



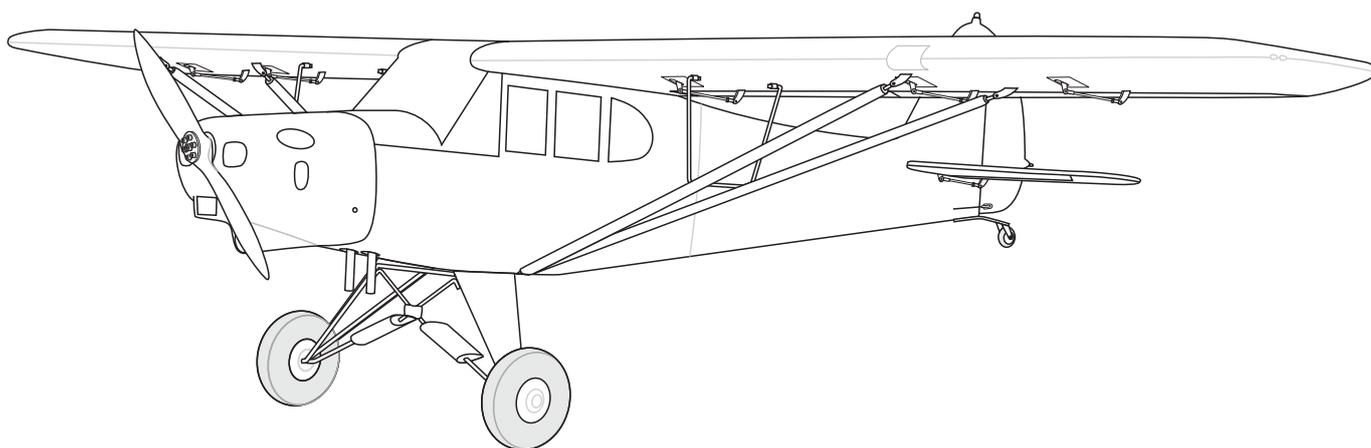
# Instruction Manual Book

Item code: BH172.

# PIPER PA -18 SUPER CUB

Glow and EP

ALL Balsa - Ply Wood Construction.  
Covered with ORACOVER®



## 95% ALMOST READY TO FLY

### **SPECIFICATION:**

#### **SPECIFICATION**

- Wingspan: 3,580 mm (140.94 in).
- Length: 2,237 mm (88.07 in).
- Weight: 19 - 19.5 kg (41.8- 42.9 lbs).
- Wing area: 180.1 dm<sup>2</sup>.
- Wing loading: 105.5 g/dm<sup>2</sup>.
- Wing type: USA 35-B Airfoil.
- Servo mount: 42mm x 21mm.

#### **Parts listing required (not included):**

- Radio: 06 channels.
- Servo: 10 standard high torque servos.
- Engine: 120 cc gas.
- Motor: Brushless outrunner 185 KV.
- Propeller motor: 28 x 10.
- Propeller engine: 27 x 10.

#### **Recommended motor and battery set up (not included):**

- Electric Motor: BOOST 180
- Battery: 12S LIPO 44,4V 6,000mAh.
- Speed control: 120A. HV.
- Receiver battery: 6.0V 2400-2600mAh(2 Packs).
- Torque servos: 11.3kg/cm – 12.9kg/cm.

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

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Or via the Internet at: <http://www.modelaircraft.org>



## Symbols used throughout this instruction manual, comprise:

 Cut off excess.

 Apply threadlocker (screw cement).

 Must be purchased separately!

 Cut off shaded portion carefully.

 Apply instant glue (C.A glue, super glue).

 Ensure smooth, non-binding movement when assembling.

 Pay close attention here.

 Apply epoxy glue.

 Drill holes using the stated. (in this case 1.5mm Ø).

 Take particular care here.

 Assemble left and right sides the same way.

 The number of times the same way Assembly (in this case twice).

 **Warning!** ▶ Set all screws securely. If they come off during flight you will lose control of your aircraft!

## WARRANTY

Black Horse Model guarantees the component parts in this kit to be free from defects in both material and workmanship at the date of purchase by the purchaser.

This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product.

This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Black Horse Model.

Return only the component part that is defective in materials or workmanship. Please pack the unit carefully and insure it, as this warranty does not cover loss or damage in transit.

## DISCLAIMER

Read this disclaimer carefully before using this product. Please strictly follow the instruction manual to assemble and use this.

In that Black Horse Model has no control over the final assembly or material used for final assembly, black Horse Model is not responsible for loss of use, or other incidental or consequential damages.

Furthermore, Black Horse Model cannot be held liable for personal injury or property damage caused by the use or misuse of Black Horse Model products. By the act of using the user-assembled products, the user accepts all resulting liability.

## SUGGESTION

To avoid scratching your new airplane, do not unwrap the pieces until they are needed for assembly. Cover your workbench with an old towel or brown paper, both to protect the aircraft and to protect the table. Keep a couple of jars or bowls handy to hold the small parts after you open the bag.

## NOTE:

Please trial fit all the parts. Make sure you have the correct parts and that they fit and are aligned properly before gluing! This will assure proper assembly. This kit is hand made from natural materials, every plane is unique and minor adjustments may have to be made. However, you should find the fit superior and assembly simple.

The painted and plastic parts used in this kit are fuel proof. However, they are not tolerant of many harsh chemicals including the following: paint thinner, C/A glue accelerator, C/A glue debonder and acetone. Do not let these chemicals come in contact with the colors on the covering and the plastic parts.

**Caution:** This model is not a toy!

If you are a beginner to this type of powered model, please ask an experienced model flyer for help and support. If you attempt to operate the model without

knowing what you are doing you could easily injure yourself or somebody else. Please keep your safety and well-being in mind at all times.

### Important: Before you start construction

Even if you have built a large number of RC models please read right through these instructions and check all the kit components against the parts list. We have taken great trouble to keep construction as simple as possible, without making any compromises in the area of safety.

### Note regarding the film covering

Minor creases or bubbles may develop in the film covering due to major fluctuations in weather conditions (temperature, humidity etc.); in rare cases you may even find a slight warp in a component. These minor faults are in the nature of film-covered built-up wooden structures, and can easily be corrected using a heat gun, as commonly used for modelling.

**Creases:** Blow warm air over the area and rub down with a soft cloth.

**Wing wrap:** Hold the panel twisted gently in the opposite direction to the wrap, and apply warm air to remove the creases from the covering.

**Caution!** do not heat the film more than is absolutely necessary. If the air or the iron is too hot, the film may melt and holes may be formed.

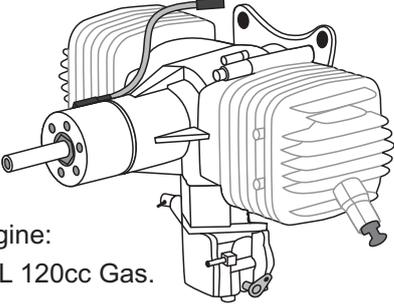
This model is highly pre-fabricated and can be built in a very short time. However, the work which you have to carry out is important and must be done carefully. The model will only be strong and fly well if you complete your tasks competently - so please work slowly and accurately.

**When self-tapping screws have to be screwed into wood, apply a little white glue to prevent them shaking loose: just squirt white glue into the hole and fit the screw**

## SAFETY PRECAUTION:

- This model is not a toy and pilots must be over the age of 14.
- Be sure that no other flyers are using your radio frequency.
- Do not smoke near fuel.
- Store fuel in a cool, dry place, away from children and pets.
- Wear safety glasses.
- The glow plug clip must be securely attached to the glow plug.
- Do not flip the propeller with your fingers.
- Keep loose clothing and wires away from the propeller.
- Do not start the engine if people are near. Do not stand in line with the side of the propeller.
- Make engine adjustments from behind the propeller only. Do not reach around the spinning propeller.
- Moisture causes damage to electronics. Avoid water exposure to all equipment not specifically designed and protected for this purpose.

**PARTS LISTING (NOT INCLUDED).**

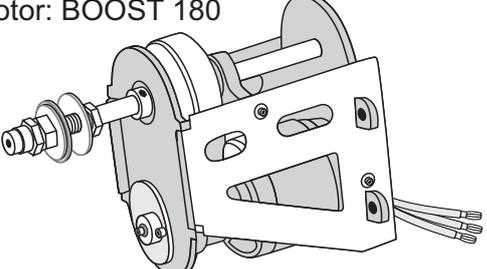


Engine:  
DEL 120cc Gas.

**Servo extension leads.**

	..... 4 pcs.
	1000mm .... 2 pcs.
	920mm .... 2 pcs.
	540mm .... 1 pcs.
	420mm .... 5 pcs.
	220mm .... 3 pcs.
	190mm ..... 2 pcs.

Motor: BOOST 180



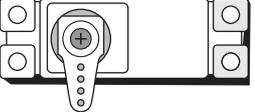
Propeller. Suit with your engine.



LiPo. 6S - 22.2V- 4500-6000mAh.



2 Packs

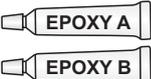
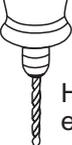
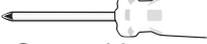


10 servos. Size: (39.9 x 20.1 x 38.1)mm.  
Torque servos: 11.3kg/cm – 12.9kg/cm.



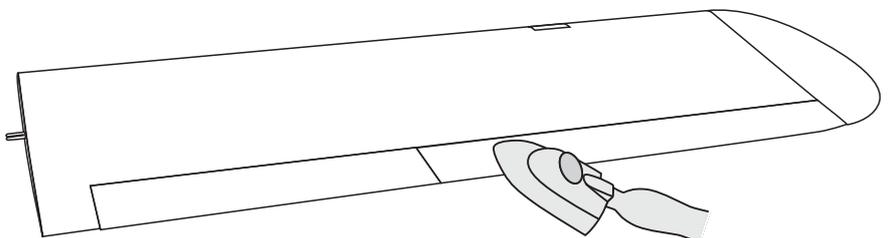
ESC: .120A ..... 1 pcs.

**TOOLS & SUPPLIES NEEDED.**

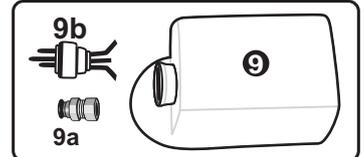
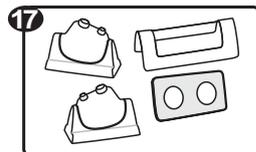
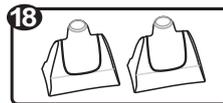
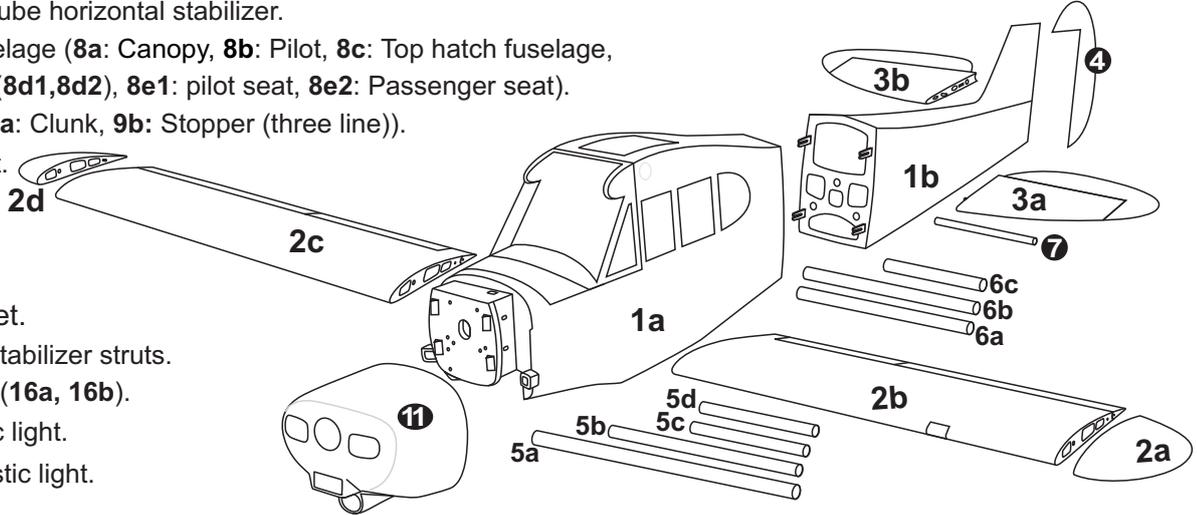
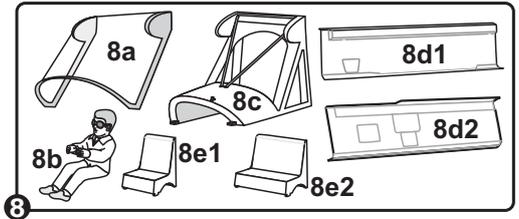
				
Medium C/A glue	Straight edge ruler.	30 minute epoxy. 5 minute epoxy.	Hex Wrench.	Hand or electric drill.
			<b>Some more tools.</b>	
Threadlocker (screw cement).	2 bender plier		• Assorted drill bits.	
	Wire cutters.		• Masking tape.	
Modeling knife.			• Paper towels.	
			• Rubbing alcohol	
			• 90° square or builder's triangle.	

**PREPARATIONS:**

Use a covering iron with a covering sock on high heat to tighten the covering if necessary. Apply pressure over sheeted areas to thoroughly bond the covering to the wood.



- ① : Fuselage (1a, 1b).
- ② : Wing panel (2a, 2b, 2c, 2d).
- ③ : Horizontal stabilizer (3a, 3b).
- ④ : Rudder.
- ⑤ : Aluminium wing dihedral brace(5a, 5b, 5c, 5d).
- ⑥ : Aluminium tube fuselage (6a, 6b, 6c).
- ⑦ : Aluminium tube horizontal stabilizer.
- ⑧ : Cockpit fuselage (8a: Canopy, 8b: Pilot, 8c: Top hatch fuselage, 8d: Cockpit(8d1,8d2), 8e1: pilot seat, 8e2: Passenger seat).
- ⑨ : Fuel tank (9a: Clunk, 9b: Stopper (three line)).
- ⑩ : Decal sheet.
- ⑪ : Cowling.
- ⑫ : Wheels.
- ⑬ : Main gear.
- ⑭ : Tail gear set.
- ⑮ : Horizontal stabilizer struts.
- ⑯ : Wing struts (16a, 16b).
- ⑰ : Wing plastic light.
- ⑱ : Rudder plastic light.



130mm Push rod -- 6	3x25mm Cap Screw  ----- 2
108mm Push rod -- 2	3x30mm Cap Screw  ----- 6
108mm Push rod -- 1	3x35mm Cap Screw  ----- 1
M3 --- 3	3x12mm Cap Screw  ----- 18
Tow plane ----- 1	3 x 10mm Screw  ----- 32
5x45mm Cap Screw -- 4	3x12mm Screw  ----- 3
5mm Washer - 4	3 x 15mm Screw  ----- 4
5mm Spring Washer ----- 4	3mm Washer -- 8
50mm Pushrod wire ----- 1	Connector ----- 3
Connector ----- 3	----- 4
----- 4	----- 4
Horn ----- 10	<u>1050mm Cable</u> ----- 2
	3mm Nut --- 9

4x15mm Cap Screw ----- 8	3mm Nut ----- 4	----- 4
4mm Washer ----- 4	3x12mm Screw ----- 16	----- 8
4mm Spring Washer ----- 8	----- 2	----- 4
3x15mm Cap Screw ----- 4	----- 2	----- 2

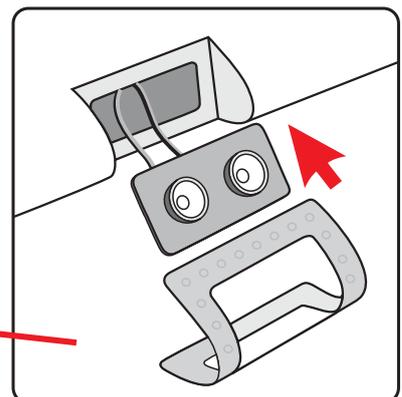
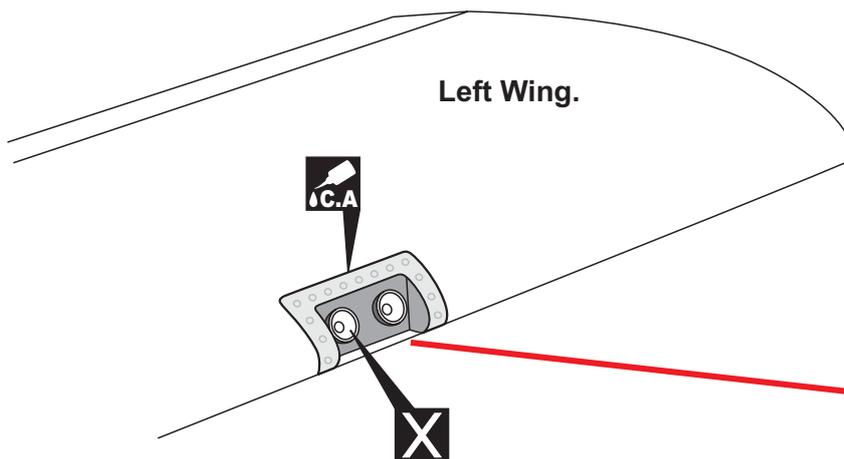
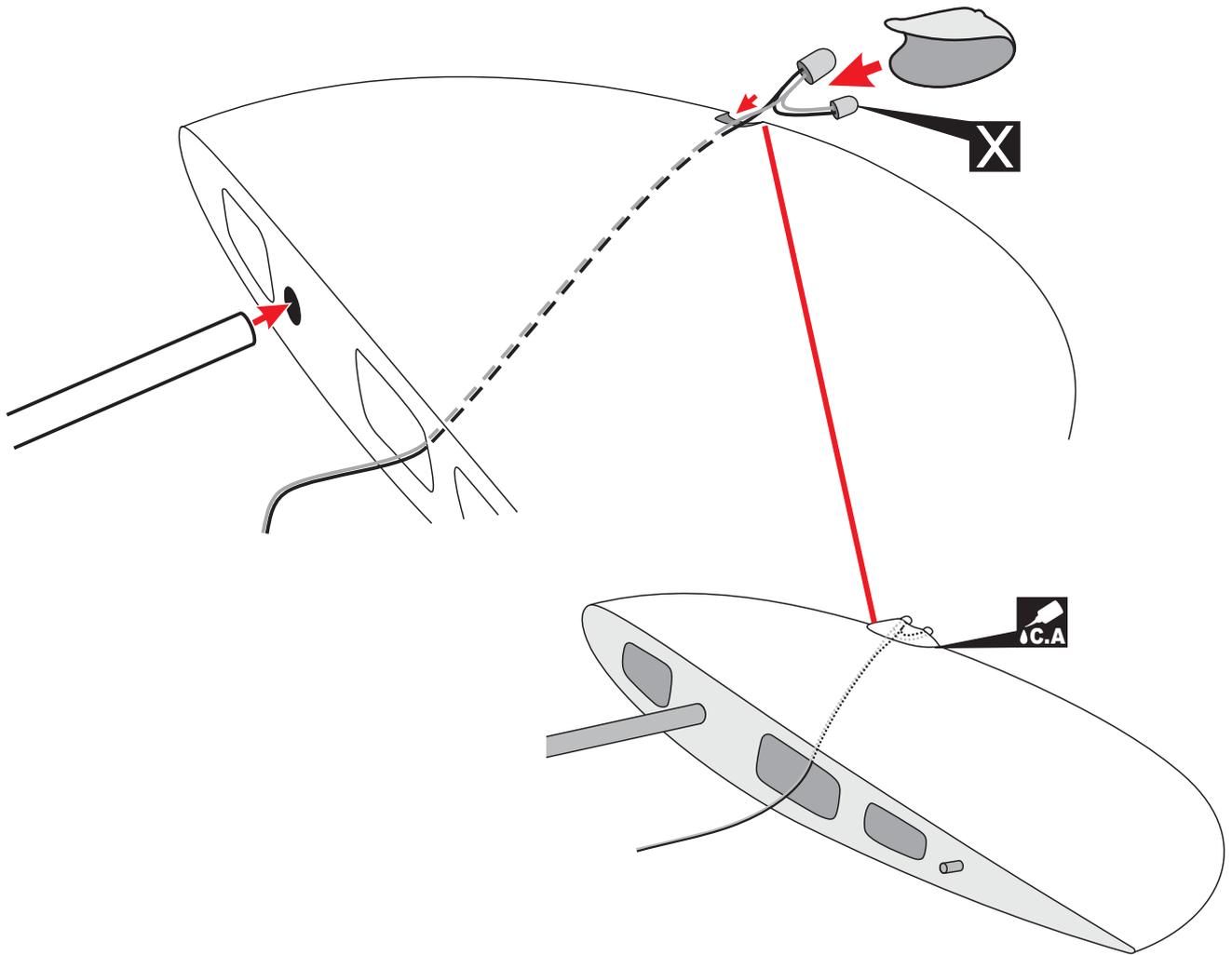
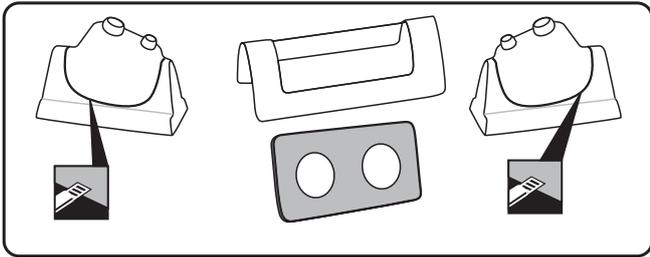
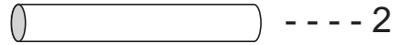
16a	16b
-----	-----

M3 ----- 2	4mm Washer ----- 2	
<u>1050mm Cable</u> ----- 2	3mm Nut ----- 2	
4x15mm Cap Screw ----- 2	----- 4	
4mm Spring Washer ----- 2	----- 2	

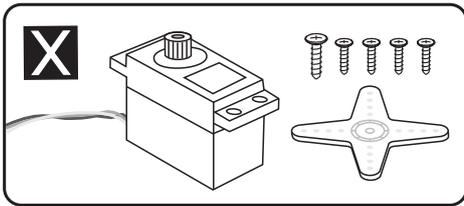
Collar ----- 4	
5mm Washer ----- 6	
5x20mm Cap Screw ----- 6	
5mm Spring Washer ----- 6	

### WING PLASTIC LIGHT

12x183mm Aluminium tube.



**INSTALLING THE AILERONS AND FLAPS SERVOS.**

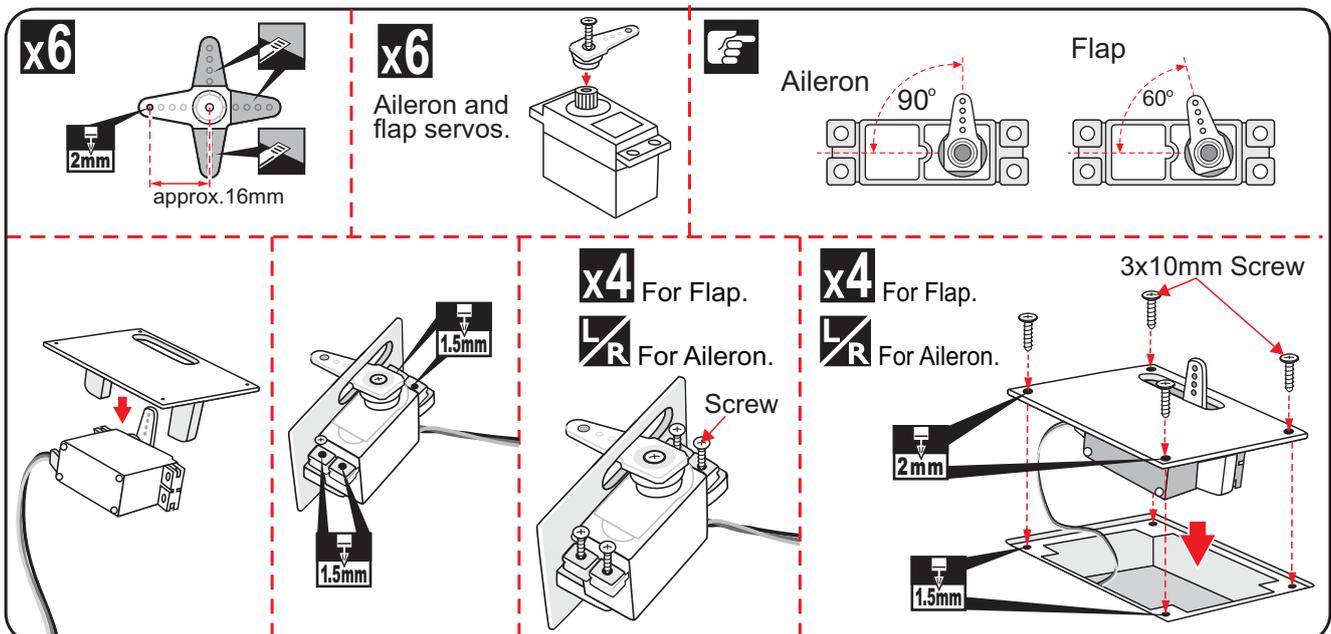
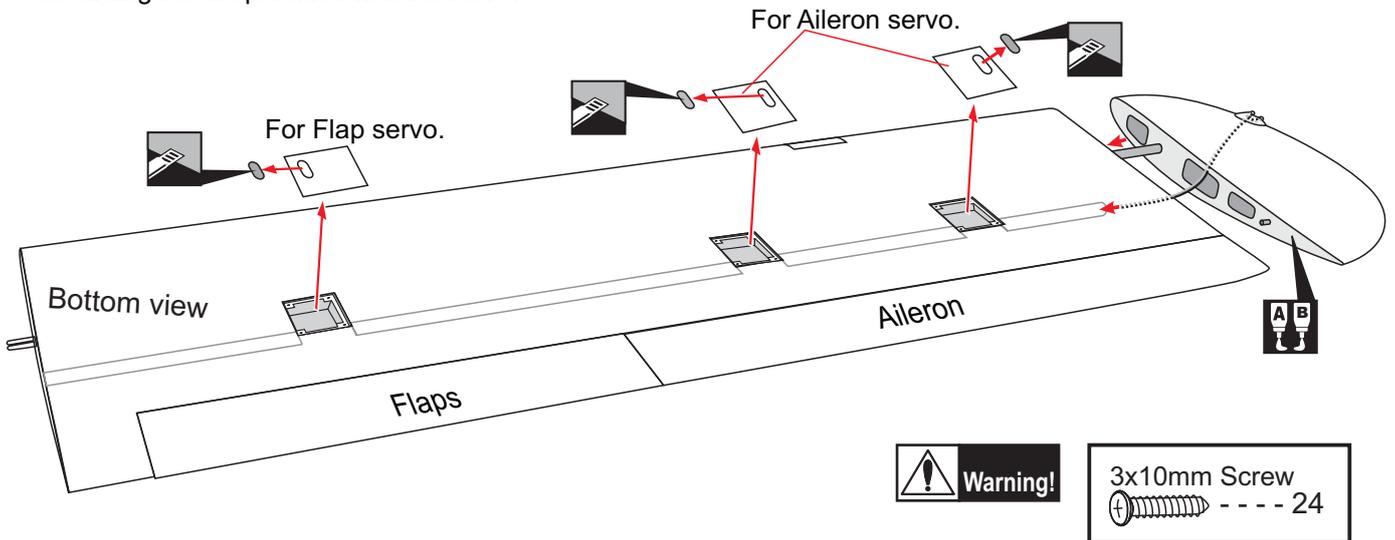


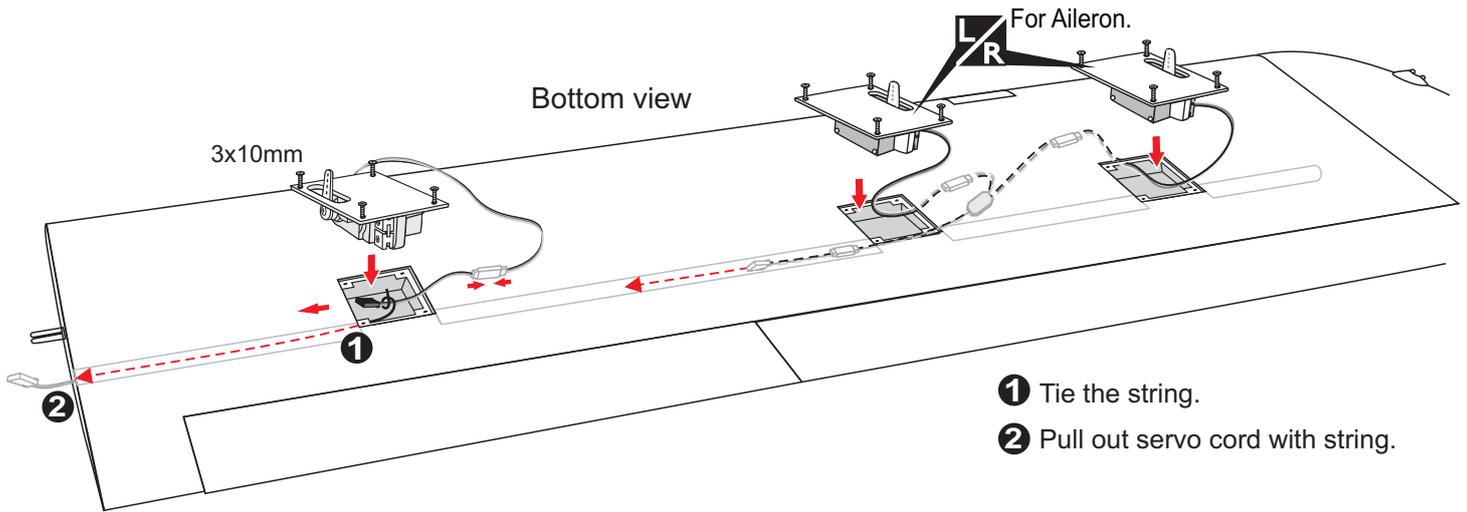
1. Install the rubber grommets and brass eyelets onto the aileron servos.
2. Using a modeling knife, remove the covering from over the pre-cut servo arm exit hole on the aileron servo tray / hatch. This hole will allow the servo arm to pass through when installing the aileron pushrods.
3. Place the servo into the servo tray. Center the servo within the tray and drill 1.5mm pilot holes through the block of wood for each of the four mounting screws provided with the servo.

4. Using the thread as a guide and using masking tape, tape the servo lead to the end of the thread: carefully pull the thread out. When you have pulled the servo lead out, remove the masking tape and the servo lead from the thread.

5. Place the servo into the servo tray/ hatch into the servo box on the bottom of the wing and drill 1.5mm pilot holes through the tray and servo box for each of the four mounting screws. Secure the servo tray in place using the mounting screws provided.

6. Repeat step # 2 - # 5 to install the aileron servo in the opposite wing half.

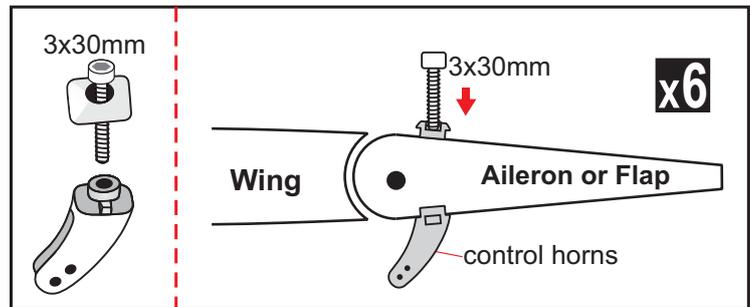




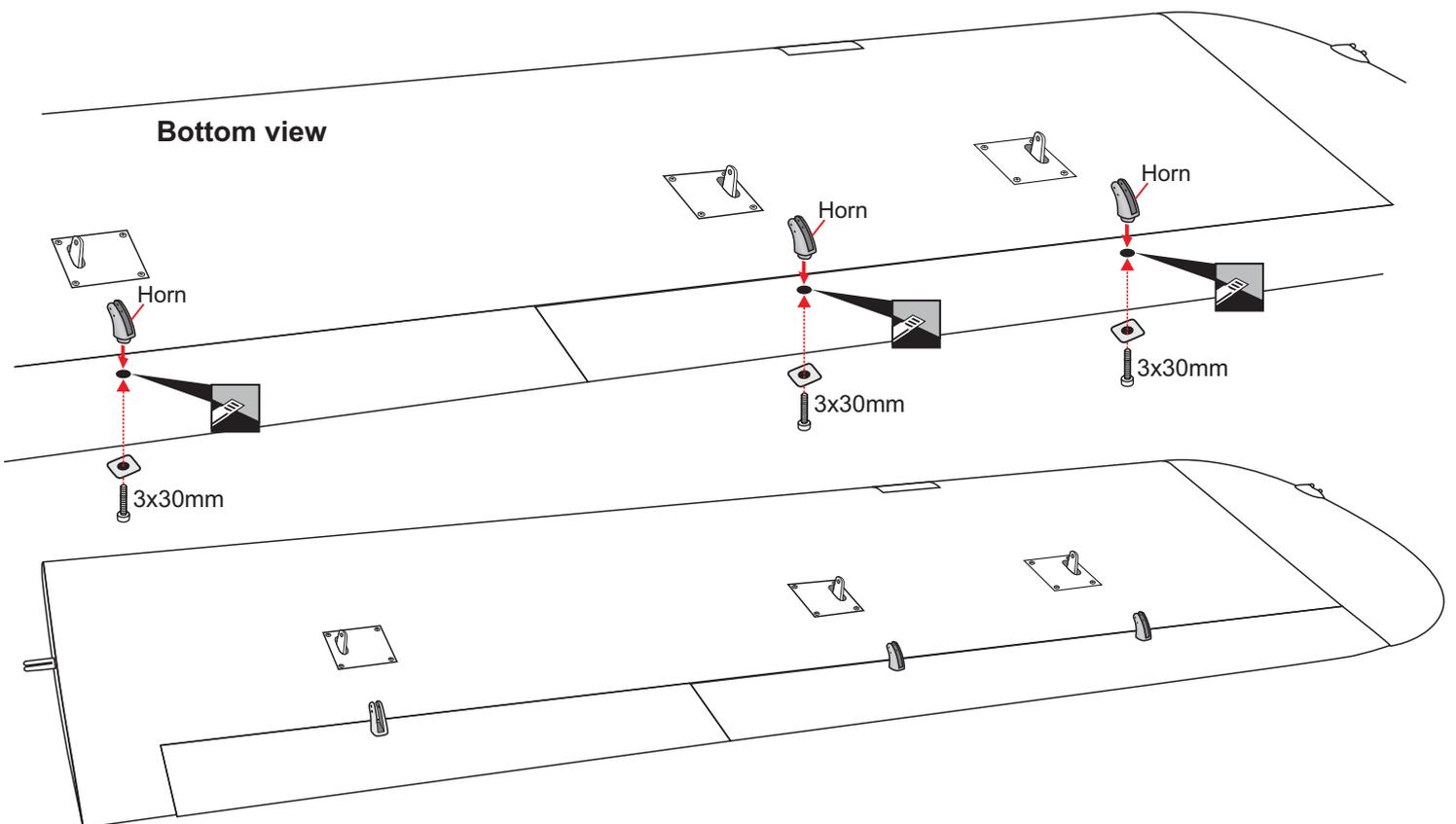
- ❶ Tie the string.
- ❷ Pull out servo cord with string.

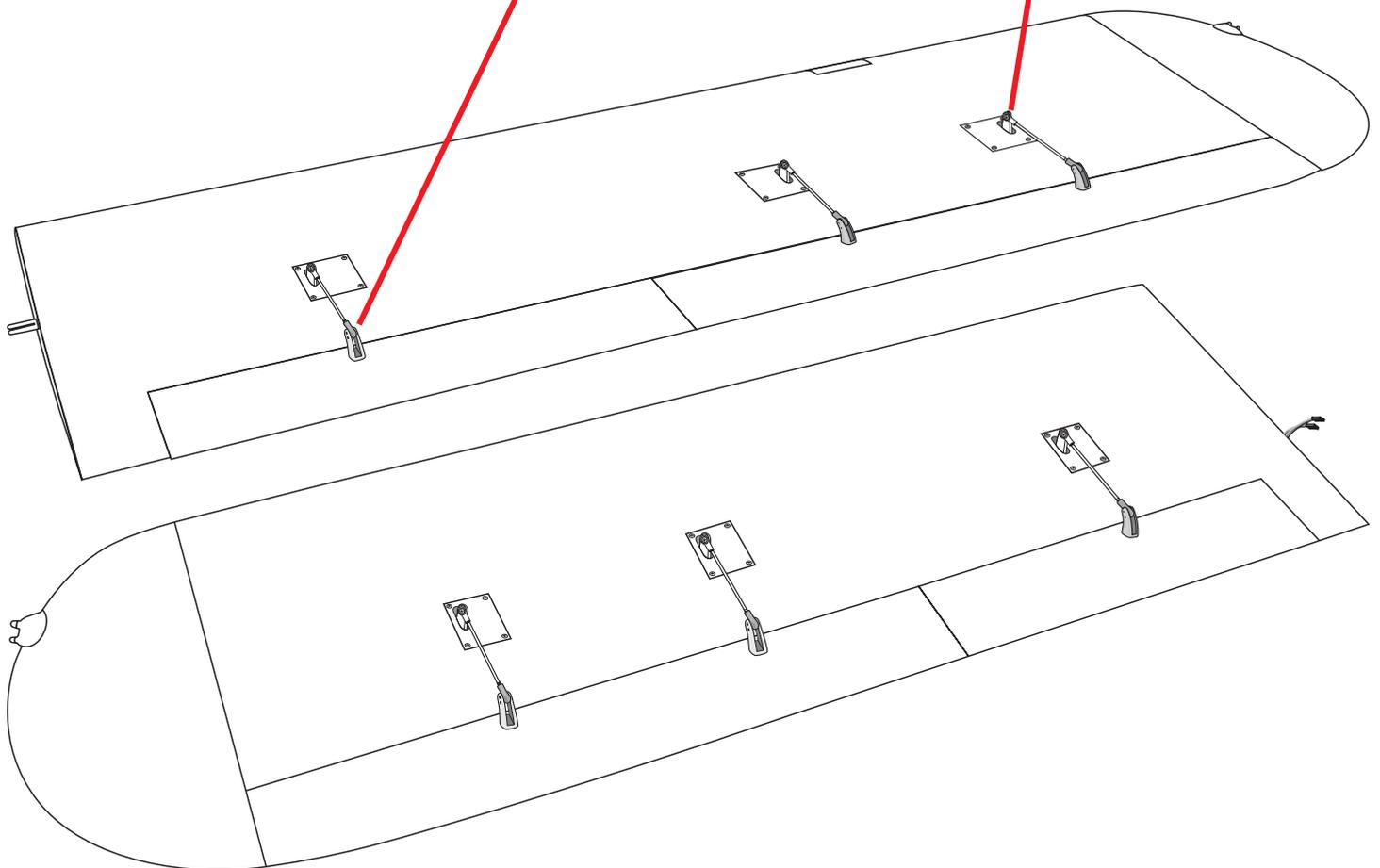
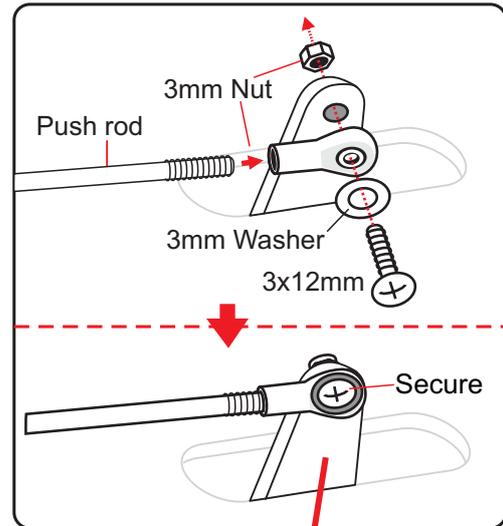
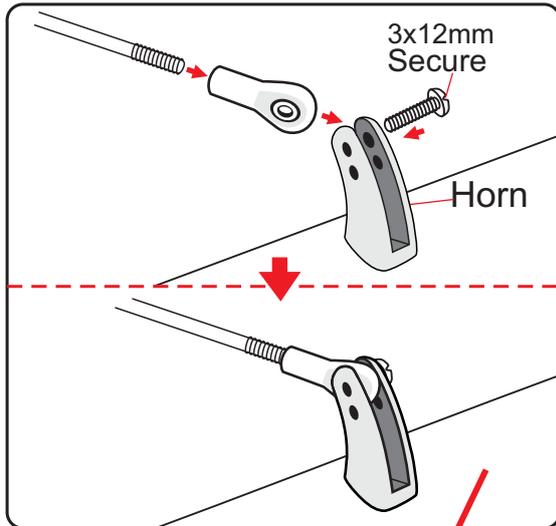
**INSTALLING THE CONTROL HORNS AND LINKAGES.**

130mm Push rod ----- 6	3mm Washer ----- 6
3x30mm Cap Screw ----- 6	Horn --- 6
3x12mm Cap Screw ----- 12	

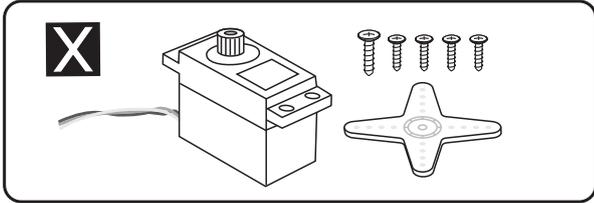


Remove the covering from the slot on the bottom of the aileron. Insert the control horn into the slot and secure.





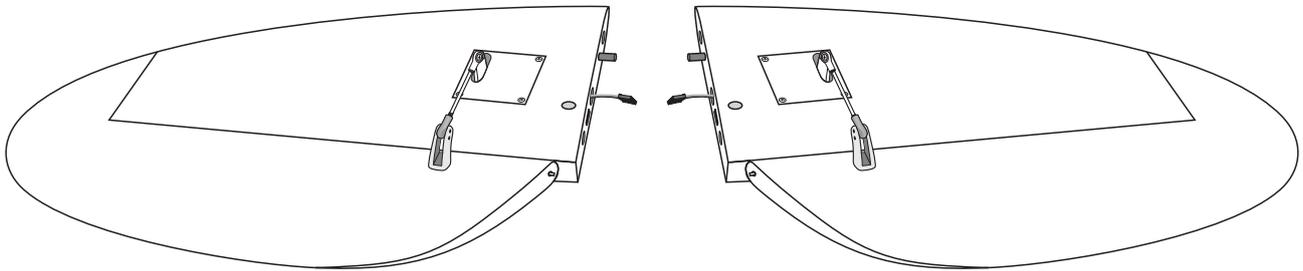
**INSTALLING HORIZONTAL STABILIZER**



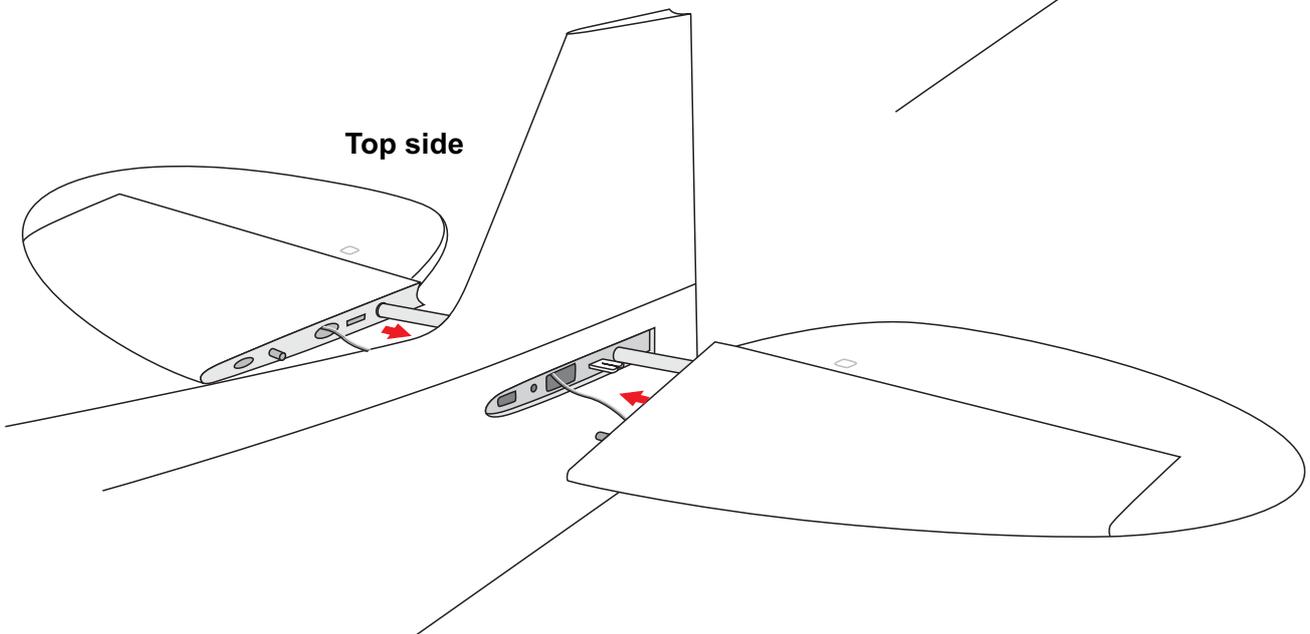
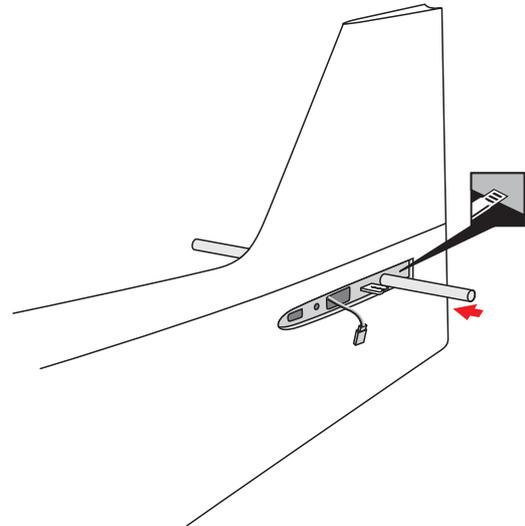
1) Servo for Horizontal stabilizer are installed the same way as the aileron before (see page 7).

2) Control horn, linkages and for Elevator are installed the same way as the aileron before (see page 8, 9).

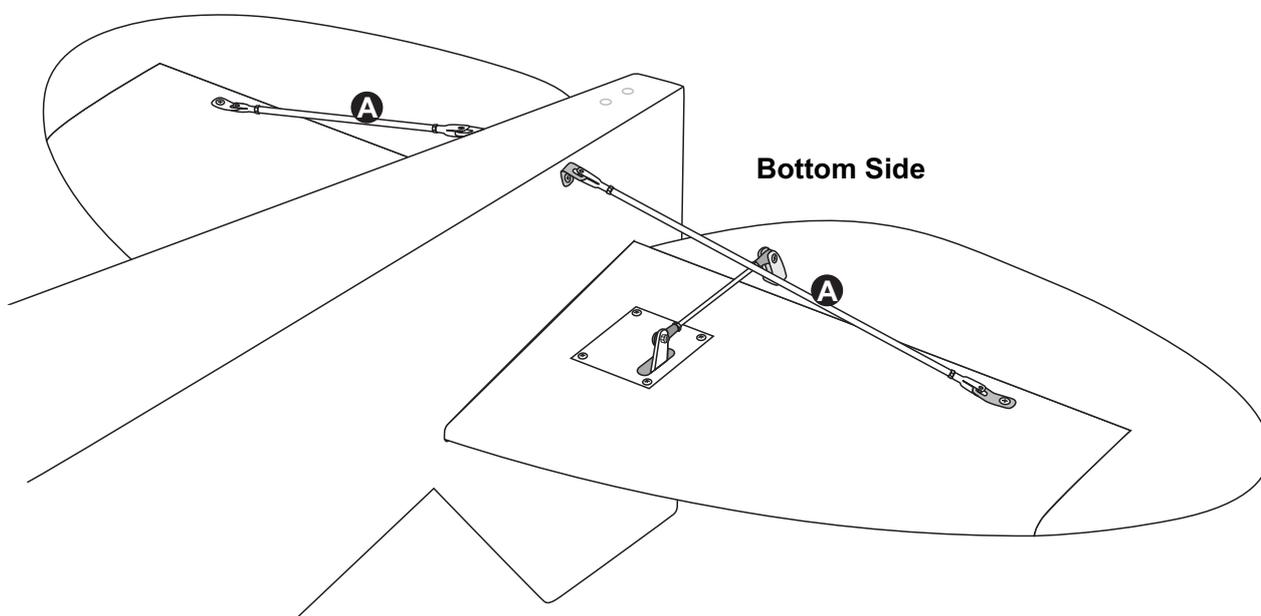
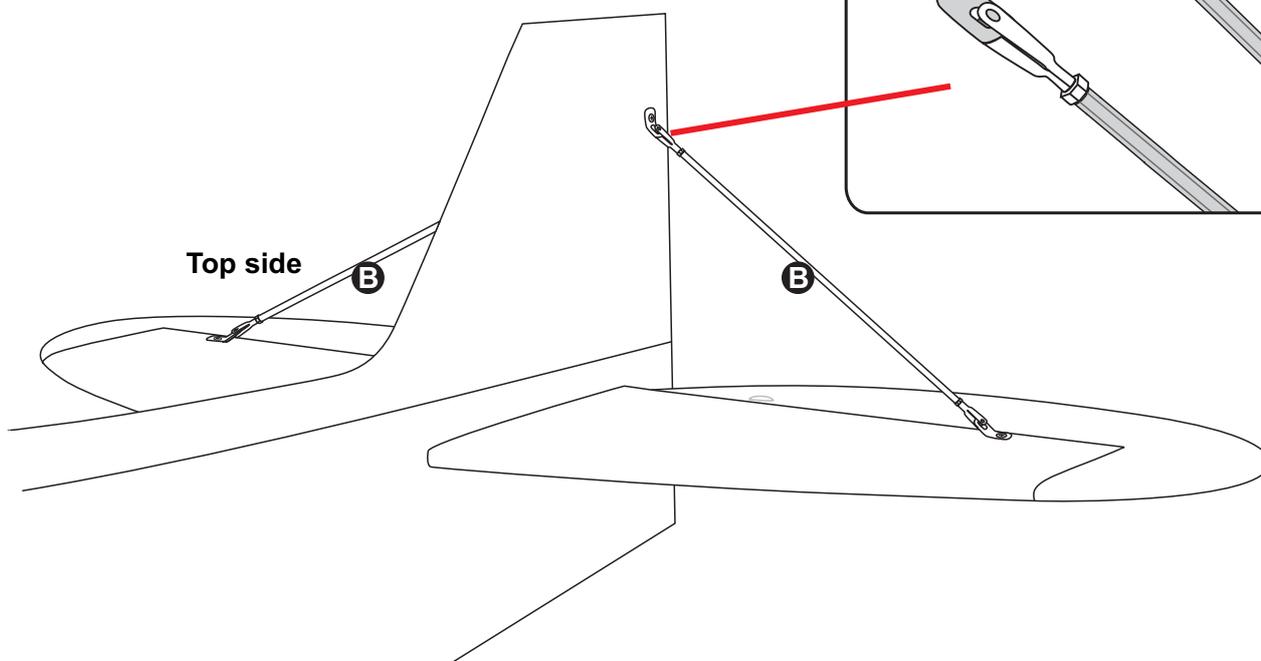
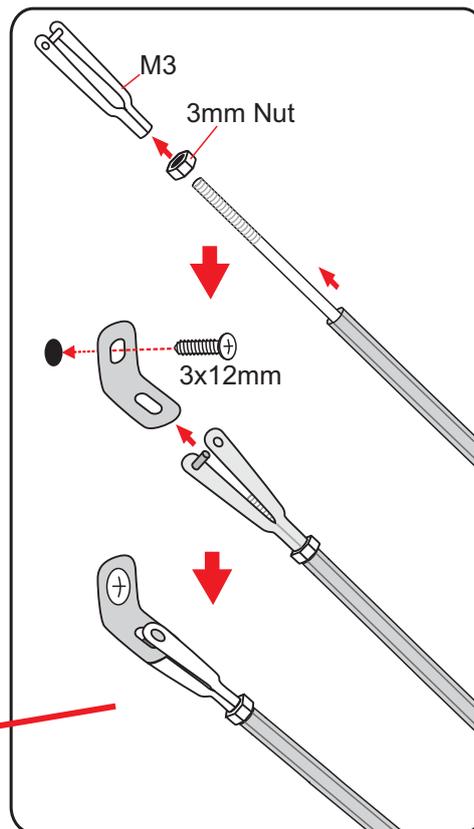
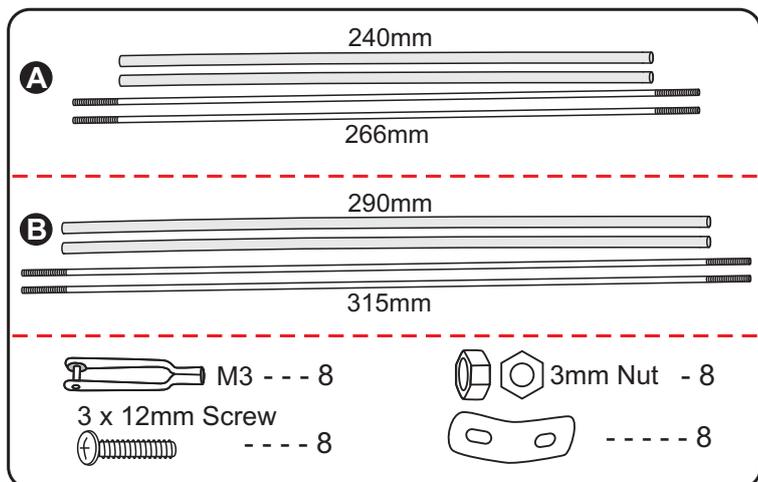
3mm Nut - 4	Horn - - - - 2
108mm Push rod - - 2	3x25mm Cap Screw - - - - 4
3x25mm Cap Screw - - - - 2	3x12mm Cap Screw - - - - 4
3mm Washer - 2	3 x 10mm Screw - - - - 8
12x302mm Aluminium tube. - - 1	



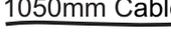
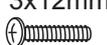
- Attach the aluminium tube into the fuselage.
- Attach the stabilizer to the fuselage.

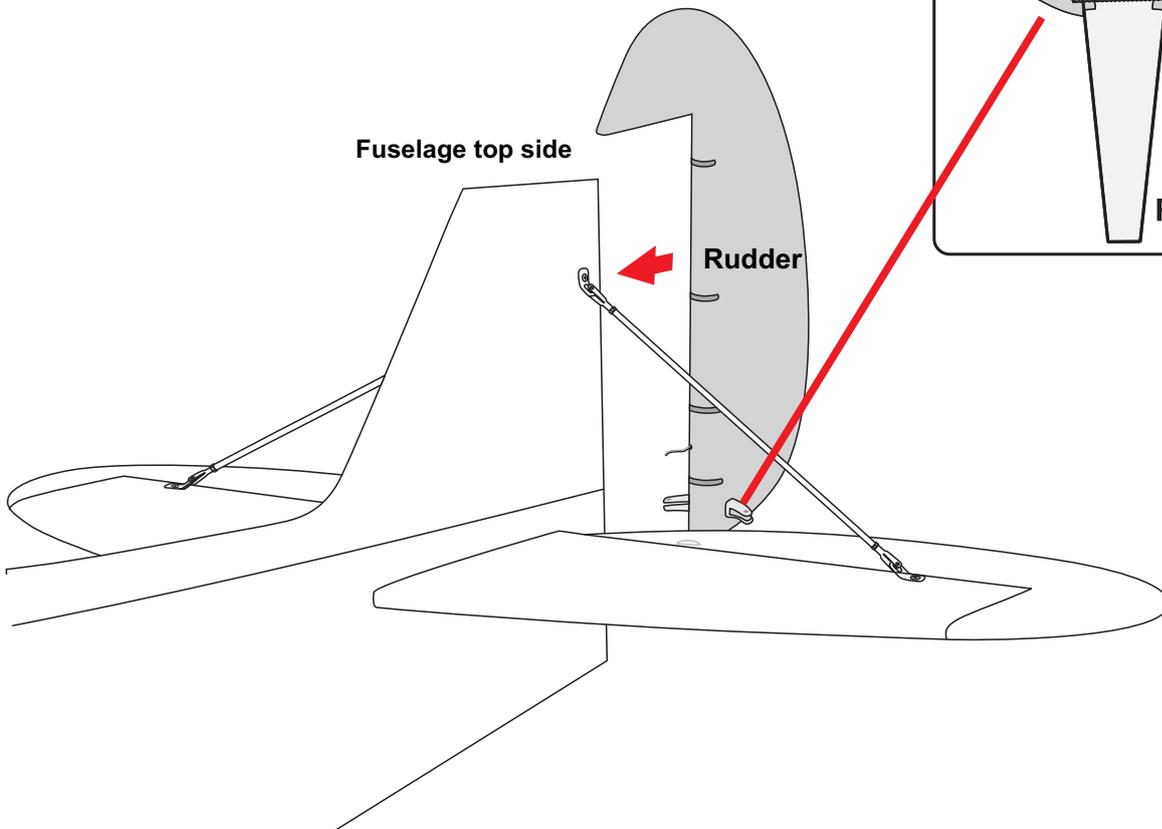
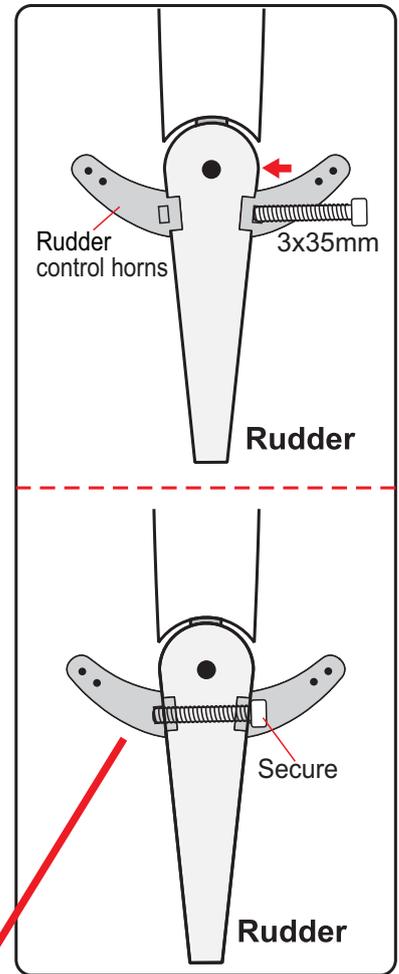
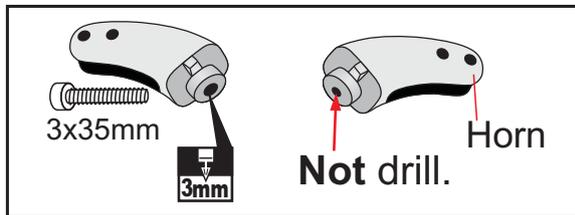


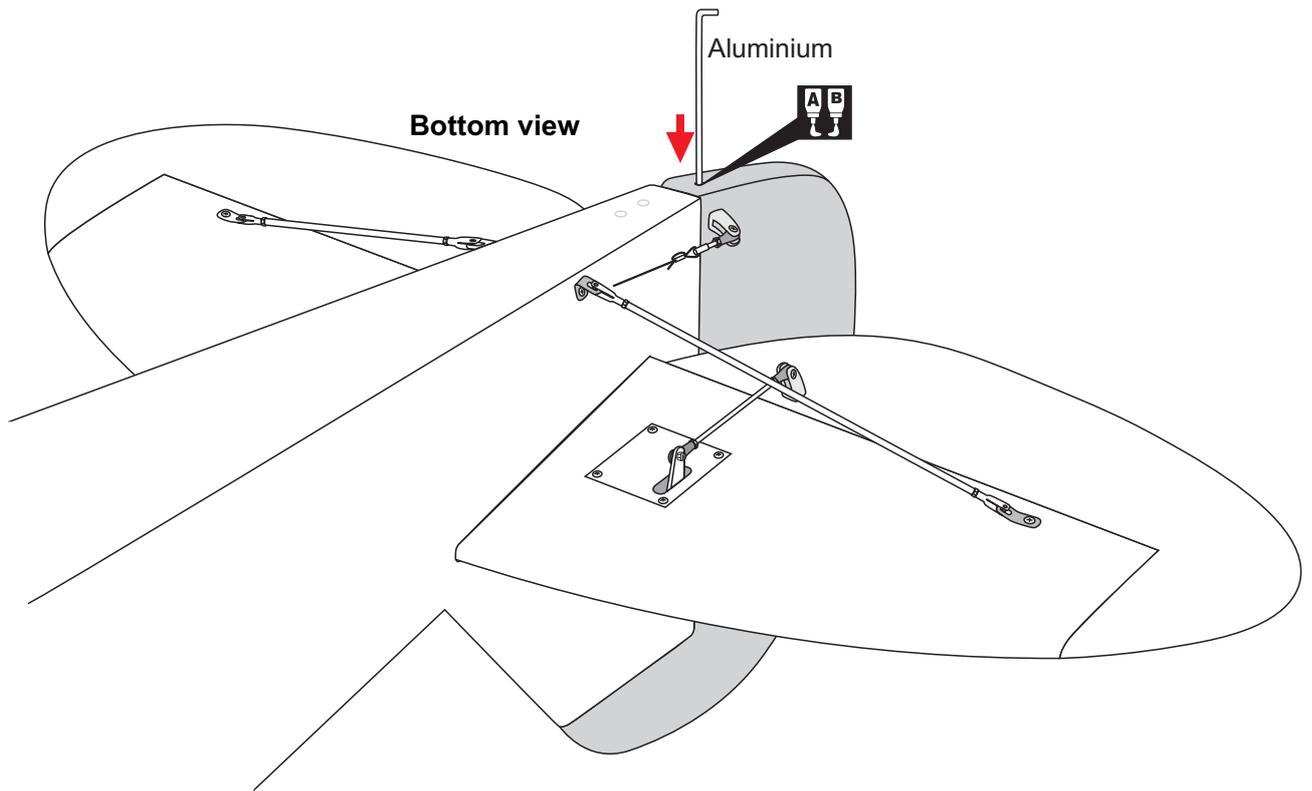
### HORIZONTAL STABILIZER STRUTS



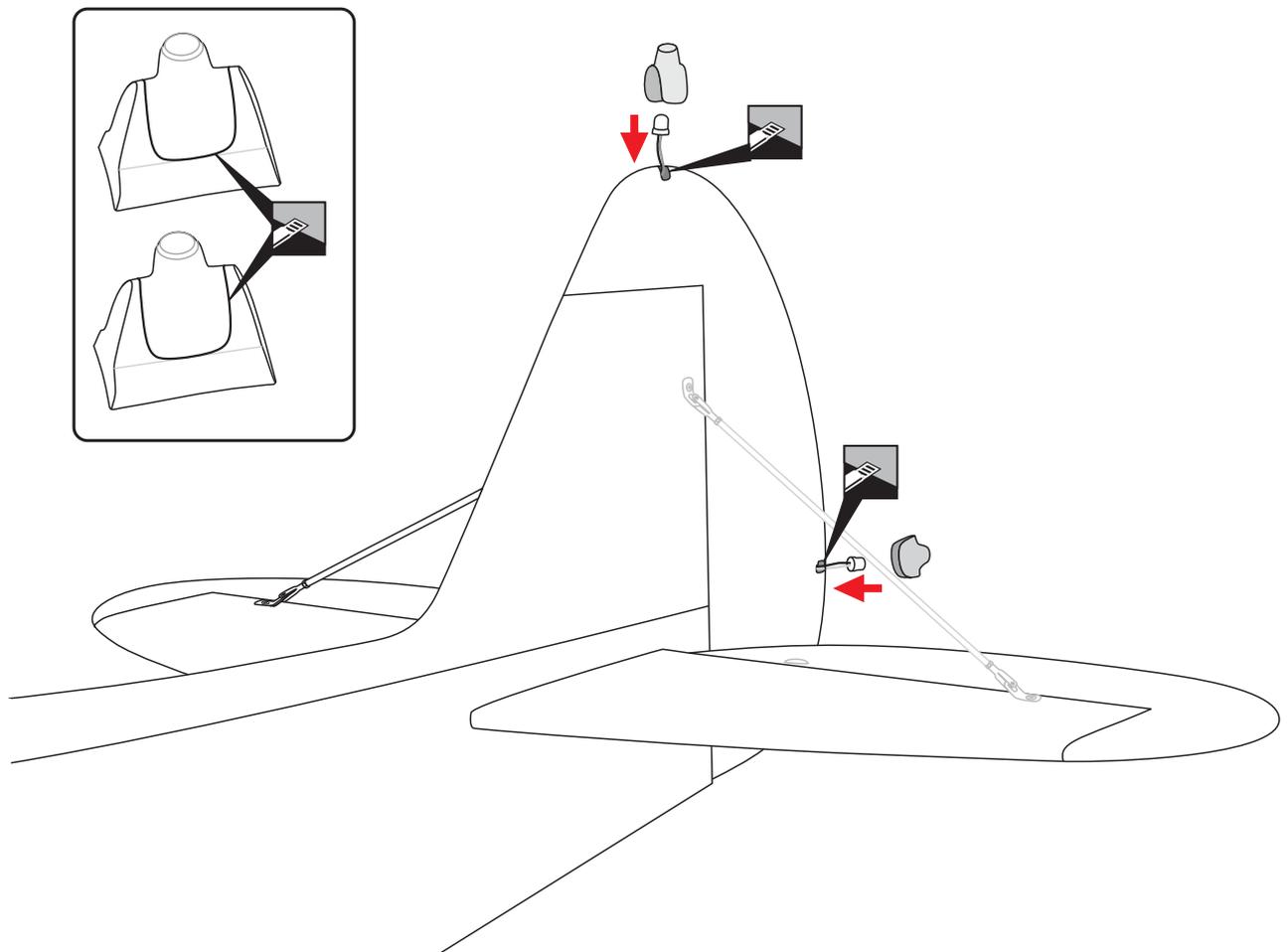
**RUDDER INSTALLATION**

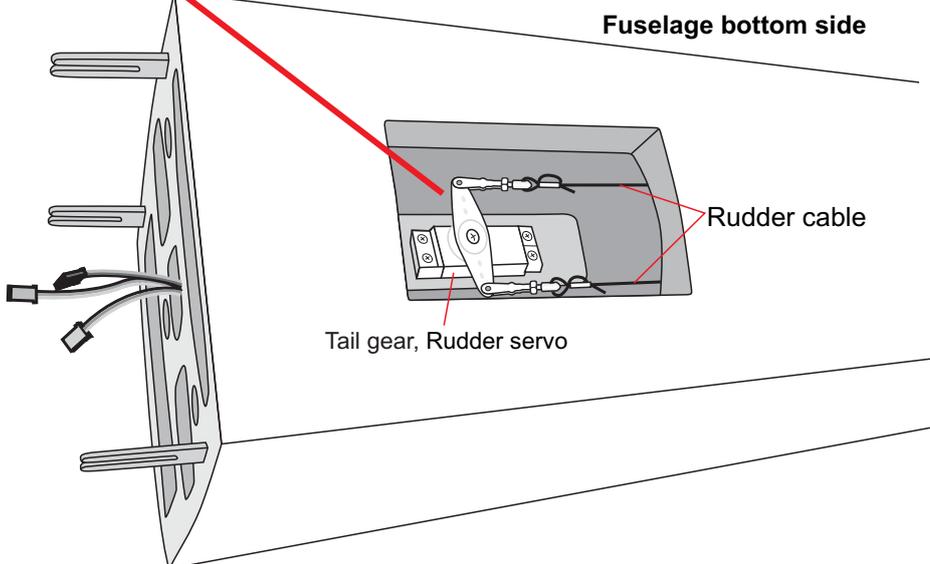
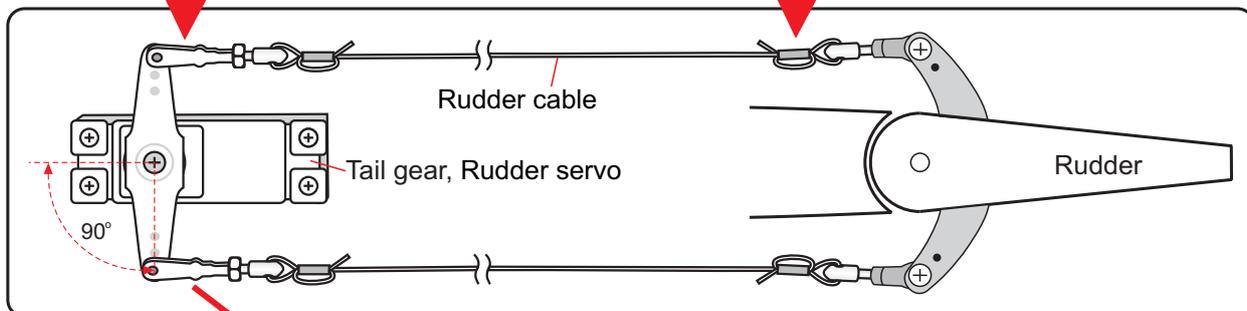
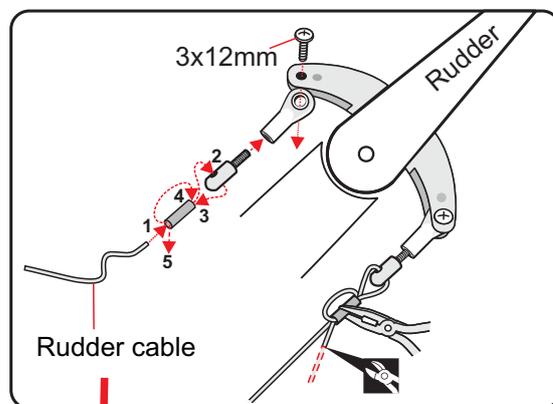
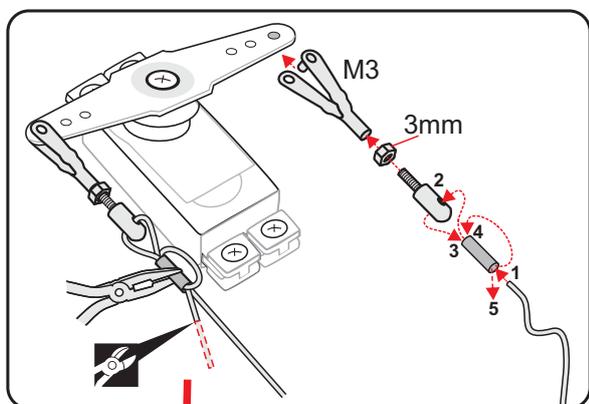
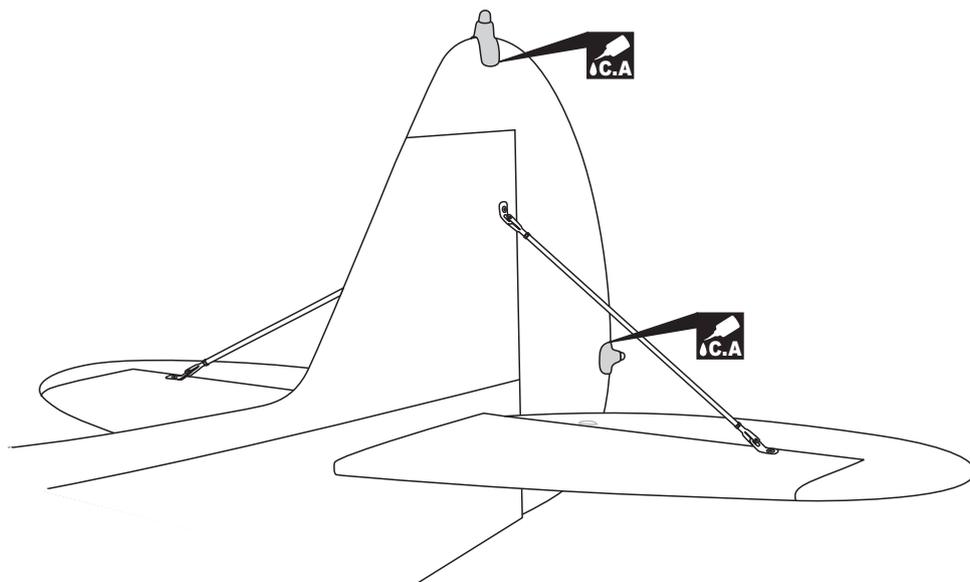
M3 	--- 2	 Horn	--- 2
1050mm Cable 	--- 2		--- 2
3x35mm Cap Screw 	--- 1		--- 4
3x12mm Cap Screw 	--- 2		--- 4
		3mm Nut 	--- 2





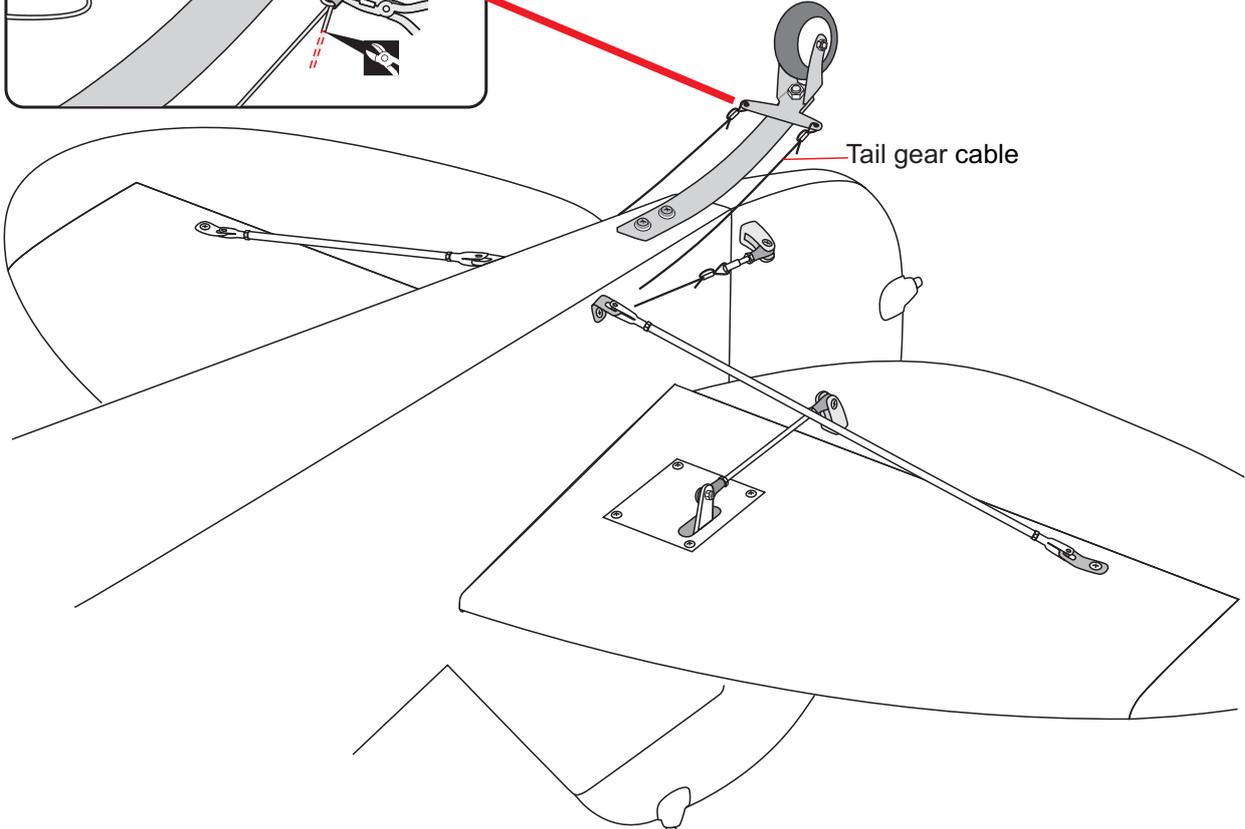
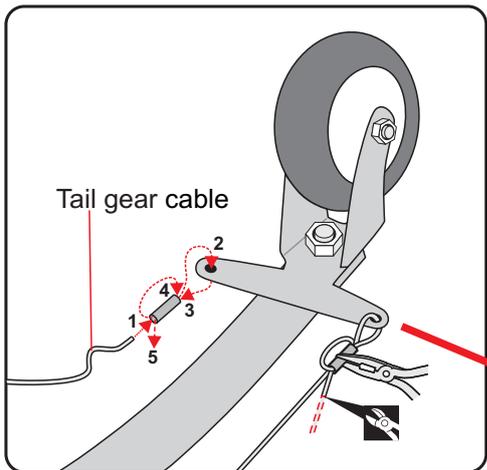
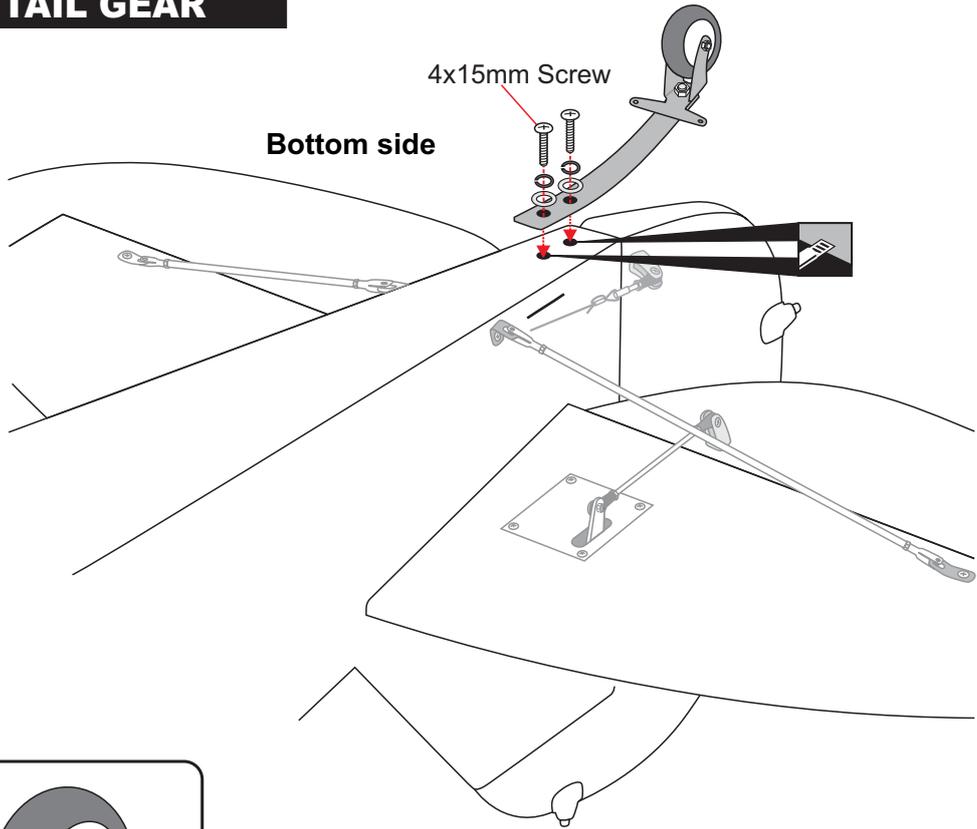
### **RUDDER PLASTIC LIGHT**

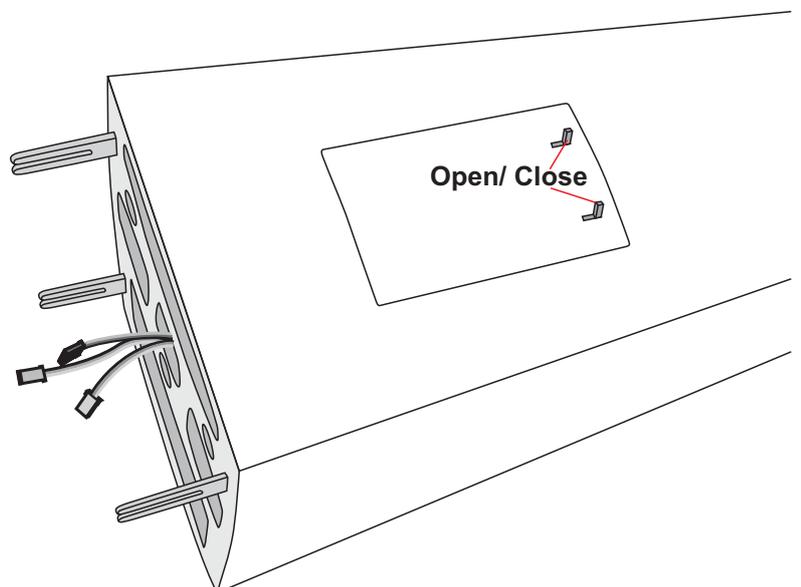
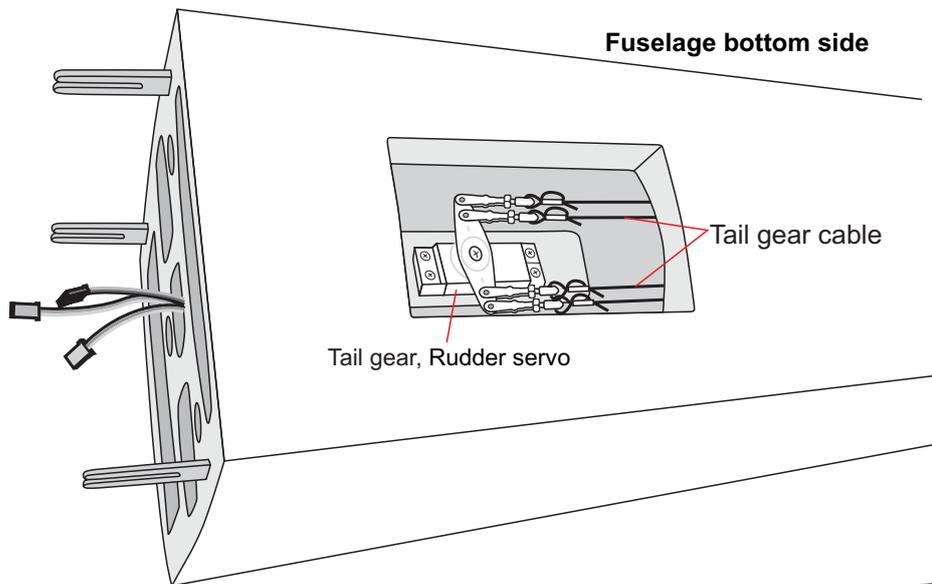
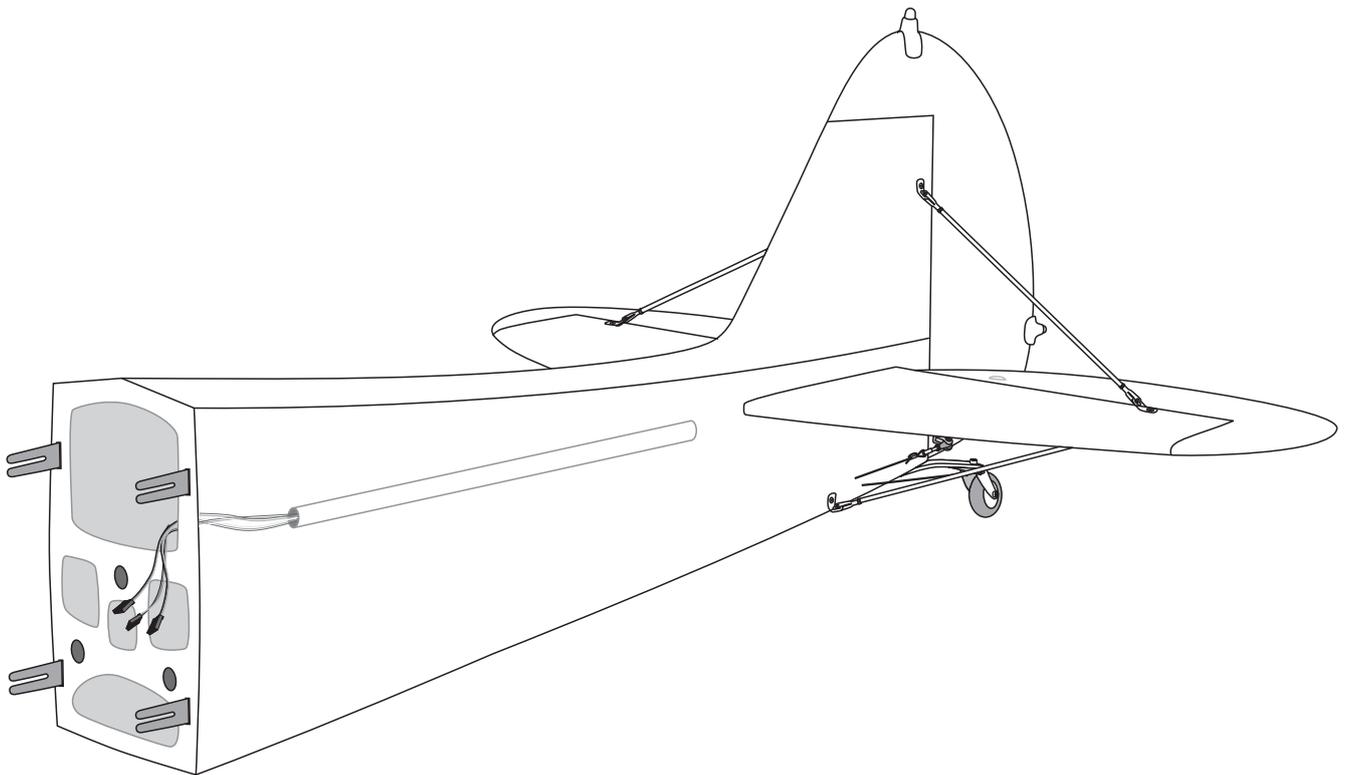




### INSTALLING THE TAIL GEAR

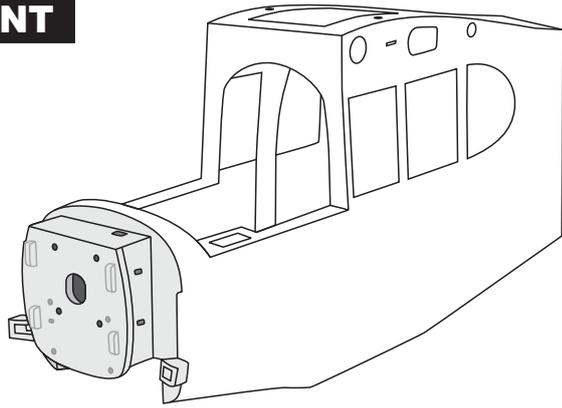
M3	---	2
1050mm Cable	--	2
4x15mm Cap Screw	-----	2
	-----	4
	-----	2
4mm Washer	-----	2
	-----	2
4mm Spring Washer	-----	2
3mm Nut	-----	2





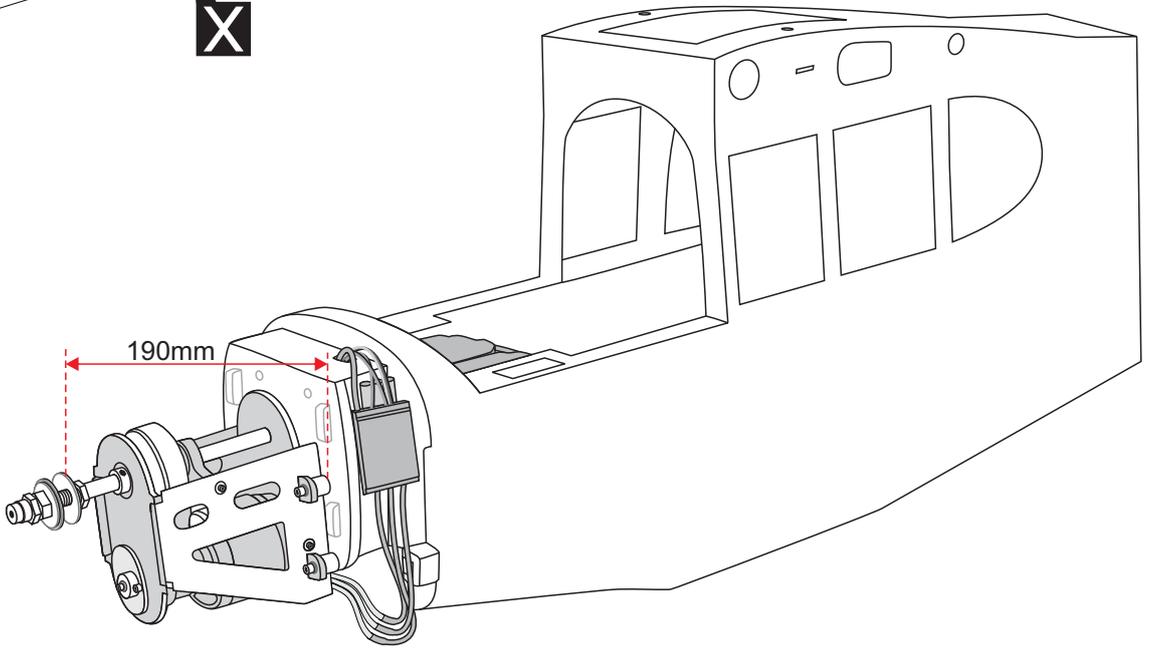
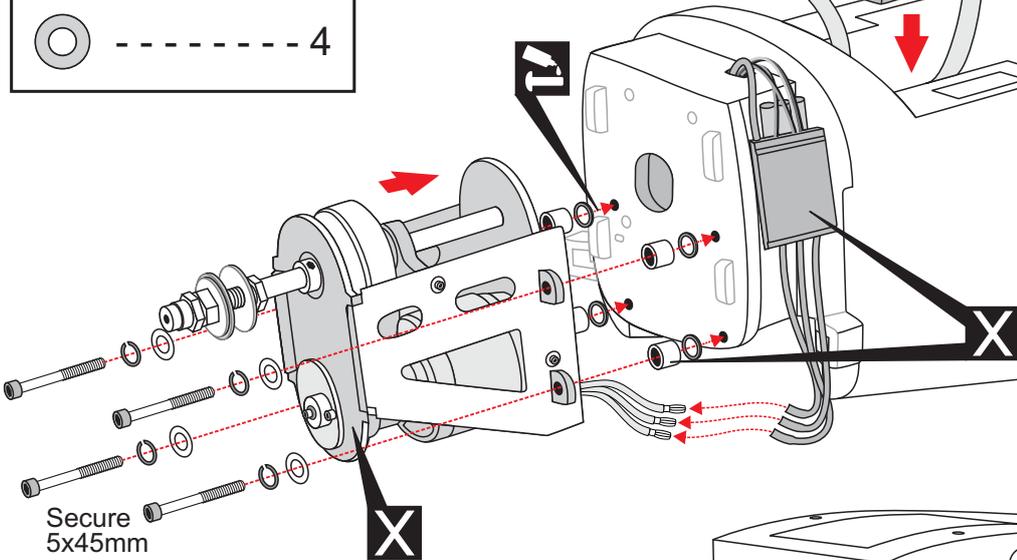
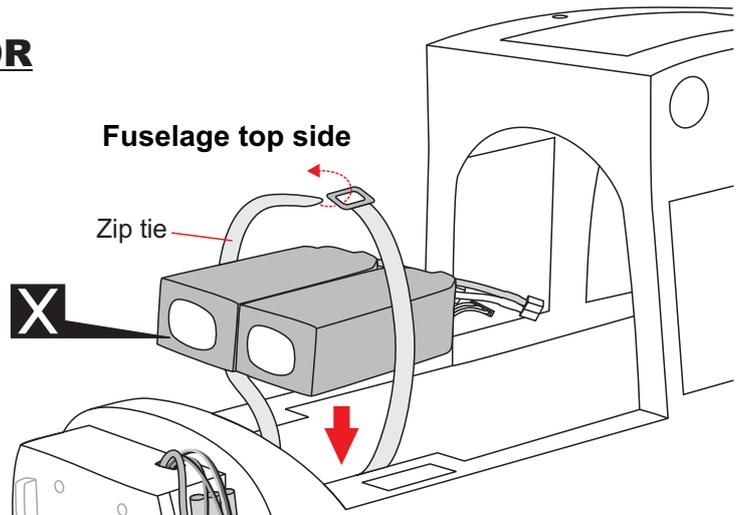
**INSTALLING THE ENGINE MOUNT**

There are two options:  
 1. Electric motor  
 2. Engine mount.



**OPTION 1: ELECTRIC MOTOR**

- |                   |       |   |
|-------------------|-------|---|
| 5x45mm Cap Screw  | ---   | 4 |
| 5mm Washer        | ----- | 4 |
| 5mm Spring Washer | ----- | 4 |
|                   | ----- | 4 |



## OPTION 2: INSTALLING THE ENGINE

### INSTALLING THE FUEL TANK.

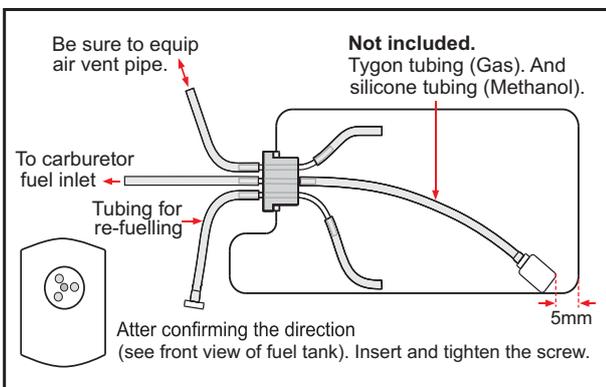
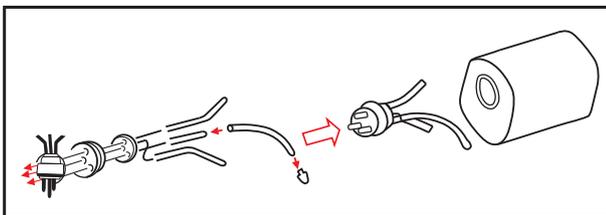
1) The stopper has been pre-assembled at the factory.

2) Using a modeling knife, cut one length of silicon fuel line (the length of silicon fuel line is calculated by how the weighted clunk should rest about 8mm away from the rear of the tank and move freely inside the tank). Connect one end of the line to the weighted clunk and the other end to the nylon pick up tube in the stopper.

3) Carefully bend the second nylon tube up at a 45 degree angle (using a cigarette lighter). This tube will be the vent tube to the muffler.

4) Carefully bend the third nylon tube down at a 45 degree angle (using a cigarette lighter). This tube will be vent tube to the fueling valve.

**!** When the stopper assembly is installed in the tank, the top of the vent tube should rest just below the top surface of the tank. It should not touch the top of the tank.



5) Test fit the stopper assembly into the tank. It may be necessary to remove some of the flashing around the tank opening using a modeling knife. If flashing is present, make sure none of it falls into the tank.

6) When satisfied with the alignment of the stopper assembly tighten the 3mm x 20mm machine screw until the rubber stopper expands and seals the tank opening. Do not over tighten the assembly as this could cause the tank to split.

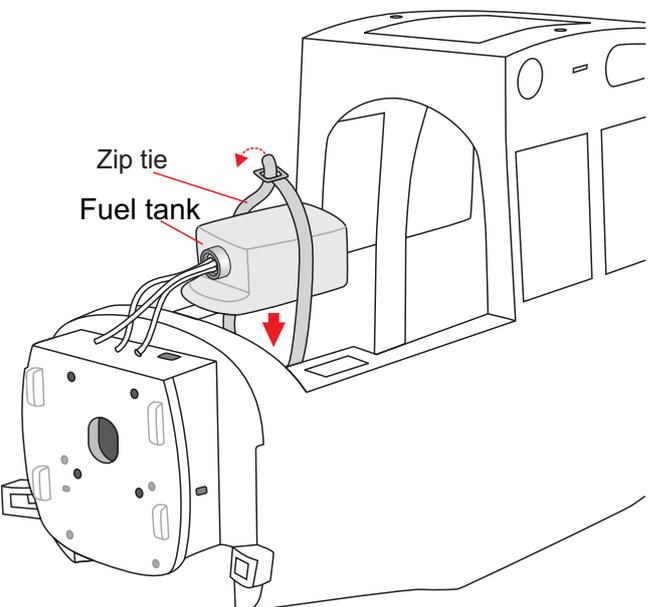
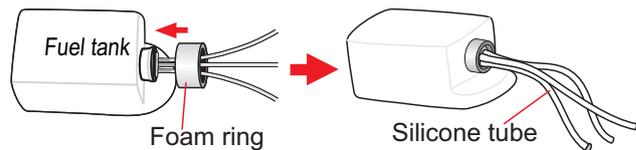
7) Using a modeling knife, cut 3 lengths of fuel line. Connect 2 lines to the 2 vent tubes and 1 line to the fuel pickup tube in the stopper.

8) Feed three lines through the fuel tank compartment and through the pre-drilled hole in the firewall. Pull the lines out from behind the engine, while guiding the fuel tank into place. Push the fuel tank as far forward as possible, the front of the tank should just about touch the back of the firewall.

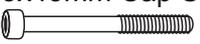
Blow through one of the lines to ensure the fuel lines have not become kinked inside the fuel tank compartment. Air should flow through easily.

**!** Do not secure the tank into place permanently until after balancing the airplane. You may need to remove the tank to mount the battery in the fuel tank compartment.

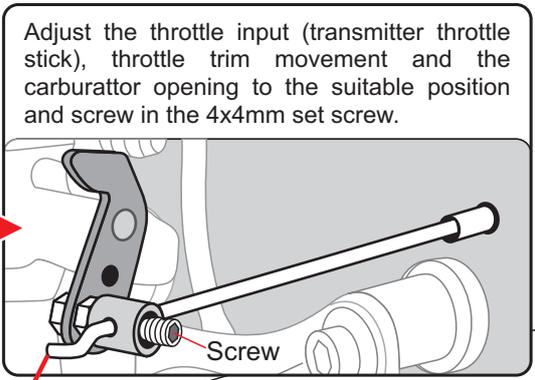
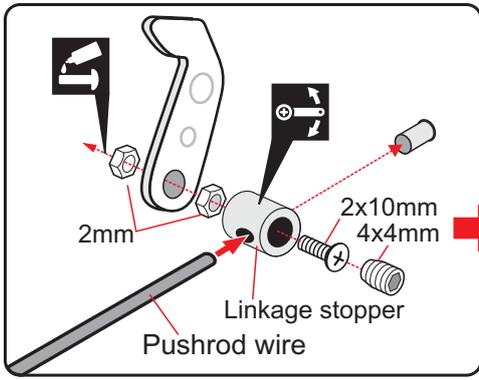
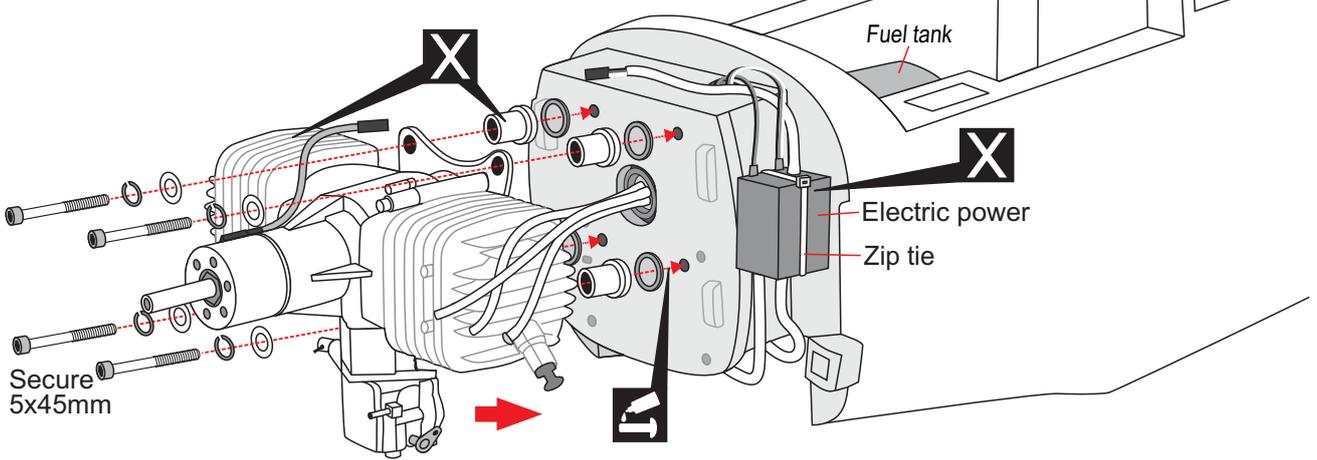
9. Secure the fuel tank.



### INSTALLING THE ENGINE

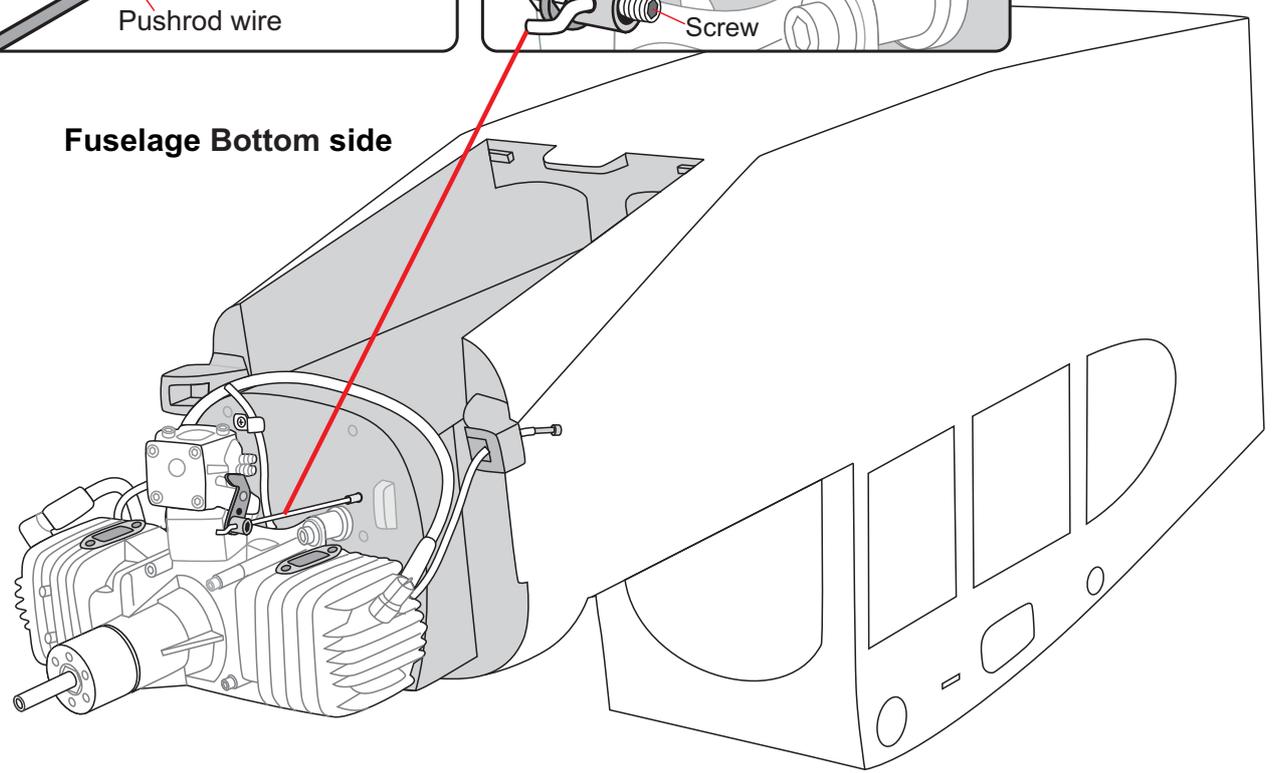
5x45mm Cap Screw  - - 4	Connector  - - - - 2
5mm Washer - 4	3x12mm Screw  - - - - 3
5mm Spring Washer  - - - - 4	 - - - - 4
50mm Pushrod wire  - - - 1	

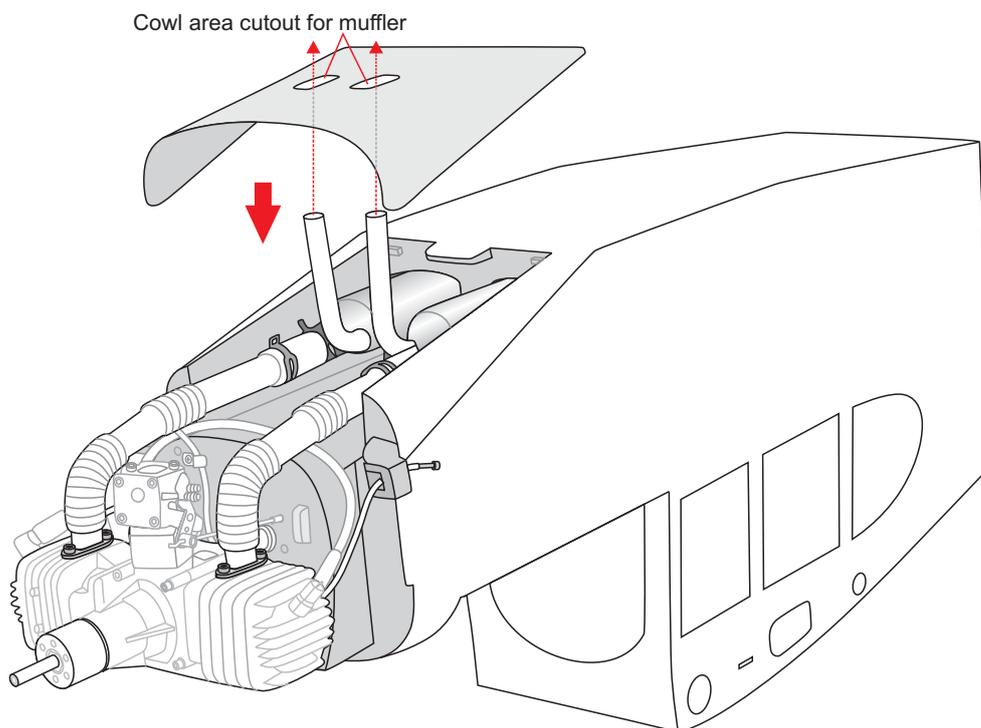
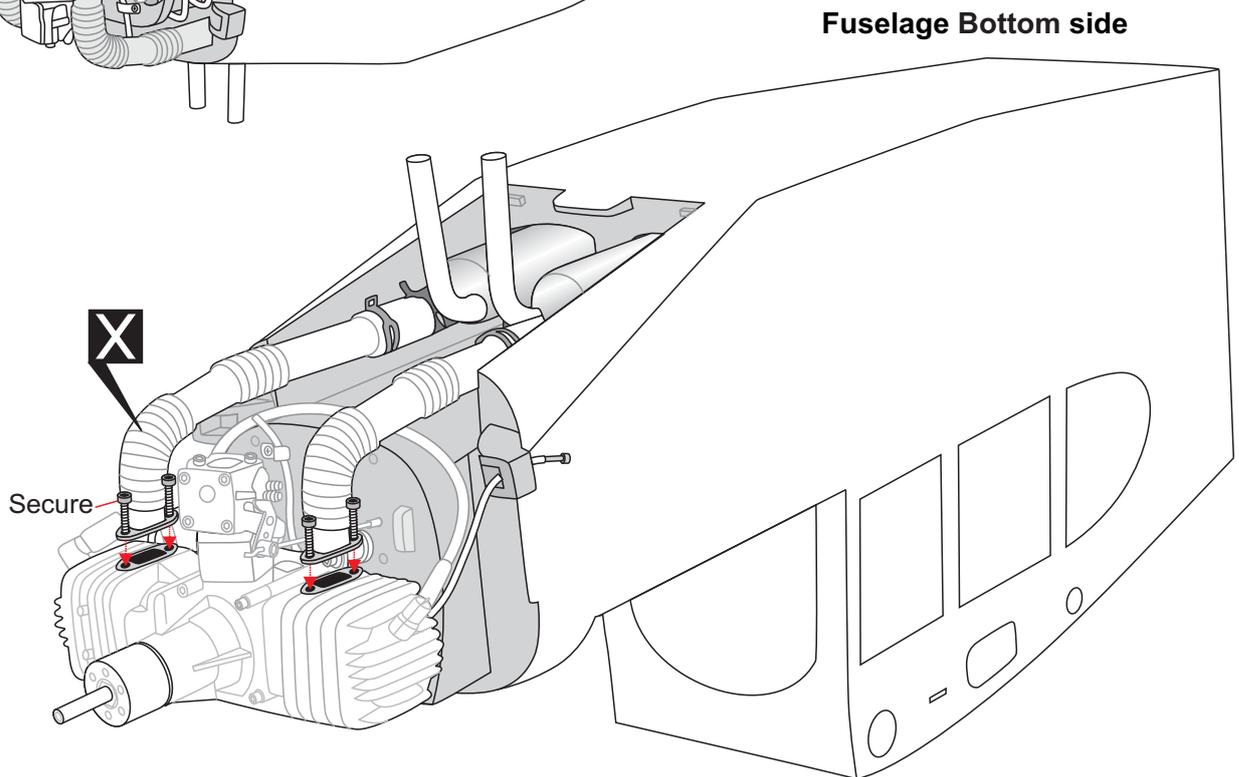
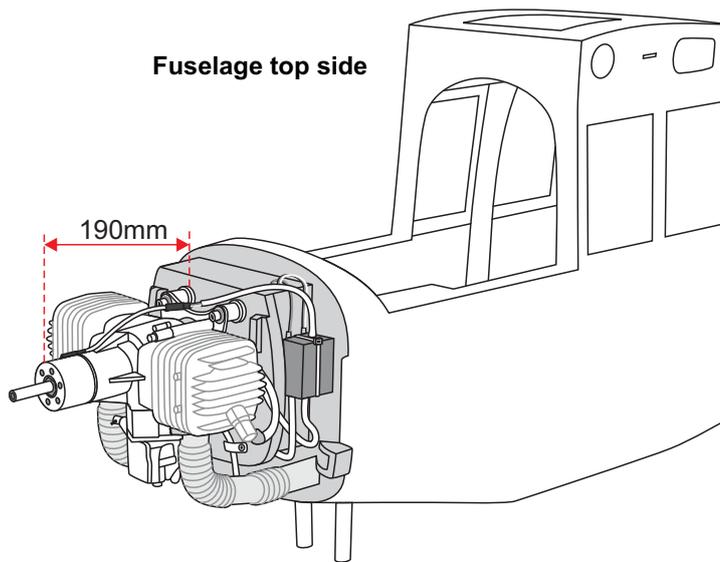
Fuselage top side

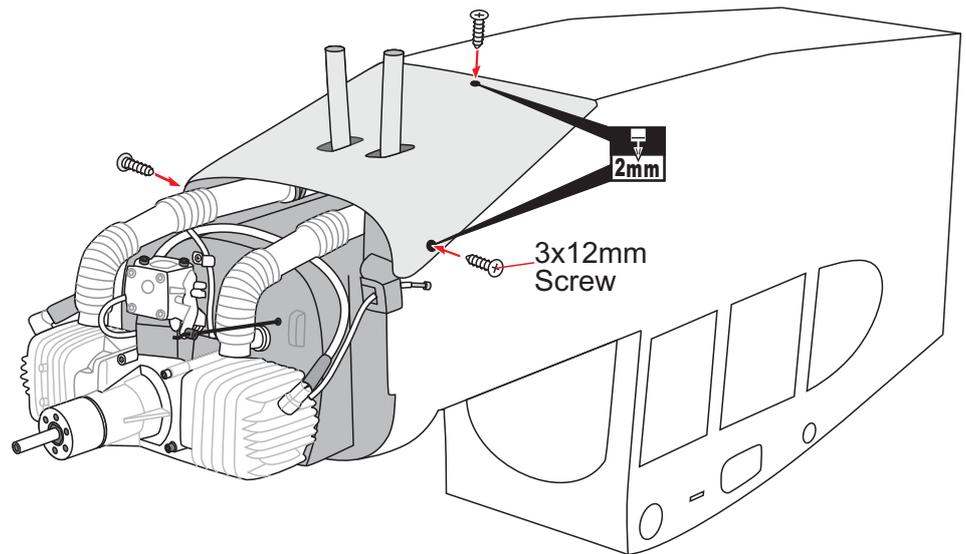


Adjust the throttle input (transmitter throttle stick), throttle trim movement and the carburettor opening to the suitable position and screw in the 4x4mm set screw.

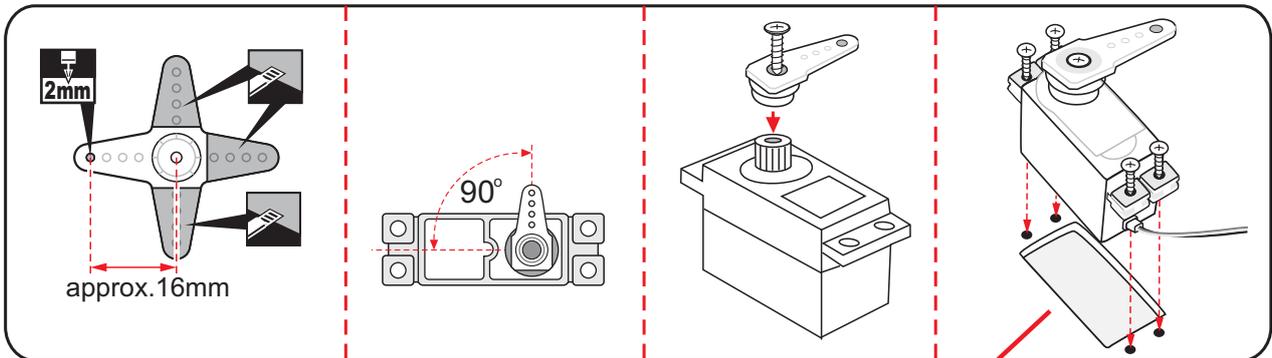
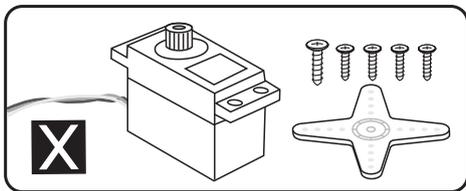
Fuselage Bottom side



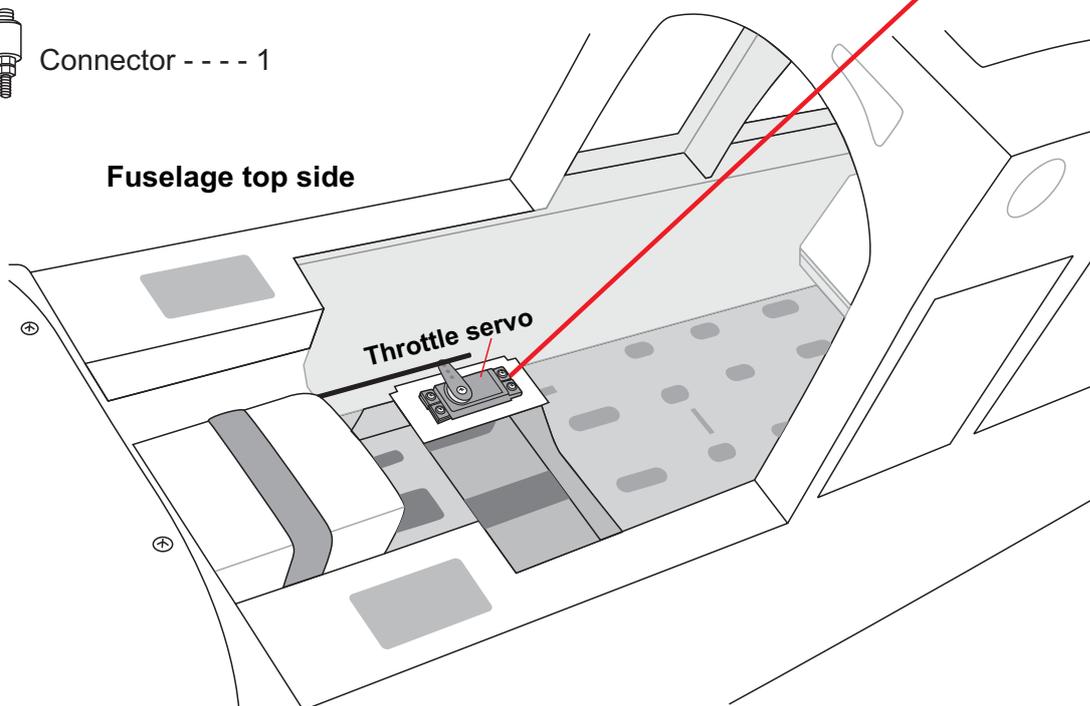




### INSTALLING THE THROTTLE



Connector - - - - 1



1) Install one adjustable metal connector through the third hole out from the center of one servo arm, enlarge the hole in the servo arm using a 2mm drill bit to accommodate the servo connector. Remove the excess material from the arm.

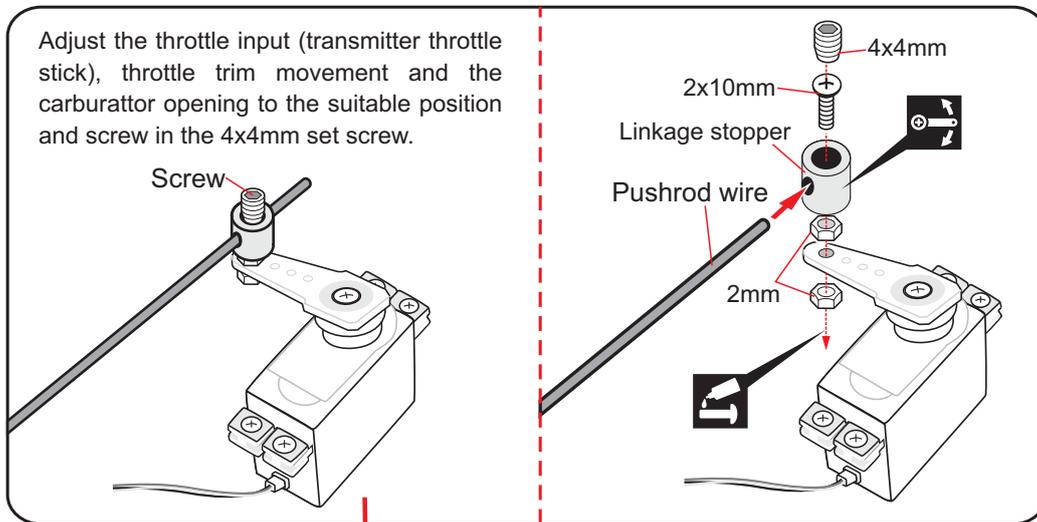
 After installing the adjustable metal connector apply a small drop of thin C/A to the bottom nut. This will prevent the connector from loosening during flight.

2) Plug the throttle servo into the receiver and turn on the radio system. Check to ensure that the throttle servo output shaft is moving in the correct direction. When the throttle stick is moved forward from idle to full throttle, the throttle barrel should also open and close using this motion. If not, reverse the direction of the servo, using the transmitter.

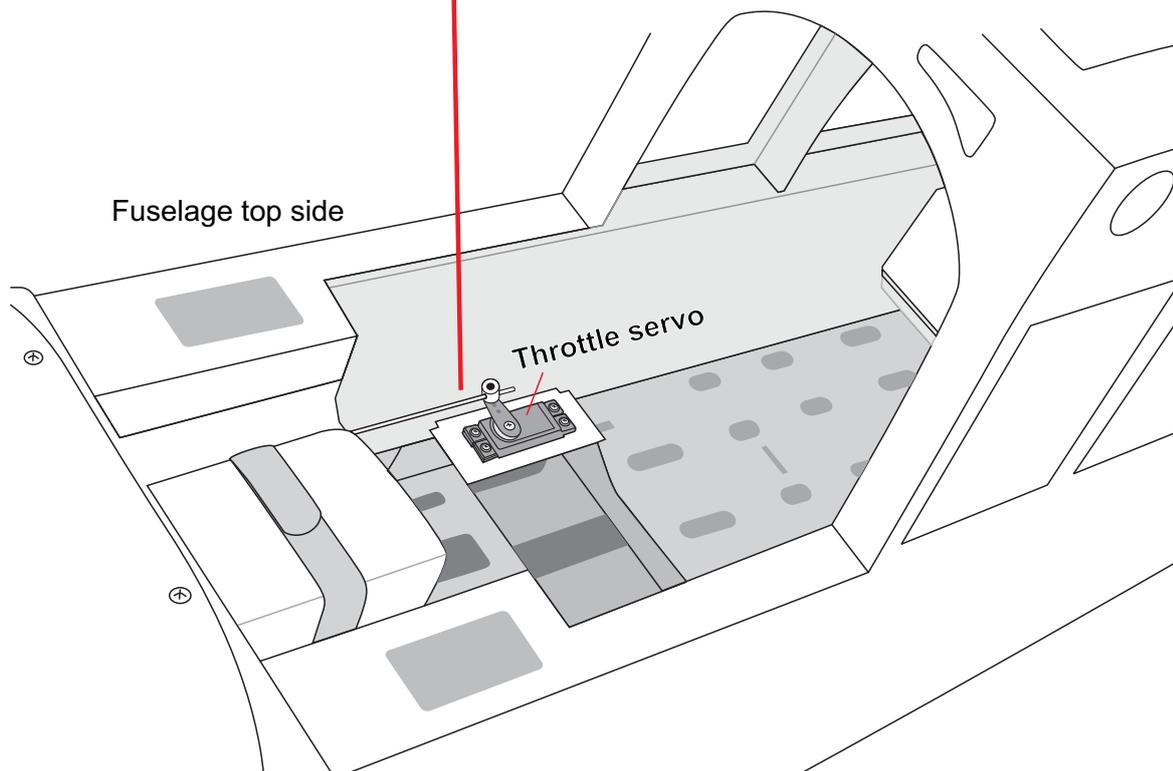
3) Slide the adjustable metal connector / servo arm assembly over the plain end of the pushrod wire. Position the throttle stick and the throttle trim at their lowest positions.

4) Manually push the carburetor barrel fully closed. Angle the arm back about 45 degree from center and attach the servo arm onto the servo. With the carburetor barrel fully closed, tighte the set screw in the adjustable metal connector.

5) Remove the excess throttle pushrod wire using wire cutters and install the servo arm retaining screw.



Adjust the throttle input (transmitter throttle stick), throttle trim movement and the carburattor opening to the suitable position and screw in the 4x4mm set screw.



**MOUNTING THE COWL**

- 1) Remove the muffler and needle valve assembly from the engine. Slide the fiberglass cowl over the engine.
- 2) Measure and mark the locations to be cut out for engine head clearance, needle valve, muffler. Remove the cowl and make these cutouts using a rotary tool with a cutting disc and a rotary sanding drum attachment.
- 3) Slide the cowl back into place. Align the front of the cowl with the crankshaft of the engine. The front of the cowl should be positioned so the crankshaft is in the middle of the precut opening. Hold the cowl firmly in place using several pieces of masking tape.

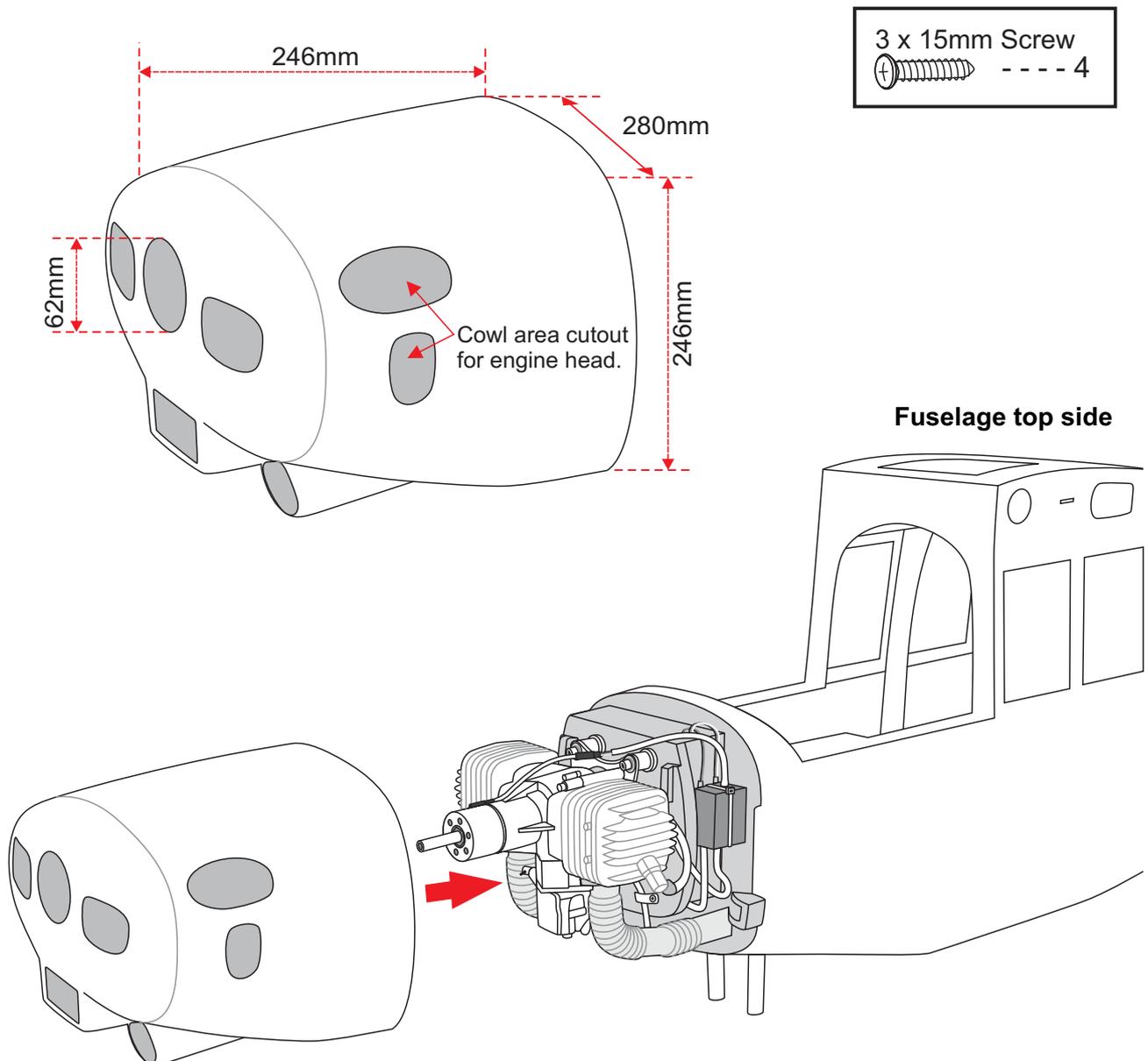
- 4) While holding the cowl firmly in position, drill four 1,6mm pilot holes through both the cowl and the side edges of the firewall.

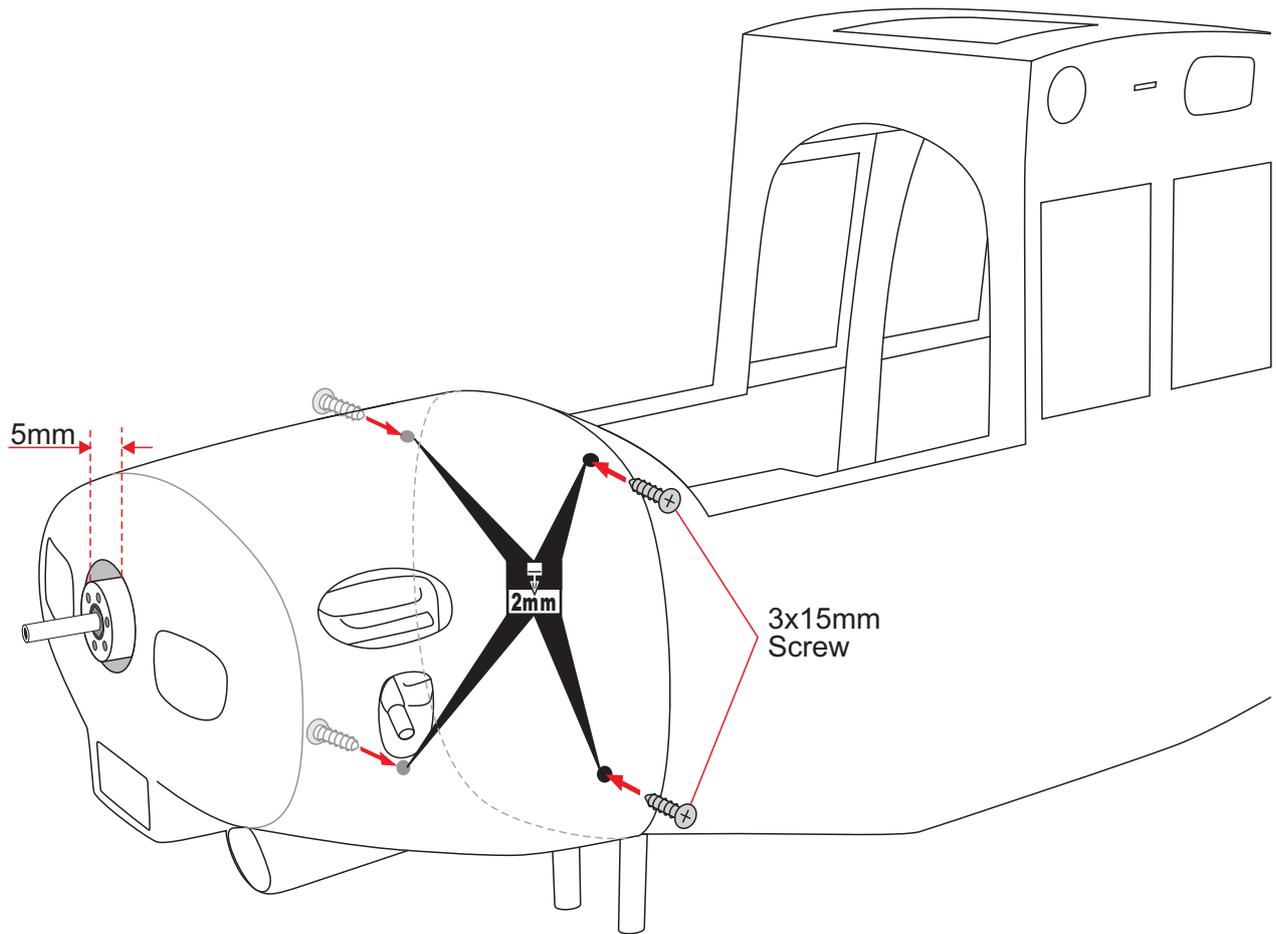
- 5) Using a 3mm drill bit, enlarge the four holes in the cowling.

 *Enlarging the holes through the cowl will prevent the fiberglass from splitting when the mounting screws are installed.*

- 6) Slide the cowl back over the engine and secure it in place using four screws.

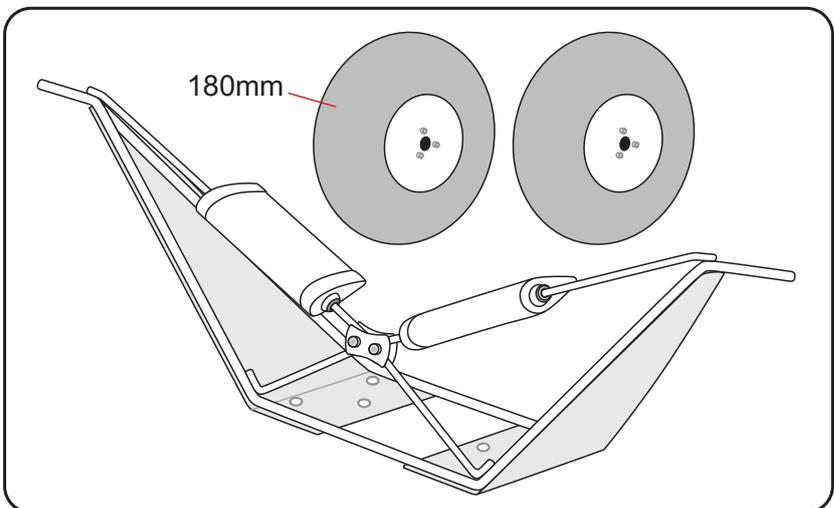
- 7) Install the muffler. Connect the fuel and pressure lines to the carburetor, muffler and fuel filler valve. Tighten the screws completely.



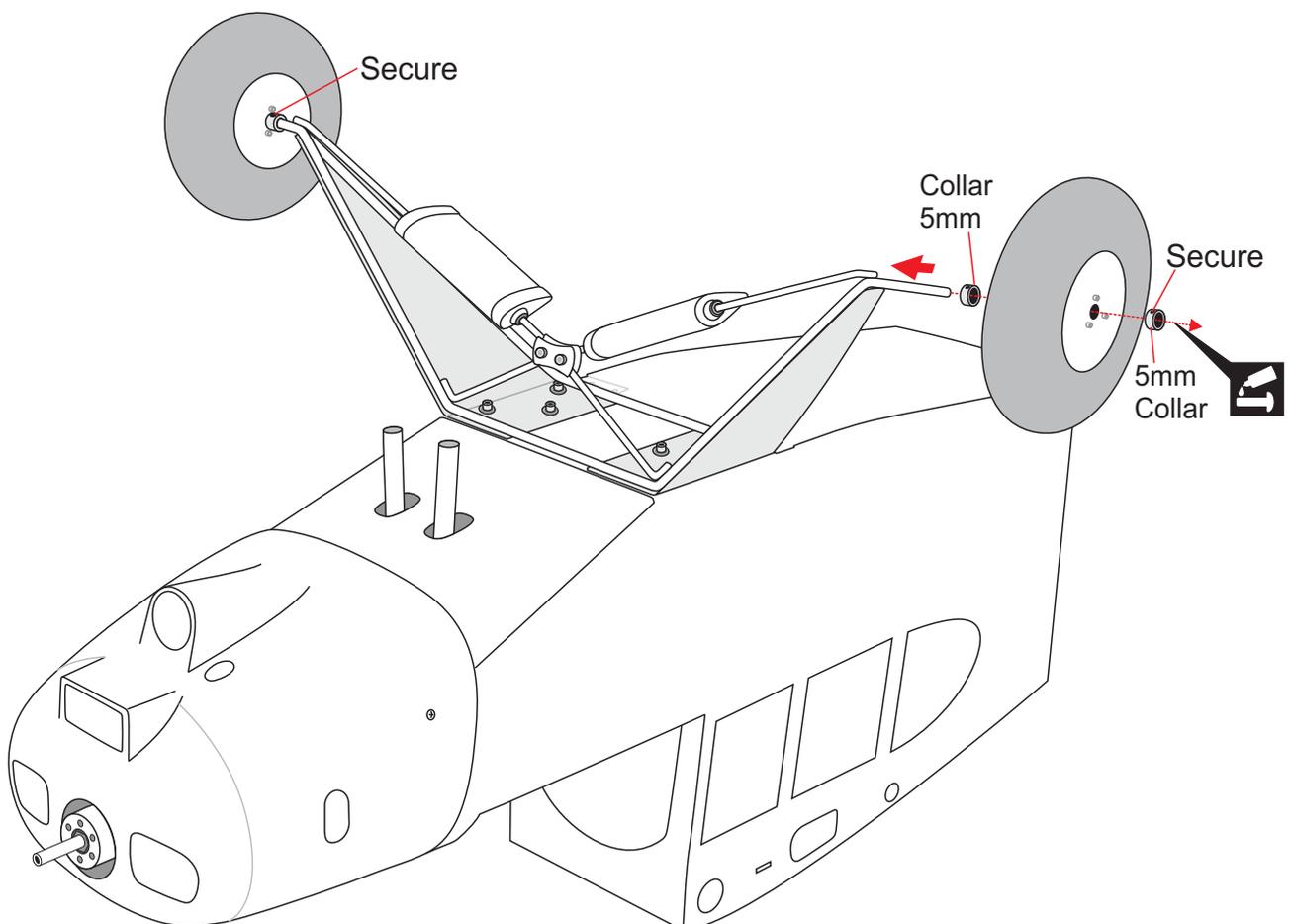
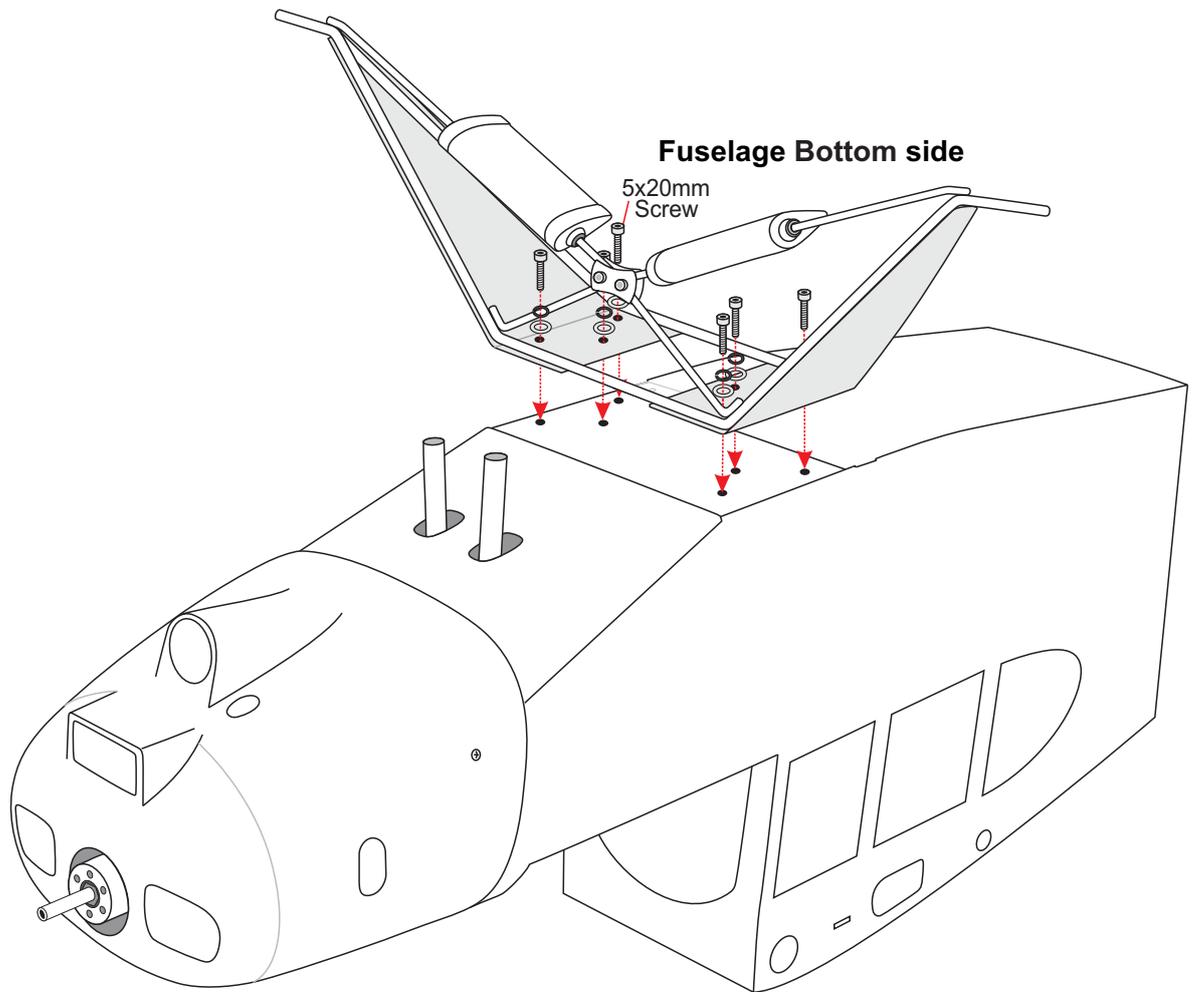


### INSTALLING THE MAIN LANDING GEAR

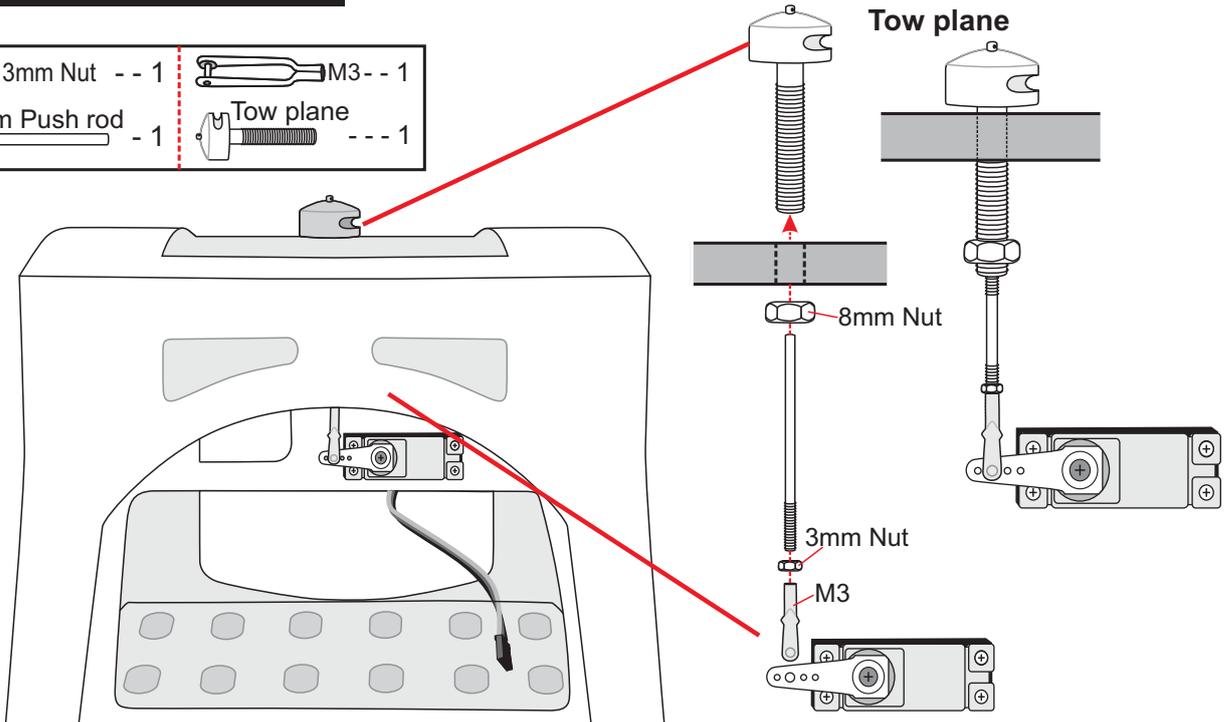
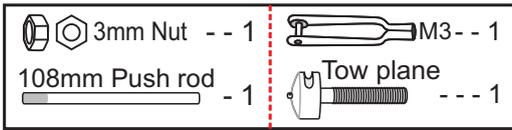
- |                   |         |
|-------------------|---------|
| 5x20mm Cap Screw  | -- 6    |
| 5mm Washer        | ----- 6 |
| 5mm Spring Washer | ----- 6 |
| 5mm Collar        | ----- 4 |



\* Using a modeling knife, carefully remove the film covering from the wing gear tray. Make sure that you do not remove any wood.



**TOW PLANE**



**INSTALLING THE SWITCH, RECEIVER AND BATTERY**

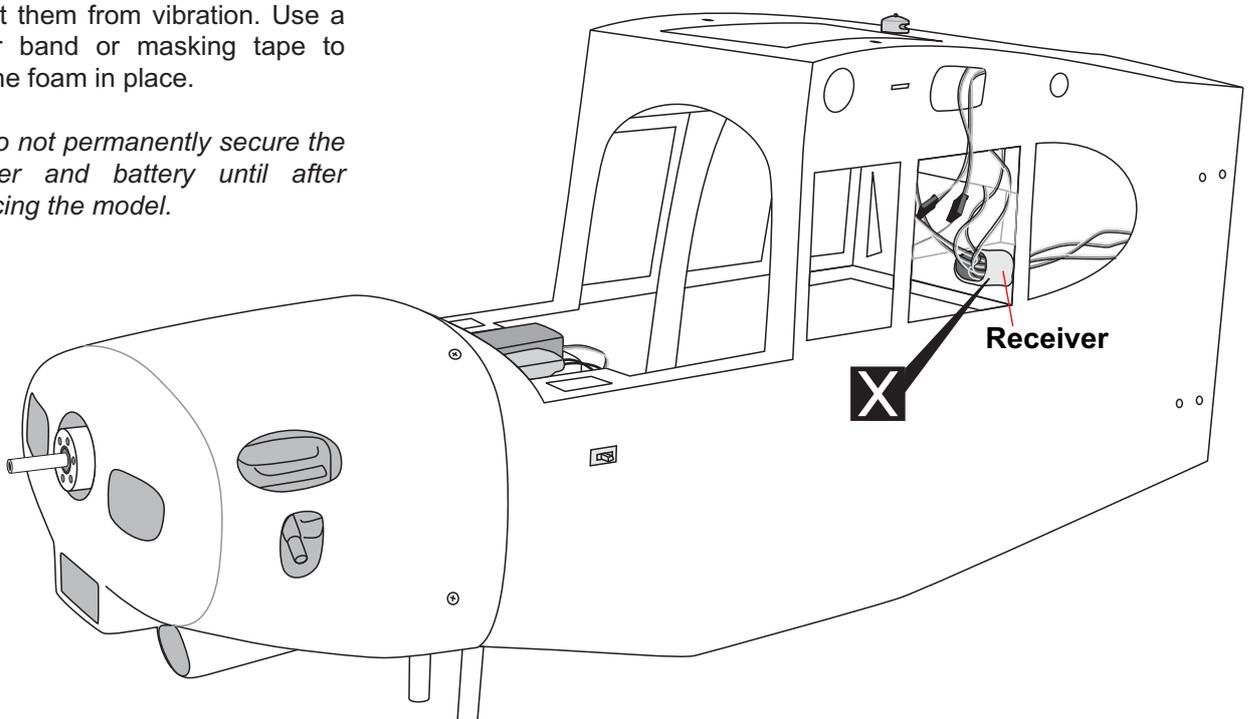
1) Plug the servo leads and the switch lead into the receiver. You may want to plug an aileron extension into the receiver to make plugging in the aileron servo lead easier when you are installing the wing. Plug the battery pack lead into the switch.

2) Wrap the receiver and battery pack in the protective foam to protect them from vibration. Use a rubber band or masking tape to hold the foam in place.

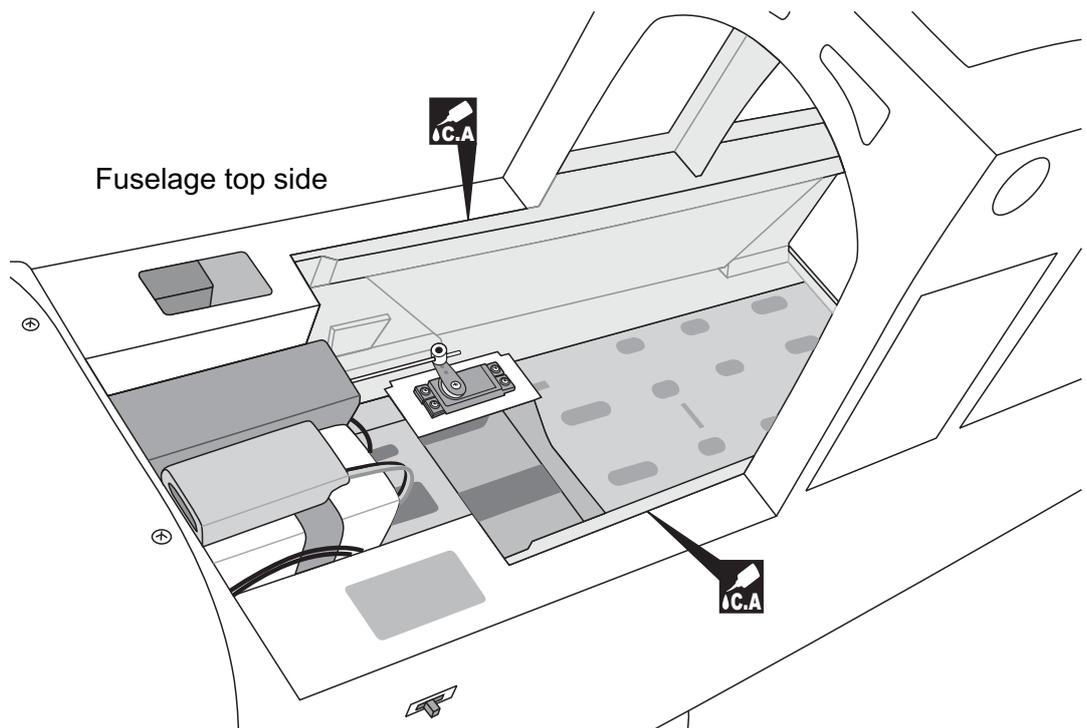
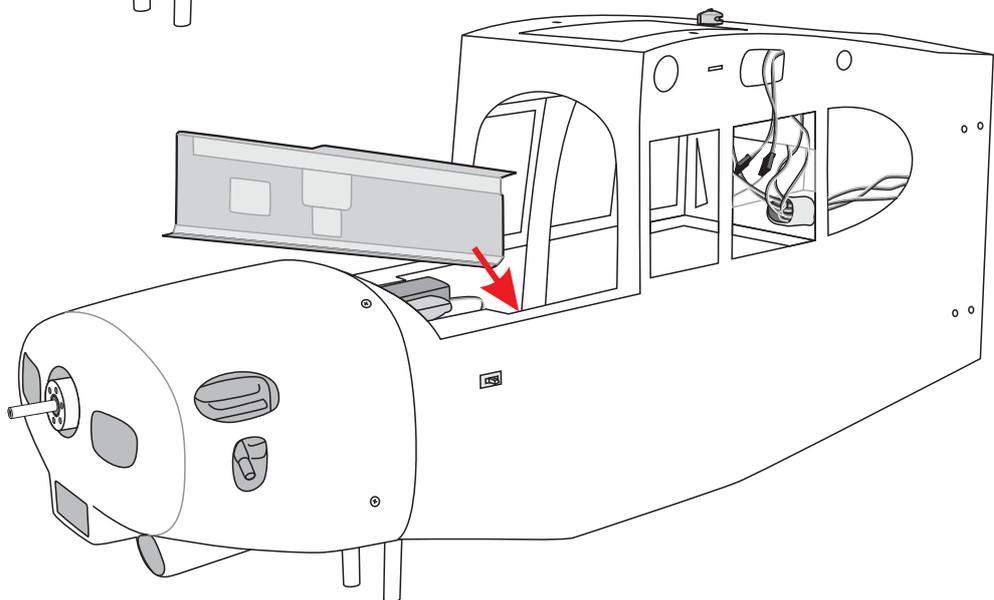
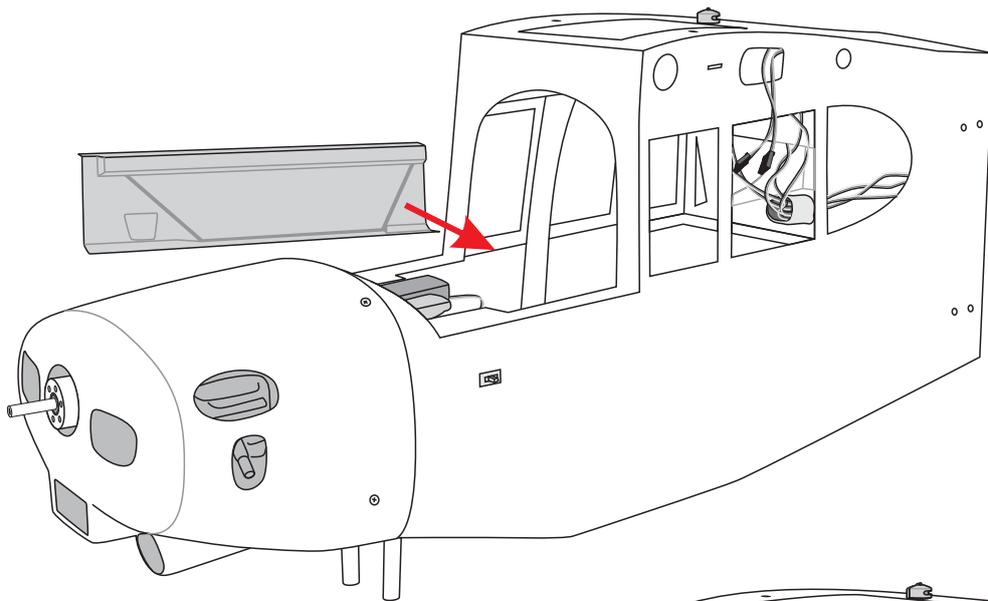
**⚠** Do not permanently secure the receiver and battery until after balancing the model.

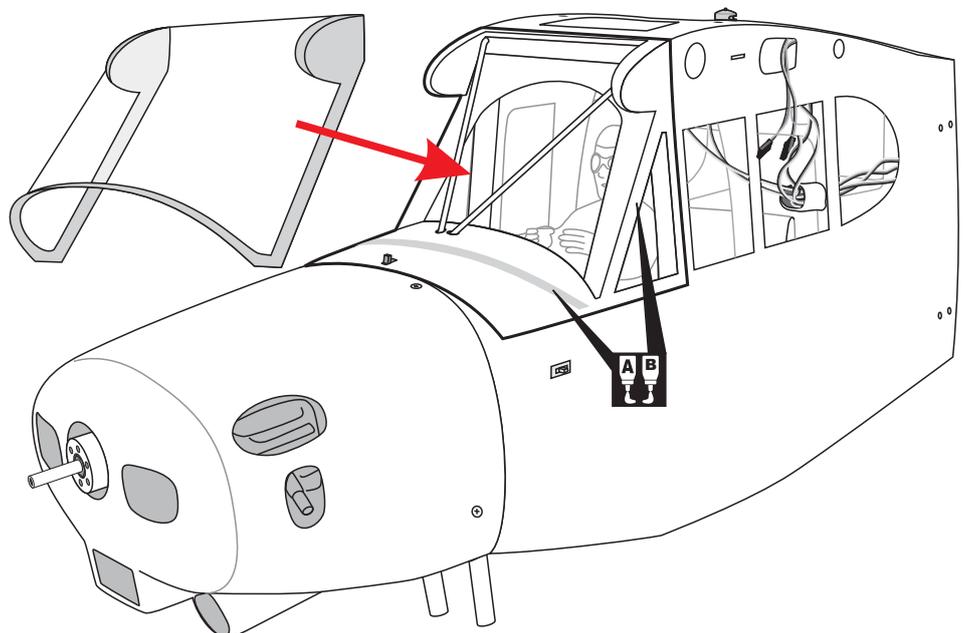
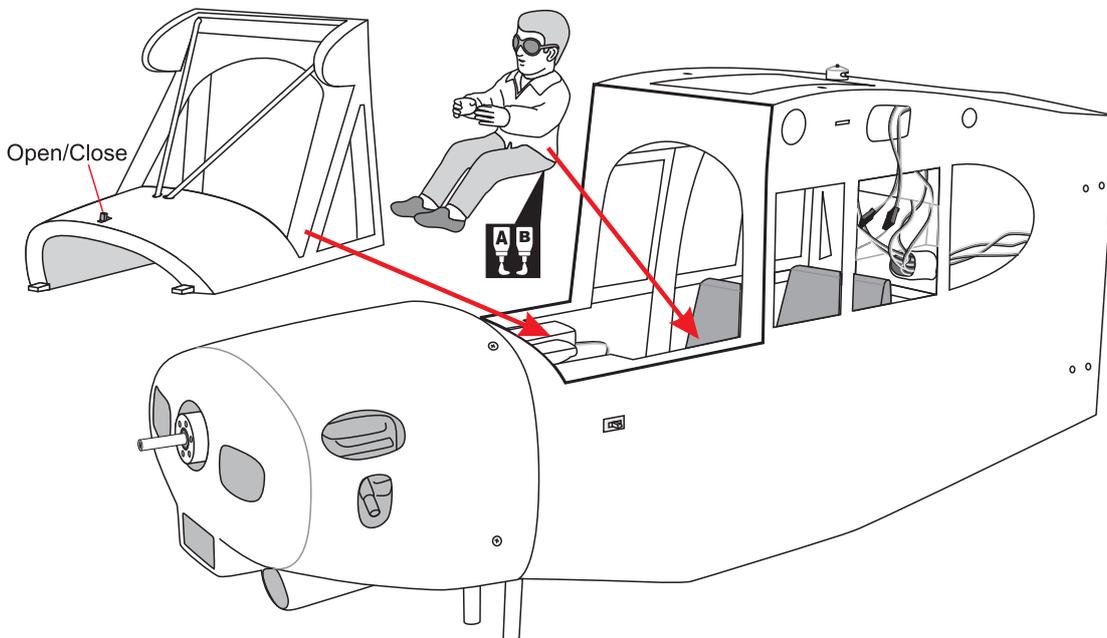
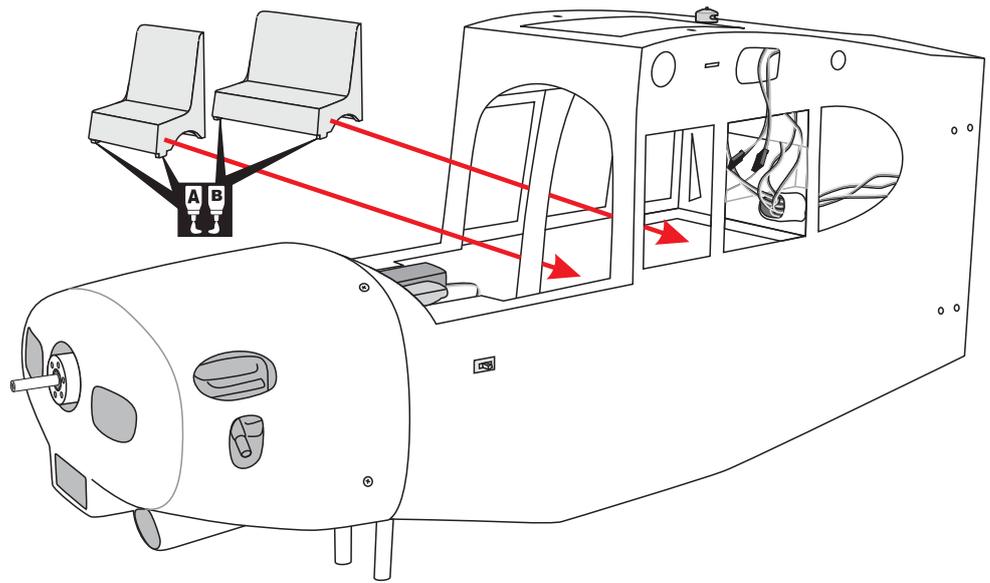
**INSTALLING THE SWITCH**

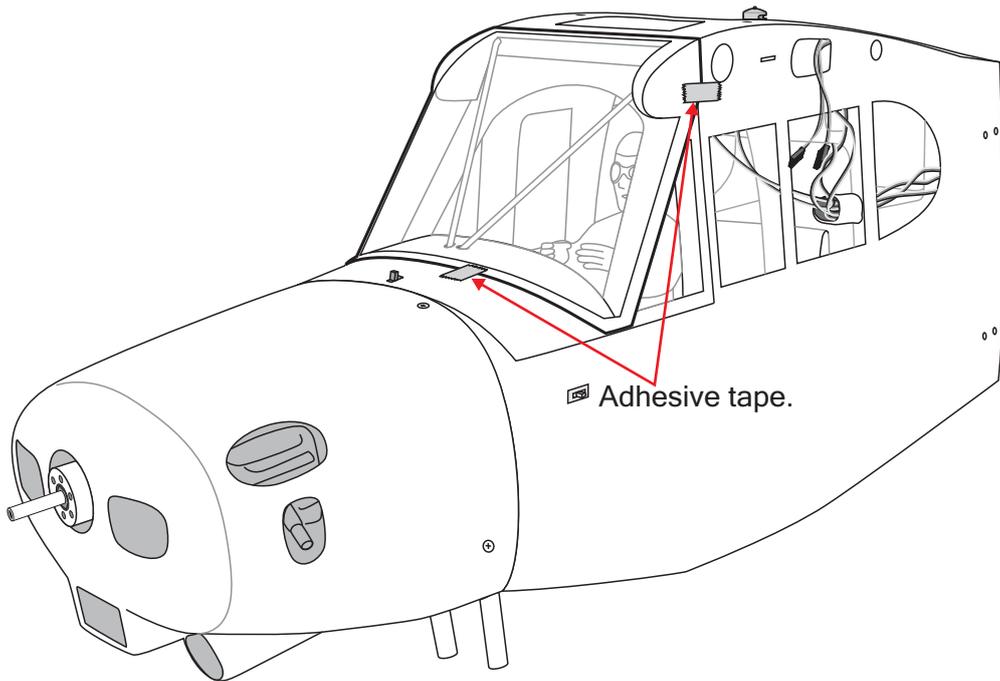
- 1) The switch should be mounted on the fuselage side, opposite the muffler, close enough to the receiver so the lead will reach. Use the face plate of the switch cut out and locate the mounting holes.
- 2) Cut out the switch hole using a modeling knife. Use a 2mm drill bit and drill out the two mounting holes through the fuselage side.
- 3) Secure the switch in place using the two machine screws provided with the radio system.











## INSTALLING THE FUSELAGE

19x378mm Aluminium tube.

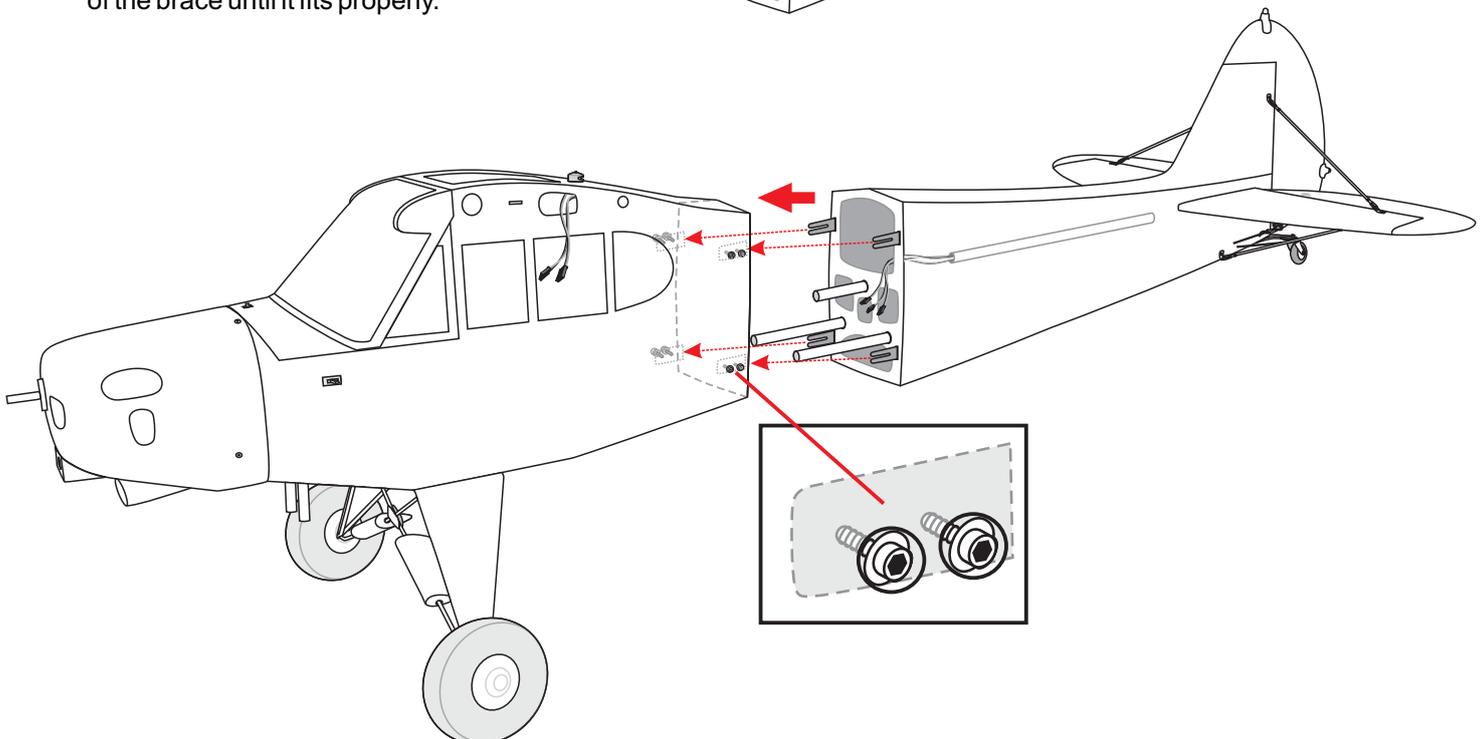
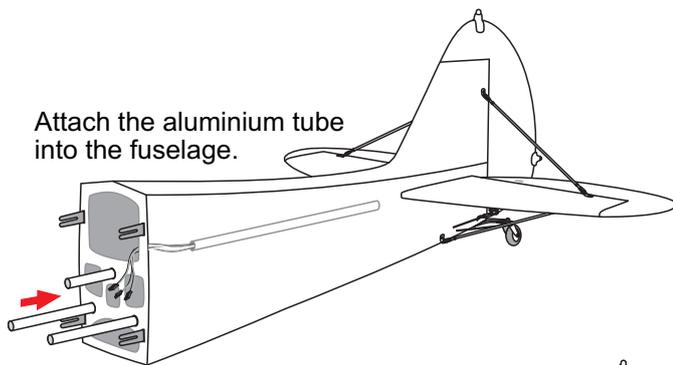
 - - - - 2

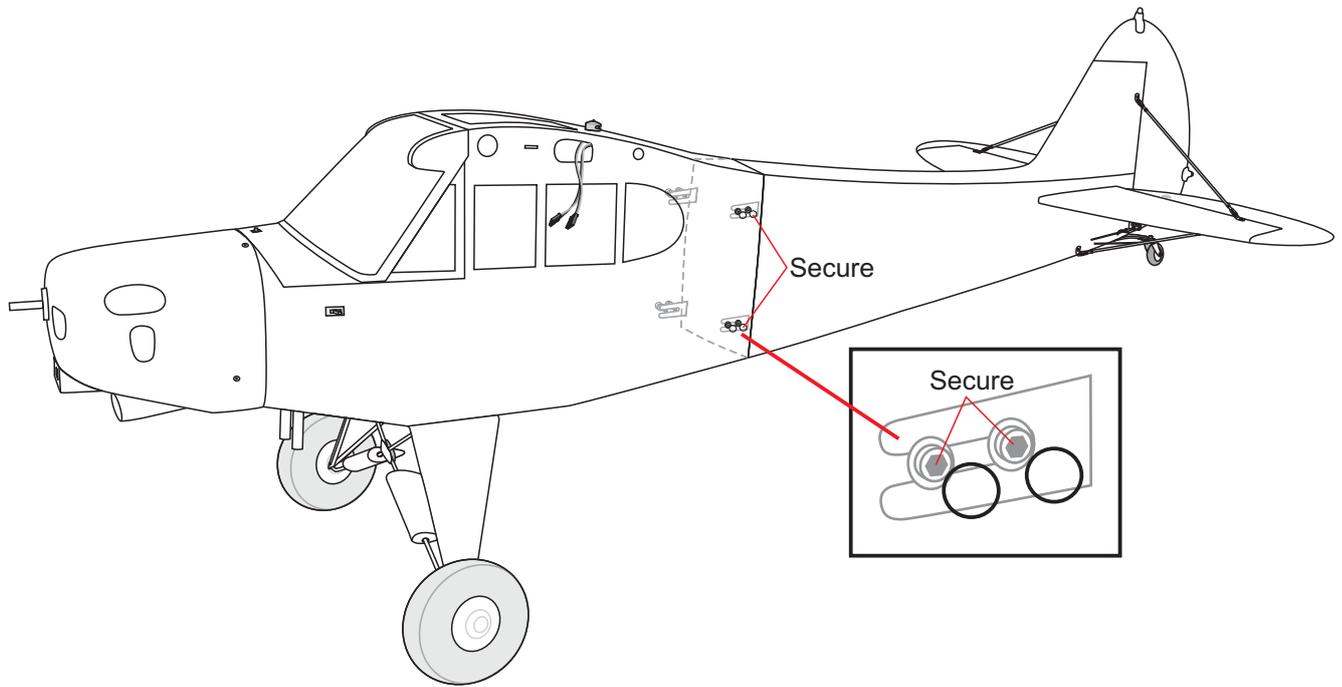
19x196mm Aluminium tube.

 - - - - - 1

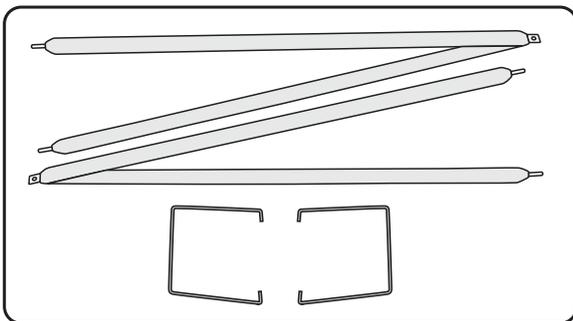
\*\*\* Test fit the aluminium tube into the fuselage. The brace should slide in easily. If not, use 220 grit sand around the edges and ends of the brace until it fits properly.

Attach the aluminium tube into the fuselage.

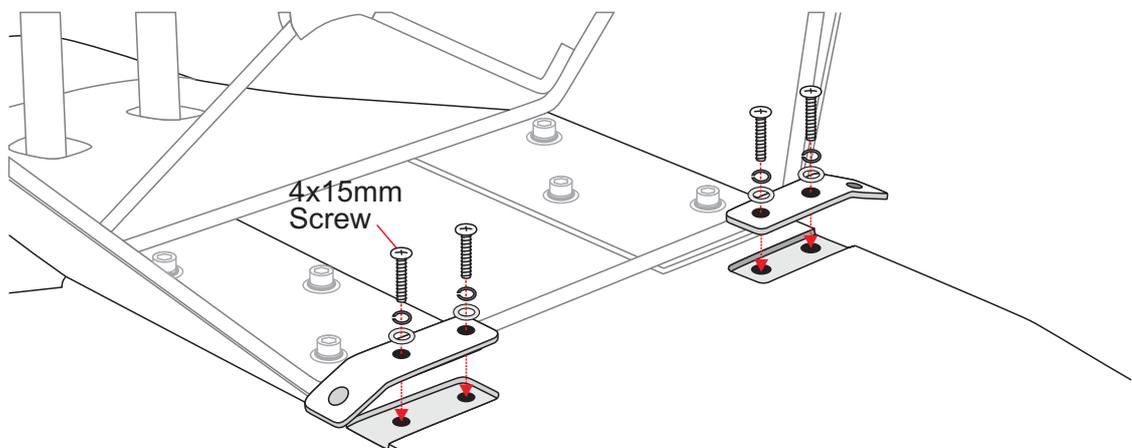




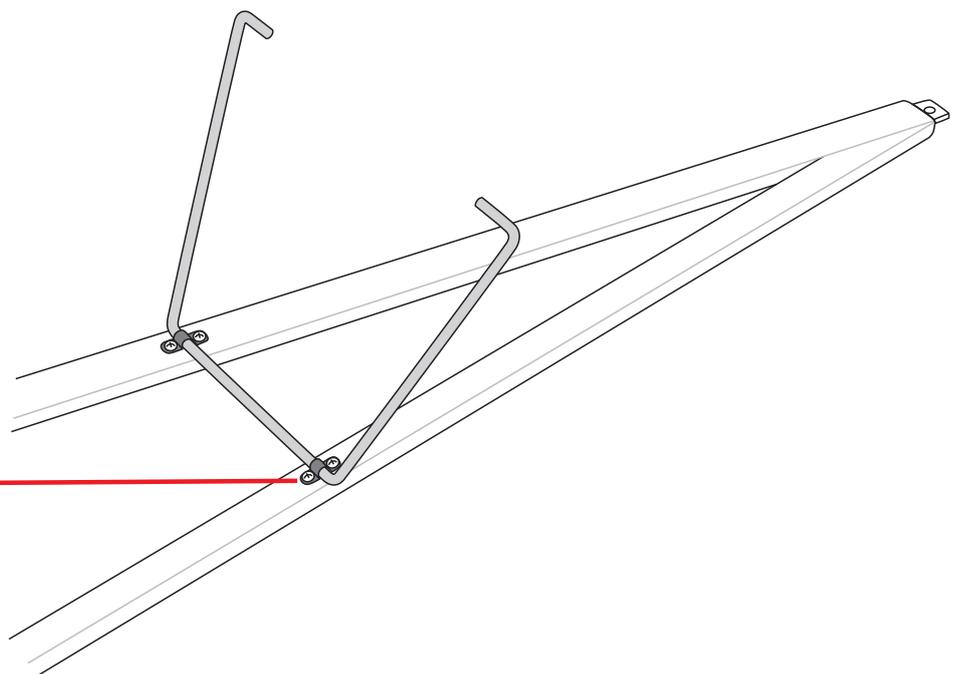
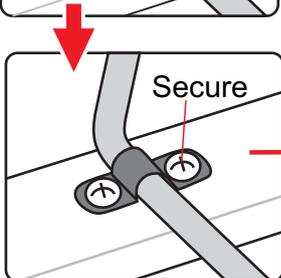
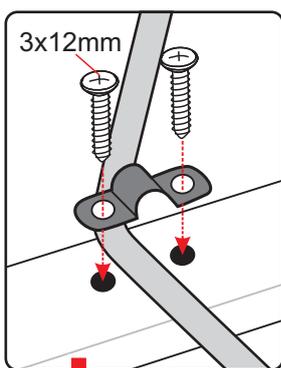
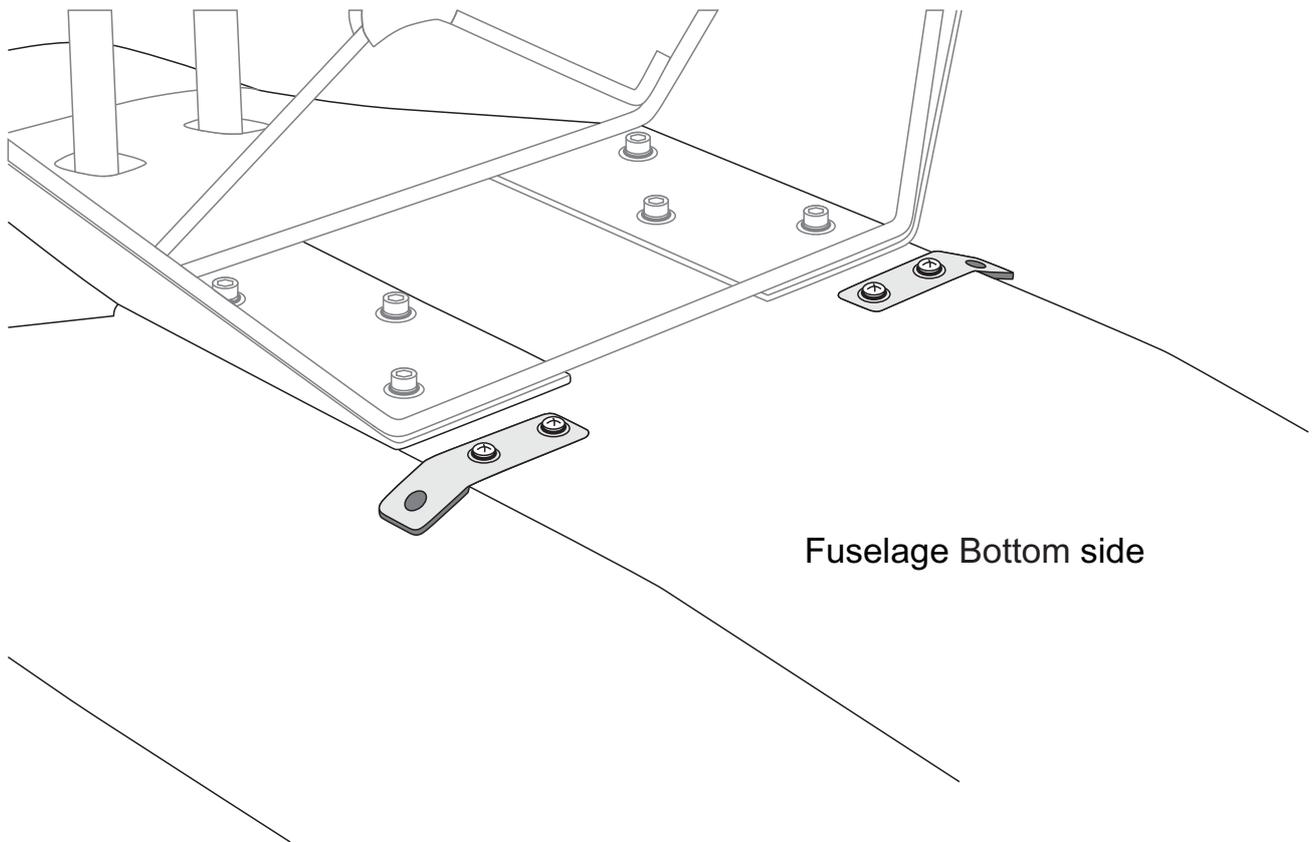
**WING STRUT SET**

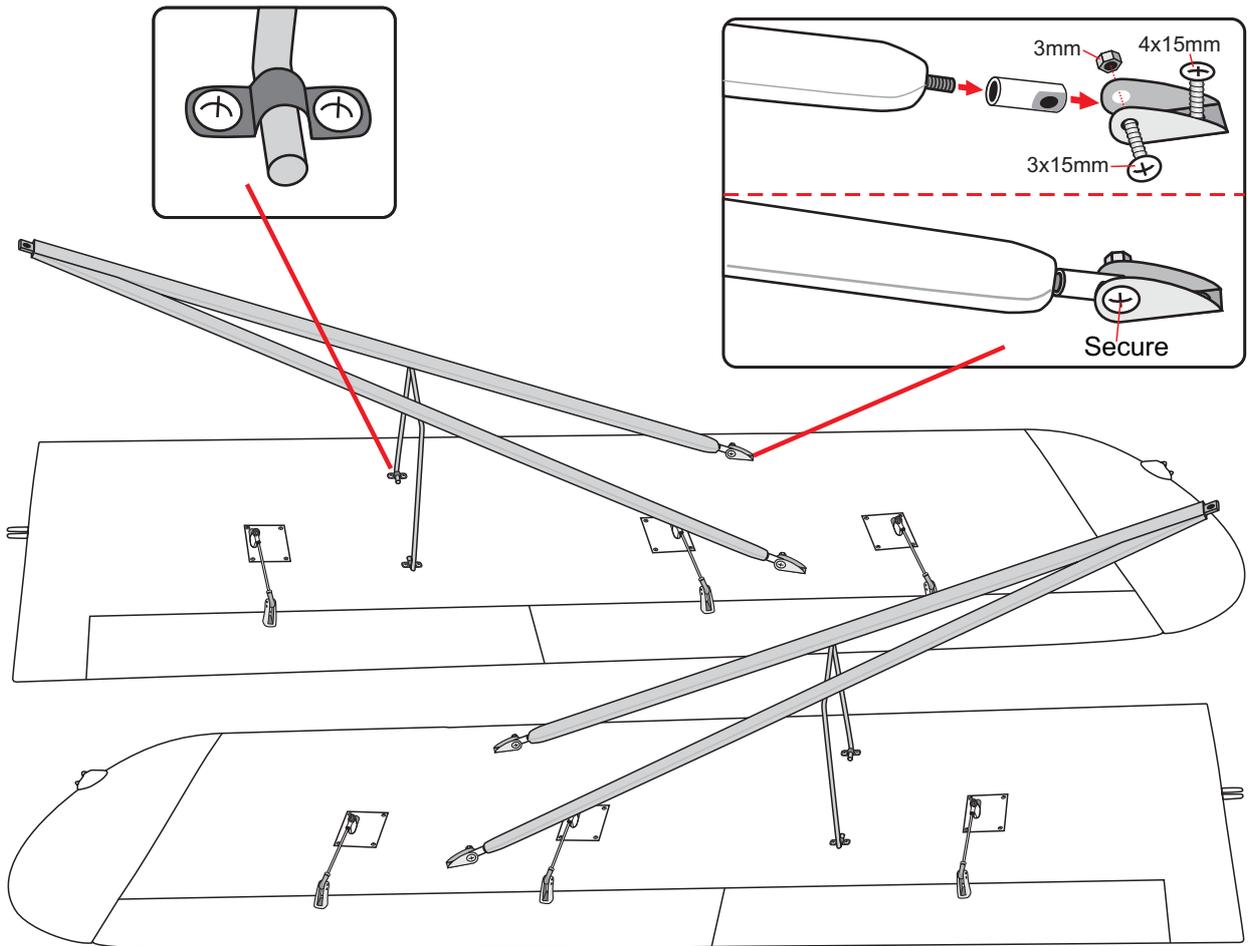


4x15mm Cap Screw  ----- 8	 3mm Nut -- 4
4mm Washer  ----- 4	3x12mm Screw  ----- 16
4mm Spring Washer  ----- 8	 ----- 4
 ----- 2	 ----- 8
 ----- 2	 ----- 4
 ----- 2	3x15mm Cap Screw  ----- 4



Fuselage Bottom side





**INSTALLING THE WING TO THE FUSELAGE**

32x1276mm Aluminium tube.

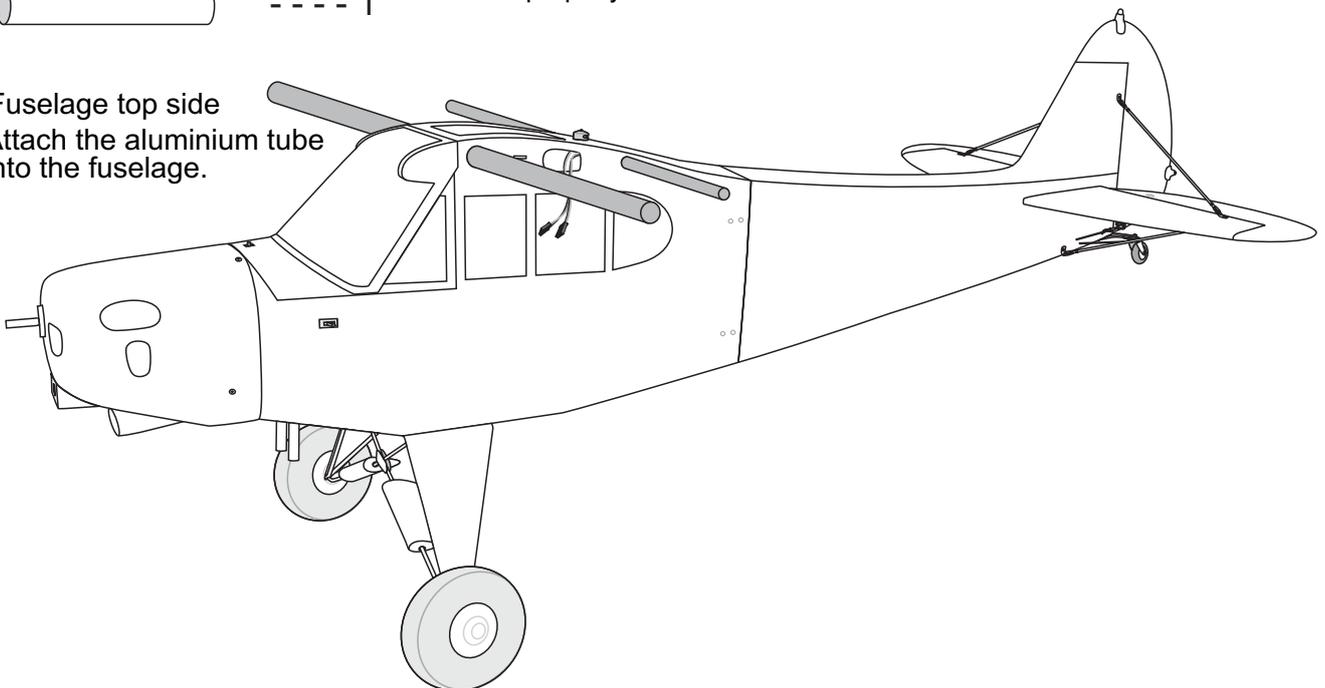


19x917mm Aluminium tube.

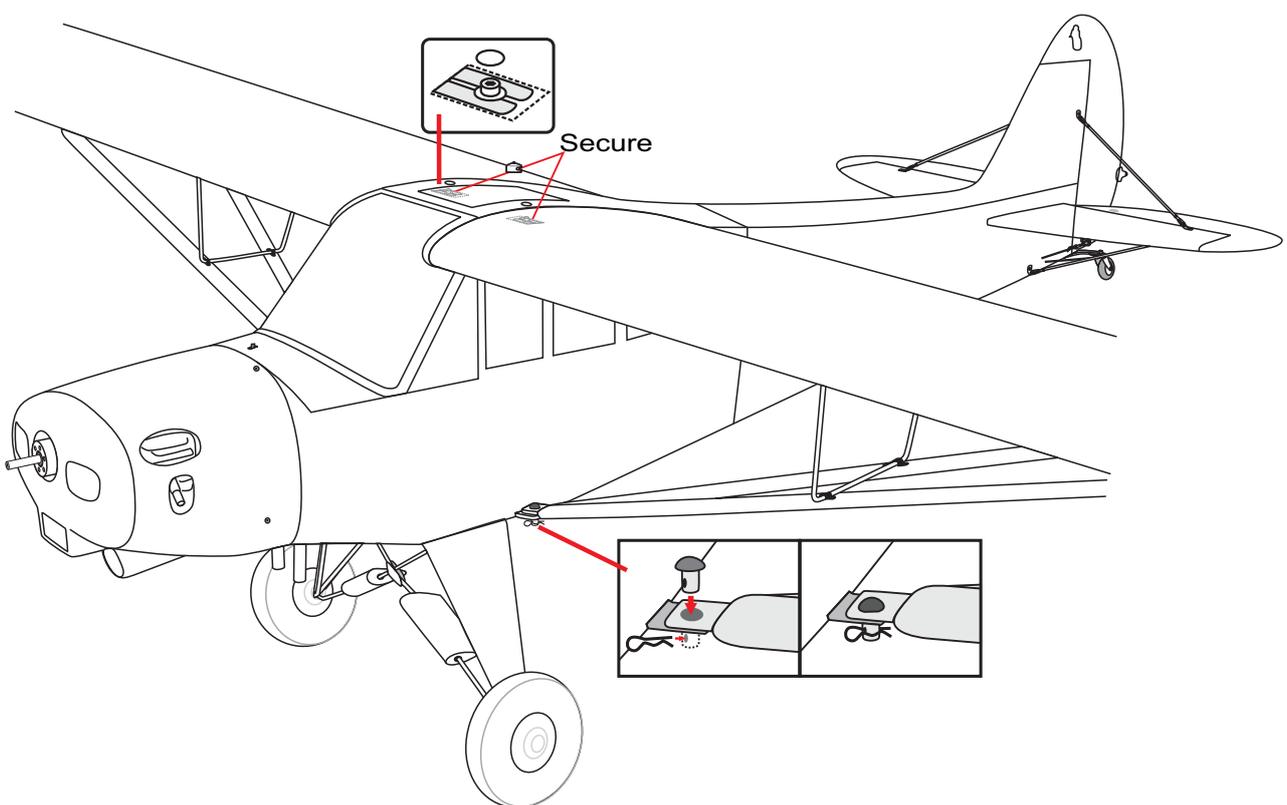
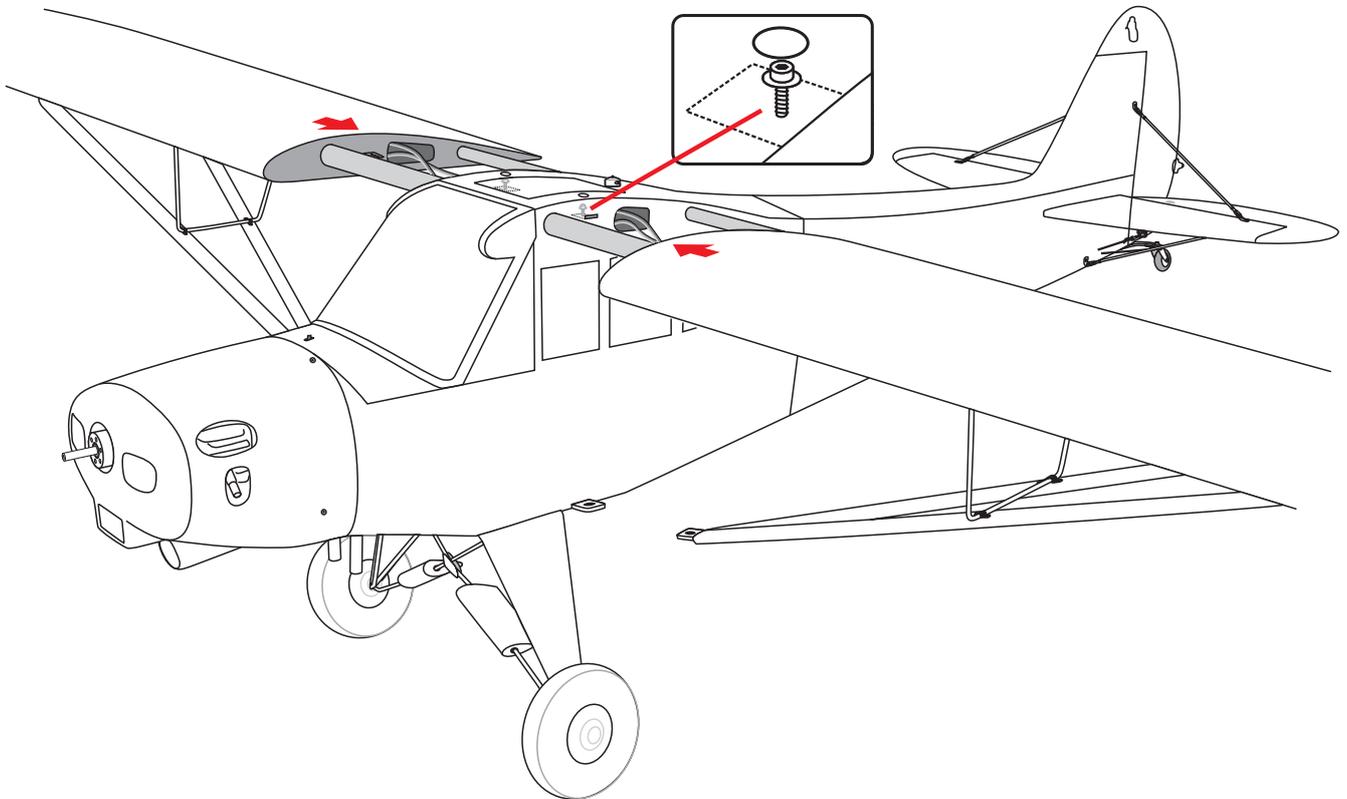


\*\*\* Test fit the aluminium tube dihedral brace into each wing haft. The brace should slide in easily. If not, use 220 grit sand around the edges and ends of the brace until it fits properly.

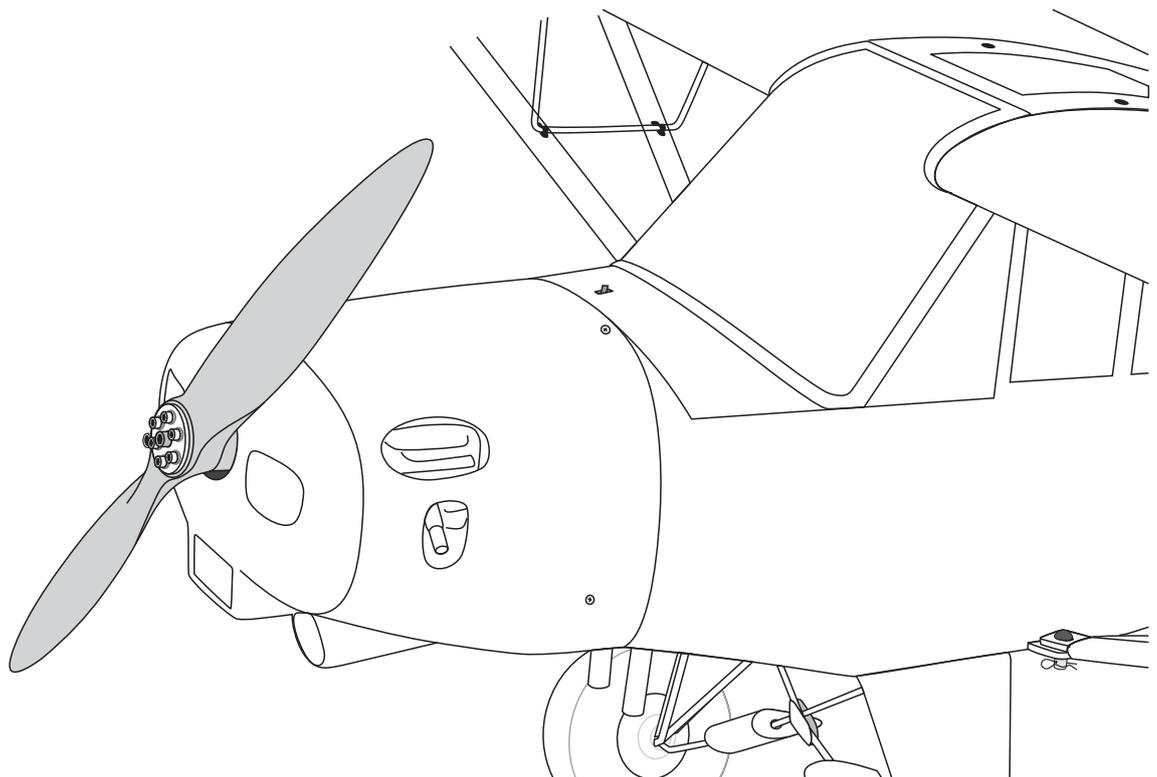
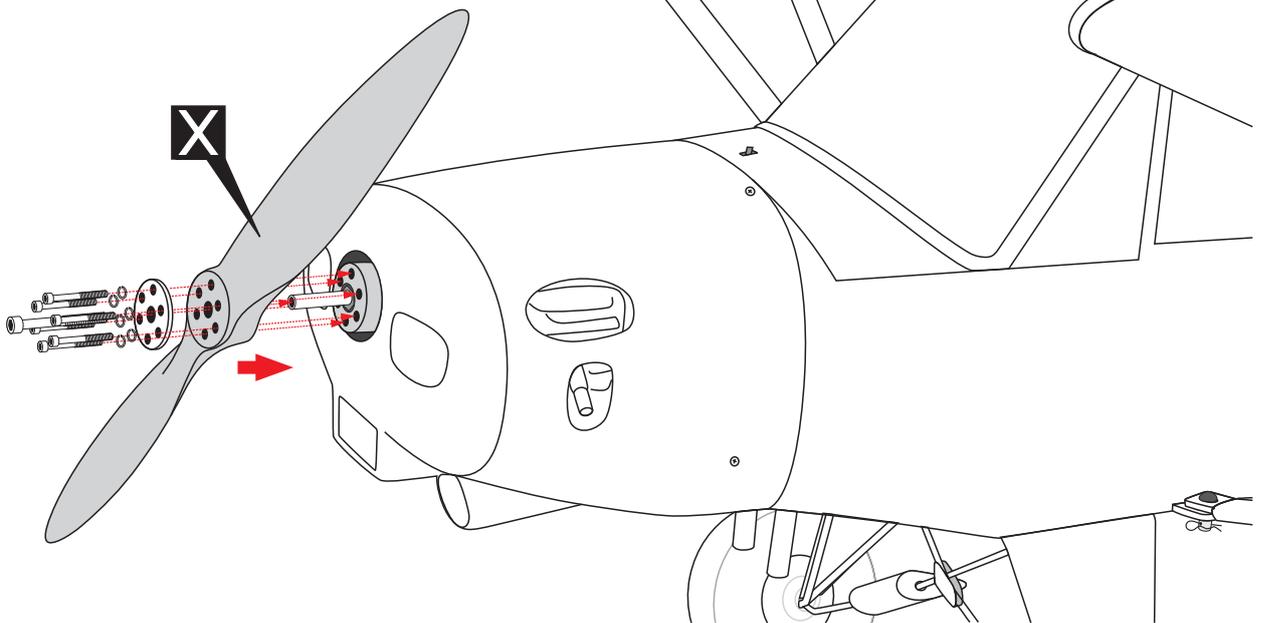
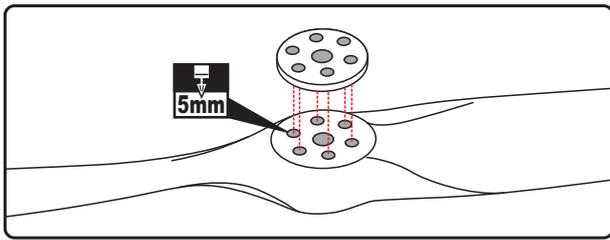
Fuselage top side  
Attach the aluminium tube into the fuselage.



Attach the wings to the joiner tube and secure the wing panels to the fuselage. Main wing must be inserted and attached completely before fixing with screw.



# INSTALLING THE PROPELLER



**BALANCING**

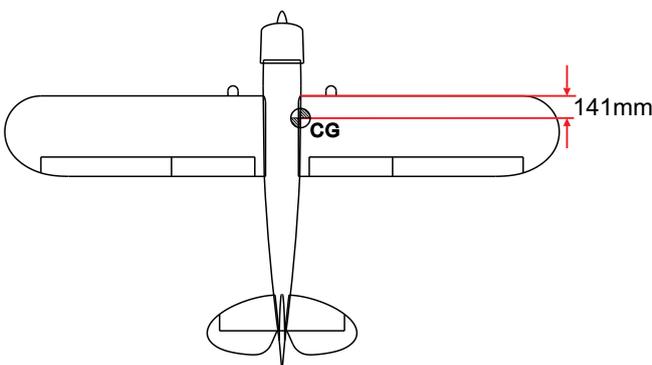
1) It is critical that your airplane be balanced correctly. Improper balance will cause your plane to lose control and crash.

THE CENTER OF GRAVITY IS LOCATED **141MM** BACK FROM THE LEADING EDGE OF THE WING. AT THE FUSELAGE. BALANCE A PLANE UPSIDE DOWN WITH THE FUEL TANK EMPTY.

2) Mount the wing to the fuselage. Using a couple of pieces of masking tape, place them on the top side of the wing **141mm** back from the leading edge, at the fuselage sides.

3) Turn the airplane upside down. Place your fingers on the masking tape and carefully lift the plane.

4) If the nose of the plane falls, the plane is nose heavy. To correct this first move the battery pack further back in the fuselage. If this is not possible or does not correct it, stick small amounts of lead weight on the fuselage under the horizontal stabilizer. If the tail of the plane falls, the plane is tail heavy. To correct this, move the battery and receiver forward or if this is not possible, stick weight into the firewall. When balanced correctly, the airplane should sit level or slightly nose down when you lift it up with your fingers.



**LATERAL BALANCE**

 After you have balanced a plane on the C.G. You should laterally balance it. Doing this will help the airplane track straighter.

1) Turn the airplane upside down. Attach one loop of heavy string to the engine crankshaft and one to the tail wheel wire. With the wings level, carefully lift the airplane by the string. This may require two people to make it easier.

2) If one side of the wing fall, that side is heavier than the opposite. Add small amounts of lead

weight to the bottom side of the lighter wing half's wing tip. Follow this procedure until the wing stays level when you lift the airplane.

**CONTROL THROWS**

1) We highly recommend setting up a plane using the control throws listed.

2) The control throws should be measured at the widest point of each control surface.

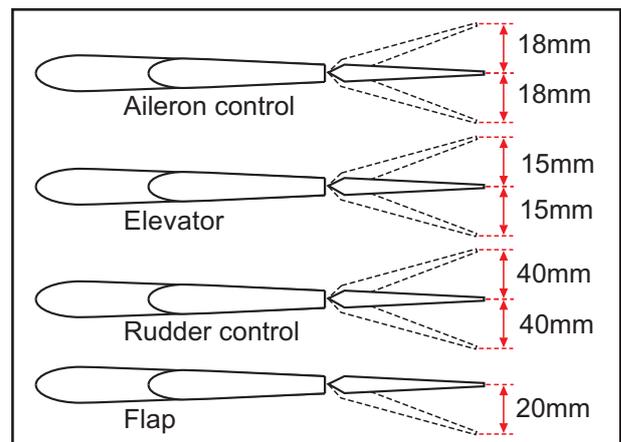
3) Check to be sure the control surfaces move in the correct directions.

**Low rate:**

- Aileron: 18 mm up 18 mm up down
- Elevator: 15 mm up 15 mm up down
- Rudder: 40 mm right 40 mm left
- Flaps: Mid: 20mm; Landing: 25mm

**High rate:**

- Aileron: 24mm up 24mm down
- Elevator: 18mm up 18mm down
- Rudder: 50 mm right 50 mm left



**PRE-FLIGHT CHECK**

1) Completely charge your transmitter and receiver batteries before your first day of flying.

2) Check every bolt and every glue joint in your plane to ensure that everything is tight and well bonded.

3) Double check the balance of the airplane.

4) Check the control surface.

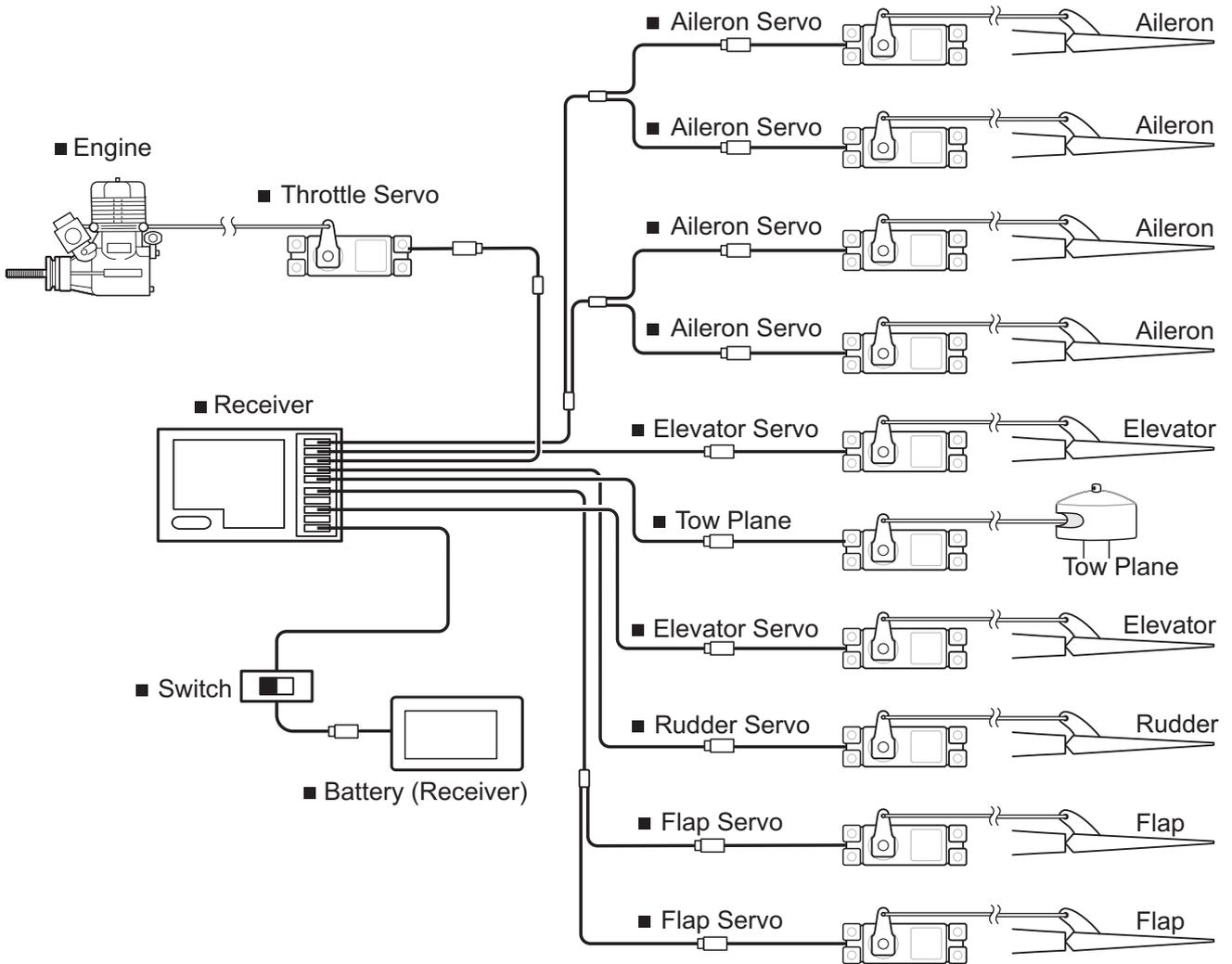
5) Check the receiver antenna. It should be fully extended and not coiled up inside the fuselage.

6) Properly balance the propeller.

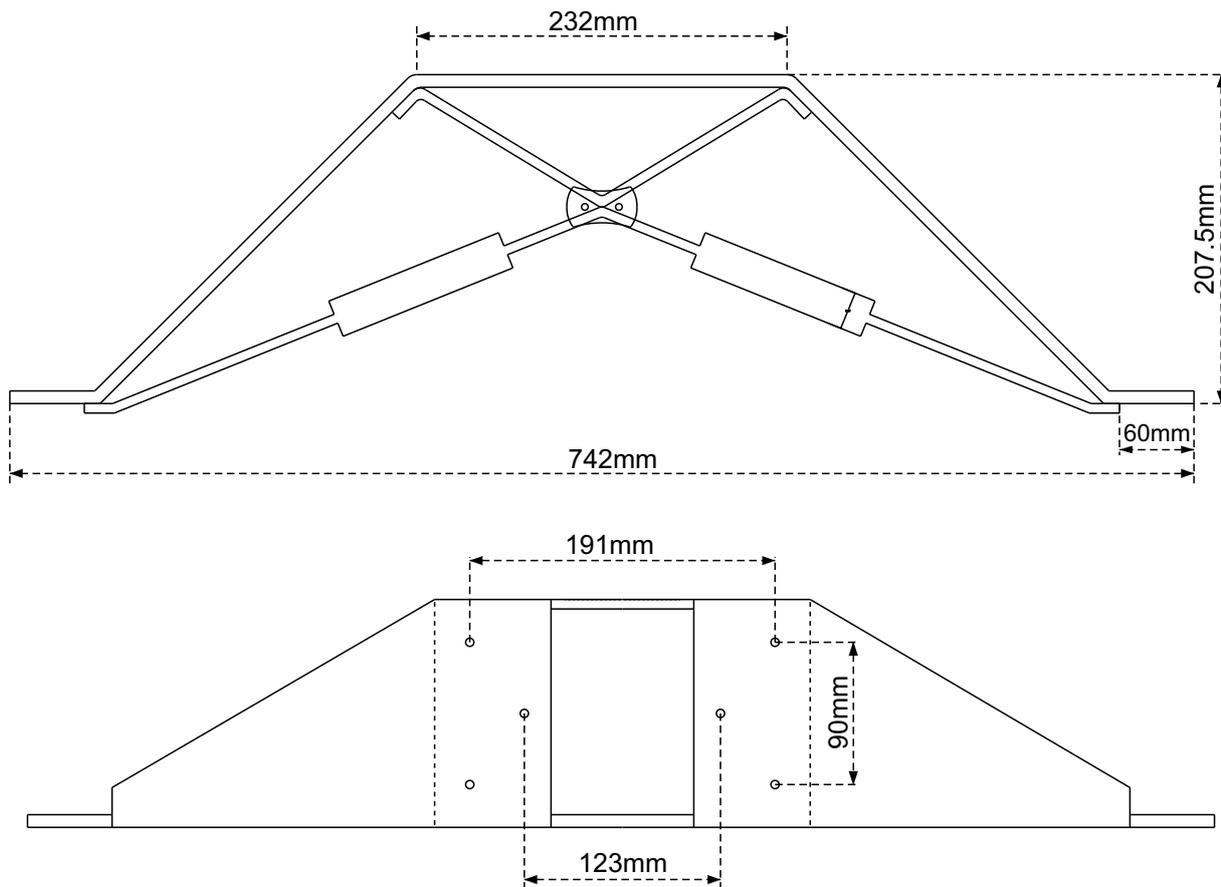
## FOR YOUR RADIO INSTALLATION BASIC CONNECTION FOR AIRPLANE AND ADJUSTMENT OF SERVOS

### Example of connection

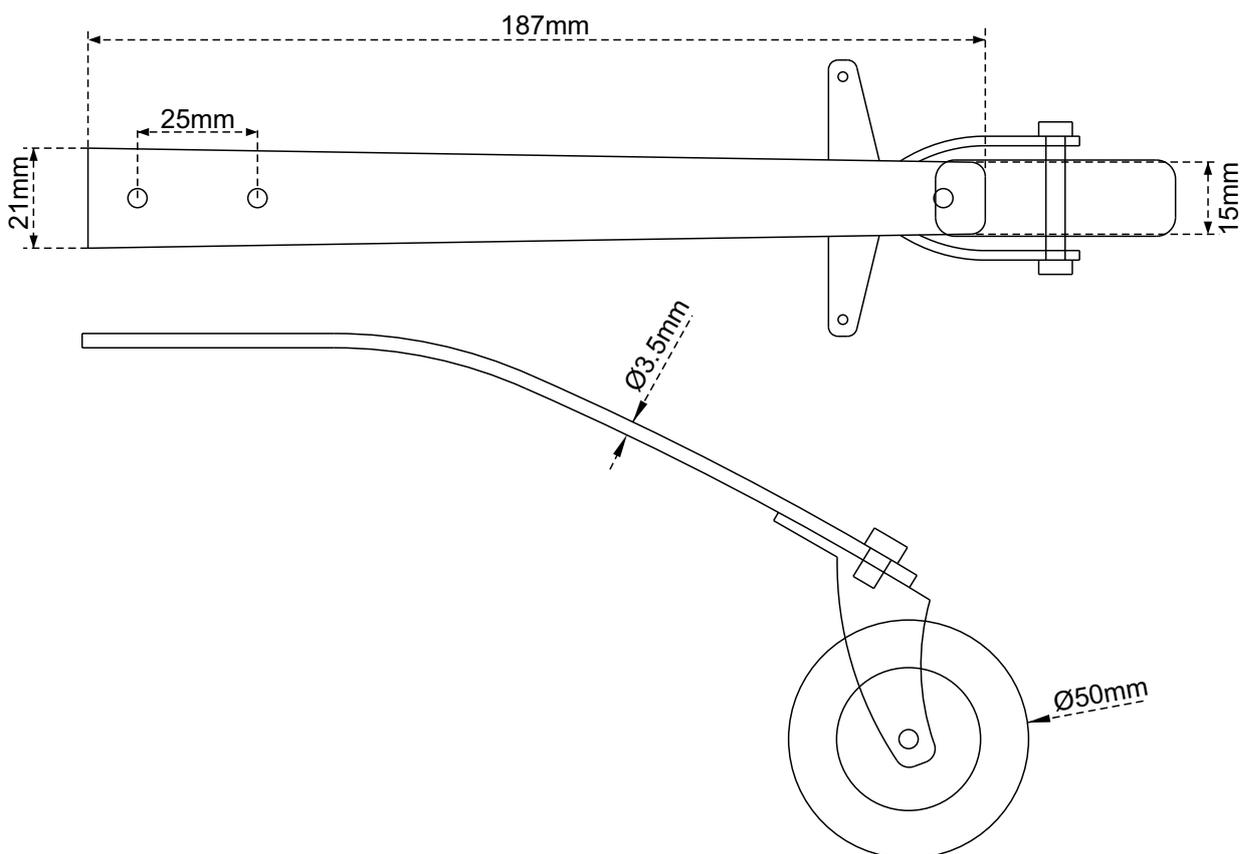
- For more information, refer to radio system instruction manual.
- Follow instruction manual of Engine and Battery.



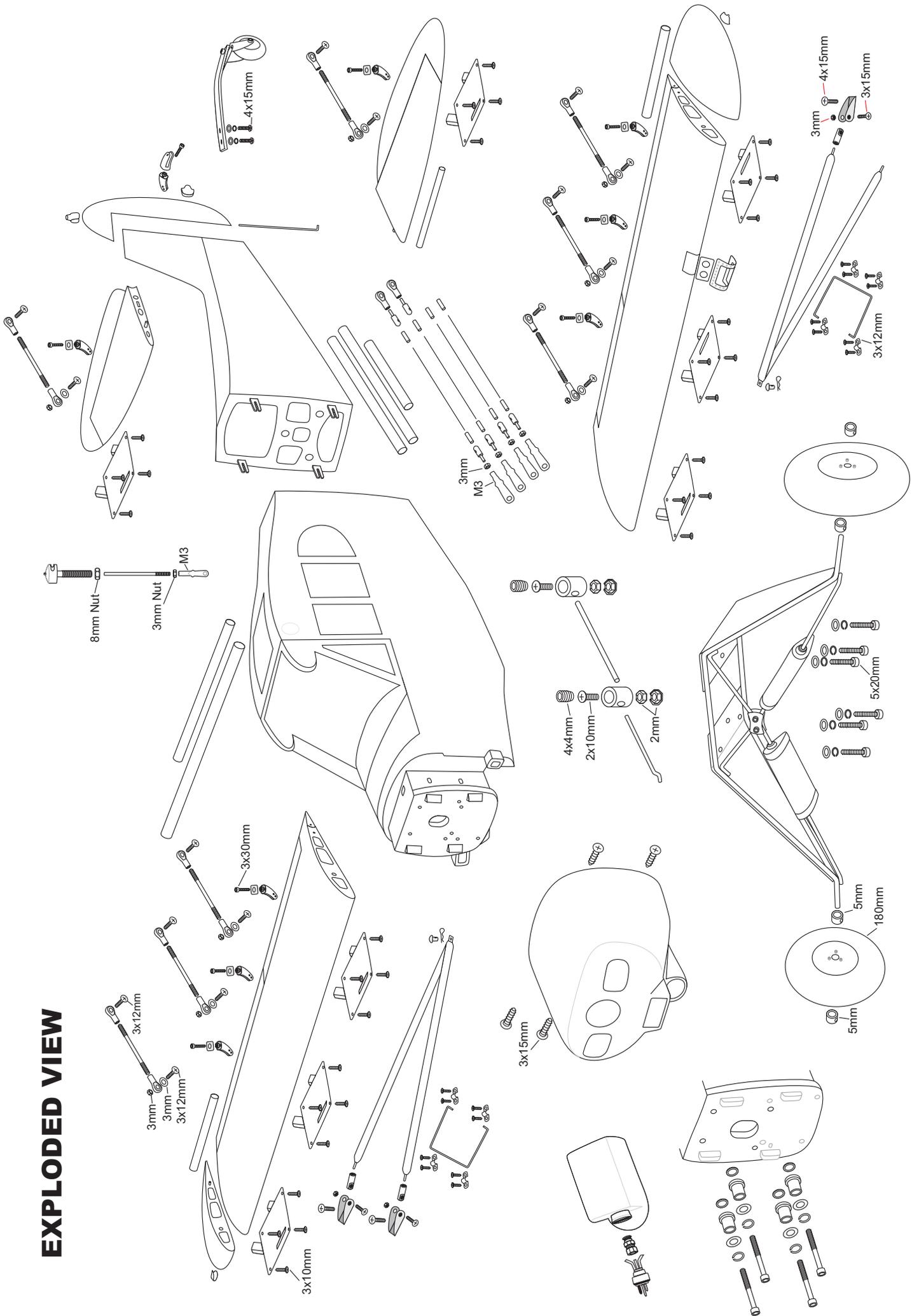
### MAIN GEAR DIMENSIONAL DETAIL



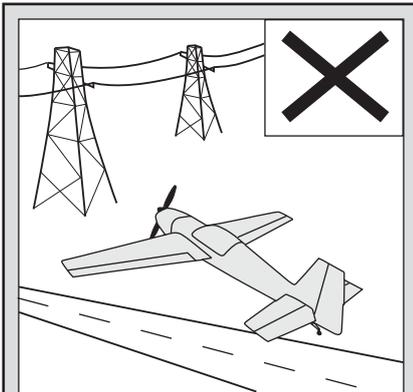
### TAIL GEAR DIMENSIONAL DETAIL



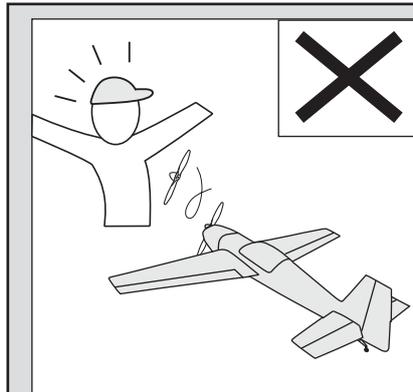
# EXPLODED VIEW



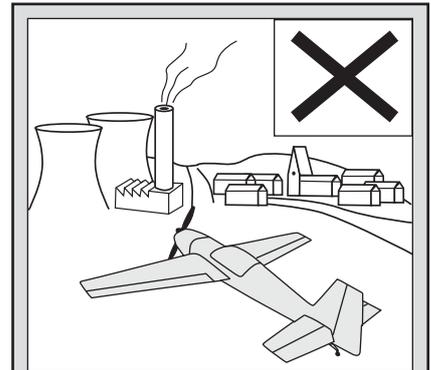
# I/C FLINGT WARNINGS



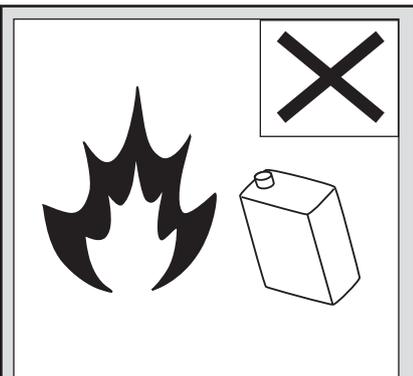
**NEVER** fly near power lines, aerials or other dangerous areas including airports, motorways etc.



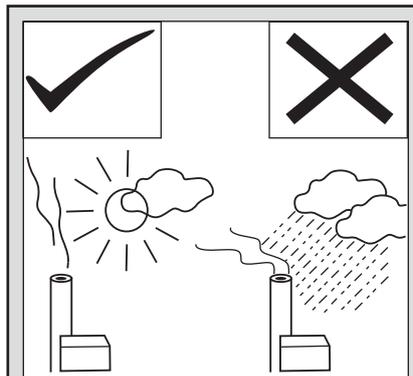
**ALWAYS** adjust the engine from behind the propeller, and do not allow any part of your body to be in line with the propeller.



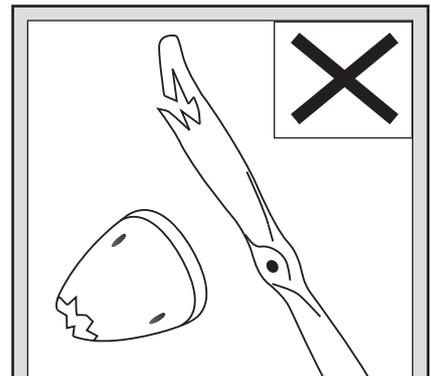
Always operate in open areas, away from factories, hospitals, schools, buildings and houses etc. **NEVER** fly your aircraft close to people or built up areas.



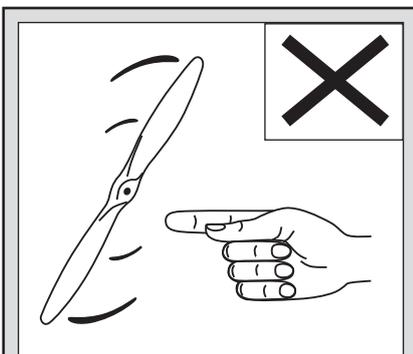
**DO NOT** dispose of empty fuel containers on a fire, this can lead to an explosion.



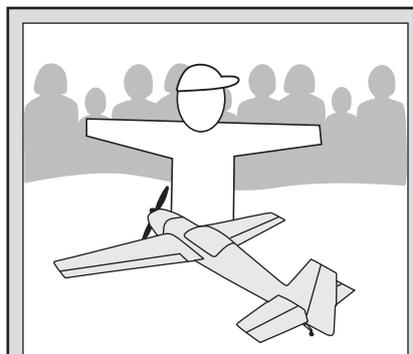
**NEVER** fly in wet conditions or on windy or stormy days.



**NEVER** use damaged or deformed propellers or spinners.

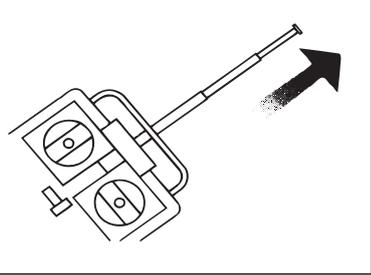


**THE PROPELLER IS DANGEROUS.**  
Keep fingers, clothing (ties, shirt sleeves, scarves) or any other loose objects that could be caught or drawn in, away from the propeller. Take care at **ALL** times.

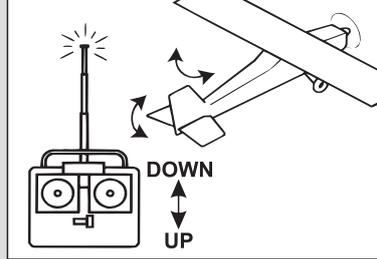


Keep all onlookers (especially small children and animals) well back from the area of operation. This is a flying aircraft, which will cause serious injury in case of impact with a person or animal.

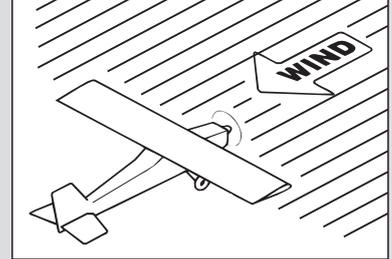
# I/C FLINGT GUIDELINES



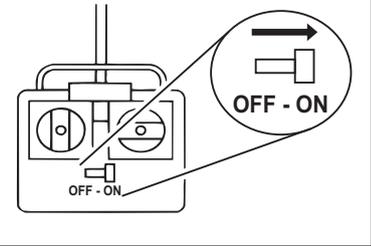
When ready to fly, first extend the transmitter aerial.



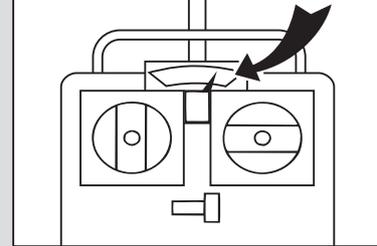
Operate the control sticks on the transmitter and check that the control surfaces move freely and in the CORRECT directions.



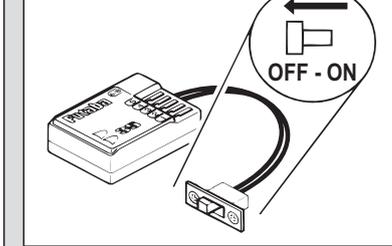
ALWAYS land the model INTO the wind, this ensures that the model lands at the slowest possible speed.



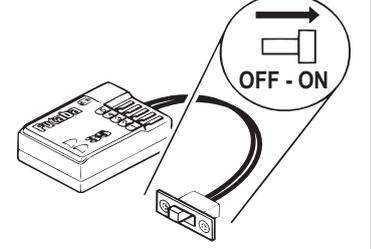
Switch on the transmitter.



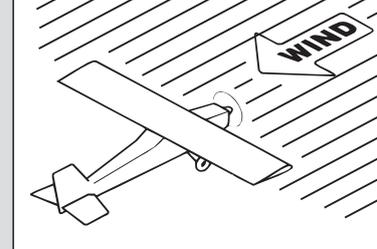
Check that the transmitter batteries have adequate power.



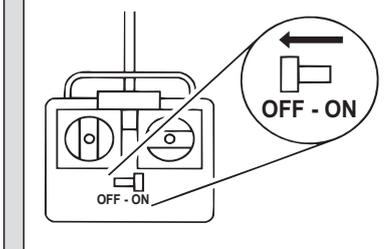
Switch off the receiver.



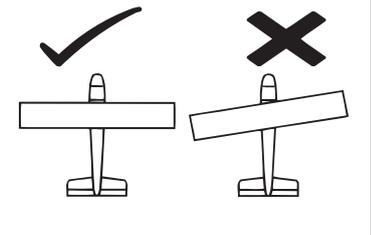
Switch on the receiver.



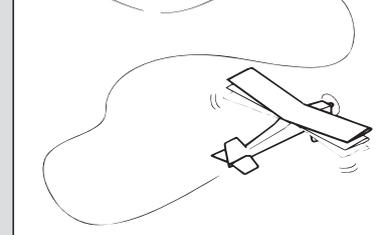
ALWAYS take off into the wind.



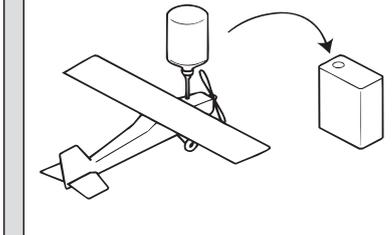
Switch off the transmitter.



Check that the wings are correctly fitted to the fuselage.



If the model does not respond correctly to the controls, land it as soon as possible and correct the fault.



Empty the fuel tank after flying, fuel left in the tank can cause corrosion and lead to engine problems.