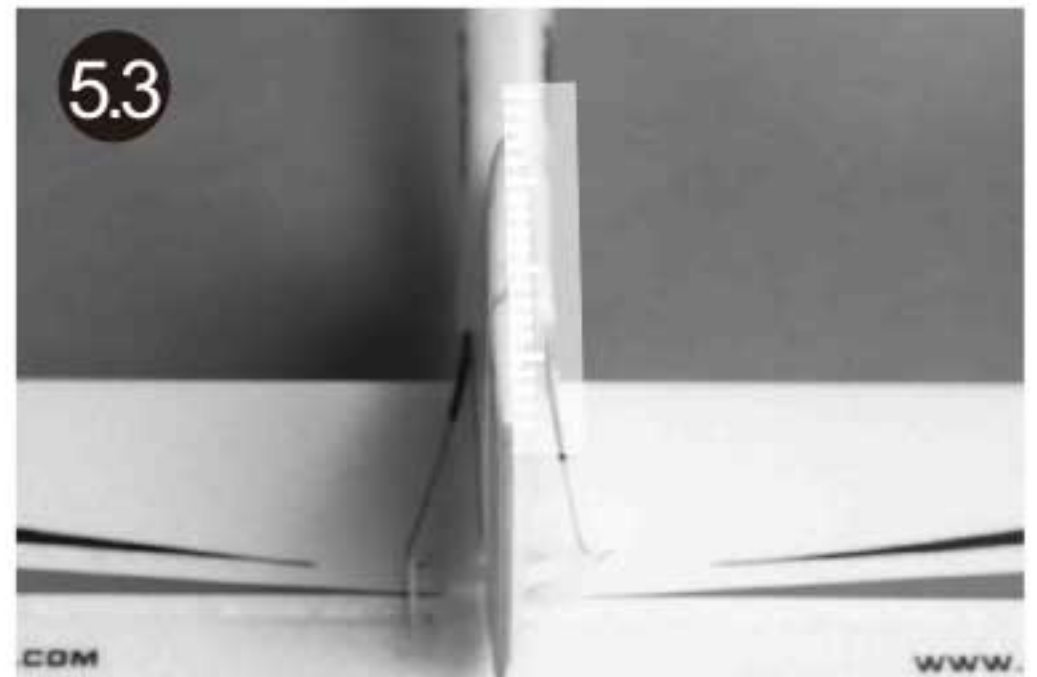


## Get your model ready to fly

4. Align the rudder and elevator with the stabilizer by open the servos hatch under of the fuselage the first.



5. Set the stabilizer neutral position by loosening the screw on control connectors and moving the linkage rod. Be sure to tighten the screw when the adjustment is complete.








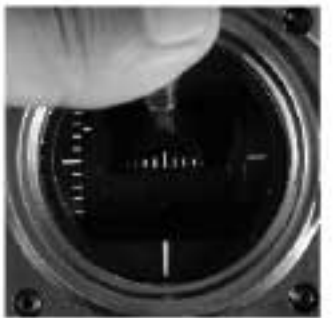



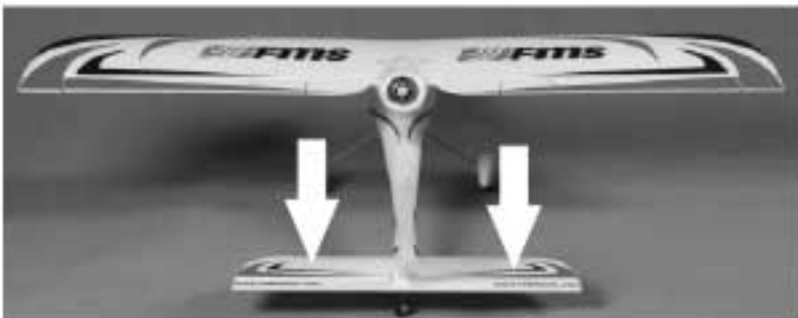





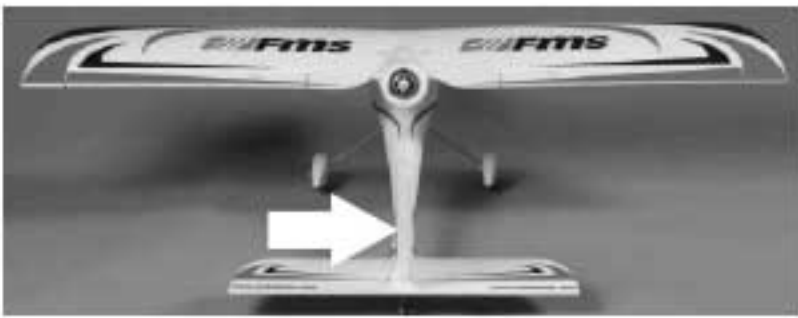




## Get your model ready to fly

### Check the control direction

Move the controls on the transmitter to make sure aircraft control surface move correctly. The control surface direction resting is been conduct from the tail view of the plane.

 	 	 	<p><b>Aileron</b></p>
 	 	 	<p><b>Elevator</b></p>
 	 	 	<p><b>Rudder &amp; Steering</b></p>

## Get your model ready to fly

### Check the control throws

The suggested control throw settings for **Red dragonfly** are as follows (Dual rate setting):

	High Rate	Low Rate
Ailerons	15mm up/down	10mm up/down
Elevator	10mm up/down	6mm up/down
Rudder	10mm up/down	6mm up/down

**Tips:** At first flight, fly the model in low rate. The first you set high rate, please fly at low to medium speed, high rate, as listed, is only for EXTREME maneuvering.

### Check the motor rotating direction

- The propeller rotating the clockwise from the tail view of the plane.  
**CAUTION:** Before testing the propeller, make sure the tail of the plane is firmly on the model stand and ensure there are no people or objects in the range of the propeller.



### Install the propeller

- Make sure the propeller adaptor is fitted well on the motor shaft before install the propeller. The hex notch side of the propeller faces the front of the plane.



- Secure the propeller holding bullet, do not over tighten the bullet, but make sure it is tight enough.



## *Before the model flying*

### **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, a site at least the size of two to three football fields should be adequate— a flying field specifically for R/C planes is best. Never fly near people— especially children who can wander unpredictably.

### **Perform the range check of 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 the 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 will turn and possibly cause damage or injury.

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

### **Monitor your flight time**

Monitor and limit your flight time use a timer (such as one on a wrist watch or in your transmitter if yours has one). 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 6 minutes. When your alarm sounds you should land right away.

## *Flying course*

### **Take off**

The plane can take off by the from the runway and hand launch due to it's optimized gliding capacity.

Ground take off: While applying power slowly steer to keep the model straight, the plane should accelerate quickly. As the model gains flight speed, you will want to rotate when you feel comfortable. The plane will climb out at a nice angle of attack (AOA).

To hand launch the plane, hold the fuselage on the underside of the airplane. Give a firm throw directly into the wind slightly up (5-10 degrees above the horizon) with the throttle all the way down and the propeller not spinning. After release, when the propeller is clear of your hands, throttle up to climb out.

**Warning:** Do not to input the throttle while you grip the plane in your hand to avoid any body injuries due to the highly rotate parts of the plane.

### **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 be for choosing a location to fly your aircraft.

### **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.

Recharge the battery and repair the model as needed. The model's nose wheel and bottom fin skids let the model land on the hard surfaces when needed (which may damage the propeller). 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 throttle to avoid damage the propeller or other components.

### **Maintenance**

The Red dragonfly is made from PA and polythene, repairs to the foam can be made using virtually any adhesive (hot glue, regular CA, epoxy, etc). When parts are not repairable, see the Spare Parts List for ordering by Item number.

Always check to make sure the screw for the control horns specially the screws related to the highly rotated components are firmly grabbed into place (The nut of the propeller adaptor, the screws hold the motor into place).

## Troubleshooting

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

# AMA

If you are not already a member of the AMA, please join, The AMA is the governing body of model aviation and membership provided liability insurance coverage, protects modelers' rights and interests and is required to fly at most R/C sites.

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## Academy of Model Aeronautics National Model Aircraft Safety Code

Effective January 1, 2011

- A. GENERAL:** A model aircraft is a non-human-carrying aircraft capable of sustained flight in the atmosphere. It may not exceed limitations of this code and is intended exclusively for sport, recreation and/or competition.  
All model flights must be conducted in accordance with this safety code and any additional rules specific to the flying site.
1. Model aircraft will not be flown:
    - (a) In a careless or reckless manner.
    - (b) At a location where model aircraft activities are prohibited.
  2. Model aircraft pilots will:
    - (a) Yield the right of way to all man carrying aircraft.
    - (b) See and avoid all aircraft and a spotter must be used when appropriate.  
(AMA Document #540-D-See and Avoid Guidance.)
    - (c) Not fly higher than approximately 400 feet above ground level within three (3) miles of an airport, without notifying the airport operator.
    - (d) Not interfere with operations and traffic patterns at any airport, heliport or seaplane base except where there is a mixed use agreement.
    - (e) Ensure the aircraft is identified with the name and address or AMA number of the owner on the inside or affixed to the outside of the model aircraft.  
(This does not apply to model aircraft flown indoors).
    - (f) Not operate aircraft with metal-blade propellers or with gaseous boosts except for helicopters operated under the provisions of AMA Document #555.
    - (g) Not operate model aircraft while under the influence of alcohol or while using any drug which could adversely affect the pilot's ability to safely control the model.
    - (h) Not operate model aircraft carrying pyrotechnic devices which explode or burn, or any device which propels a projectile or drops any object that creates a hazard to persons or property.

**Exceptions:**

- ◆ Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight.
  - ◆ Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Team AMA Program Document (AMA Document #718).
3. Model aircraft will not be flown in AMA sanctioned events, air shows or model demonstrations unless:
- (a) The aircraft, control system and pilot skills have successfully demonstrated all maneuvers intended or anticipated prior to the specific event.
  - (b) An inexperienced pilot is assisted by an experienced pilot.
4. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

**B. RADIO CONTROL (RC)**

1. All pilots shall avoid flying directly over unprotected people, vessels, vehicles or structures and shall avoid endangerment of life and property of others.
2. A successful radio equipment ground-range check in accordance with manufacturer's recommendations will be completed before the first flight of a new or repaired model aircraft.
3. RC model aircraft must use the radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.
4. RC model aircraft will not operate within three (3) miles of any pre-existing flying site without a frequency-management agreement (AMA Documents #922-Testing for RF Interference; #923- Frequency Management Agreement)
5. With the exception of events flown under official AMA Competition Regulations, excluding takeoff and landing, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and the pilot's helper(s) located at the flight line.
6. Under no circumstances may a pilot or other person touch a model aircraft in flight while it is still under power, except to divert it from striking an individual. This does not apply to model aircraft flown indoors.
7. RC night flying requires a lighting system providing the pilot with a clear view of the model's attitude and orientation at all times.
8. The pilot of a RC model aircraft shall:
  - (a) Maintain control during the entire flight, maintaining visual contact without enhancement other than by corrective lenses prescribed for the pilot.
  - (b) Fly using the assistance of a camera or First-Person View (FPV) only in accordance with the procedures outlined in AMA Document #550.

**C. FREE FLIGHT**

1. Must be at least 100 feet downwind of spectators and automobile parking when the model aircraft is launched.
2. Launch area must be clear of all individuals except mechanics, officials, and other fliers.
3. An effective device will be used to extinguish any fuse on the model aircraft after the fuse has completed its function.



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