



F-22 Raptor V2

USER MANUAL

Wingspan: 1060mm (41.7 in)
Length: 1500mm (59 in)



www.sz-freewing.com

MADE IN CHINA

EN

1-10

中

11-18

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Thank you for purchasing our Freewing 90mm EDF Super Scale Jet, the F-22 Raptor! The F-22 is the world's first and features cutting edge advances such as stealth capabilities, enhanced agility and computer controlled maneuverability, and precision weapon combat capabilities. The F-22 represents the future of modern air combat, and its technology continues to set the standard against which all other Fifth Generation fighters are judged.

The Freewing F-22 is a flying foam RC replica of this innovative fighter jet. The Freewing F-22 is 1500mm in length, with a wingspan of 1060mm. Assembled from an array of materials including EPO foam, aluminum, carbon fiber, and other parts, the Freewing F-22 is capable of extreme maneuvers and extended durability on grass runways. The model aircraft features highly detailed surface detailing and paintwork and decals, to accentuate the muted but complex surface seen on the full-size F-22. Assembly is completed primarily with screws to attach the flying surfaces. The main wings disconnect conveniently with a flexible ribbon wire cable, which smartly reduces the load exerted on the actual electronic connections.

The Freewing F-22 is available in two PNP versions. The Standard version features a 90mm EDF with an all-new 12 blade single piece impeller, factory balanced for precise operation, paired with a 3668-1960KV In-runner brushless motor and 120A ESC. The Deluxe version features a 90mm 12 blade impeller, also molded as a single unit and factory balanced, mounted to a powerful 4075-1350KV outrunner brushless motor and 120A ESC. The F-22's maximum level airspeed has been measured at 170KPH / 106MPH and 190KPH / 119MPH between the Standard and Deluxe versions, respectively.

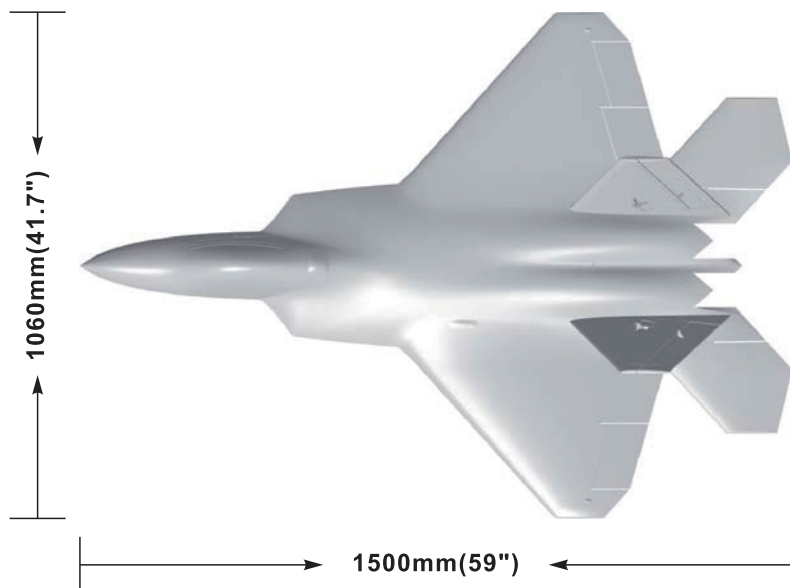
The Freewing F-22 has been optimized for operation on paved runways and also short grass runways. Even without flaps, the model can takeoff in less than 30 meters. A widened gear stance and larger grass-appropriate wheels greatly improve ground handling. In the flight pattern, the F-22 truly shines. It is highly maneuverable and difficult to stall, and can be flown at high angles of attack including high-alpha passes, inverted Immelmans, etc. In the landing pattern, flaps are not required to slow the model to a long and level descent. If flaps are desired, we recommend mixing slight down elevator to avoid a nose-high approach.

Overall the Freewing 90mm F-22 is a very approachable flyer and suitable for pilots moving up from 80mm to their first 90mm jet.

Note

1. This is not a toy! Operator 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.

 **Warning:** 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.



Wingloading: 80.5g/dm²
 Wing area : 48 dm²
 Servo: 9g digital hybrid (2pcs)
 17g digital MG (6pcs)
 23g digital MG (2pcs)

6S Standard Version

Motor: 3668-1960KV In-runner
 Ducted fan: 90mm 12-Blade fan
 ESC: 120A with 8A UBEC
 (Thrust Reverse Function)
 Empty weight: 3100g (w/o battery)
 Thrust: 3700g

8S Deluxe Version

Motor: 4075-1350KV I/R brushless motor
 Ducted fan: 90mm 12-Blade fan
 ESC: 120A with 8A UBEC
 (Thrust Reverse Function)
 Empty weight: 3200g (w/o battery)
 Thrust: 4700g

Features

EPO material with plastic parts
 Electric retracts and trailing link suspension struts
 Magnetic removable nose cone with plastic cap
 Spring-hinged double nose door
 Nose landing gear Led light
 Simulated formation lights
 Scale pilot (1pcs)

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



No.	Name	PNP	ARF Plus	Airframe
1	Fuselage	Pre-installed all electronic parts	Pre-installed servo	No electronic equipment
2	Main wing	Pre-installed all electronic parts	Pre-installed servo	No electronic equipment
3	Horizontal tail	✓	✓	✓
4	Vertical tail	Pre-installed all electronic parts	Pre-installed servo	No electronic equipment
5	Nose cone	✓	✓	✓
6	MCB-E	✓	✓	✓

No.	Name	PNP	ARF Plus	Airframe
7	Carbon tube	✓	✓	✓
8	Pushrod	✓	✓	✓
9	Non-slip mat	✓	✓	✓
10	Glue	✓	✓	✓
11	Manual	✓	✓	✓
12	Screw	✓	✓	✓

PNP Assembly Instructions

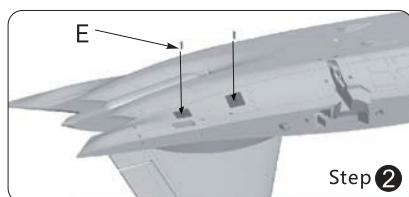
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Install vertical tail

Assemble left and right Vertical stabilizer as the right photo show:

Step 1

- A- the vertical tail
- B- fuselage
- C- formation light wire
- D- servo wire
- E- Screw (KM 3*10mm 4PCS)

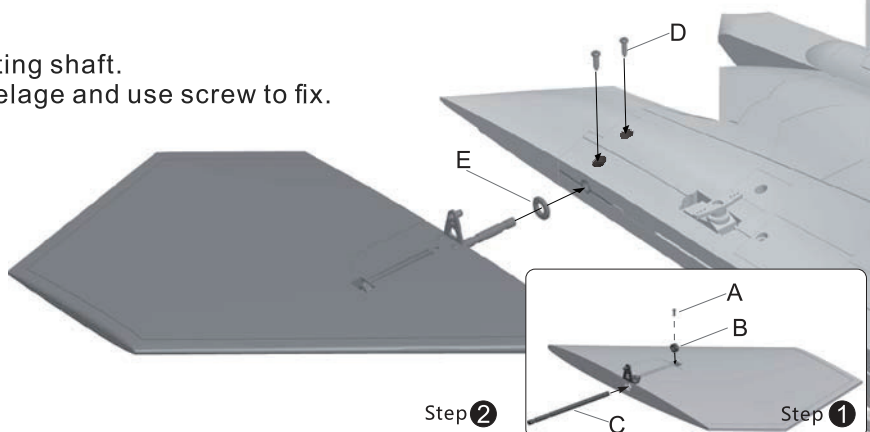


Step 2

Install horizontal tail

1. Use metal fixed ring to fix the rotating shaft.
2. Insert the rotating shaft to the fuselage and use screw to fix.

- A- Screw (HM 2*4mm 2PCS)
- B- metal fixed ring
- C- Rotating shaft
- D- Screw (KM 3*10mm 4PCS)
- E- Washer



Step 2

Step 1

Install Main Wing

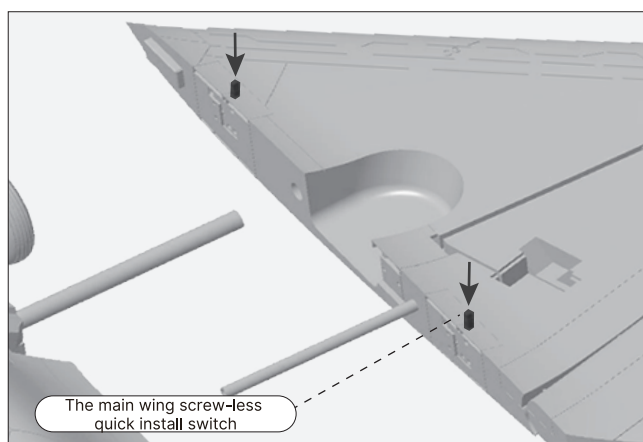
As the photo show:

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

- 1 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

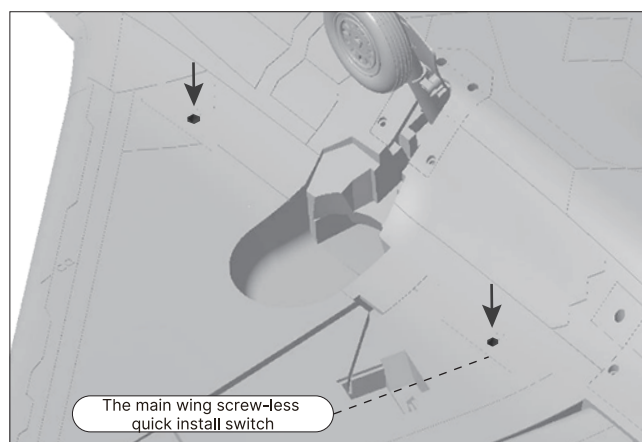
As shown in the following photo:
Press the main wing screw-less quick install switch to the bottom and release it. The button pops up to the highest position, indicating that the main wing has been unlocked and can be easily removed and installed.



The main wing screw-less quick install switch

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.



The main wing screw-less quick install switch

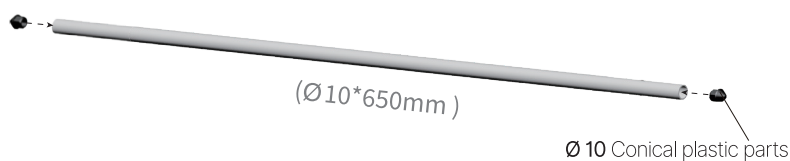
Install Main Wing

As the photo show:

1. Use glue to fix the 【 Conical plastic part 】 on two carbon tubes respectively;

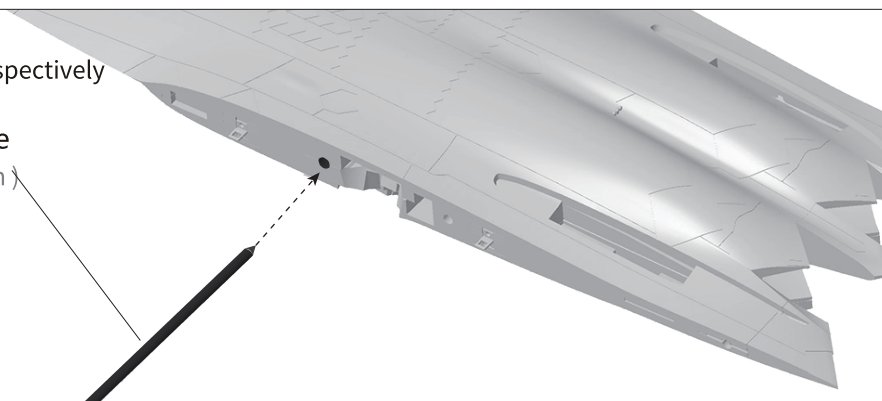
Carbon tube (Ø10*650mm)

Conical plastic parts (Ø10mm)

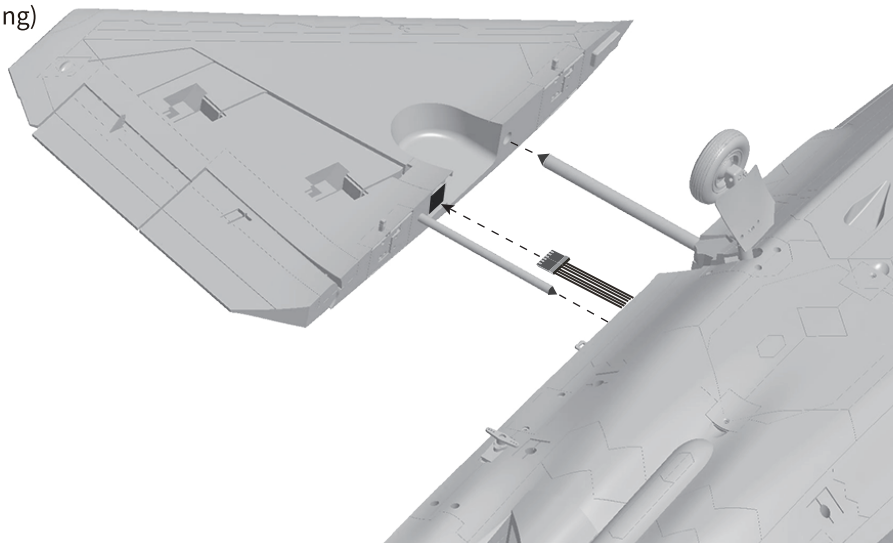


2. Insert carbon fiber tube A and carbon fiber tube B into the fuselage respectively

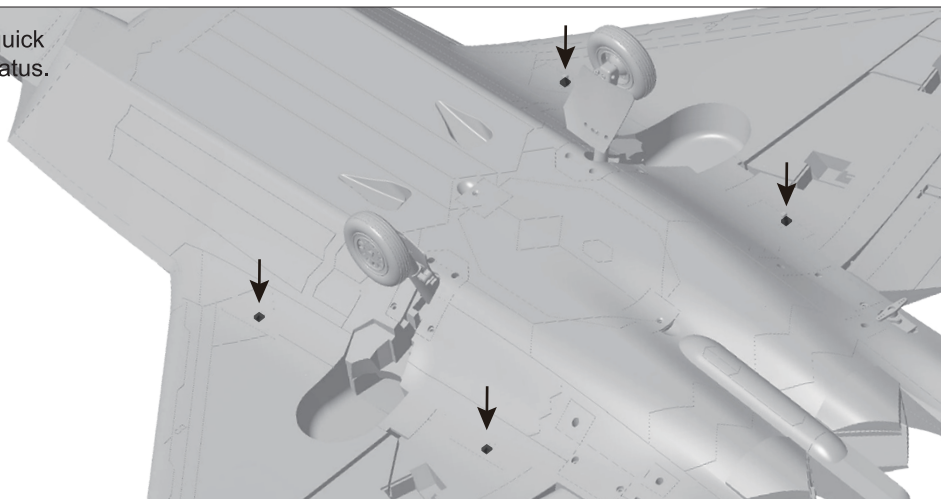
carbon fiber tube
(Ø10*650mm)



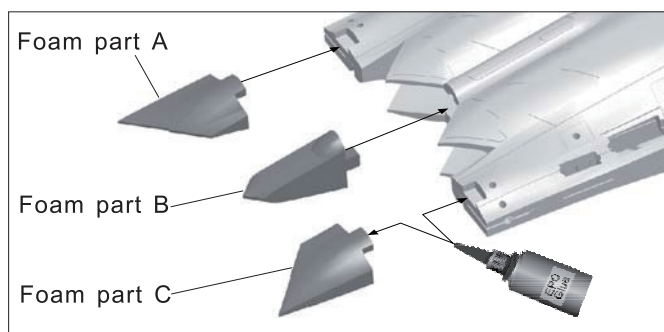
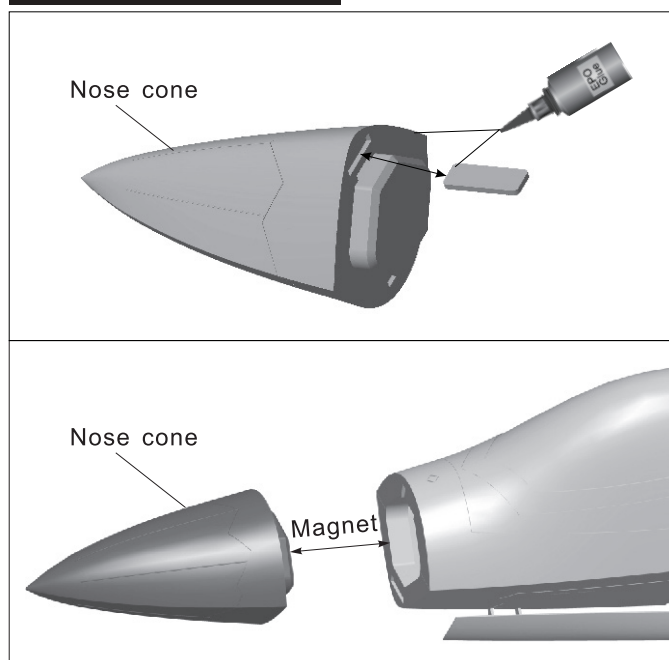
3. Use glue to fix the 【 Conical plastic part 】 on two carbon tubes respectively;
4. Align the main wing carbon tube with the fuselage, remove the ribbon cable from one end of the fuselage, connect it to the main wing slot, and push the main wing into the installation position of the fuselage;
(Repeat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



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

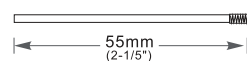


Install small plastic parts



Pushrod instructions

Nose steering pushrod size

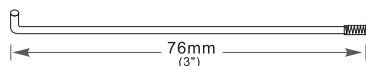


Pushrod diameter : Ø 1.2mm

Servo pushrod installing hole



Flap pushrod length

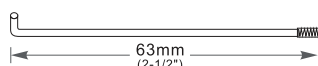


Pushrod diameter : Ø 1.5mm

Flap pushrod mounting hole



Aileron pushrod length

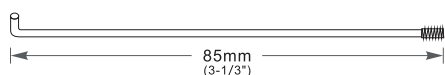


Pushrod diameter : Ø 1.5mm

Aileron pushrod mounting hole



Elevator pushrod length

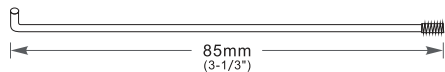


Pushrod diameter : Ø 1.5mm

Elevator pushrod mounting hole



Rudder pushrod length



Pushrod diameter : Ø 1.5mm

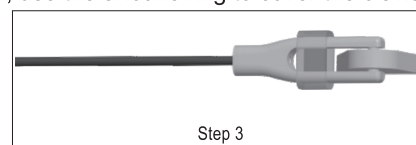
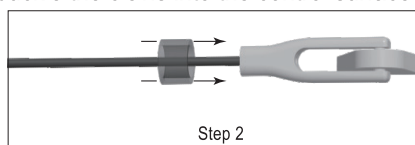
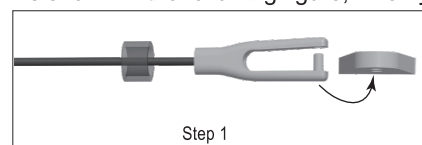
Rudder pushrod mounting hole



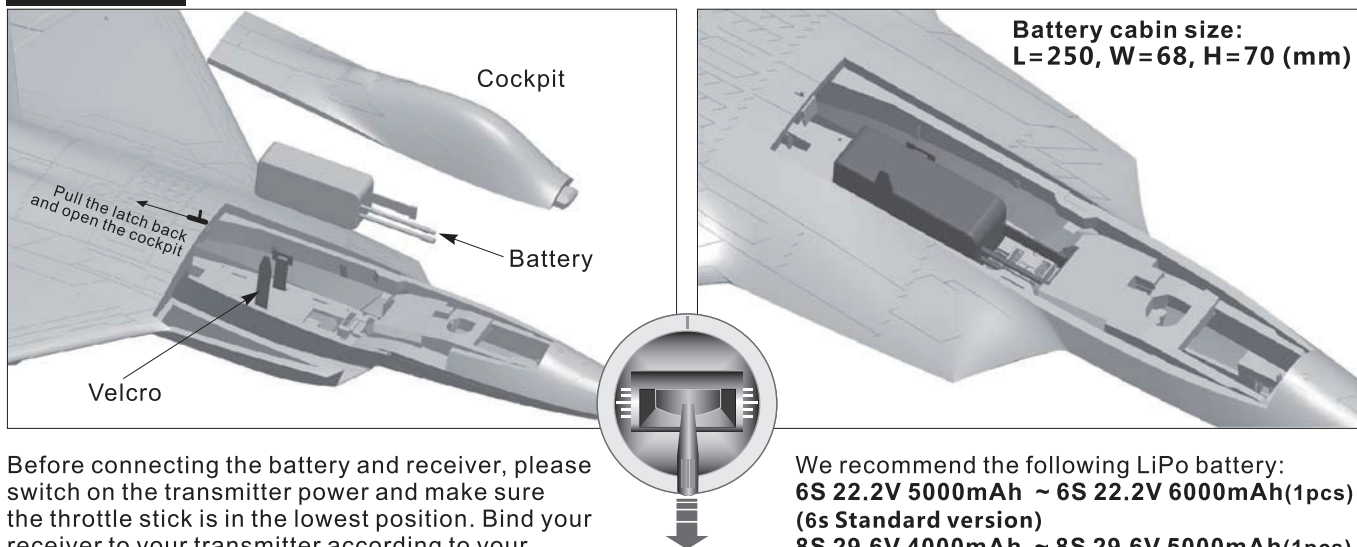
Important additional notes

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.



Battery Size



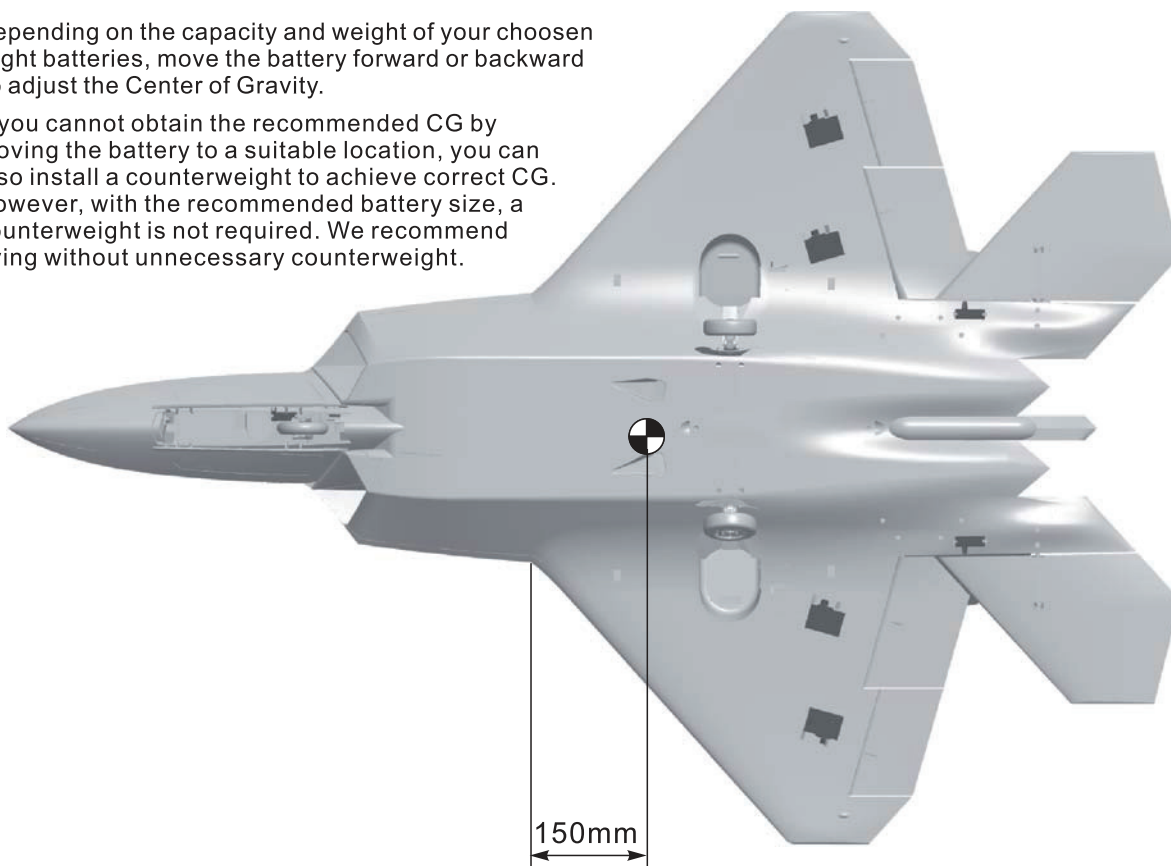
Before connecting the battery and receiver, please switch on the transmitter power and make sure the throttle stick is in the lowest position. Bind your receiver to your transmitter according to your transmitter's instruction manual.

We recommend the following LiPo battery:
6S 22.2V 5000mAh ~ 6S 22.2V 6000mAh(1pcs)
 (6s Standard version)
8S 29.6V 4000mAh ~ 8S 29.6V 5000mAh(1pcs)
 (8s Deluxe version)
Discharge rate of C ≥ 35C

Center of Gravity

Correct Center of Gravity 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 chosen 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.



Control Direction Test

After installed the plane, before flying, we need a fully charged battery and connect to the ESC, then use radio to test and check that every control surface work properly.

Aileron

Stick Left



Stick Right

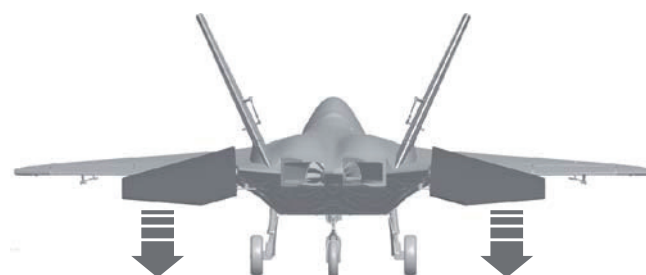


Elevator

Stick down



Stick Up

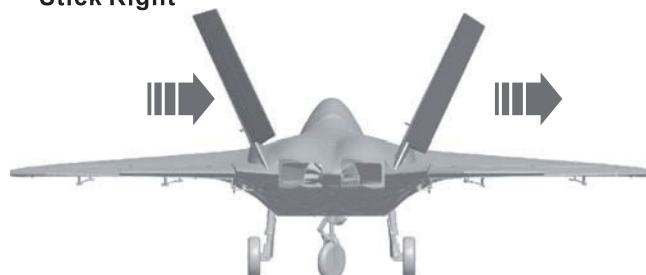


Rudder

Stick Left



Stick Right



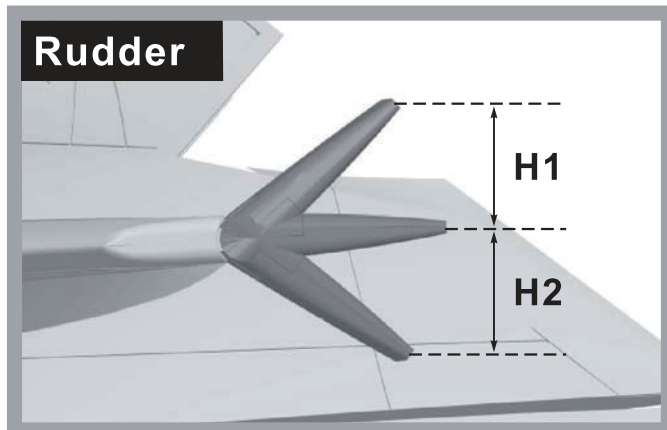
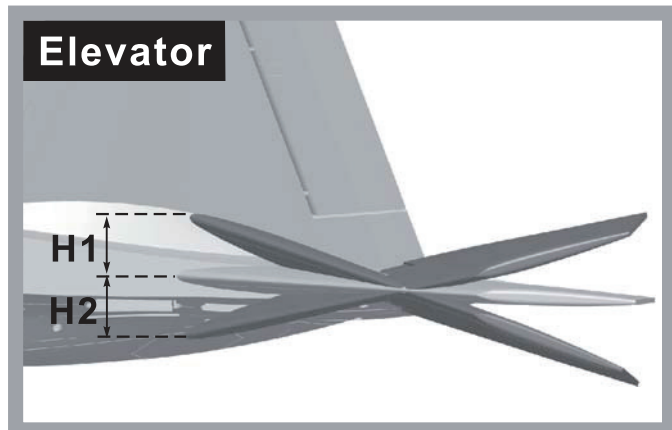
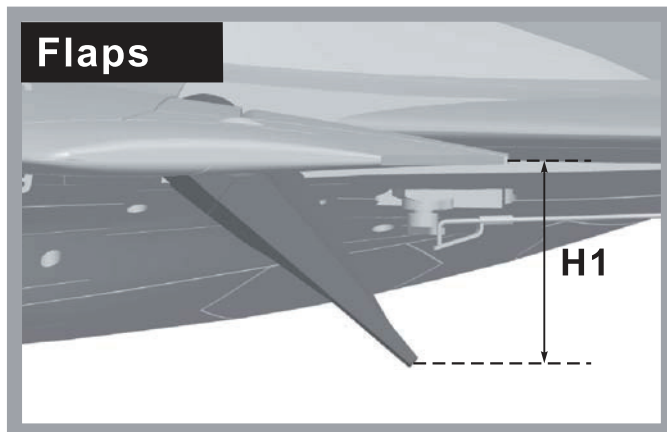
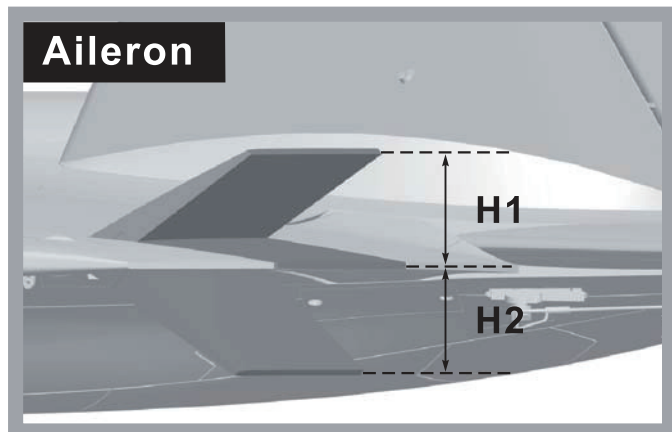
Flaps

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 28mm/28mm D/R Rate : 80%	H1/H2 27mm/27mm D/R Rate : 60%	H1/H2 26mm/26mm D/R Rate : 80%	H1 22mm
High Rate	H1/H2 32mm/32mm D/R Rate : 100%	H1/H2 35mm/35mm D/R Rate : 80%	H1/H2 32mm/32mm D/R Rate : 100%	H1 32mm

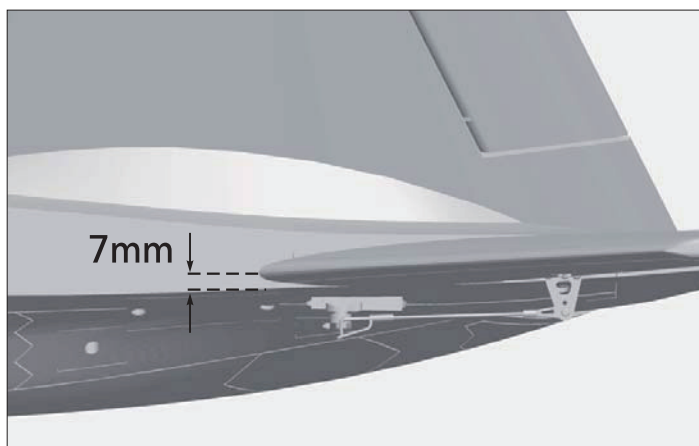
⚠ Important Flight Notes:

A Flap-to-Elevator Mix is required to maintain level flight when the flaps are deployed. The detail is as below:

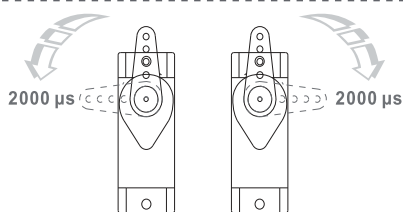
With high rate flaps deployed,
mix 2mm of DOWN elevator.

With low rate flaps deployed,
mix 1mm of DOWN elevator.

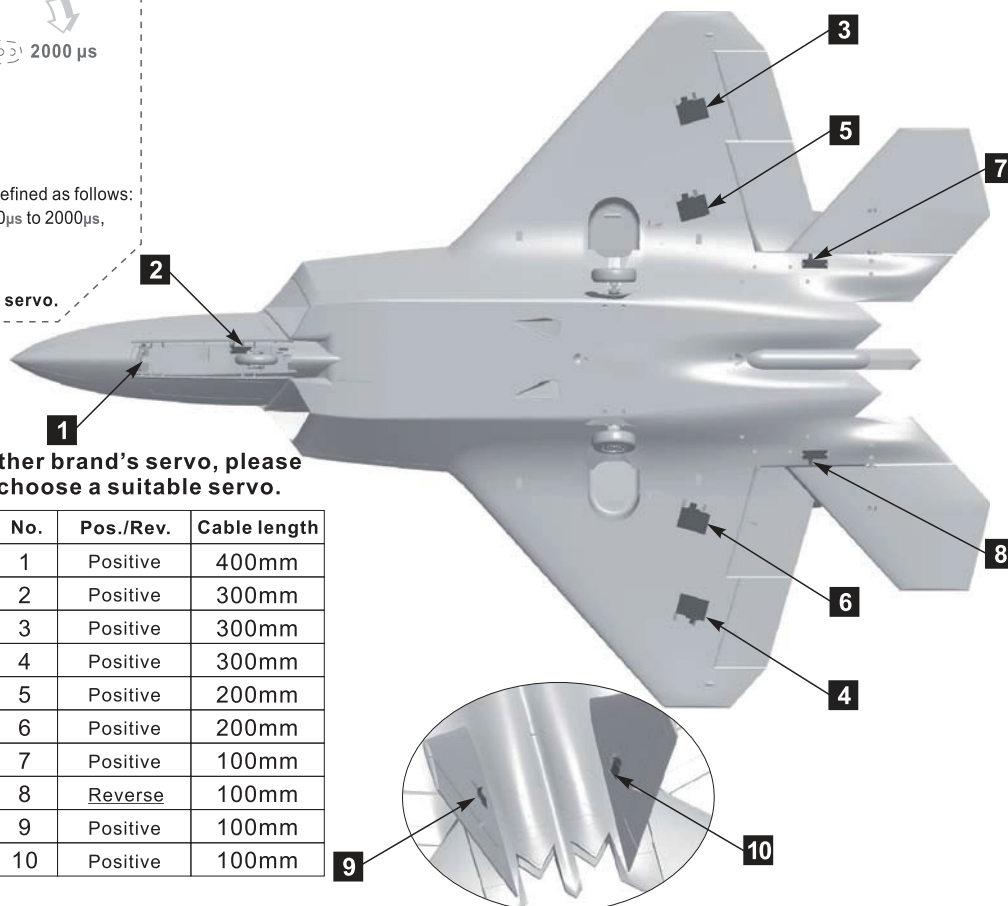
Please confirm your horizontal tail position is correct as the right photo show.



Servo Direction



The servo positive or reverse rotation is defined as follows:
 When servo input signal change from 1000 μ s to 2000 μ s,
 The servo arm is rotated clockwise, its positive servo.
 The servo arm is rotated counterclockwise, its reverse servo.

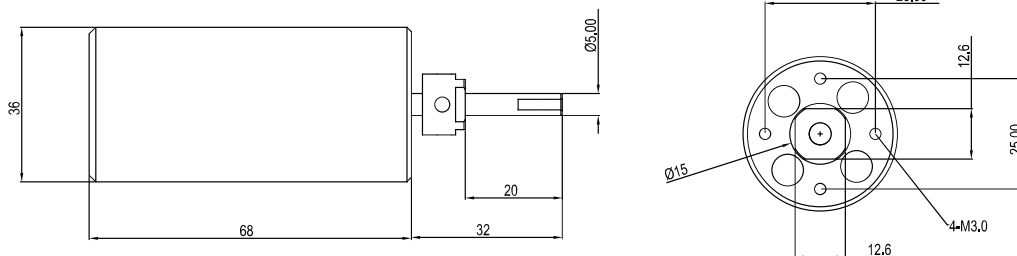


If you need to purchase another brand's servo, please refer to the following list to choose a suitable servo.

Position	Servo type	No.	Pos./Rev.	Cable length
Nose door	9g Hybrid-Digital	1	Positive	400mm
Nose gear steering servo	9g Hybrid-Digital	2	Positive	300mm
Aileron(L)	17g MG-Digital	3	Positive	300mm
Aileron(R)	17g MG-Digital	4	Positive	300mm
Flap(L)	17g MG-Digital	5	Positive	200mm
Flap(R)	17g MG-Digital	6	Positive	200mm
Elevator(L)	23g MG-Digital	7	Positive	100mm
Elevator(R)	23g MG-Digital	8	Reverse	100mm
Rudder(L)	17g MG-Digital	9	Positive	100mm
Rudder(R)	17g MG-Digital	10	Positive	100mm

Motor Specification

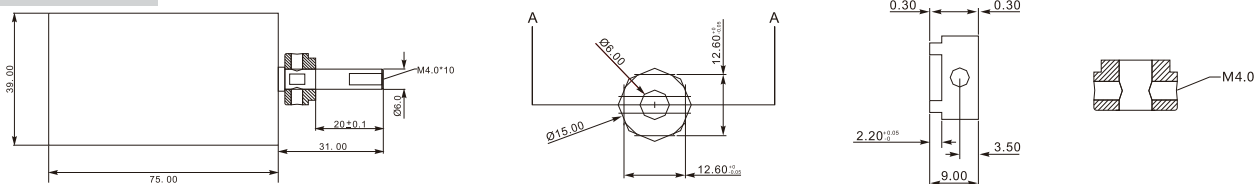
3668-1960
 Item No.:MI036681



Unit :mm

Item No.	EDF Fans	Battery	Current(A)	Max power (W)	Thrust(g)	Efficiency (g/w)	Motor(KV)	Use ESC (A)	Weight (g)
E72216	90mm 12-Blade	6S	120	2600	3700	1.4	3668-1960	120	454

Item No.:MI040754
4075-1350kv



Unit :mm

Item No.	EDF Fans	Battery	Current(A)	Max power (W)	Thrust(g)	Efficiency (g/w)	Motor(KV)	Use ESC (A)	Weight (g)
E72215	90mm 12-Blade	8S	115	3400	4700	1.39	MI040754 4075-1350KV	120	558



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