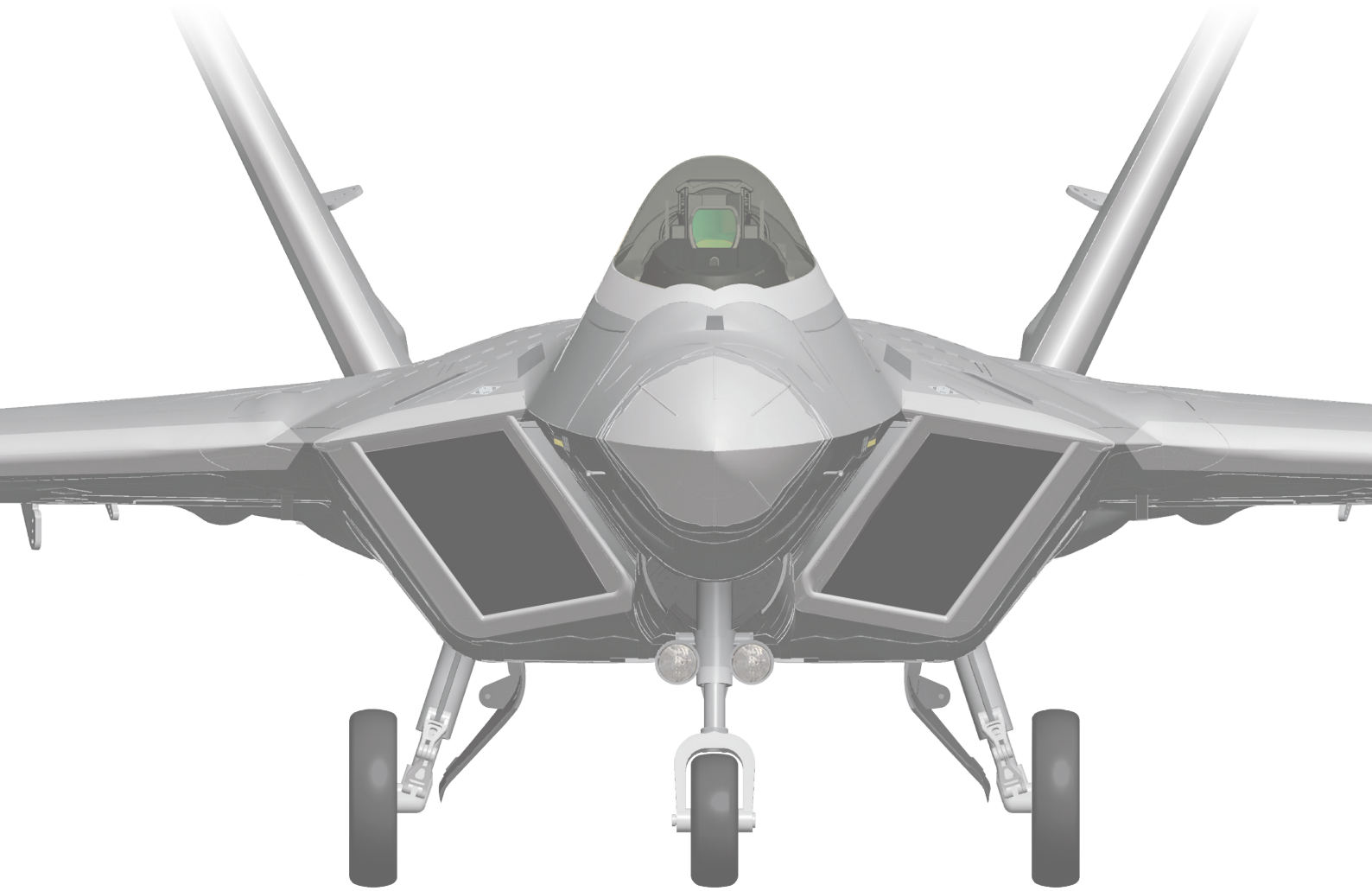
www.freewing-model.com

F-22 RAPTOR

User Manual

80MM EDF JET

WINGSPAN:935MM(36.8") LENGTH:1300MM (51.2")
EMPTY WEIGHT:2530G (W/O BATTERY)



Thank you for purchasing our Freewing 80mm EDF super scale jet, F-22 Raptor. Before you assemble this F-22 model jet, please carefully read the instructions and follow the correct process for assembly and adjustment. If you encounter problems during assembly and debugging, please first resolve them by referring to the instructions. If the problem persists, please contact the distributor or directly contact us.

As is well known, the F-22 has excellent flight performance, and many model airplane enthusiasts have already or will soon experience the flying pleasure it brings. We provide F-22 ducted aircraft models of different sizes and design thinking to meet different needs.

This Freewing F-22 Raptor 80mm EDF electric model jet uses EPO material, length is 1300mm, wing span is 935 mm. As a new member of 80mm EDF jet, it will present us with more scale details: realistic concave and convex surfaces, precise engraved line details, more plastic parts that shape the appearance details, simulated dashboard and ejection seat (optional), hidden control surface hinge, simulated LED navigation lights, landing gear sliding lights and LED light for heads-up display, front and rear intact cabin doors, and high-precision, painted landing gear. Compared with the Freewing F-22 90mm EDF jet, it leans more towards the design of simulation elements. 80 F22 and 90 F22 complement each other.

The PNP version can be assembled without glue. The main wing adopts the screw-less "QUICK II" portable install structure. It makes the use and storage of the aircraft more convenient. And tail wing use the screws to fix. It will finish the installation within 30 minutes.

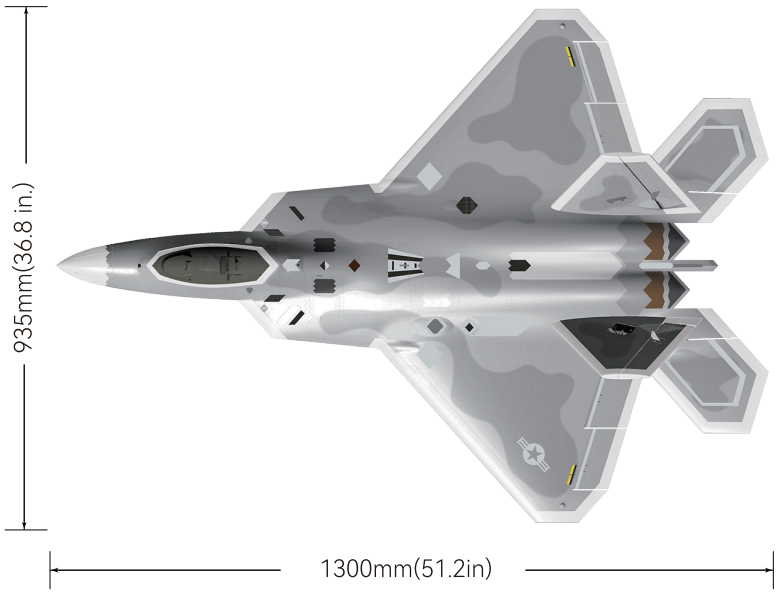
When PNP at factory, it pre-installed with a 80mm 12 blade duct fan, a 3658-2150KV brushless in-runner motor, and an 100A ESC. Under this configuration, the maximum level flight speed reaches 178KM/H, and the powerful power brings a more enjoyable flying experience!

Thank you again. I hope this new F-22 Raptor model jet can bring you a better experience. I wish you a successful flight!

Note:

1.This is not a toy! Operater should have a certain experience, beginners should operate under the guidance of professional players.
2.Before install, please read through the instructions carefully and operate strictly under instructions.
3.Cause of wrong operation,Freewing and its vendors will not be held responsible for any losses.
4.Model planes' players must be on the age of 14 years old.
5.This plane used the EPO material with surface spray paint, don' t use chemical to clean, otherwise it will damage.
6.You should be careful to avoid flying in areas such as public places,high-voltage-intensive areas,near the highway, near the airport or any other place where laws and regulation clearly prohibit.
7.You cannot fly in bad weather conditions such as thunderstorms,snows....
8.Model plane's battery, don't allowed to put in everywhere. Storage must ensure that there is no inflammable and explosive materials in the round of 2M range.
9.Damaged or scrap battery should be properly recycled, it can't discard to avoid spontaneous combustion and fire.
10.In flying field, the waste after flying should be properly handled,it can't be abandoned or burned.
11.In any case, you must ensure that the throttle is in the low position and transmitter switch on, then it can connect the lipo-battery in aircraft.
12.Do not try to take planes by hand when flying or slow landing process. You must wait for landing stop, then carry it.

⚠ **NOTE:** This is not a toy. Not for children under 14 years. Young people under the age of 14 should only be permitted to operate this model under the instruction and supervision of an adult. Please keep these instructions for further reference after completing model assembly.



Standard Version

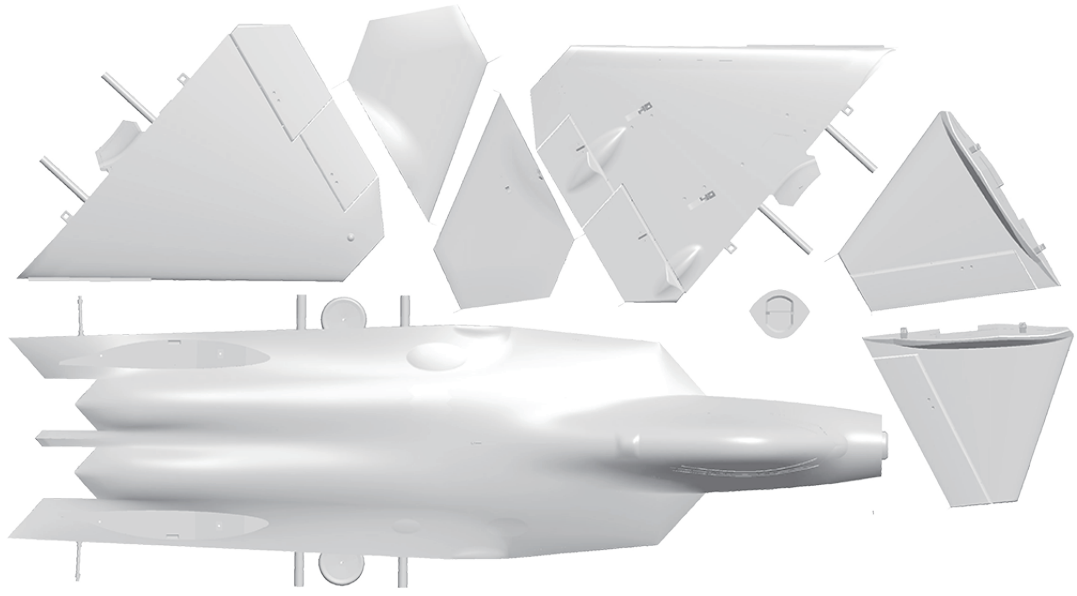
Wingload: 89.1g/dm²
Wing Area: 36.9dm²
Servo: 9gHybrid digital servo(7pcs)
9gDigital plastic servo(3pcs)
23gMG digital servo(2pcs)
Motor: 3658-2150KV I/R Motor
Ducted fan: 80mm 12-blade fan
ESC: 100A Brushless(7A UBEC)
Weight: 2530g(w/o Battery)
Li-Po Battery: 6S 4000-5200mAh

Other Notes

Landing gear: electric retracts and aluminum shock absorber struts, scale decorated part
Cabin doors: front and rear complete cabin doors, servo control
Navigation lights: LED navigation lights
Other: Simulated cockpit 3D printing set (need to purchase separately)

⚠ Note: The parameters in here are derived from test result using our accessories.
If use other accessories, the test result will be different. Any problem since of using other accessories, we are not able to provide technical support.

Package List



Different equipment include different spareparts. Please refer to the following contents to check your sparepart list.

No.	Name	PNP	ARF Plus
1	Fuselage	Pre-installed all electronic parts	Pre-installed servo
2	Main wing	Pre-installed all electronic parts	Pre-installed servo
3	Horizontal tail	Pre-installed all electronic parts	Pre-installed servo
4	Vertical tail	Pre-installed all electronic parts	Pre-installed servo
5	Nose cone	√	√

No.	Name	PNP	ARF Plus
6	Cockpit	√	√
7	Landing gear	√	√
8	Annex bag	√	√
9	Manual	√	√

Install the Horizontal tail

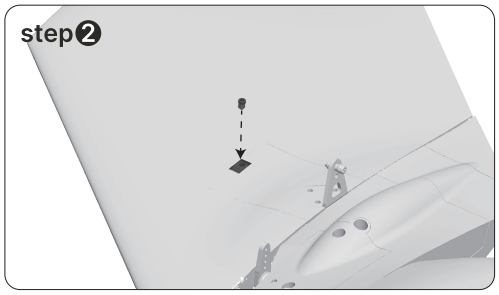
As the photo show:

1. Put the elevator fixing ring (screw hole facing upwards) into the elevator installation groove; Wrap it together with the horizontal tail on the rotating shaft at the end of the fuselage until it reaches the bottom.
2. Screw the screw into the locking hole on the fixing ring to prevent the horizontal tail from falling off.
   (First, lock the screw into the horizontal tail fixing ring, and then place it into the horizontal tail installation slot for easier installation.)
3. Repeat the above steps and install the other side with a horizontal tail.

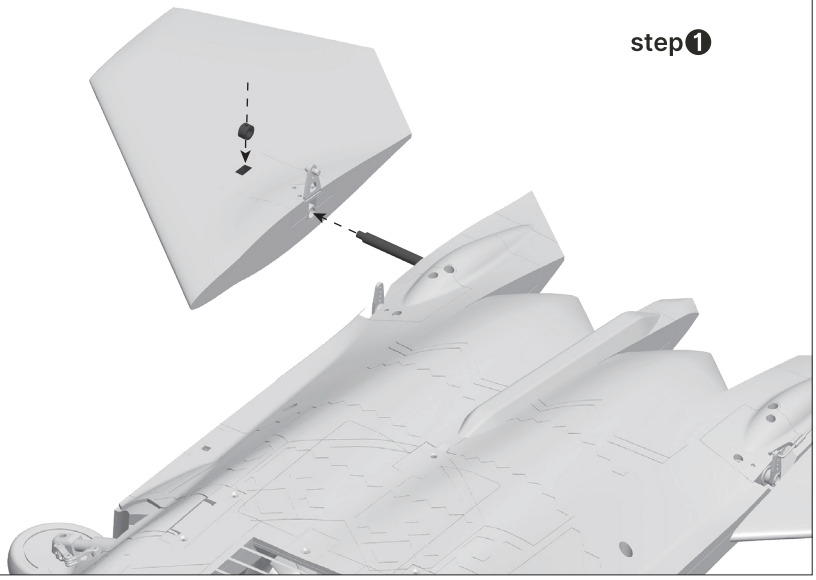
Screw (M 4*3mm 2PCS)

⚠ Attention: The diameter of the screw here is small, and it can be tightened slightly during the tightening process. Do not use excessive force to cause the screw to slip.

step❷



step❶



Install Main Wing

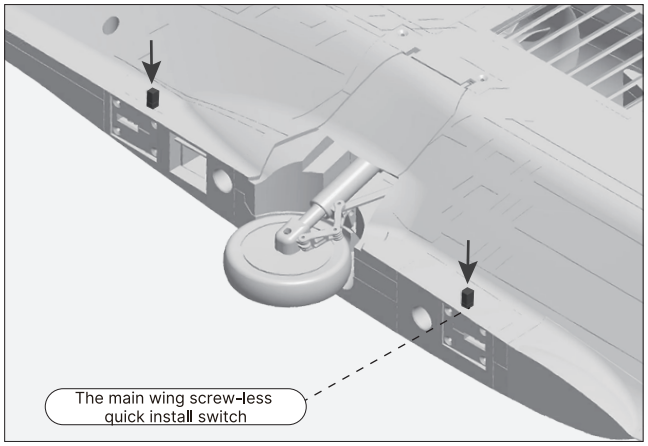
As the photo show:

1. Press the fuselage screw-less quick install switch to unlock it ;❶

❶ Two different status diagrams of the main wing screw-less quick install switch:（The working mode is to press the button to the bottom and release it. The button pops up to the highest position, which is the unlocked status.Once the button is pressed to the bottom again and released, but the button does not pop up, which is the locked status）

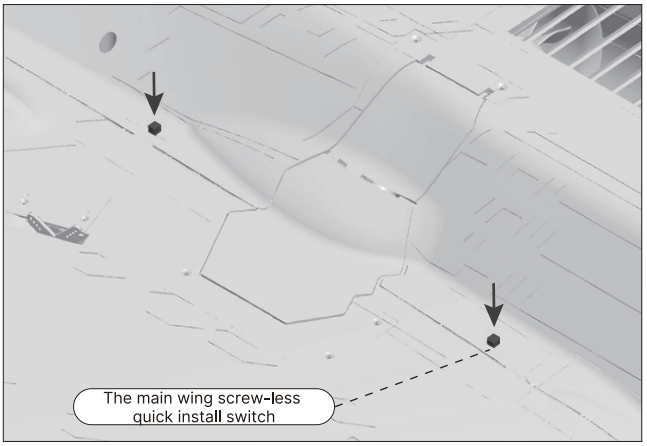
Unlock status

As shown in the following photo:
Press the main wing screw-less quick install switch to the bottom and release it. The button pops up to the highest position, indicating that the main wing has been unlocked and can be easily removed and installed.



Lock status

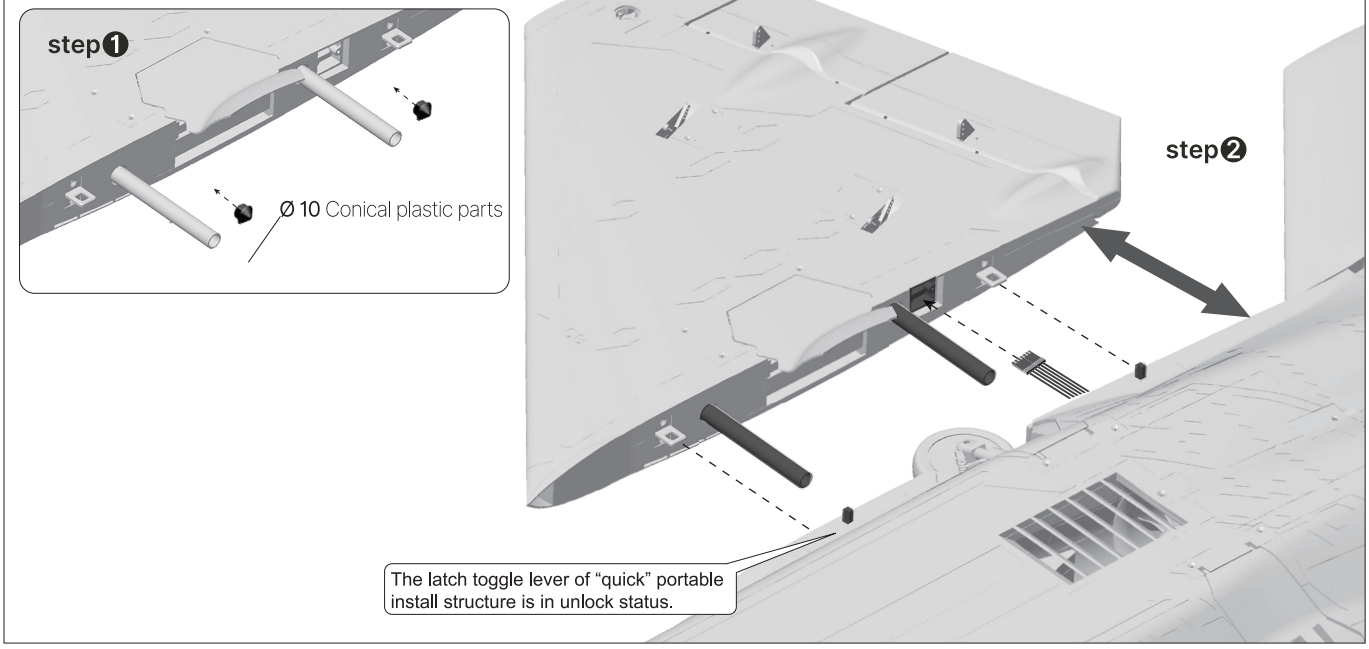
As shown in the following photo:
After installed the main wing, press again the main wing screw-less quick install switch to the bottom and release it. If the button does not pop up, it is the locked status. At this point, pull the main wing outward and can not remove it.



Install Main Wing

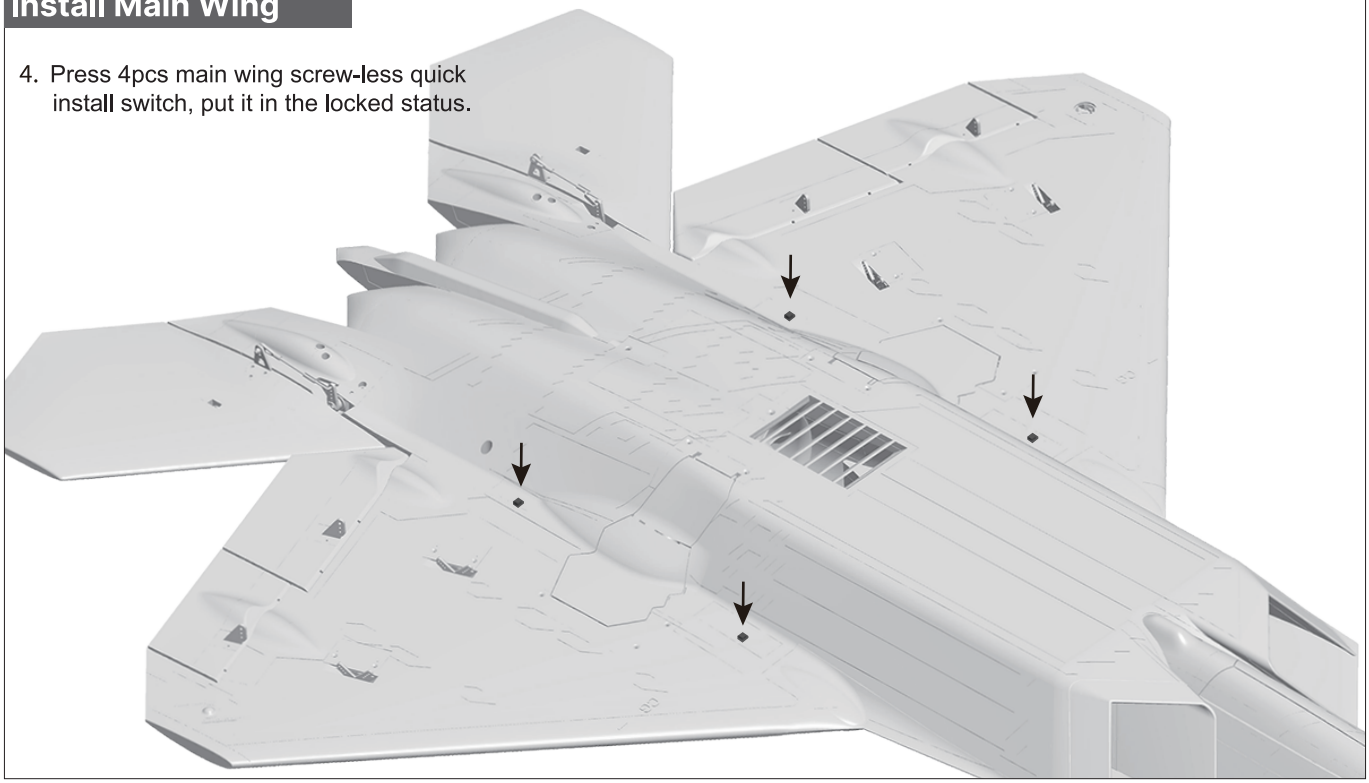
2. Use glue to fix the 【Conical plastic part】 on two carbon tubes respectively;
3. Align the main wing carbon tube with the fuselage, remove the ribbon cable from one end of the fuselage, connect it to the main wing slot, and push the main wing into the installation position of the fuselage; (Repeat this step for the other main wing)

Conical plastic parts (Ø10mm 4PCS)



Install Main Wing

4. Press 4pcs main wing screw-less quick install switch, put it in the locked status.

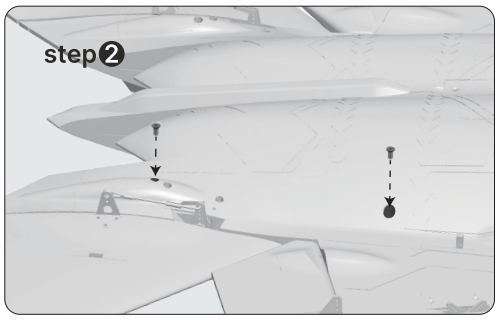


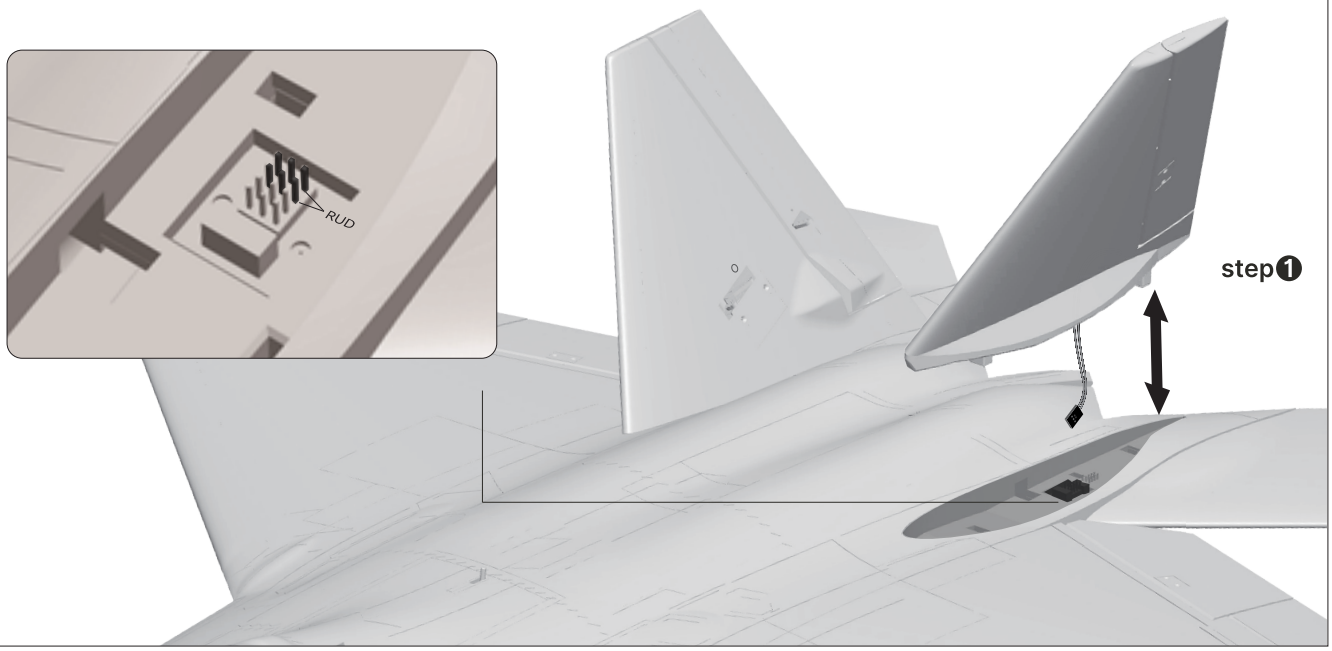
Install the Vertical tail

As the photo show:

1. Insert the rudder servo wire onto the tail wing control board;
2. After installed the vertical tail onto the fuselage, tighten it with four screws.
   (Repeat this step for the other vertical tail)

Screw (KM 3*7mm 4PCS)

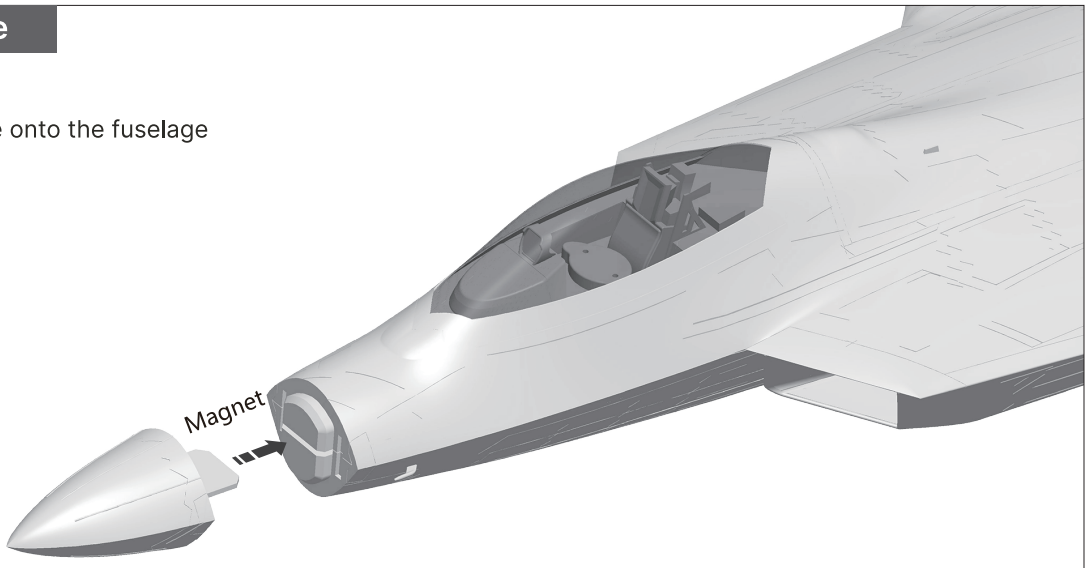




Install Nose Cone

As the photo show:

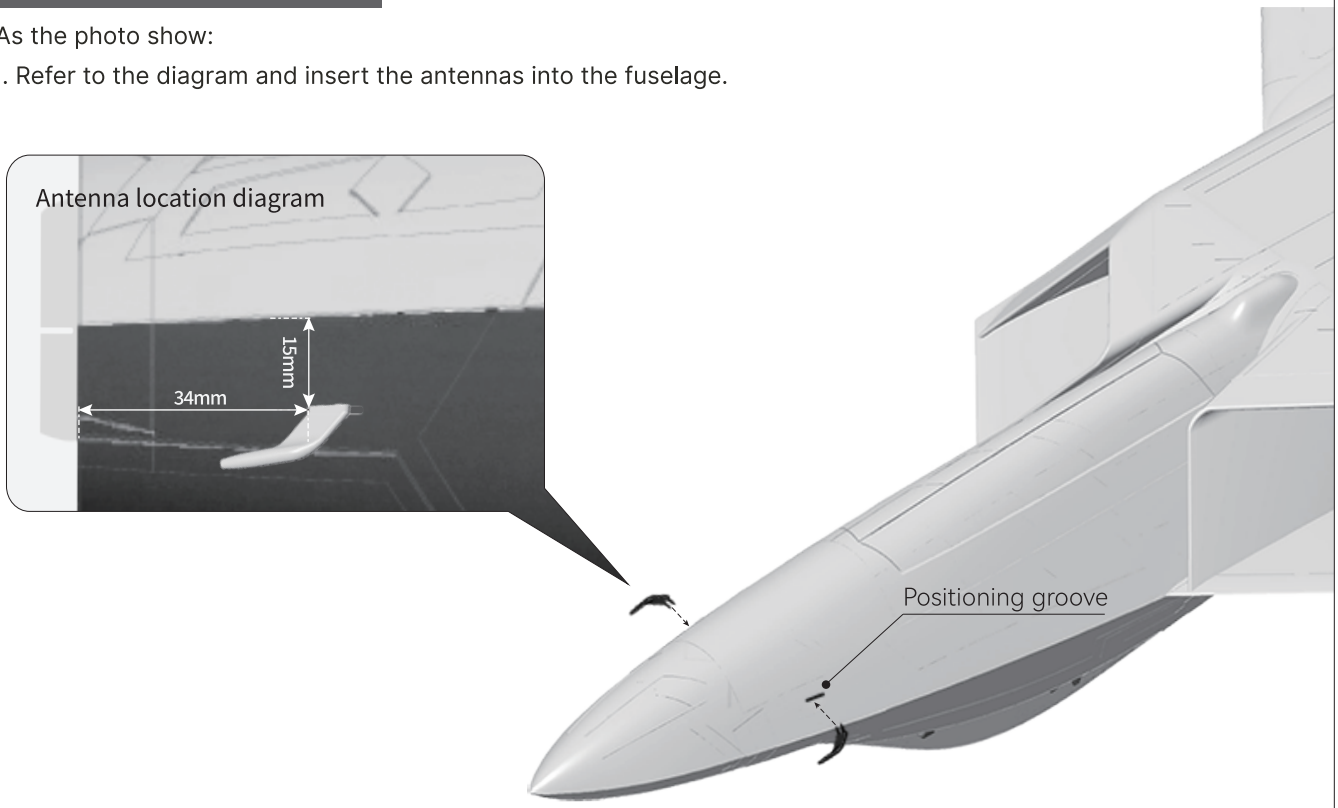
1. Install the nose cone onto the fuselage



Install other accessories

As the photo show:

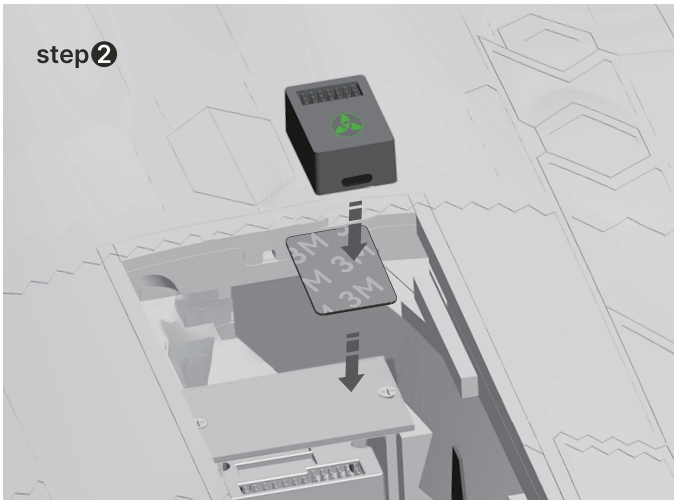
1. Refer to the diagram and insert the antennas into the fuselage.

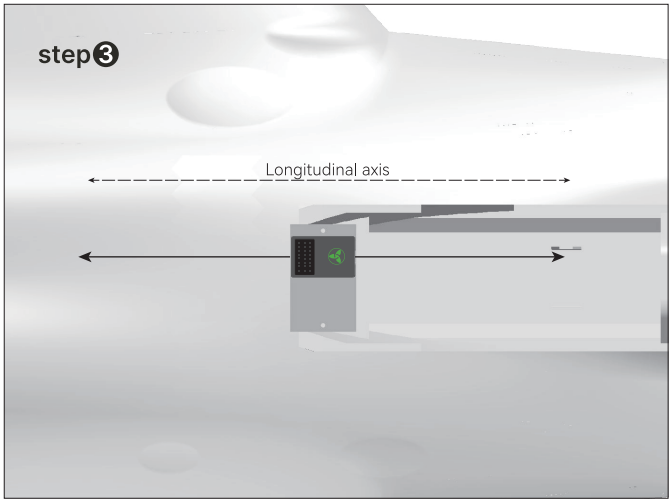


Install optional accessory – Freewing Guard 6-axis gyro

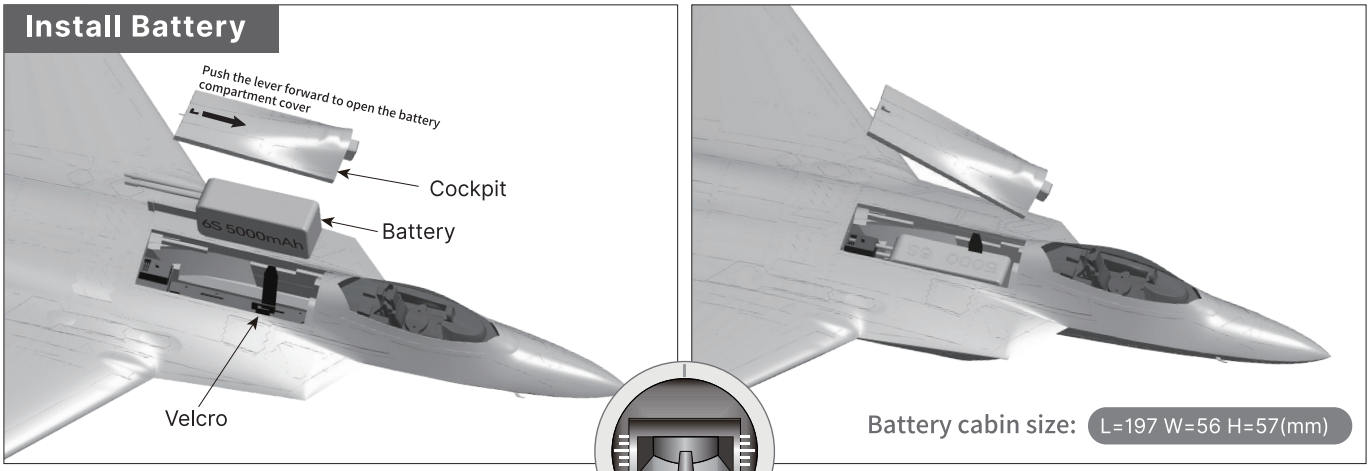
As the photo show:

1. Use double-sided tape to install the Freewing Guard 6-axis gyro on the wooden piece, keeping the gyro parallel to the longitudinal axis of the aircraft and minimizing installation angle deviation.





Install Battery

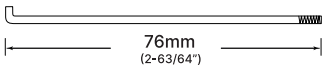


Before connecting the battery and receiver, please switch on the transmitter power and make sure the throttle stick is in the lowest position. Bind your receiver to your transmitter according to your transmitter's instruction manual.

We recommend the following LiPo battery:
6S 22.2V 4000mAh~6S 22.2V 5200mAh (1pcs)
Discharge rate of C ≥35C

Pushrod Instructions

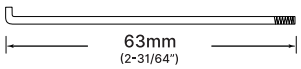
Aileron pushrod length



Pushrod diameter Ø1.5mm

Aileron pushrod mounting hole

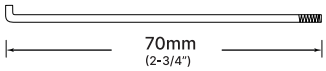
Rudder pushrod length



Pushrod diameter Ø1.5mm

Rudder pushrod mounting hole

Flap pushrod length



Pushrod diameter Ø1.5mm

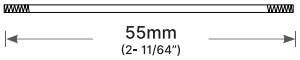
Flap pushrod mounting hole(Inside)

Elevator pushrod length

Pushrod diameter Ø1.5mm

Elevator pushrod mounting hole

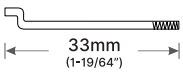
Nose gear steering pushrod length



Pushrod diameter Ø1.5mm

Nose gear steering pushrod mounting hole

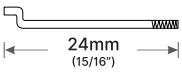
Nose Cabin door pushrod length



Pushrod diameter Ø1.2mm

Nose cabin door pushrod mounting hole

Rear cabin door pushrod length

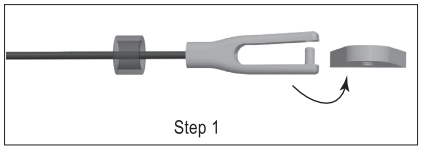


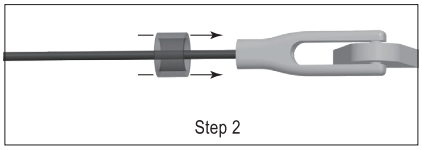
Pushrod diameter Ø1.2mm

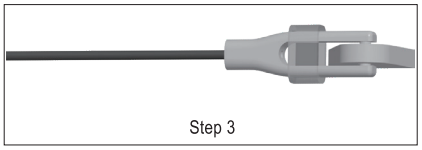
Rear cabin door pushrod mounting hole

Important additional notes

The Y-type clevis used in this product is equipped with a transparent silicone ring for secondary reinforcement, which can effectively prevent the clevis from accidentally loosening.
As shown in the following figure, when you buckle the clevis into the control surface horn, use the silicone ring to cover the clevis.





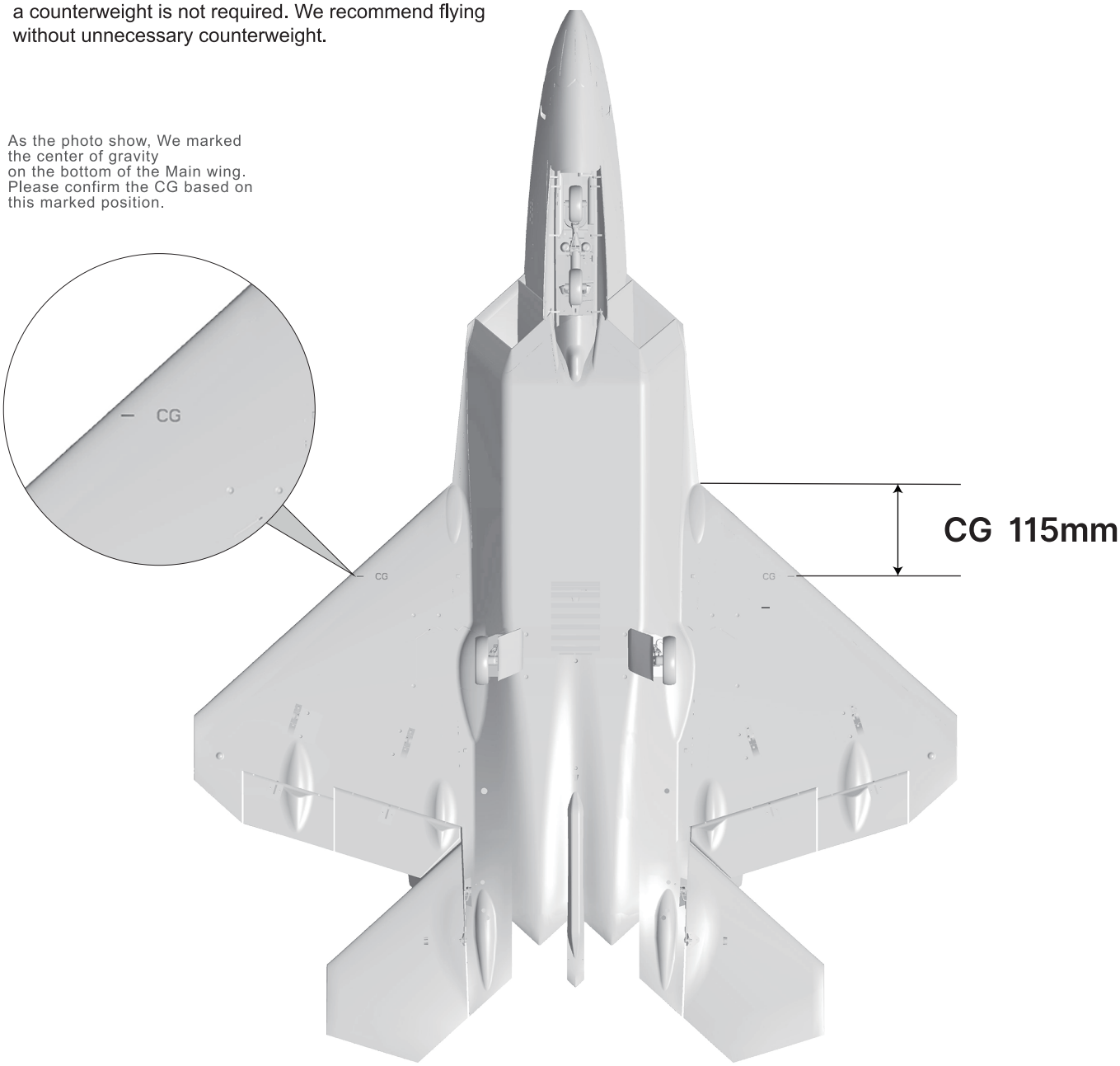


Center of Gravity

Correct Center of Gravity (”CG”) is critical for enabling safe aircraft stability and responsive control. Please refer to the following CG diagram to adjust your aircraft’s Center of Gravity.

- Depending on the capacity and weight of your choosen flight batteries, move the battery forward or backward to adjust the Center of Gravity.
- If you cannot obtain the recommended CG by moving the battery to a suitable location, you can also install a counterweight to achieve correct CG. However, with the recommended battery size, a counterweight is not required. We recommend flying without unnecessary counterweight.

As the photo show, We marked the center of gravity on the bottom of the Main wing. Please confirm the CG based on this marked position.



After installed this F22 model plane, please connect to the receiver and power on, then adjust it.

1.When all channels of radio are fine tuned to zero and the control stick is centered: check whether each control surface on the aircraft is in the center position. If it is found that the control surface is not in the center position, please adjust the control rod to center it;

2.Please refer to the diagram below and use the radio to test each control surface to ensure that its movement direction matches the diagram. If the opposite movement occurs, first check whether the relevant channel in the radio has enabled the reverse function; If the problem persists, please contact us for assistance in resolving it.

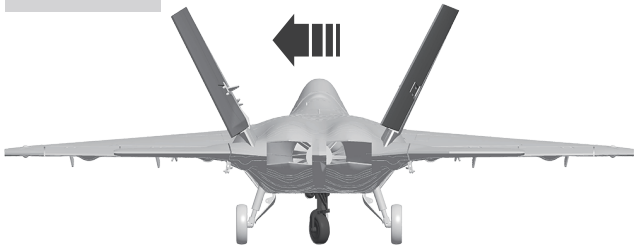
Aileron

Stick Left

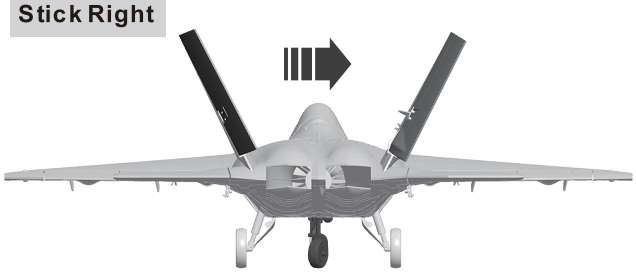
Stick Right

Rudder

Stick Left

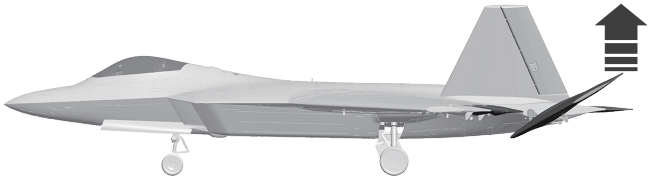


Stick Right

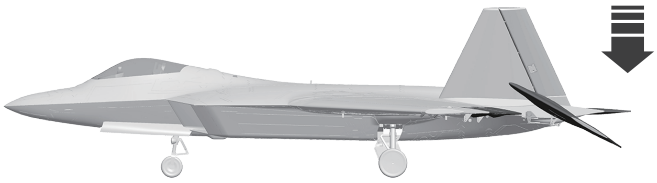


Elevator

Stick down

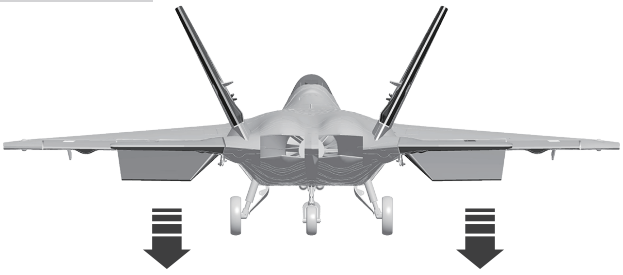


Stick up



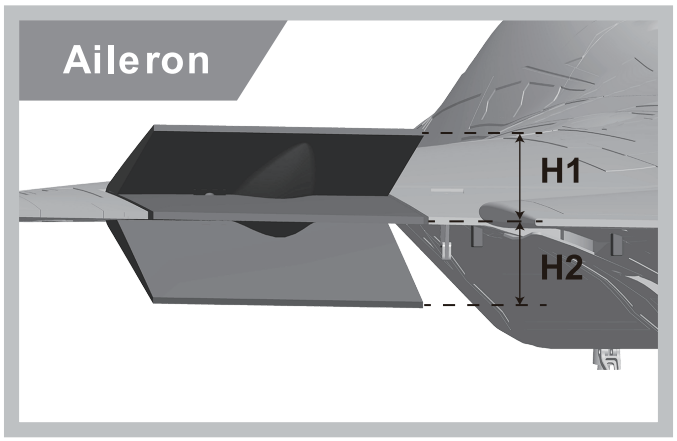
Flaps

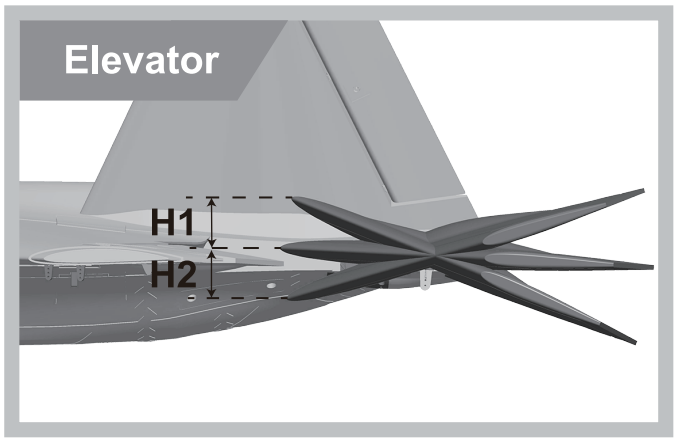
Flaps down

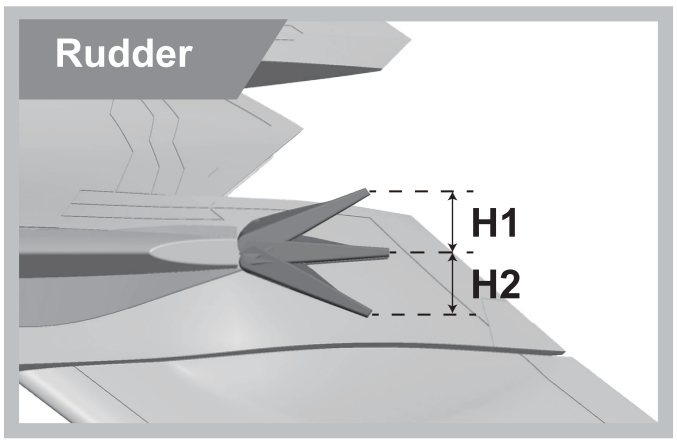


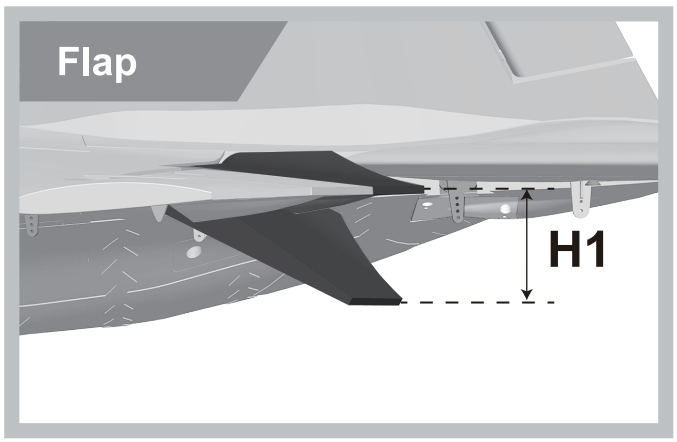
Dual Rates

According to our testing experience, use the following parameters to set Aileron/Elevator Rate. Program your preferred Exponential % in your radio transmitter. We recommend using High Rate for the first flight, and switching to Low Rate if you desire a lower sensitivity. On successive flights, adjust the Rates and Expo to suit your preference.





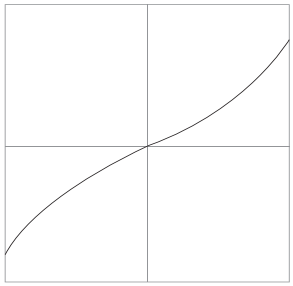




	Aileron (Measured closest to the fuselage)	**Elevator** (Measured closest to the fuselage)	**Rudder** (Measured from the bottom)	**Flaps**
Low Rate	H1/H2 22mm/22mm D/R Rate: 100%	H1/H2 28mm/28mm D/R Rate: 80%	H1/H2 10mm/10mm D/R Rate: 50%	H1 12mm
High Rate	H1/H2 22mm/22mm D/R Rate: 100%	H1/H2 34mm/34mm D/R Rate: 100%	H1/H2 12mm/12m D/R Rate: 60%	H1 19mm

Remote Control EXP Setting Suggestion

1.Elevator EXP curve is shown as below :

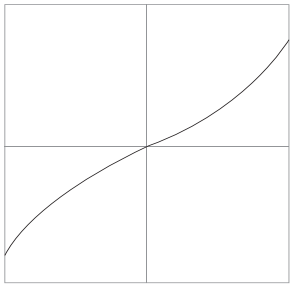


Futaba brand Remote Control : EXP A -30

EXP B -30

Spektrum brand Remote Control : EXPO 30% 30%

2.Rudder EXP curve is shown as below :



Futaba brand Remote Control : EXP A -30

EXP B -30

Spektrum brand Remote Control : EXPO 30% 30%

⚠ Important Flight Notes:

1. When F-22 80mm EDF model jet landing and flaps are developed, there may be a slight down-head. A Flap-to-Elevator Mix is required to maintain a good landing when flaps are deployed.

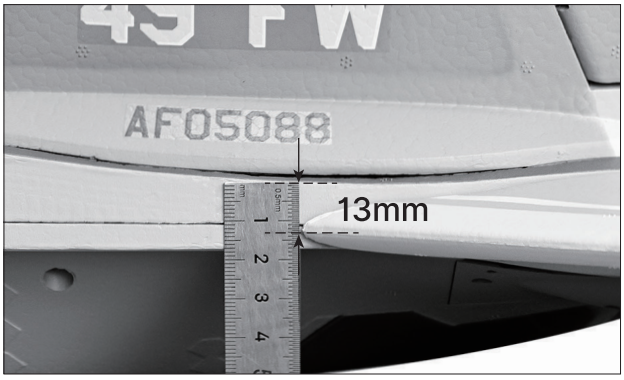
   The detail is as below:

   With flaps (Low Rate), **mix 0.8mm of Up Elevator.**

   With flaps (High Rate), **mix 1.5mm to Up Elevator.**

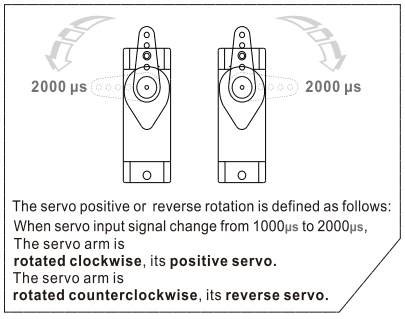
2. Please refer to the right photo and adjust the flaps and elevator to the correct center position.

   Distance from the leading edge of the horizontal tail root (at the forefront position) to the upper surface of the fuselage: 13mm

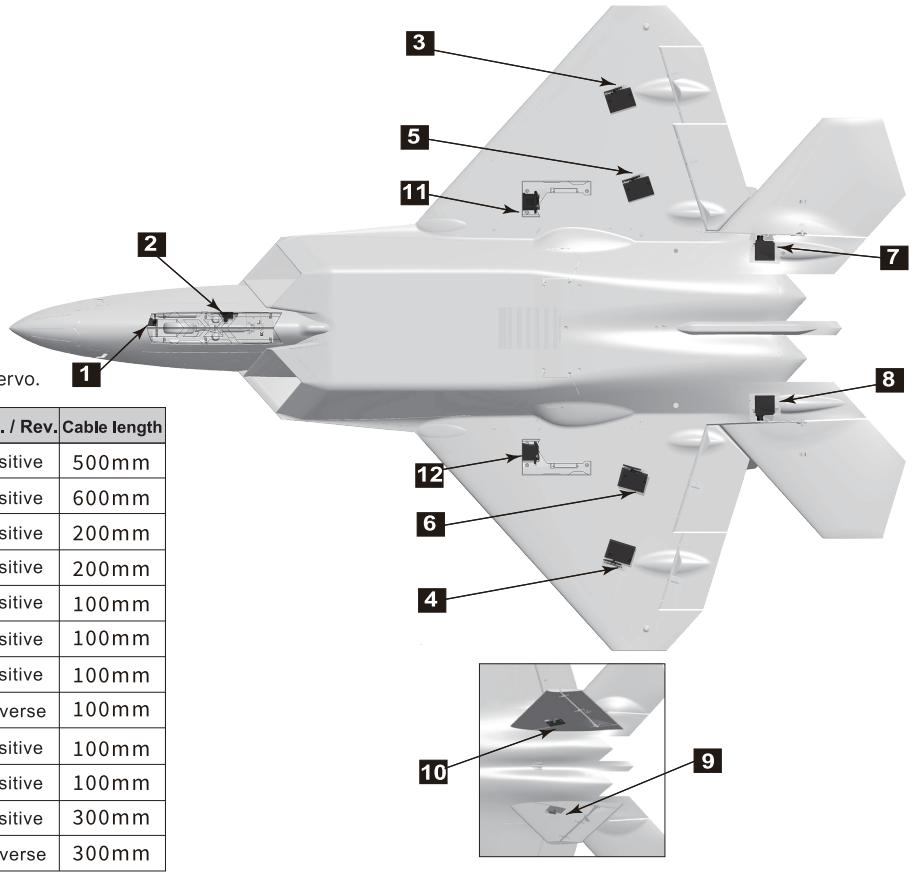


3. ESC note: This thrust reverse function of F-22 80 ESC is a specialized program, and the reverse throttle start process is relatively slow from start to maximum, with 1.5 seconds to reach the maximum throttle.
   This is a normal setting for this F-22 80 model jet. Please be careful to maintain sufficient braking distance when using.

Servo Direction



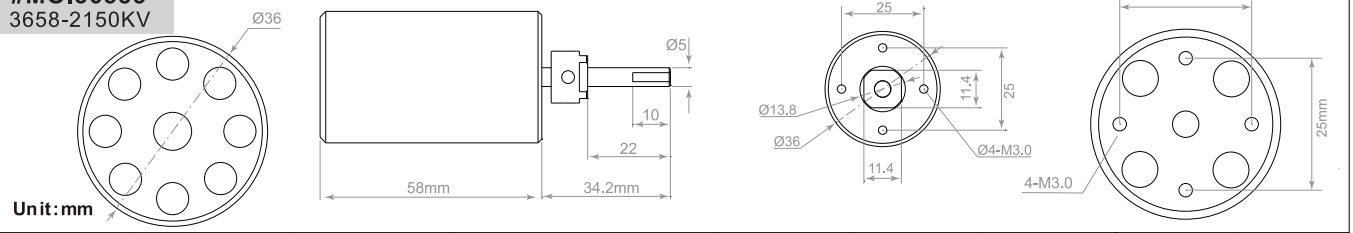
If you need to purchase another brand's servo, please refer to the following list to choose a suitable servo.



Position	Servo regulation	No.	Pos. / Rev.	Cable length
Nose gear steering servo	9g Digital-Hybrid	1	Positive	500mm
Nose cabin door	9g plastic servo	2	Positive	600mm
Aileron(L)	9g Digital-Hybrid	3	Positive	200mm
Aileron(R)	9g Digital-Hybrid	4	Positive	200mm
Flap(L)	9g Digital-Hybrid	5	Positive	100mm
Flap(R)	9g Digital-Hybrid	6	Positive	100mm
Elevator(L)	23g Digital-MG	7	Positive	100mm
Elevator(R)	23g Digital-MG	8	Reverse	100mm
Rudder(L)	9g Digital-Hybrid	9	Positive	100mm
Rudder(R)	9g Digital-Hybrid	10	Positive	100mm
rear cabin door (L)	9g plastic servo	11	Positive	300mm
rear cabin door (R)	9g plastic servo	12	Reverse	300mm

Motor Specification

#MOI36585
3658-2150KV



Item No.	Fan size	Motor specifications	Voltage (V)	Current (A)	Max power (W)	Thrust (g)	Efficiency (g/w)	Speed (rpm)	Weight (g)
E72314	80mm 12-Blade	3658-2150KV	22.2	95	2100	3550	1.7	47700	340