HIROBO

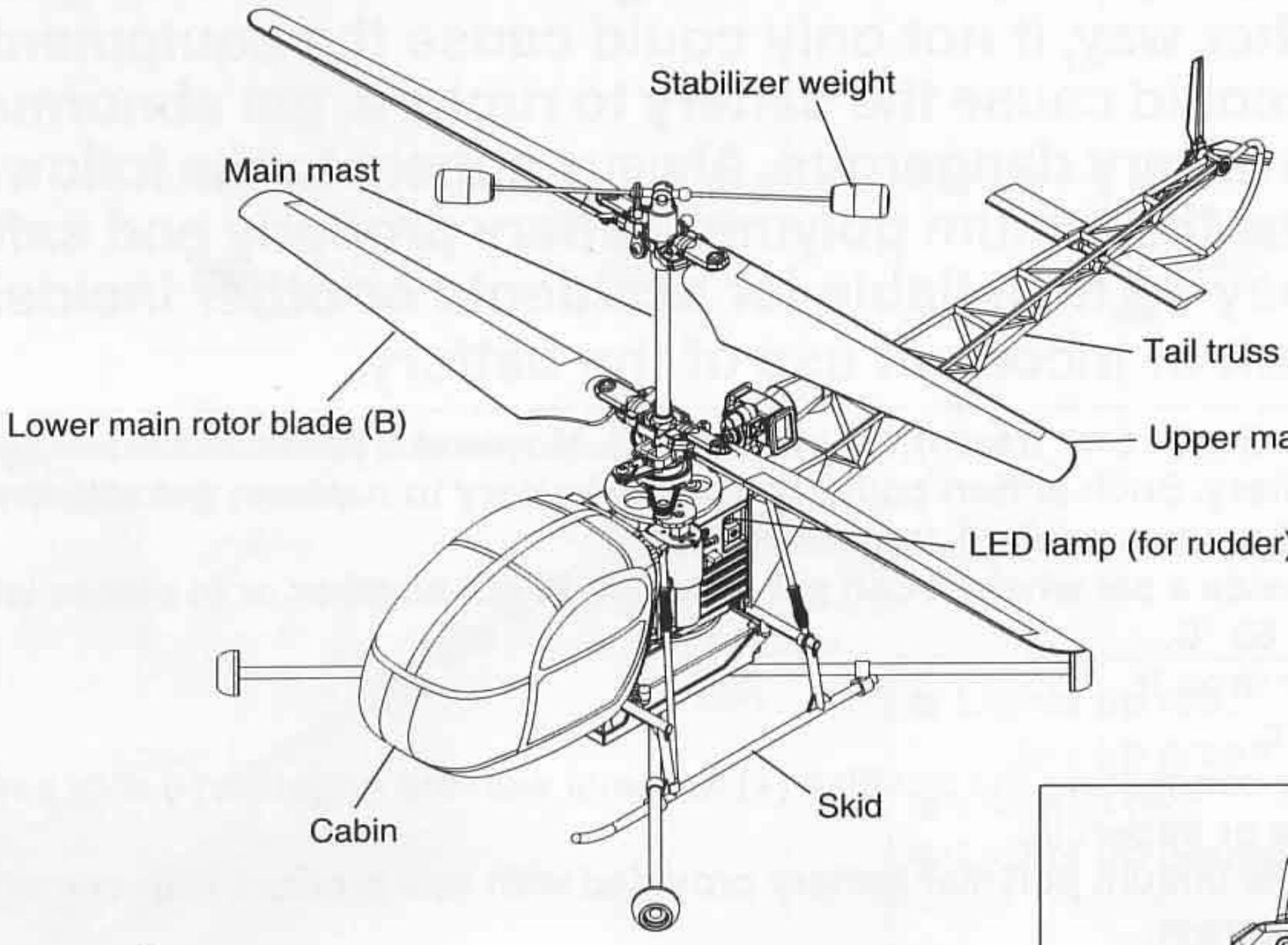
INDOOR
FLIGHT
HELICOPTER

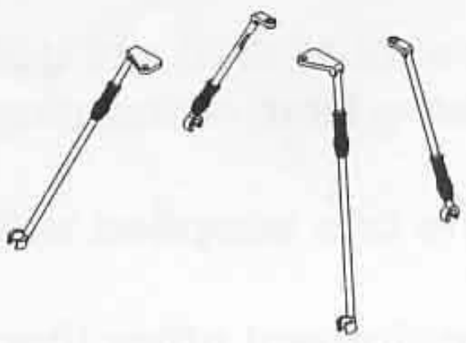
XRB SR lama

SKY ROBO

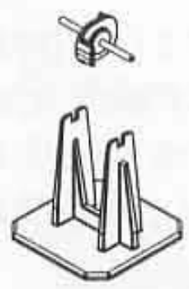
01. Set Contents

Check that the following components are included.

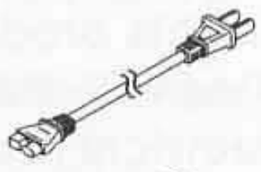


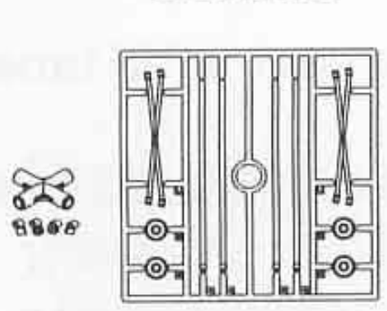


Skid brace

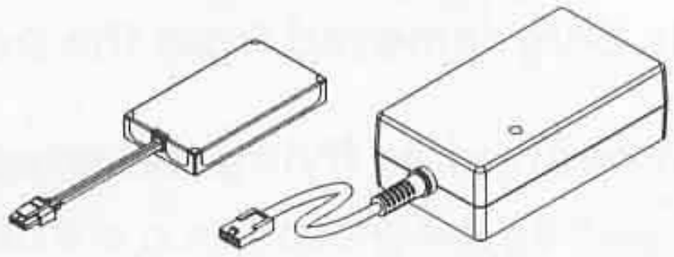


Blade Balancer





Safety skid

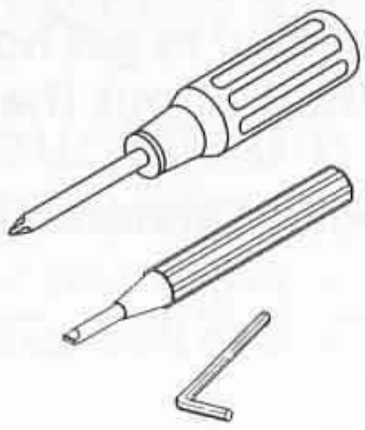


Lithium polymer battery

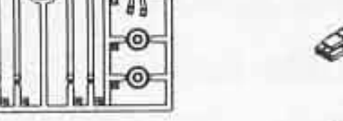
Lithium polymer battery charger

Users manual (this document)

Questionnaire



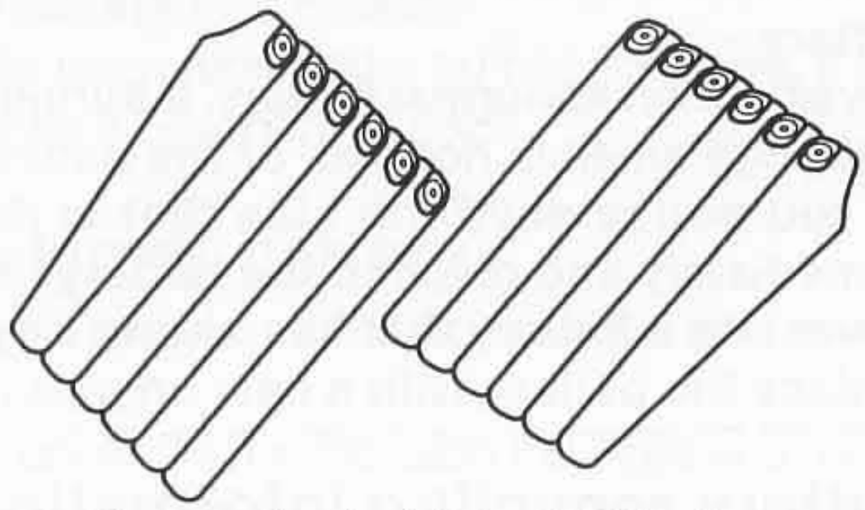
Tools (+, - Screwdriver, Allen wrench)



Stabilizer weight light weight type

Transmitter

* The transmitter is only supplied when you purchase the full set. As the transmitter is not supplied with the flying unit and battery set, it needs to be obtained separately.
For details, see "08. Using a Commercial Transmitter" on page 25.



Upper main rotor blades (A) X 3set
Lower main rotor blades (B) X 3set

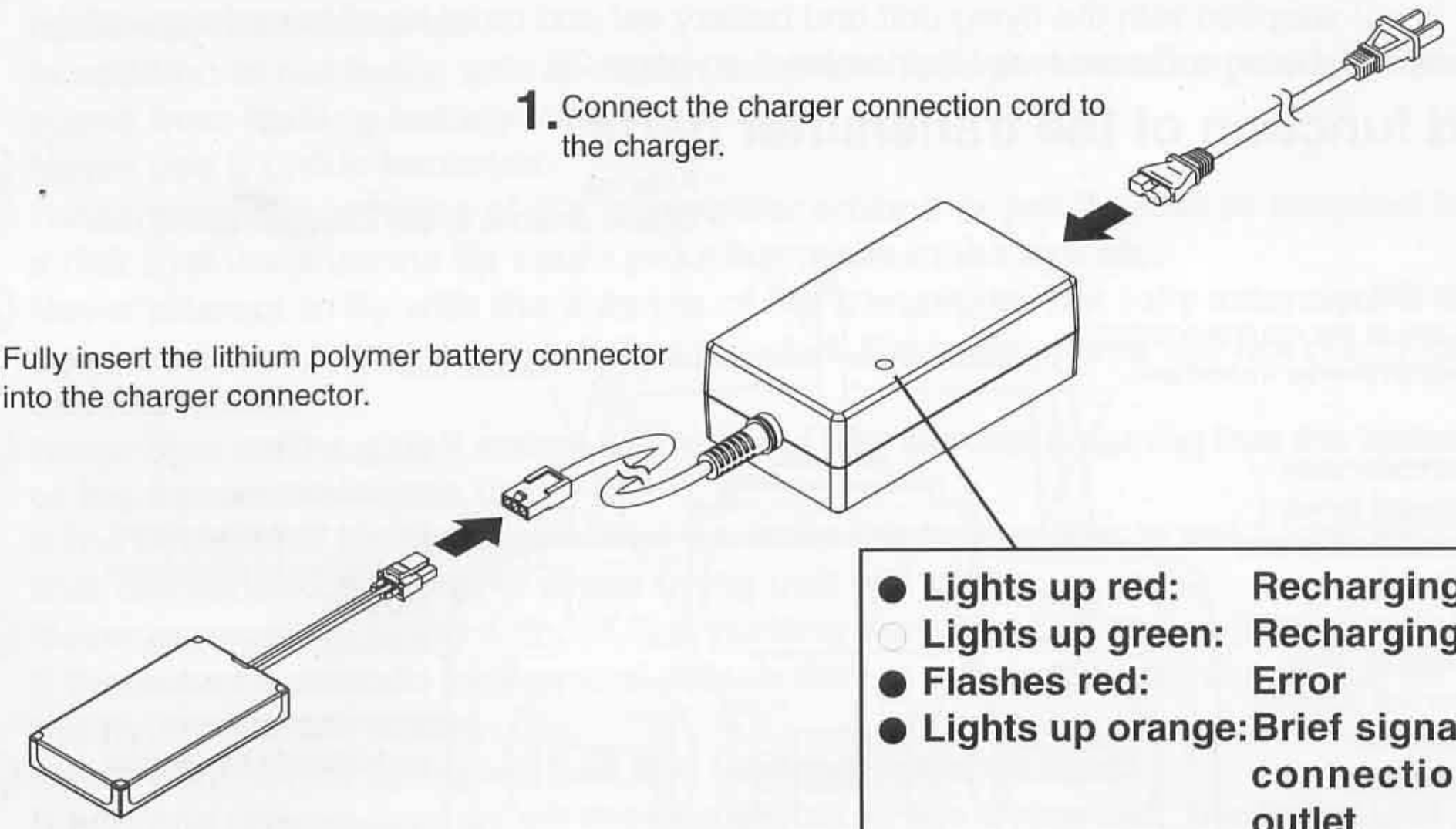
*For optimum safety, the Main blades are made of styrofoam and should be considered replaceable parts. The main blade cannot be repaired.

● How to recharge the battery

Follow the steps 1 to 5 illustrated in the figure below and turn on the switch.

2. Plug the cord into a power outlet.
* The LED will light up orange for a brief period.

1. Connect the charger connection cord to the charger.



3. Fully insert the lithium polymer battery connector into the charger connector.

● **Lights up red:**	**Recharging**
○ **Lights up green:**	**Recharging is complete**
● **Flashes red:**	**Error**
● **Lights up orange:**	**Brief signal to indicate connection to power outlet**

4. When recharging begins, the LED lamp lights up red.

5. When the LED lamp lights up green, recharging is complete.
* Recharging takes between 60 to 90 minutes.

● If an error occurs

Wait for 10 minutes with the connections left as they are. After 10 minutes, first disconnect the lithium polymer battery connector from the charger connecter and then reconnect to begin recharging. It may be necessary to repeat this process a few times before recharging is possible.
If recharging cannot be performed even after this step has been repeated a number of times, it means the battery has deteriorated and it is necessary to purchase a new battery pack.

● Getting the most from your lithium polymer battery

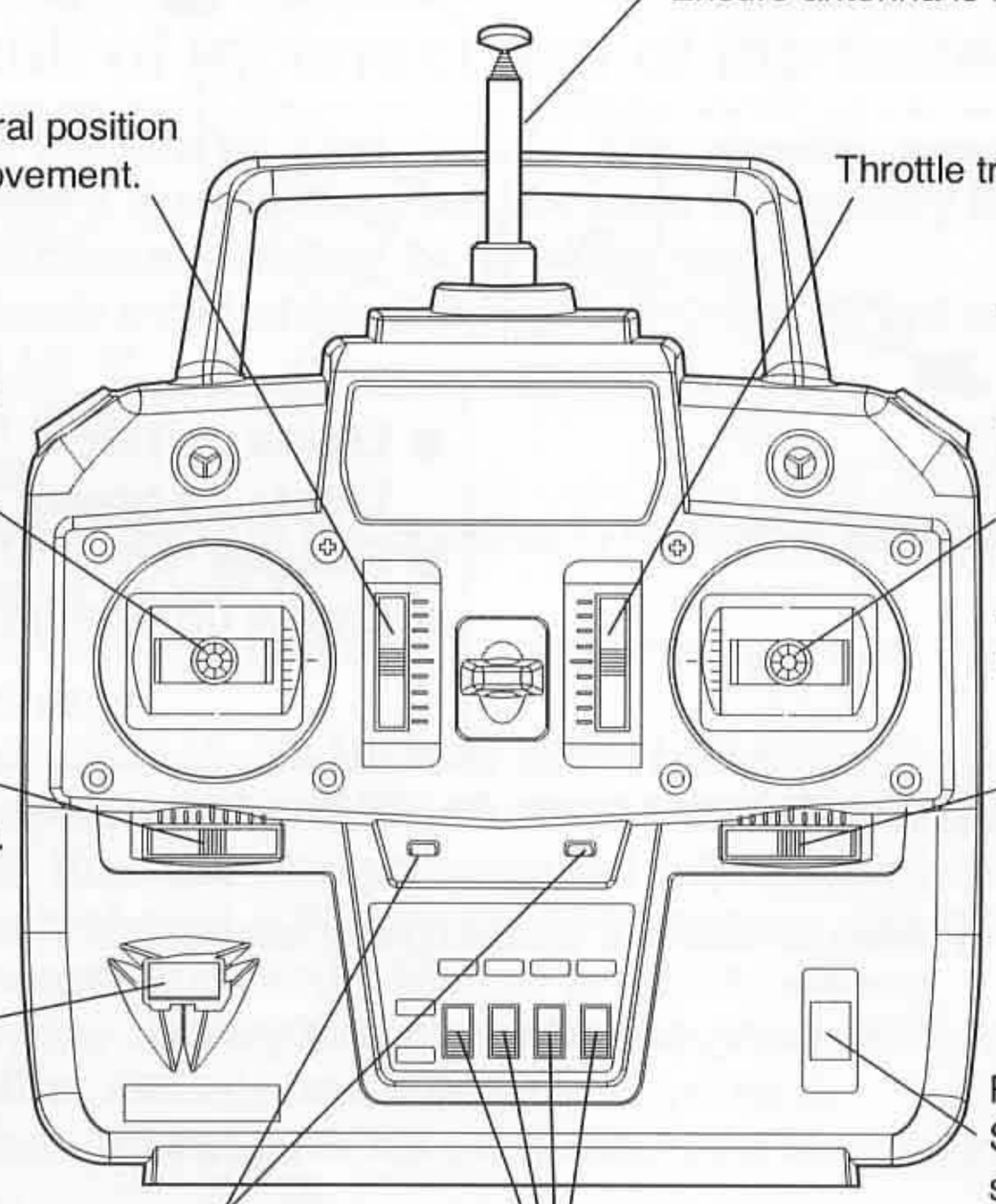
- As it is not possible to use a lithium polymer battery if it has been over discharged, it is important to pay attention to the following to avoid over discharging your battery.
  - If during flying it is not possible to achieve lift even when under full throttle, stop the flight and recharge the battery.
  - Do not discharge using a discharger etc before recharging. (It is possible to recharge lithium polymer batteries when they are not fully discharged without any loss of performance.)
  - Even if your battery has been recharged, it will naturally discharge gradually over time. To prepare for storage, recharge the battery before storing it. It may be necessary to occasionally recharge the battery when it is not being used for a long time to prevent it from completely discharging.
- In a cold environment, the battery will not perform as well, the length of time the battery can be used for will be shorter and there may be instances where adequate output cannot be achieved. For these reasons, use this product in a warm environment.
- If the length of time the battery can be used for becomes significantly shorter, it is an indication that the battery has deteriorated and you need to purchase a new battery. (Part No. 0301-032)

03. Using the Transmitter

● The transmitter information provided here assumes you have purchased the full set.

A transmitter is not supplied with the flying unit and battery set and must be obtained separately.
For details, see "08. Using a Commercial Transmitter" on page 25.

● Name and function of the transmitter parts



Antenna
Ensure antenna is fully extended during use.

Elevator trim
Use to adjust the neutral position for forward/reverse movement.

Throttle trim

Mode I
Elevator/rudder stick
Use to control forward /reverse movement and left/right turning.
Mode II
Throttle/rudder stick
Use to control up/down movement and left/right turning.

Mode I
Throttle/aileron stick
Use to control up/down and left/right movement.
Mode II
Elevator/aileron stick
Use to control forward /reverse movement and left/right movement.

Rudder trim
Use to adjust the neutral position for left/right turning.

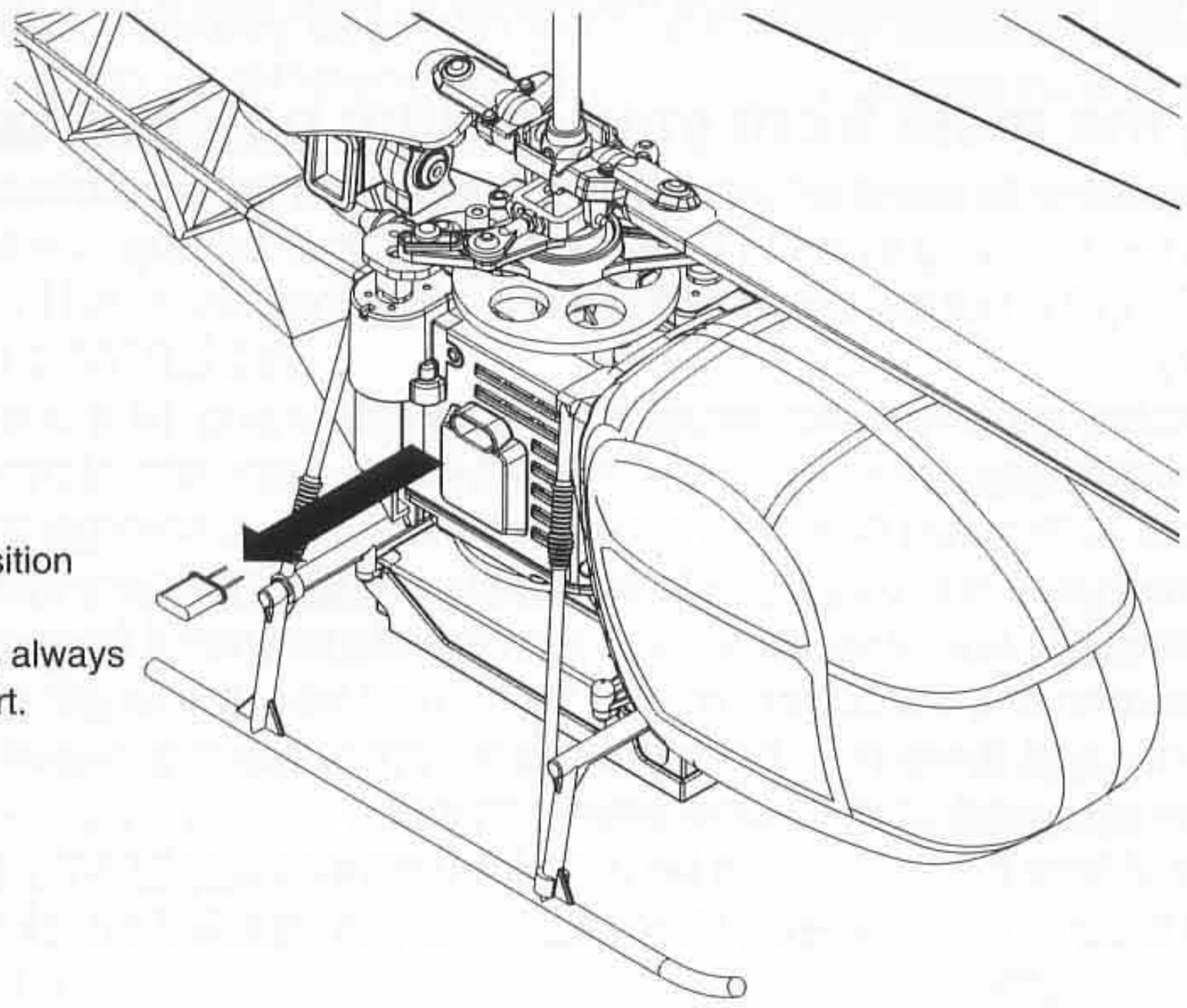
Aileron trim
Use to adjust the neutral position for left/right movement.

Transmitter crystal
It is possible to change the radio frequency by exchanging this with a separately sold crystal.
* Always use the Futaba Corporation's FM72 MHz band crystal for transmitters.

Power switch
Slide to the up position to switch on the power.
* Ensure this switch is on before adjusting the on/off switch of the flying unit.

Battery level indicator
If the green lamp is off and only the red lamp is lit, the battery must be replaced.

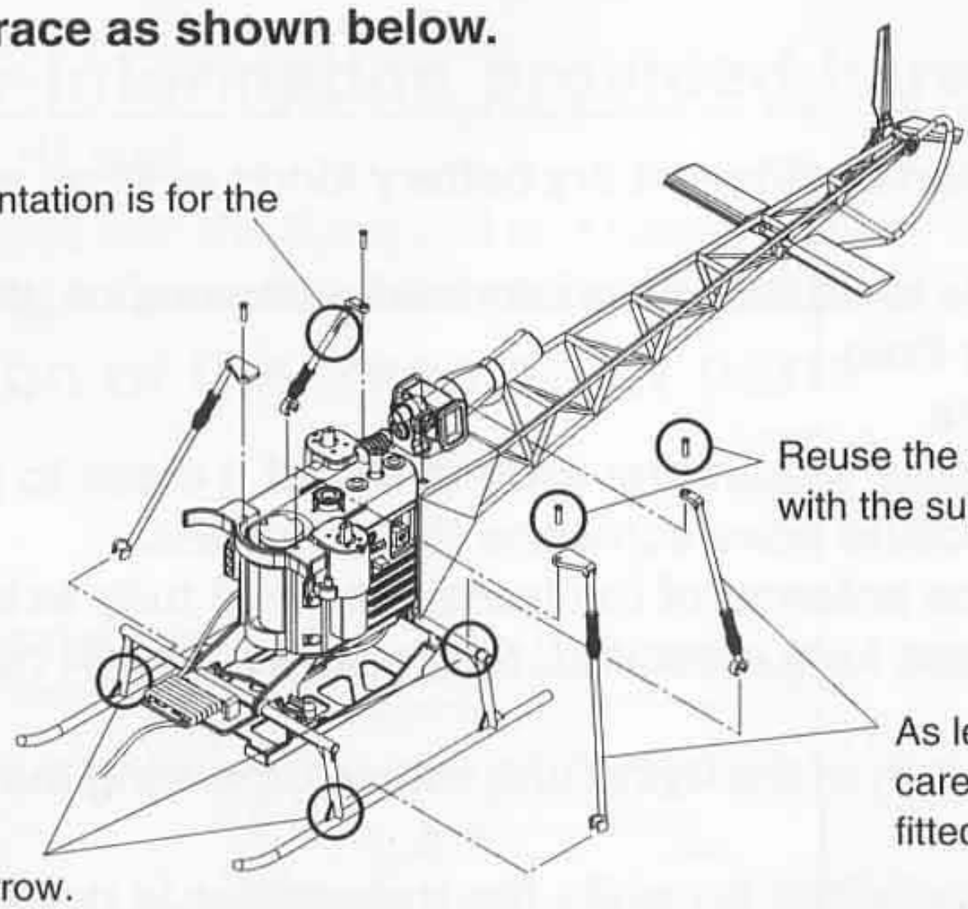
Reverse switch
Use to switch the up/down and left/right movement in the opposite direction.
* Normally all switches are down.



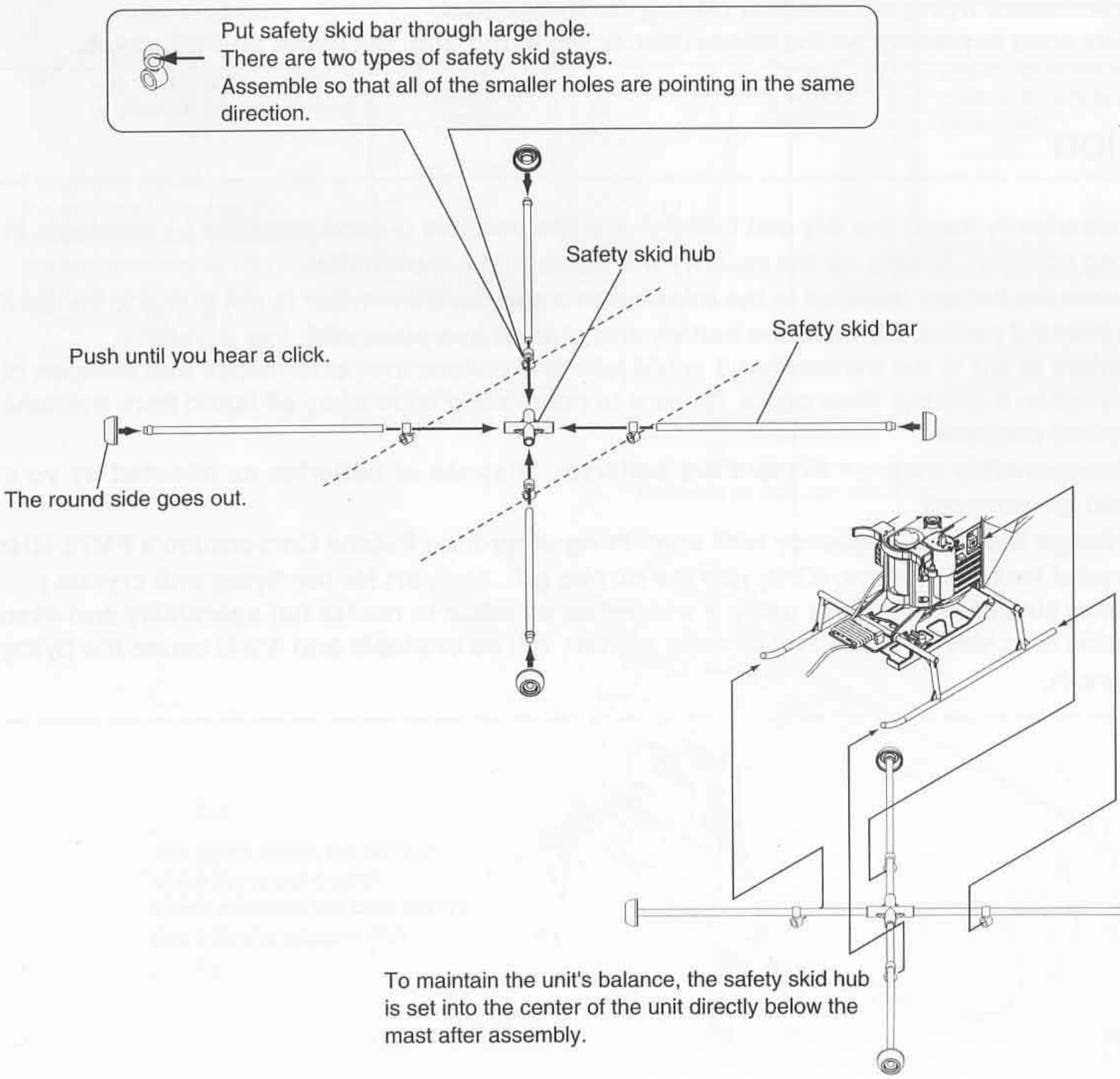
The figure shows the position of the flying unit crystal.
When replacing this part, always use a Hirobo genuine part.

04-1. Flight Preparations 1 Safety Skid Assembly

- **Fit the supplied skid brace as shown below.**



- **Fit the supplied safety skid if you are not yet confident flying the helicopter. The skid will make it more difficult to tip the helicopter, and help prevent damage.**
  With a pair of snips, remove each part of the safety skid and assemble as shown below.

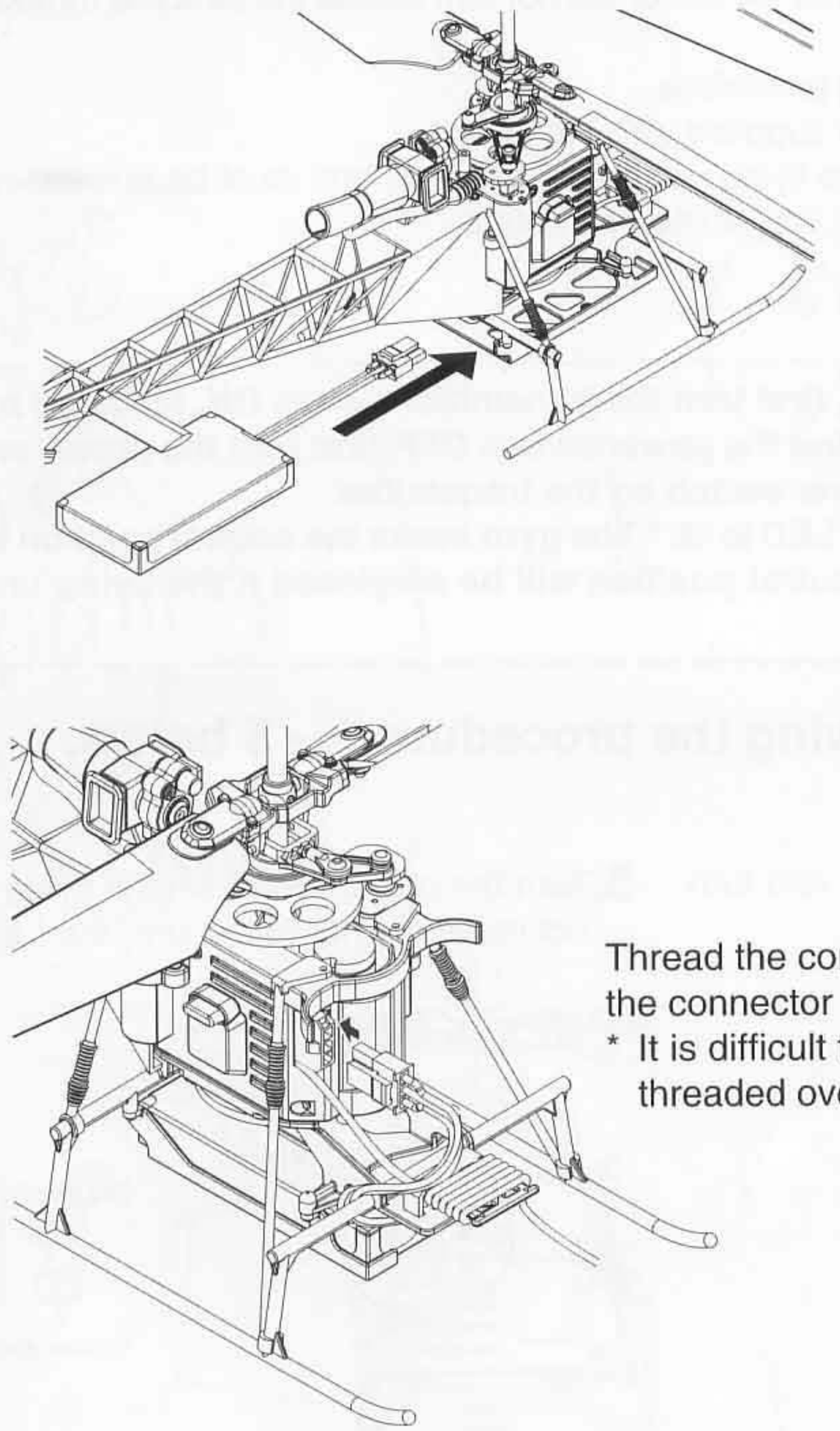


To maintain the unit's balance, the safety skid hub is set into the center of the unit directly below the mast after assembly.

04-2. Flight Preparations 2 Installing the Battery

● Installing the lithium-polymer battery

Fit the lithium-polymer battery from behind the flying unit.



Thread the cord under the skid and insert the connector into the flying unit.

* It is difficult to fit the cabin if the cord is threaded over the skid.

● **Remove by performing the operations in reverse.**

⚠Caution

Remove and store the connector when not flying the helicopter in order to prevent over-discharge of the battery. A very small amount of power will be consumed, possibly resulting in over-discharge, if the connector is left connected.

04-3. Flight Preparations 3 Procedure for ON/OFF Switches

● Safety device is incorporated in the helicopter to prevent runaway due to incorrect operation.

The helicopter is designed to ensure that the motor will not turn unless the switch is turned ON with the correct procedure.
Turn the switch ON with the following procedure.
The following explains the transmitter supplied with the full set.
The transmitter is not supplied with the flying unit and battery set, and must be purchased separately.
See page 25 '08 Using a Commercial Transmitter' for details.

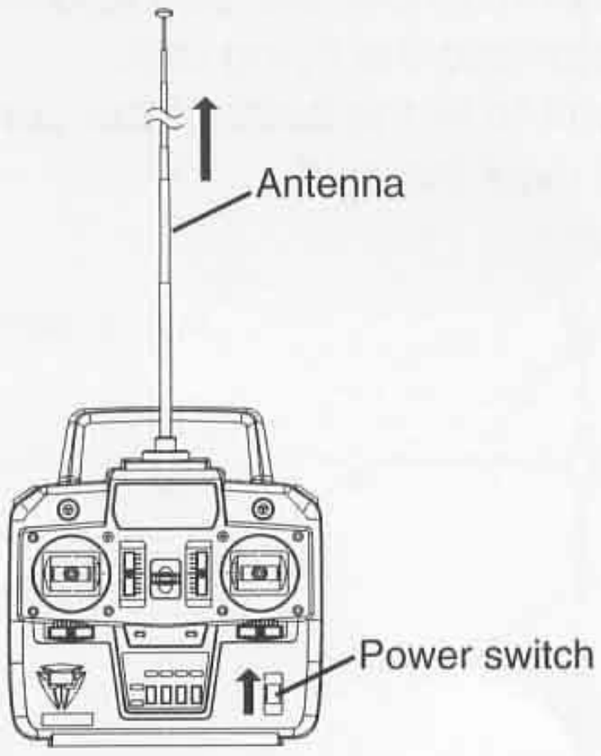
⚠Caution

- **When turning the power switch ON, first turn the transmitter switch ON, followed by the power switch on the flying unit. When turning the power switch OFF, first turn the power switch on the flying unit OFF, followed by the power switch on the transmitter.**
- **Do not move the helicopter until the LED is lit. * The gyro seeks the neutral position immediately after power is switched ON. The neutral position will be displaced if the flying unit is moved during this interval.**

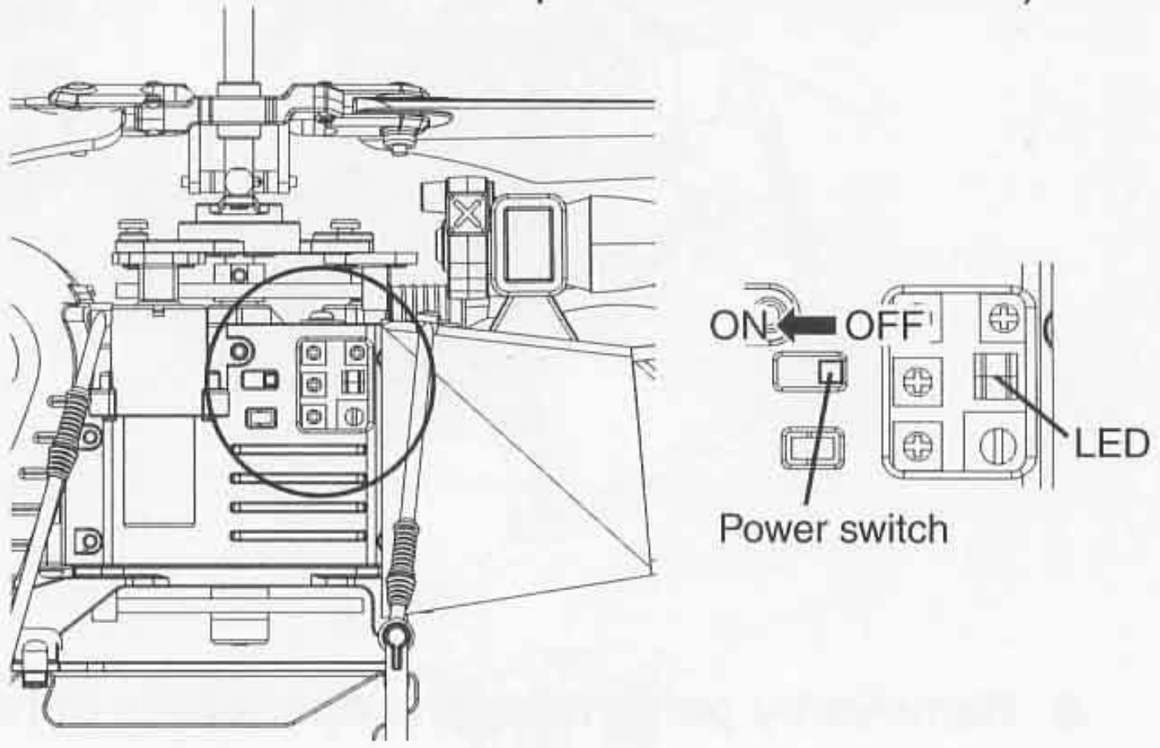
● Turn the switch ON following the procedure 1. - 5 below.

1. Set the flying unit on a flat surface.

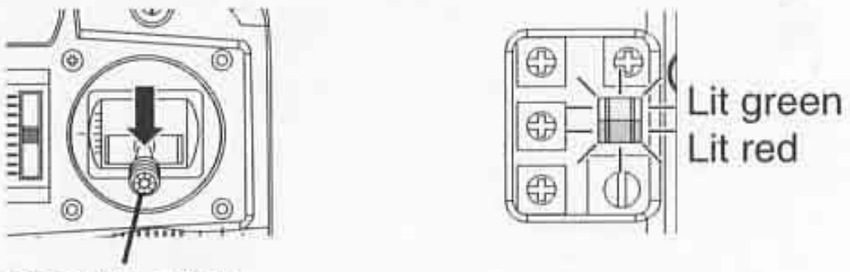
2. Extend the antenna of the transmitter, and turn the power switch ON.



3. Turn the power switch on the flying unit ON (do not move the helicopter until the LED is lit).



4. Move the throttle stick to the very bottom.

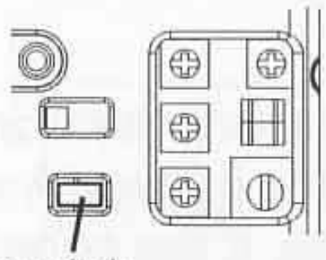


Both the green and red LEDs are lit when the throttle stick is moved to the very bottom.

* The motor will not turn when the Start switch is pressed unless the green and red LEDs are lit.

5. Press the Start switch.

* The motor will not turn if the Start switch is pressed continuously for more than three seconds. In this case, turn the switch OFF, and start again.

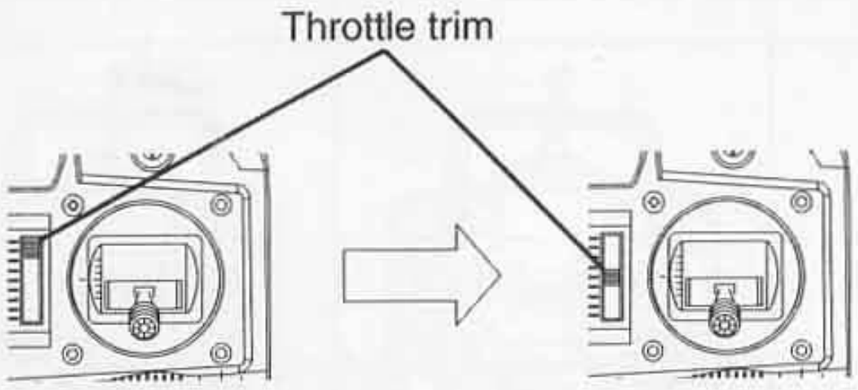


The XRB-SR is now ready for flight.

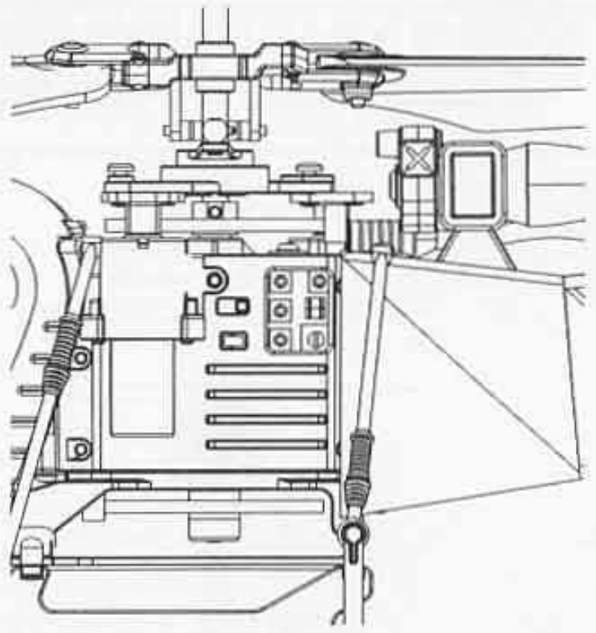
04-4. Flight Preparations 4 Preflight Inspection

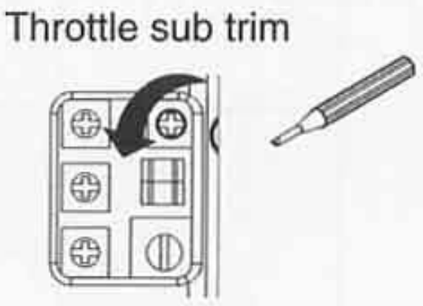
● Are the servo and motor operating correctly?

The safety lock is not cleared, and the motor will not turn, if the throttle trim is at the top of its range. If the servo moves but the motor does not turn, set the throttle trim to a position below neutral, and turn the switch ON again following the correct procedure.



If the transmitter throttle trim is at the top of its range, set it to a position below neutral.





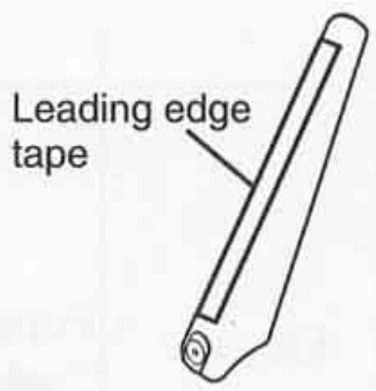
Use slotted screwdriver included in this set to turn screws.

If the safety lock is not cleared when the throttle trim is set to a position below neutral, turn the throttle sub trim at the left of the flying unit to the left.

If the safety lock is not cleared by adjusting the throttle trim, check whether the throttle reverse switch is set correctly. See page 7 for details, or read the instruction manual for the transmitter.

● Is the leading edge tape on the main blades peeling?

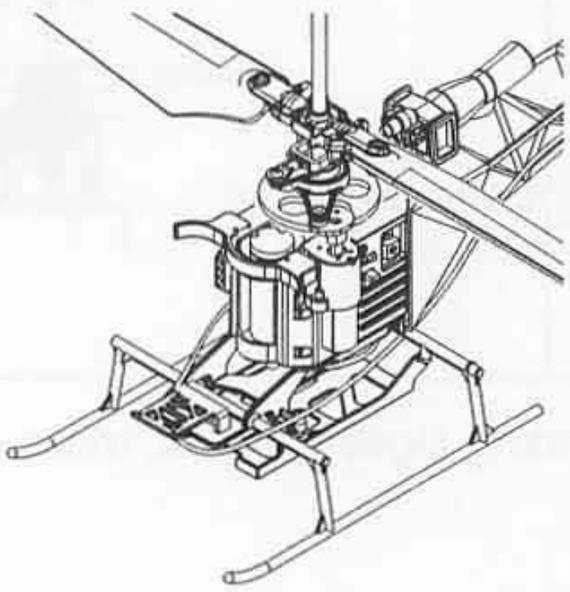
White tape is attached to the leading edge of the main blades.
Any lifting or peeling of this tape will have adverse affects on flight characteristics, and it should therefore always be checked before flight by pressing it lightly with the fingers.



* The fuselage will turn in one direction, or vibration will increase, if the tape has lifted.

● Is the transmitter antenna extended?

If the transmitter antenna is not extended, the radio transmissions will not reach the helicopter, and control may become impossible. Always extend the antenna.



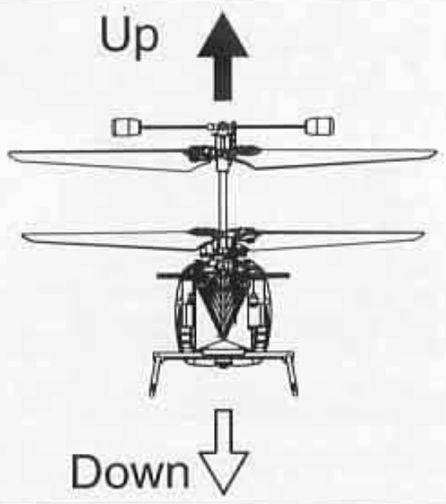
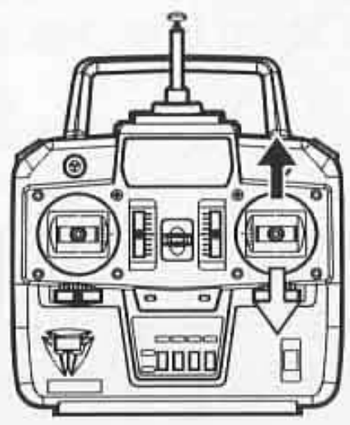
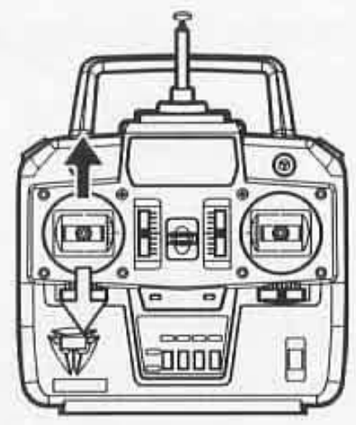
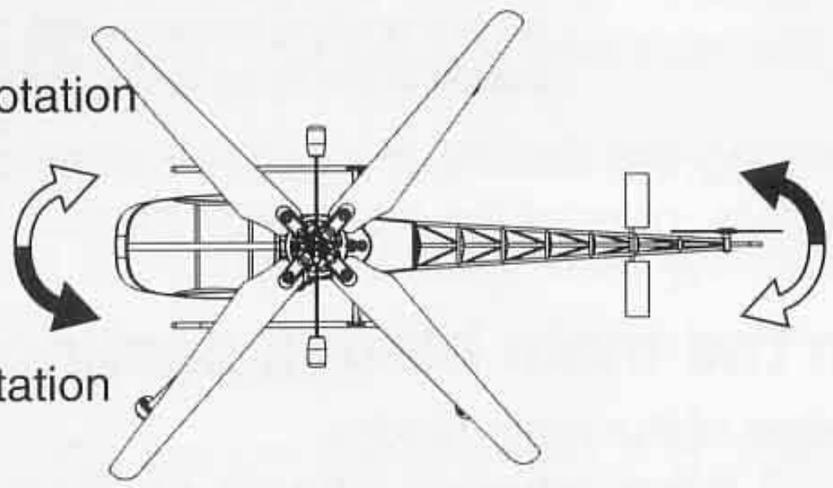
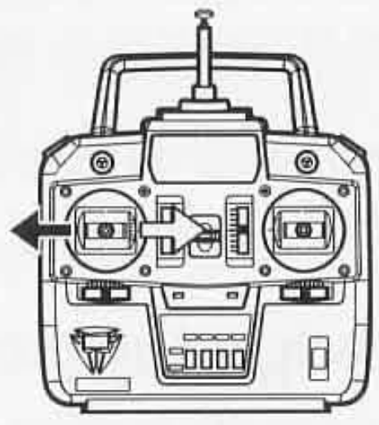
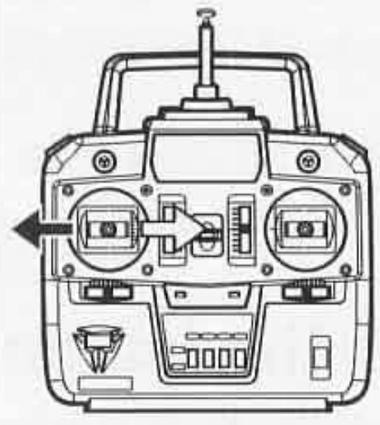
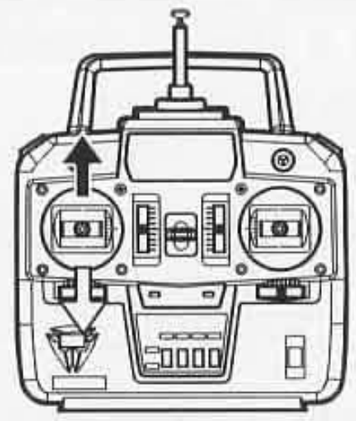
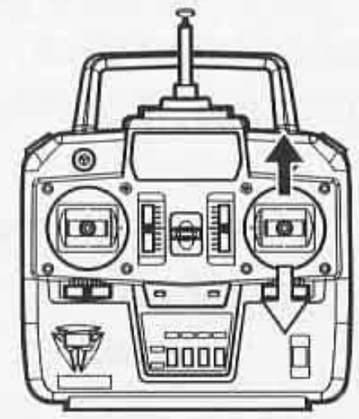
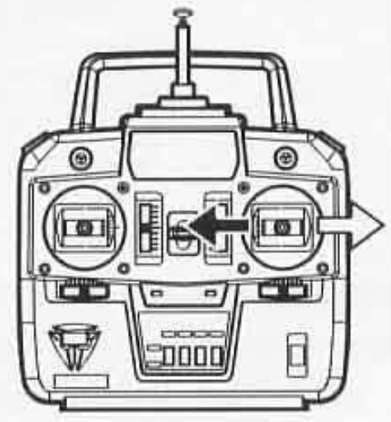
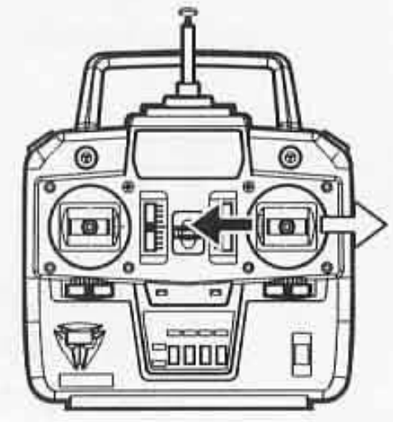
It is normally not necessary to extend the antenna on the flying unit. Extend the antenna if you need to increase the range of the radio transmissions.

● Is sufficient power remaining in the batteries?

The radio transmissions become weaker as the batteries discharge, and control may become impossible. Check the battery level display, and replace the batteries if necessary.

05-1. Flight Practice 1 Unit Movement and Stick Operation

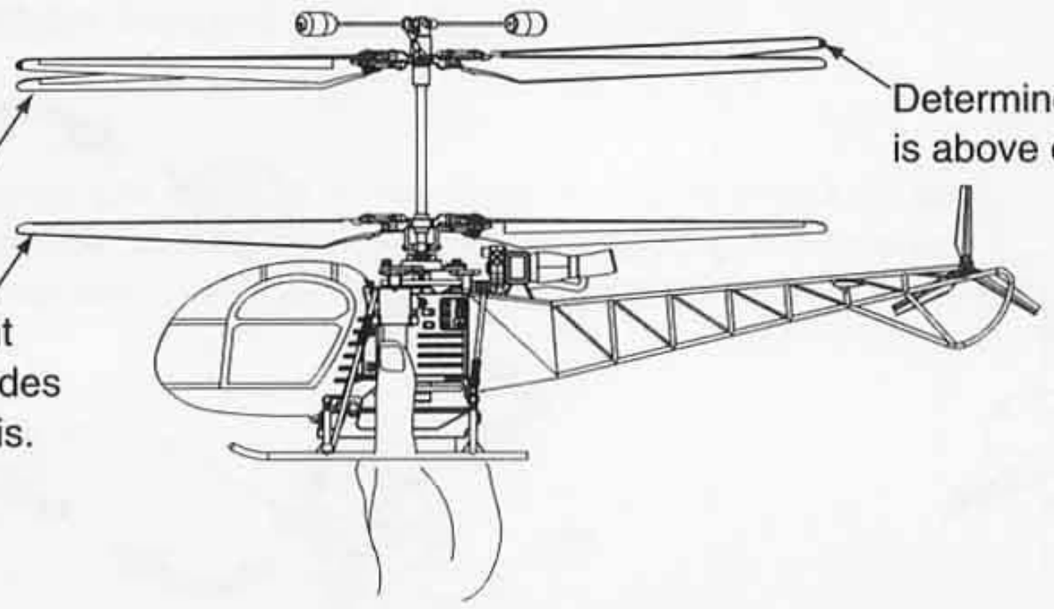
Check whether your transmitter is Mode I or Mode II, and learn movement of the flying unit and stick operation in accordance with the following table.
The throttle and elevator stick are moved in opposite directions left-right in Mode I and Mode II.

		Mode I	Mode II
Throttle	Up  Down		
Rudder	Right rotation  Left rotation		
Elevator	Forward  Back		
Aileron	Left movement  Right movement		

Before beginning flight practice, make sure to learn how to control with the chart above.

06-1. Unit Adjustment 1 Adjusting the Tracking

- When turning the main blades, adjust so that they both trace the same path and appear to overlap. This is referred to as 'tracking adjustment'. Vibration will occur, having a negative effect on flight, if the blades do not track correctly.

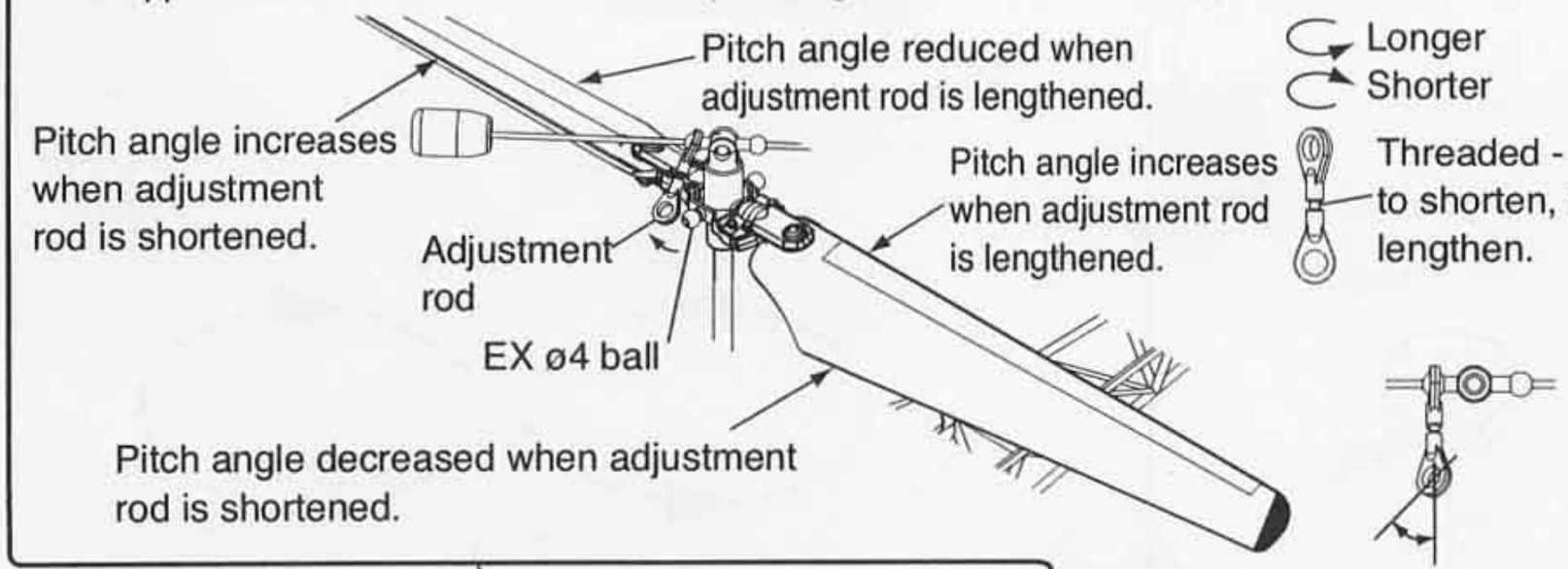


⚠Caution

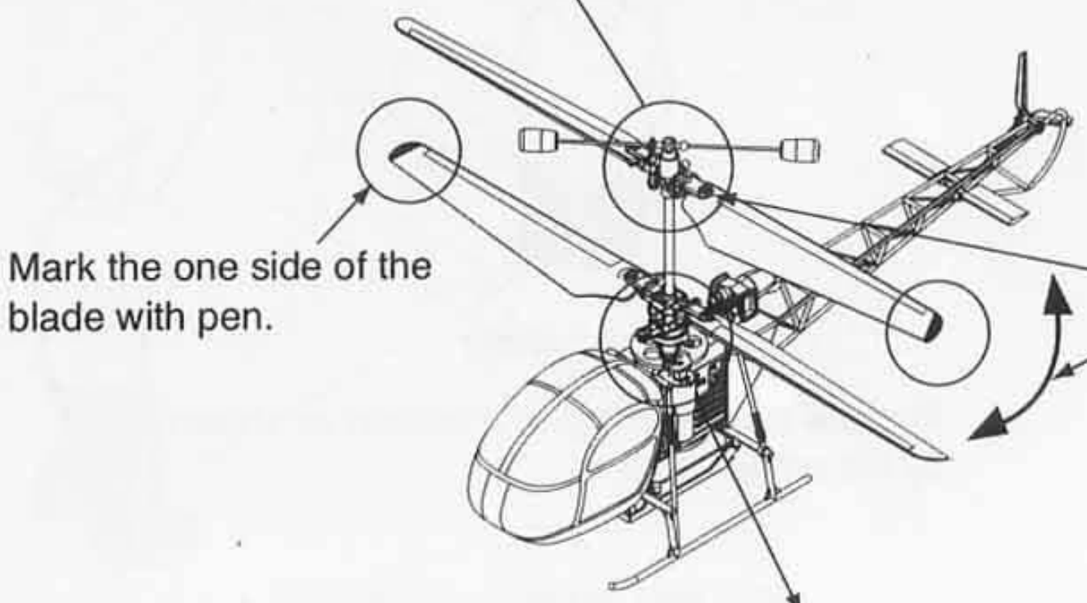
If the blades do not track correctly to the extent that sufficient adjustment is not possible, they may be damaged. Replace with new blades immediately. Continued flight in this condition may result in a crash.

<Adjusting Upper main blade tracking>

Adjust the length of the adjustment rod so that, when the rotor is turned, the pitch angle of the blade which appears to be above is small, and the pitch angle of the blade which appears to be below is large.

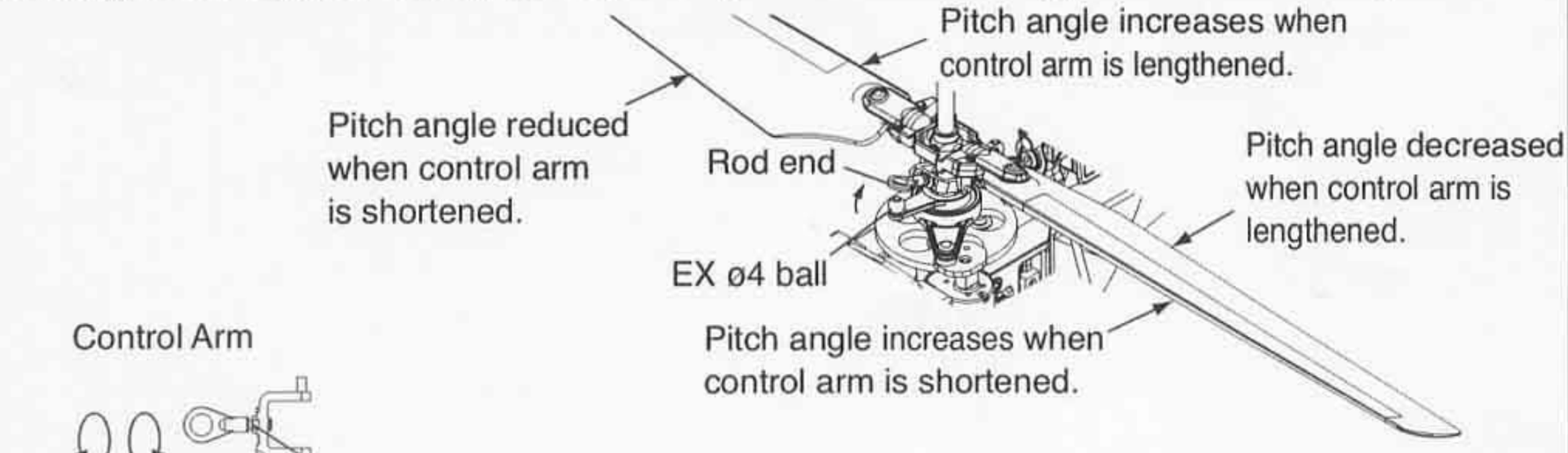


Make sure that the rod ends are mounted at a 40°~50° angle to each other or the stabilizer will not operate properly and the helicopter may crash.



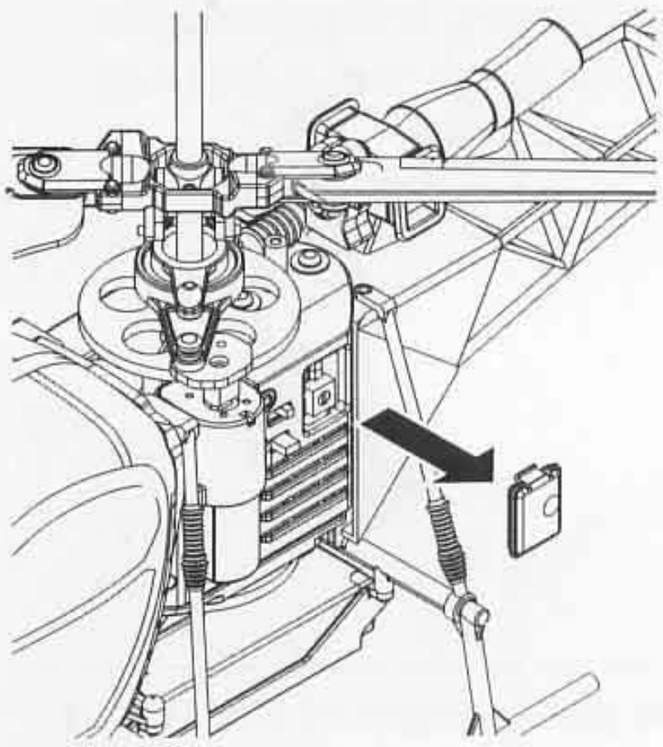
<Adjusting Lower main blade tracking>

Adjust the length of the control arm so that, when the rotor is turned, the pitch angle of the blade which appears to be above is small, and the pitch angle of the blade which appears to be below is large.

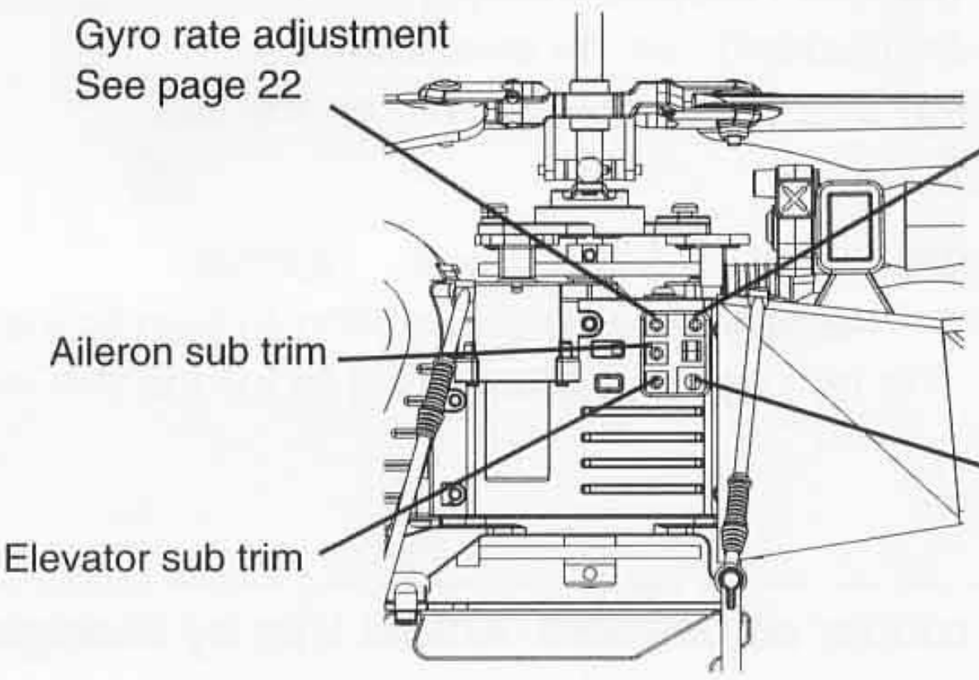


06-2. Unit Adjustment 2 Adjusting the Forward/Reverse and Left/Right Movement

- Adjust the trim if the flying unit moves forward/reverse and left-right without operation of the stick. Trim can be adjusted with the trim lever on the transmitter, or with the sub trim on the flying unit, however it is best to make coarse adjustments on the flying unit, and fine adjustments on the transmitter.

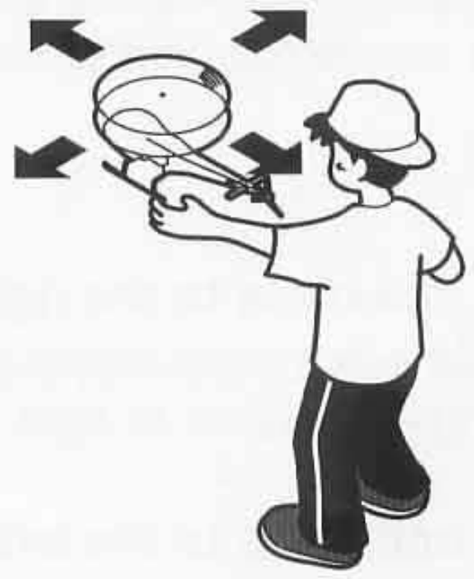


Remove switch cover.

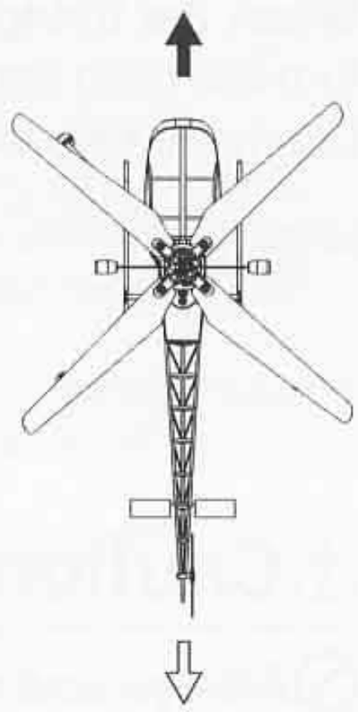


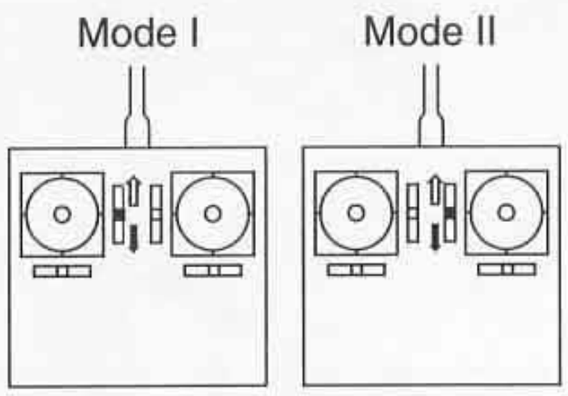
Hold the flying unit during adjustment if you are not yet confident flying the helicopter.
Slowly open the throttle to increase rpm to a point where the helicopter almost leaves the ground.
While holding the helicopter, determine by feel whether it is attempting to move in the forward/reverse or left/right direction.
Gently let the helicopter go when the force on your hand diminishes slightly.
Slowly adjust until the helicopter is able to remain stationary in mid-air for a period of 5-10 seconds.

* If the flying unit rotates during forward/reverse and left/right adjustment, adjust for left/right rotation as in '06-3 Unit Adjustment 3 Adjusting the Left/Right Turn' on the next page, and make both adjustments simultaneously.



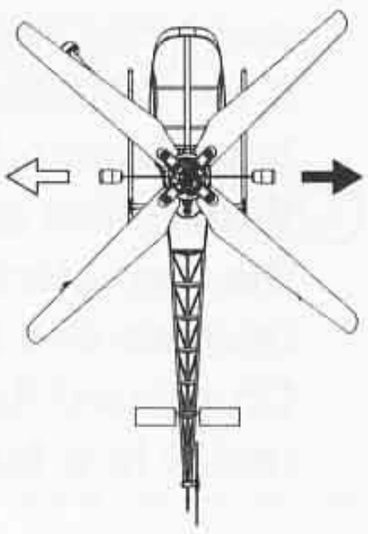
<Fixing forward/reverse movement>
When the unit moves forward, move the trim lever back (Black arrow in diagram).
When the unit moves backward, move the trim lever forward (White arrow in diagram).

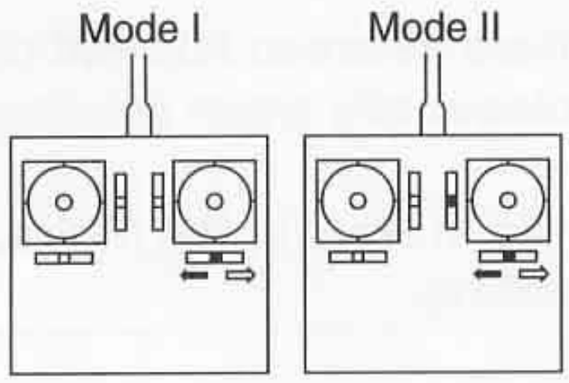


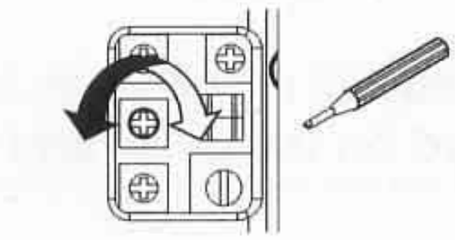


Use slotted screwdriver included in this set to turn screws.

<Fixing left/right movement>
When the unit moves to the right, move the trim lever to the left (Black arrow in diagram).
When the unit moves to the left, move the trim lever to the right (White arrow in diagram).



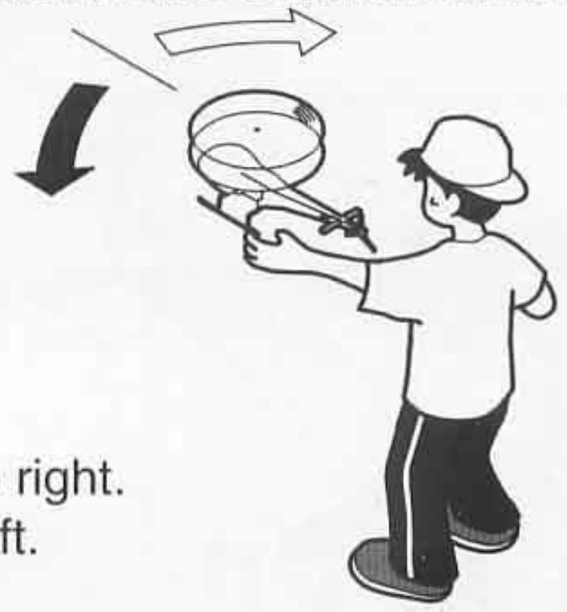




Use slotted screwdriver included in this set to turn screws.

06-3. Unit Adjustment 3 Adjusting the Left/Right Turn

● After forward/reverse and left/right trim adjustment are partially complete, continue while making both adjustments simultaneously.



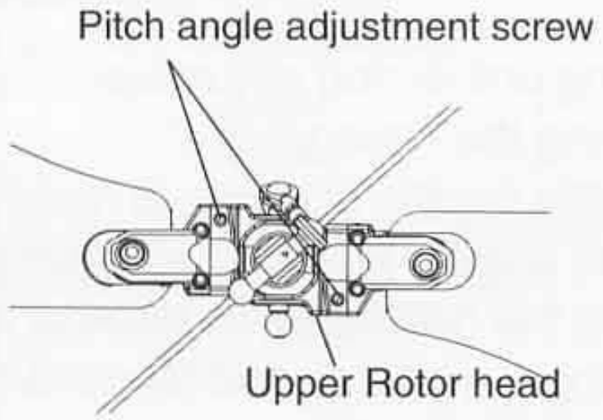
[Checking left/right turn (rudder) displacement]
The direction of left/right turn (rudder) can be evaluated by stopping in mid-air (hovering) and checking the LED on the left of the flying unit.

* LED alternately blinks red and green....Normal
LED lit green....The helicopter is attempting to turn to the right.
LED lit red....The helicopter is attempting to turn to the left.

⚠Caution

⃠ Trim is not used for rudder adjustment. Adjust trim by changing the pitch angle of the upper main blades.

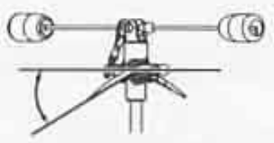
Pitch (angle) Adjustment
When the pitch angle of the upper main blades is changed, a difference in rotation occurs with the lower main blades. Use the change in the torque reaction to compensate the rudder direction.



When the flying unit turns to the right (green LED),
turn the pitch angle adjustment screw to the right.
Learn the following - unit turns to right, turn screw to right!


If it turn clockwise, reduced pitch angle

When the flying unit turns to the left (red LED),
turn the pitch angle adjustment screw to the left.
Learn the following - unit turns to left, turn screw to left!


If it turn counterclockwise, increased pitch angle

⚠Caution

⃠ Always use the supplied Phillips screwdriver to turn both pitch (angle) adjustment screws the same number of turns. If the angles of opposing blades differ, the blades will no longer track correctly, resulting in vibration.
If the blades no longer track correctly, turn both screws as far to the right as possible, and begin again from the minimum pitch angle.

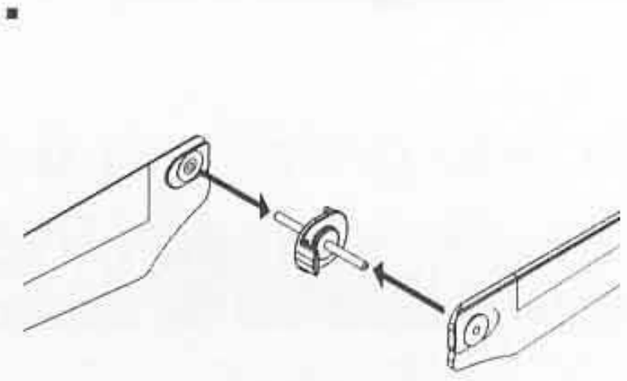
⃠ If the pitch angle is not adjusted correctly, the rate of turn differs between left and right when the turn stick is used. Furthermore, the helicopter will move diagonally when moving forward/reverse and left/right.
Continued flight with these symptoms will result in an imbalance in wear of the motor, and may result in a fault due to excessive load on the gyro, and overheating.

06-4. Unit Adjustment 4 Finer Tuning Adjustments

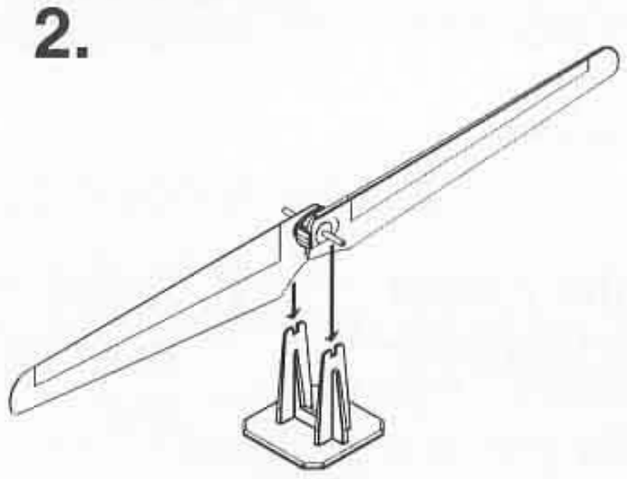
● Blade Balancing

The main blades are the components having the greatest effect on the flight of the helicopter. A significant difference in flying performance can be observed between a main blade that has received balance adjustment and one that has not. Use the supplied blade balancer for adjustment. A balance adjustment can reduce vibration and noticeably improve stability.

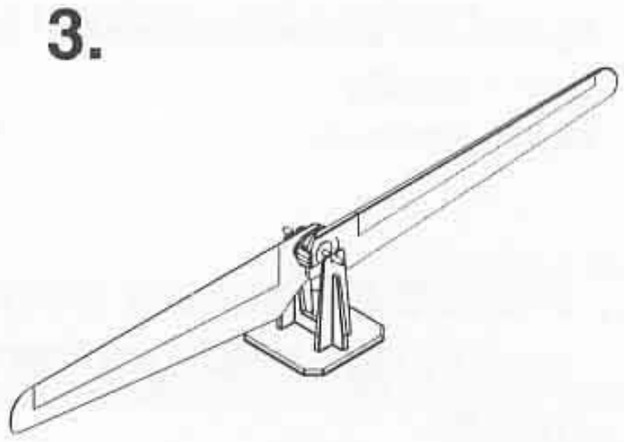
1.



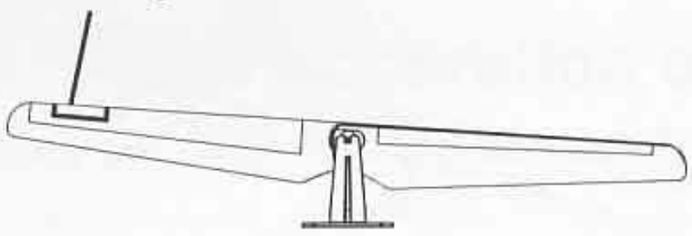
2.



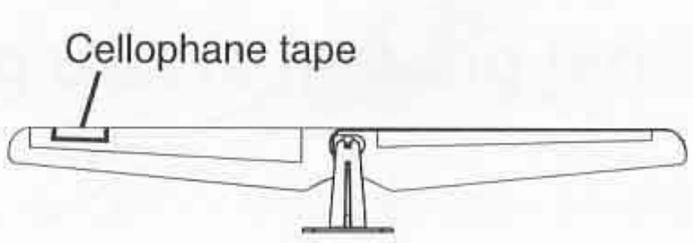
3.



4. Apply cellophane tape etc to the lighter blade until left and right blades are balanced.

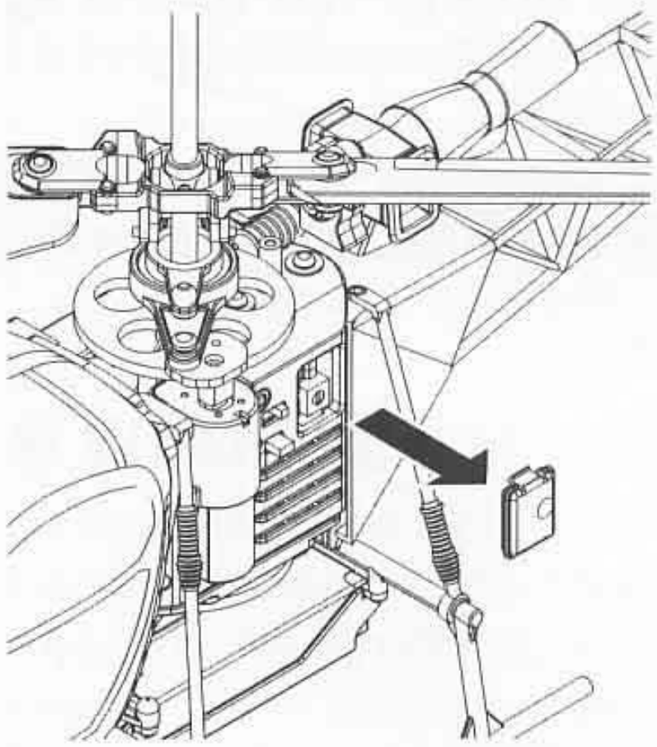


5.



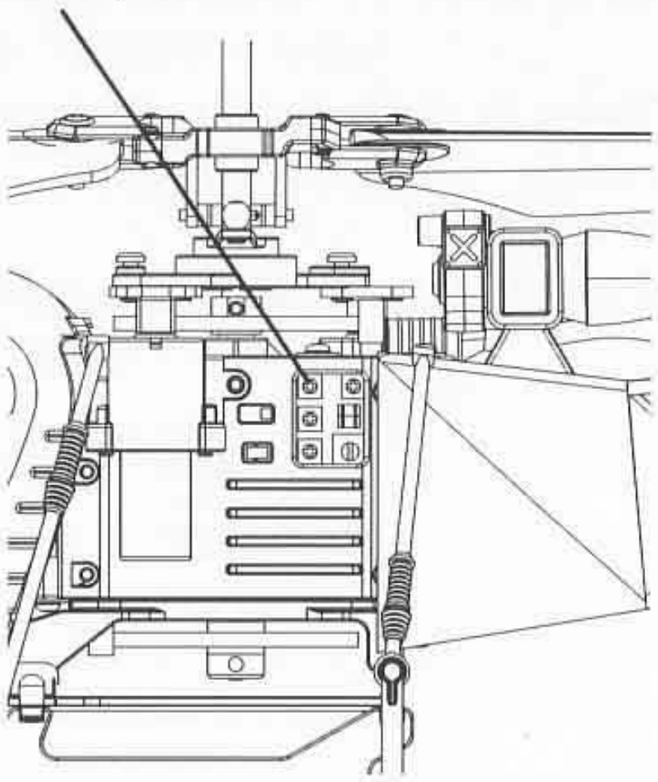
● Rudder Turn Speed Adjustment

Use gyro rate adjustment to increase or decrease the speed at which the rudder turns.



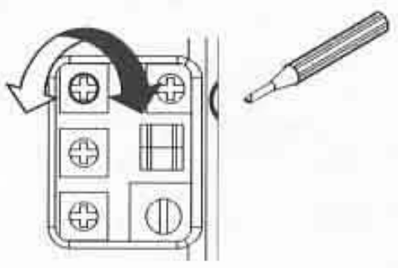
Remove switch cover.

Gyro rate adjustment



Turn to the left to decrease the speed at which the rudder turns.

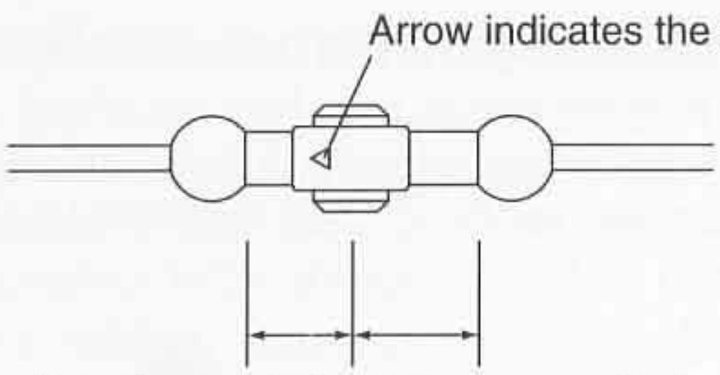
Turn to the right to increase the speed at which the rudder turns.



Use slotted screwdriver included in this set to turn screws.

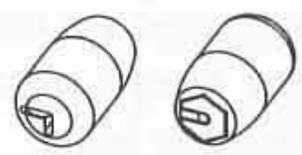
● Setting for advanced pilots

Sensitivity of response is improved by changing the position of the stabilizer ball. Sensitivity of response is also improved by replacing the stabilizer weights with the supplied lighter weights.

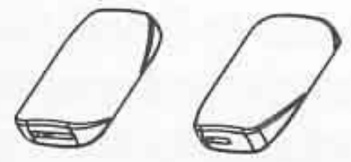


Shorter (for advanced pilots)
Lower stability
Quick response

Longer (for beginners)
Higher stability
Slower response

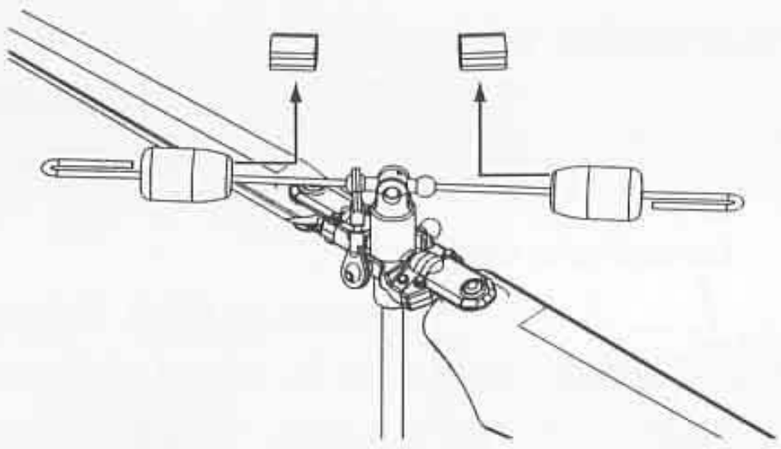


Standard (for beginners)
Higher stability
Slower response

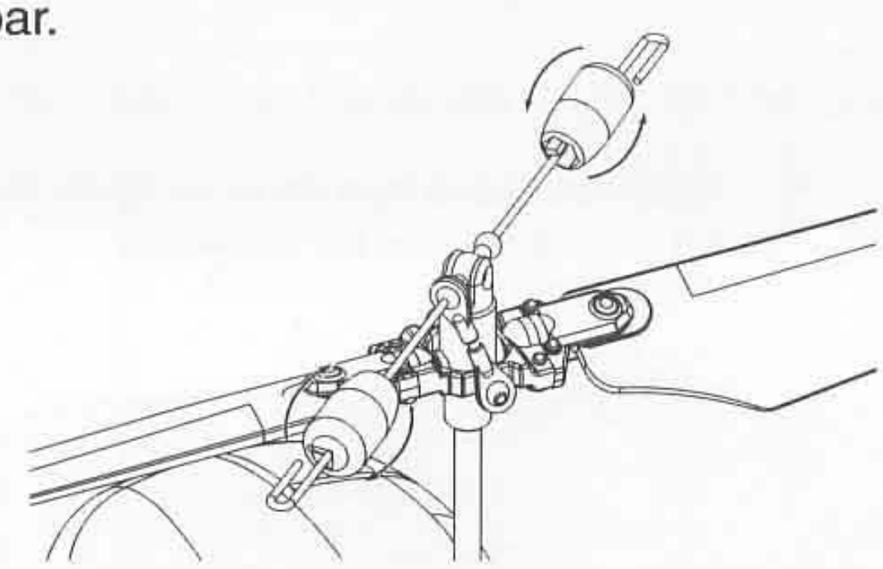


Light weight (for advanced pilots)
Lower stability
Quick response

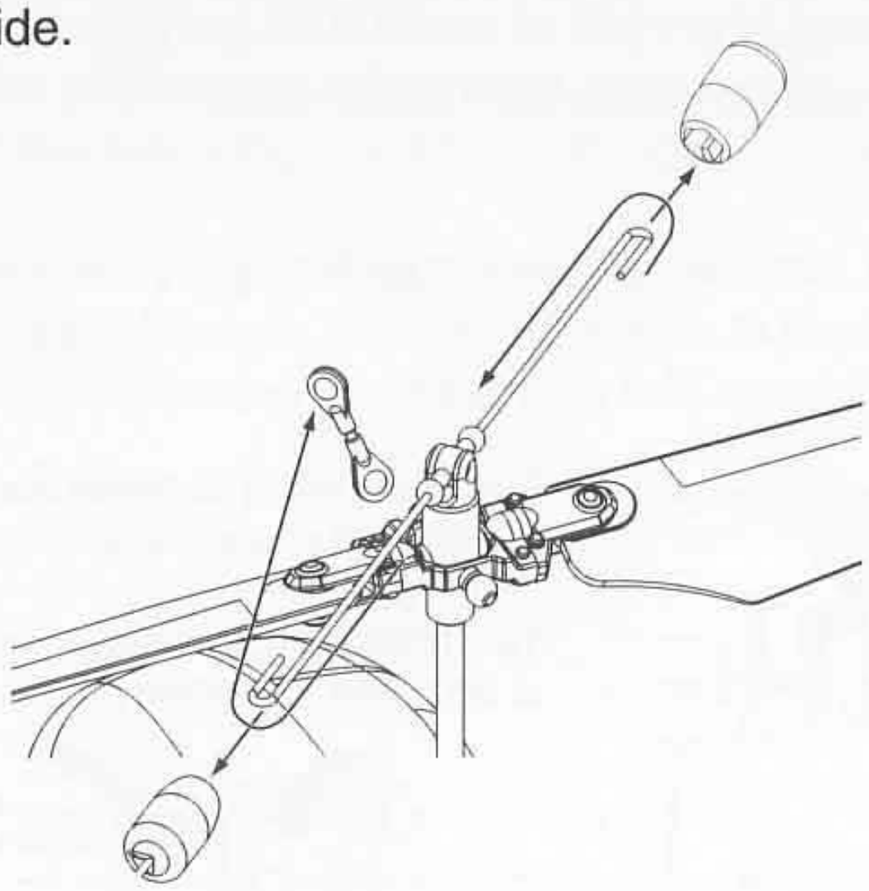
1. Press the Stabilizer weight and the rubber cover to the inside and remove the Stabilizer weight.



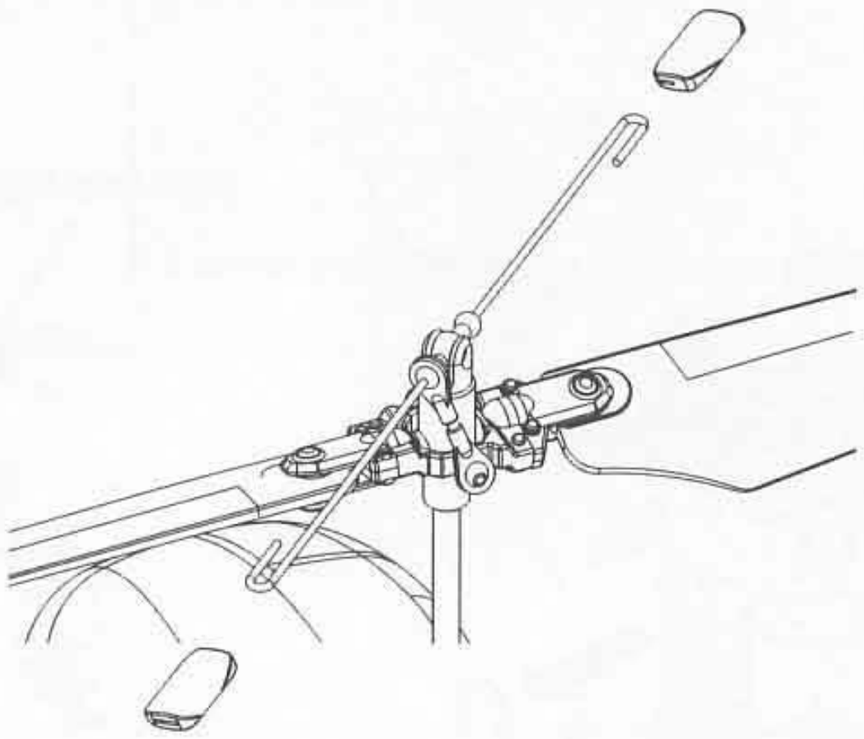
2. Rotate the rubber cover 90°, bring the longer hole to a horizontal position, and pull out the stabilizer bar.



3. Remove the rod end and attach to the shorter side.



4. Use the lighter stabilizer weights to further improve sensitivity of response.



⚠Caution

⃠ **The response of the controls will become extremely quick. Only advanced pilots should make these adjustments.**

07. Checkpoints for Flying Problems

- The part that has the most impact on helicopter flying is the main blade. There are often cases when flying performance has been improved just by replacing the main blade. Moreover there is a big difference in flying performance between a helicopter with a balance-adjusted main blade and a main blade that has not had the balance adjusted. In cases when the helicopter is not flying well, we recommend the first line of action is to replace the main blade with one that has had its balance adjusted.

● If the flying unit does not move at all

1. Check that the power is on at the transmitter and at the flying unit. ..... See page 11.
2. Check that the battery levels of the batteries in the transmitter and in the flying unit are sufficient
   ..... See pages 5 to 8 and see also the instruction manual for the transmitter.
3. Check that the radio frequency of the transmitter's crystal is the same as that of the flying unit. ..... See page 8.
4. Check that the transmitter manufacturer selection switch is set correctly. ..... See pages 25, 26.
5. This product has been designed so that when the safety lock has not been cleared, the motor will not rotate. ..... See pages 11, 12.
6. Is the throttle trim raised to the up position? ..... See page 12.

● If there is faulty operation or the flying unit is moving jerkily

1. Check that the battery levels of the batteries in the transmitter and in the flying unit are sufficient
   ..... See pages 5 to 8 and see also the instruction manual for the transmitter.
2. Is the antenna of the transmitter extended? ..... See page 12.
3. If the faulty operation occurs when the distance between the transmitter and the flying unit is greater, extend the antenna of the flying unit. ..... See page 12.
4. There is a possibility that radio waves of the same frequency are being used nearby. ..... Wait a while and turn on the power again.

● When the flying unit does not stop rotating

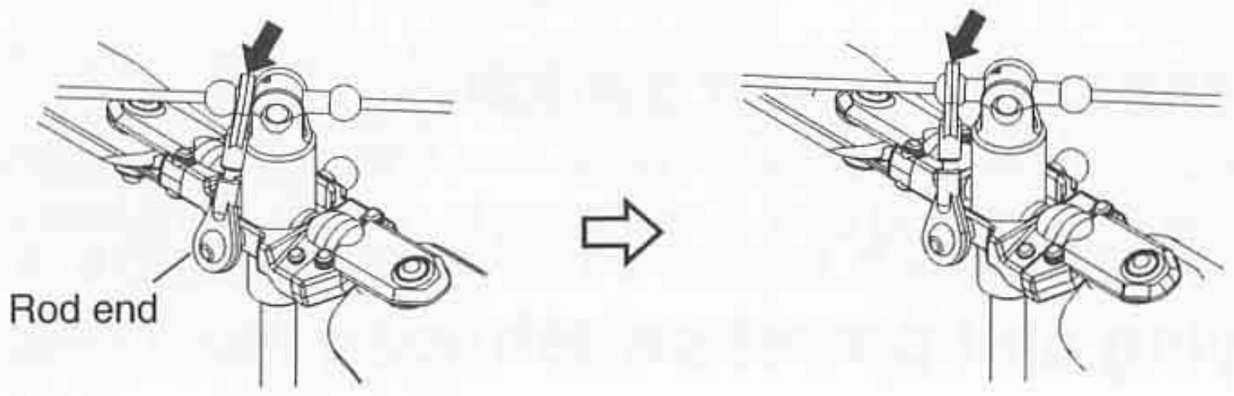
1. The rudder has not been adjusted properly. ..... See page 21.
2. Each main blade is physically different and depending on how it is combined, there are cases when it does not stop rotating.Replace the blade and try flying the unit again.
3. It is possible the motor is damaged or worn. . Rotate the motor by hand to make sure it rotates smoothly and does not generate strange noises. If not, replace the motor.

● When flying unit moves forward/reverse and left/right, and cannot hover

1. Is the flying unit being caught in a wind caused by an air conditioner or the like?
   ..... If there is a wind, hovering cannot be achieved. Fly the unit with the windows closed and the air conditioner off.
2. Trim adjustment has not been done. ..... See page 20.
3. The cabin or tail truss has been removed on one side only.
   ..... If you remove the cabin or truss on one side only, the center of gravity in forward/reverse changes and you cannot hover. Affix what needs to be affixed and fly the unit.

● When the unit vibrates strongly

1. Is the tape on the edge of the main blade coming off? ..... See page 12.
2. Is main blade moving smoothly in forwards/reverse? ..... See page 27.
3. Has the tracking been adjusted properly? ..... See page 19.
4. Has the center of gravity been properly adjusted for the main blade? ..... See page 22.
5. Has the end of the rod come off the stabilizer ball? ..... Position the rod onto the ball as shown in the figure.



08. Using a Commercial Transmitter

For cases when this product has not been purchased as the full set, which also supplies the transmitter, it is possible to use a commercial transmitter made by Futaba Corporation, Sanwa Electronic Instrument or Japan Remote Control Co. Ltd., (JR). Since transmitter is not supplied with the flying unit and battery set, you can purchase a transmitter made by any of the above companies.

● Transmitters that can be used

Manufacturer: Futaba Corporation, Sanwa Electronic Instrument or Japan Remote Control Co. Ltd., (JR)
Modulation system: FM-PPM (you cannot use AM or PCM.)
Channels: At least 4 channels

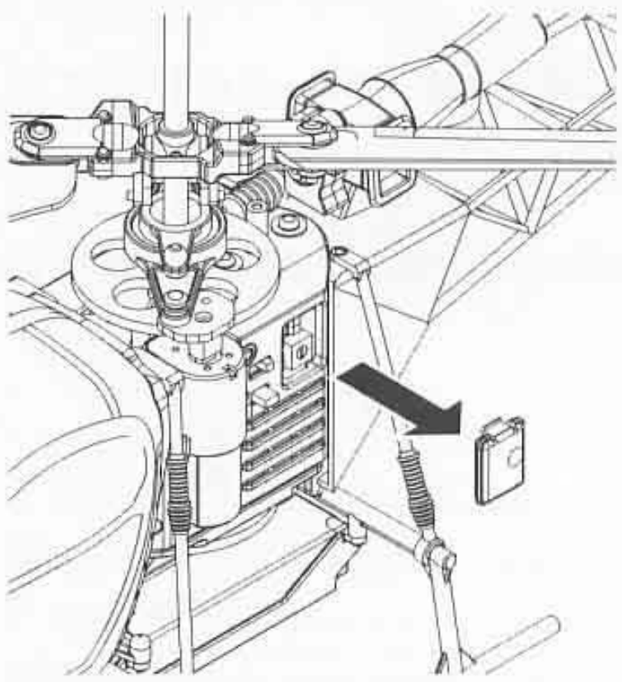
Most of the recently released transmitters on the market are computer transmitters but you can fly the unit without using these various functions. When using the functions of these transmitters, use them after completing the initial settings. If you use transmitter functions during the initial setting, the settings cannot be performed correctly and it is possible that you will not be able to operate the unit. While performing the initial settings, either reset the data or select a model in which data has not been entered. It is possible to fly the unit with a transmitter that is not a computer transmitter and you can even use an airplane transmitter.

⚠Caution

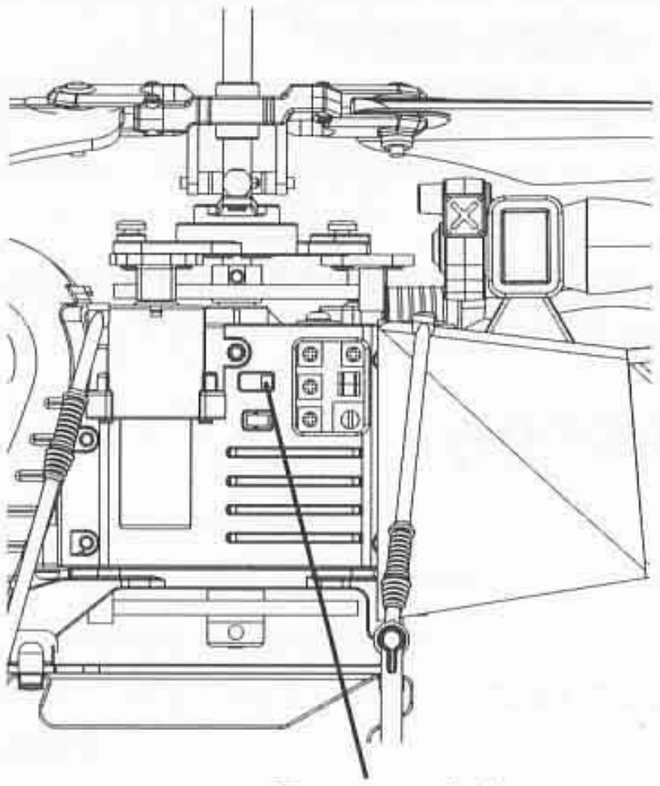
Always set the trim controls in the center position.
Always set the modulation to PPM. (You cannot use PCM.)
Always select normal type if using a swash plate type. (You cannot use swash mode, CCP mixing or CCPM.)
Each company calls the normal type a different name:
Futaba: HELI SWH1
Sanwa: NOR
JR: 1SERVO
Never use revolution mixing (tail curve).

1. Selecting the manufacturer setting

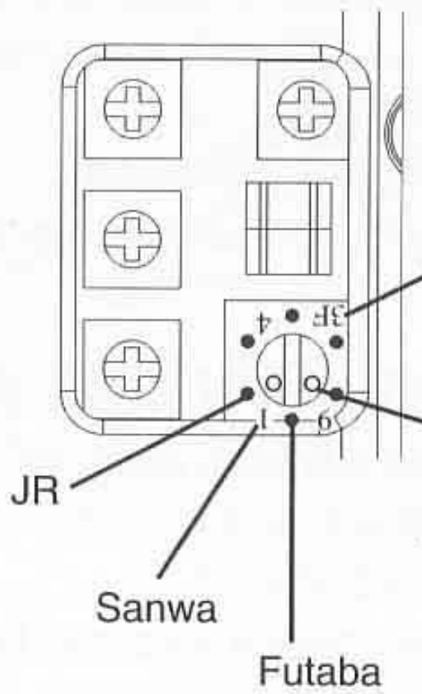
Turn off the power switch and use the slotted screwdriver provided to switch the manufacturer selection switch to the manufacturer of the transmitter being used.
If you changed the manufacturer selection switch position while the power switch was turned on, turn off the power switch and then turn it on again. Modification of the manufacturer selection cannot be made while the power is on.



Remove the switch cover.



Power switch



Manufacturer selection switch

Line up the end of the groove with the small holes with the position allocated for the manufacturer.

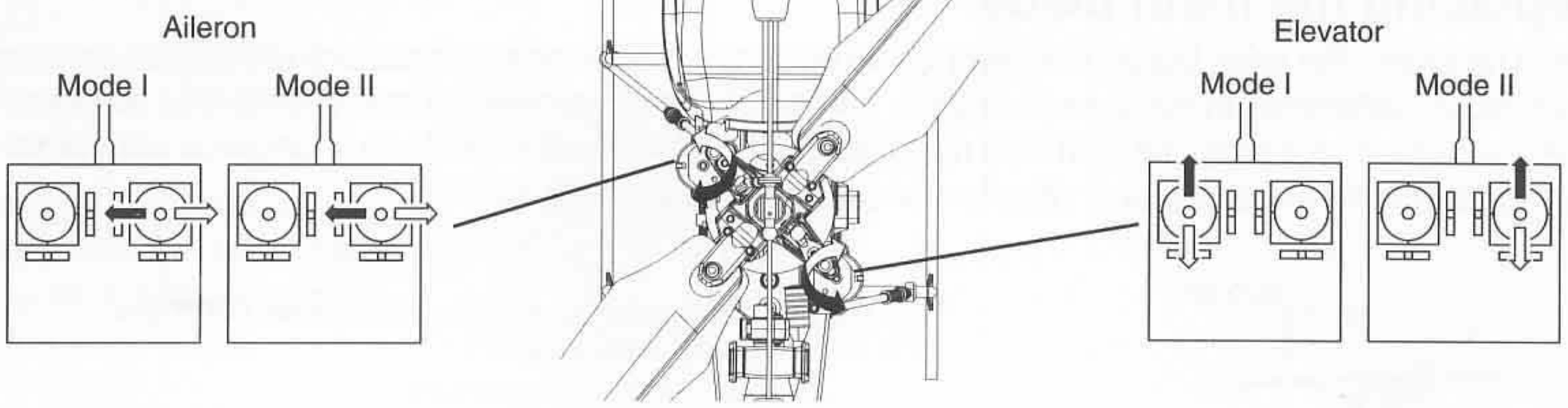
2. Turn on the transmitter power switch.

Reset the data or select a model that does not have data entered. Some manufacturers use revolution mixing (tail curve) in the initial setting so it is important to disable this function or set all values to 0%.

3. Turn on the flying unit power switch.

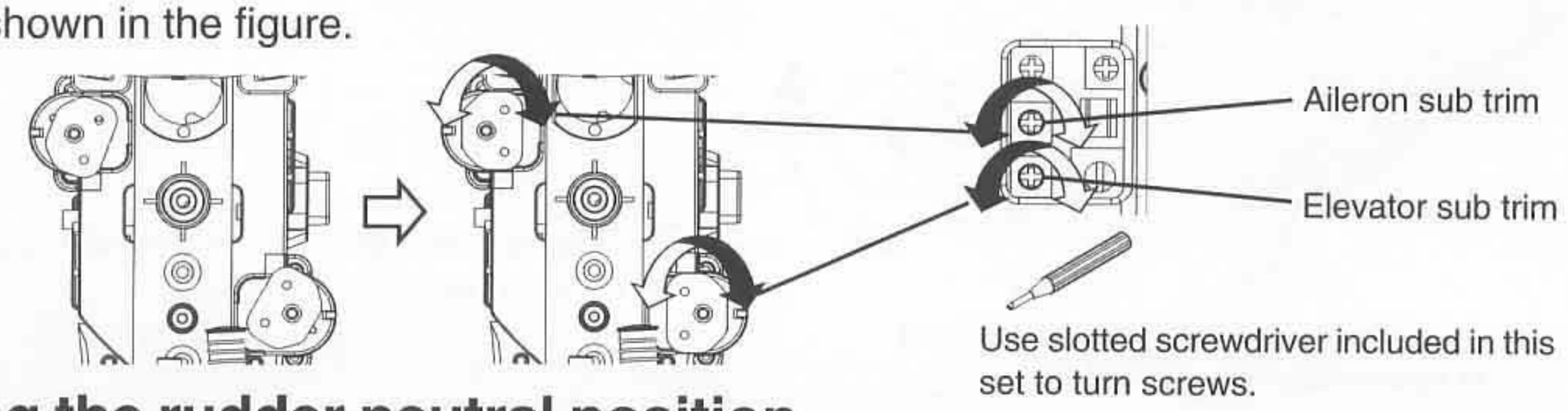
4. Checking the direction of servo operation

Check the resulting LED lamp display and direction of servo operation for each stick operation is as shown in the figure below. If the direction of operation is reversed, then change the direction using the transmitter's servo reverse switch.



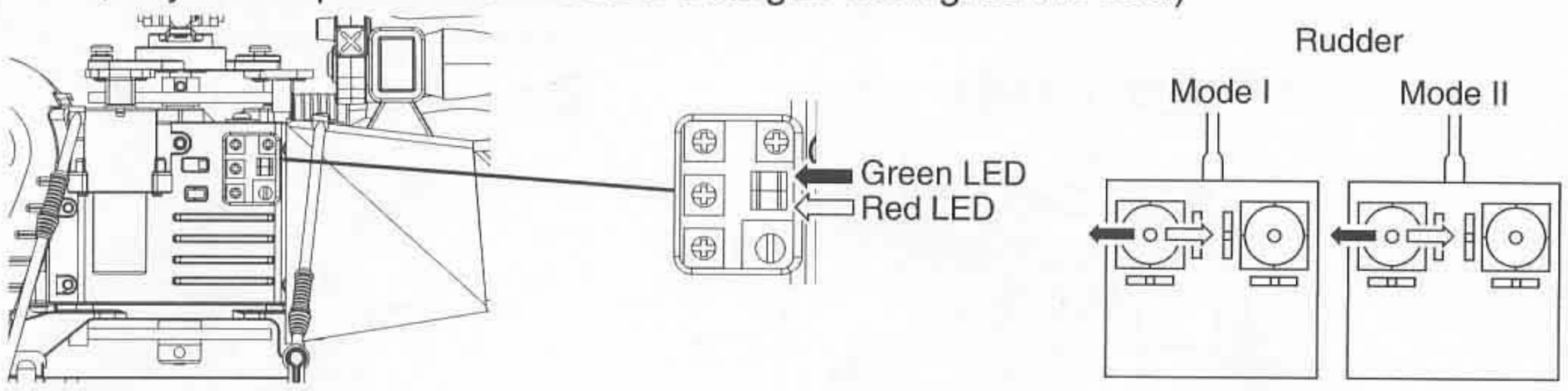
5. Adjusting the servo neutral position

Adjust the aileron sub trim and elevator sub trim for each aileron and elevator servo so that they are straight as shown in the figure.



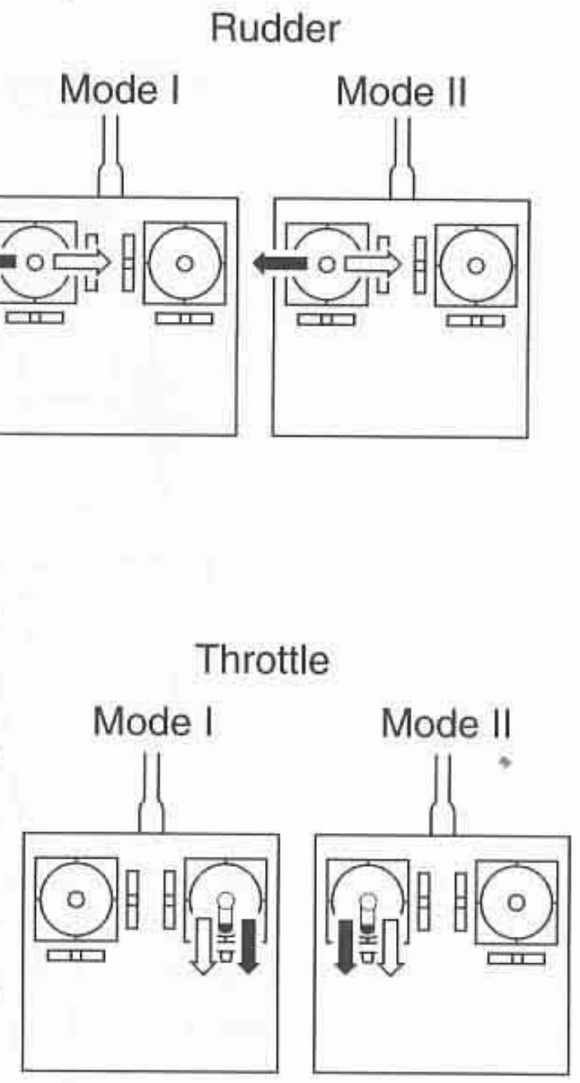
6. Adjusting the rudder neutral position

The rudder neutral position can be checked by LED lamp display.
Raise the throttle stick a little and move the rudder stick to the left and the LED will light up green, move the rudder stick to the right and the LED will light up red.
When the rudder stick is in the center position, it is in neutral position if the neither the red or green LED lamp is lit. (When the throttle stick is lowered to the furthest down position both red and green LED lamp light up, make sure the throttle stick is not in this position by raising the throttle stick a little.)
The rudder neutral position adjustment function is not on the flying unit side, so use the trim and the sub trim controls on the transmitter until both LED lamps are off. (If there is actually no position where both lamps are off, adjust the position to where it changes from green to red.)



7. Adjusting the throttle neutral position

Set the throttle stick so that when it is lowered to the furthest down position, both green and red LED lamps are lit at the same time.
If both lamps are lit when the throttle stick is raised to the furthest up position, then it is opposite to what it should be. If both LED lamps are not lit in either the up or down position, make sure the throttle trim is in the center position and that rudder angle adjustment functions (ATV, endpoint and travel adjust) are not in use. If the throttle trim is not in the center position or if rudder angle adjustment functions are being used, it is not possible to correctly set the neutral position.
If the transmitter has been correctly set but both the red and green LED are not lit at the same time, adjust by rotating the throttle sub trim on the flying unit side. For details, see page 12.

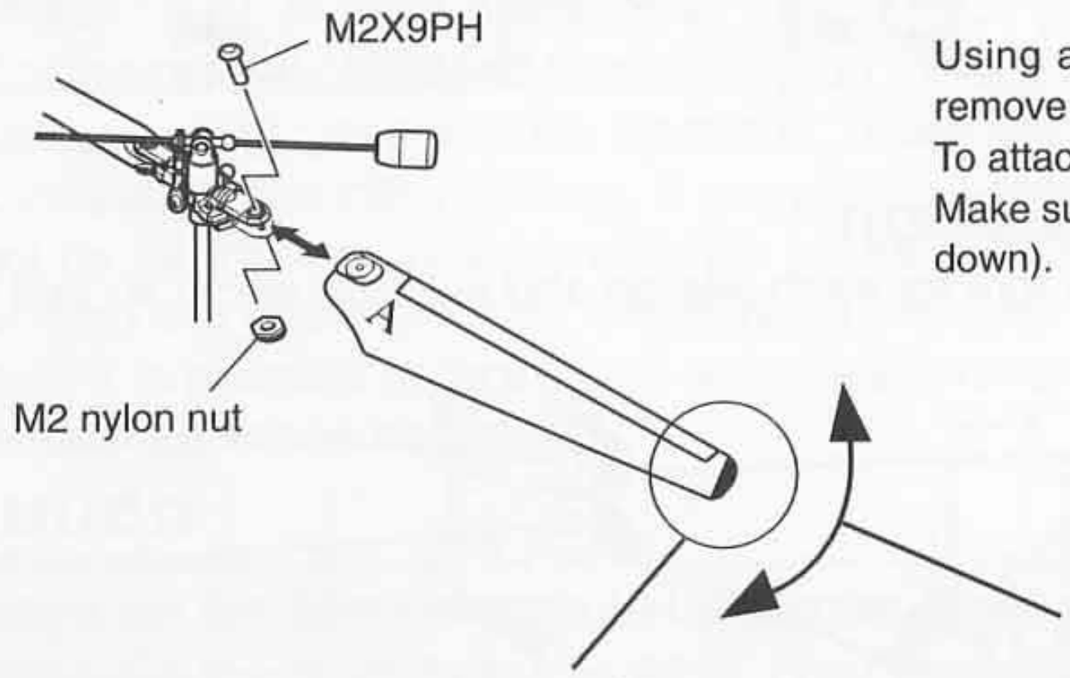


8. After the above adjustments have been carried out, adjust the flying unit as described from page 19 to 23.

09. Part Replacement

● Replacing the main blade

When replacing the main blade, it is recommended that a main blade balance adjustment be performed. A significant difference in flying performance can be observed between a main blade that has received balance adjustment and one that has not. See page 22 on how to perform a balance adjustment. A balance adjustment can reduce vibration and noticeably improve stability.



Using a Phillips screwdriver, loosen M2X9PH and remove the Main blade.
To attach, reverse this process.
Make sure that the blade is not upside down (A: up, B: down).

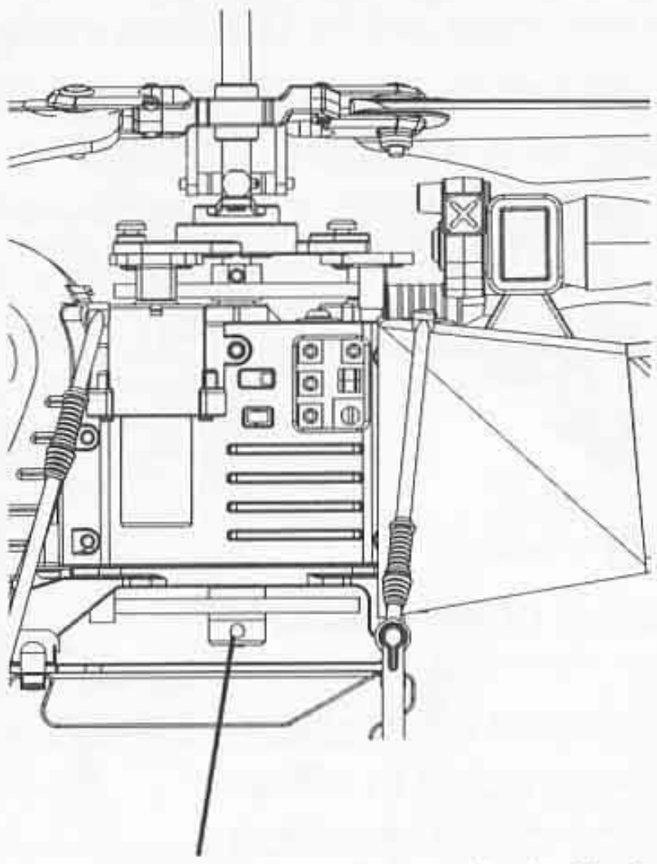
Tighten M2X9PH so that the main blade can be moved slightly with the hand.

After changing the blade, mark the tip in appropriate way. (See P.19.)

⚠Caution

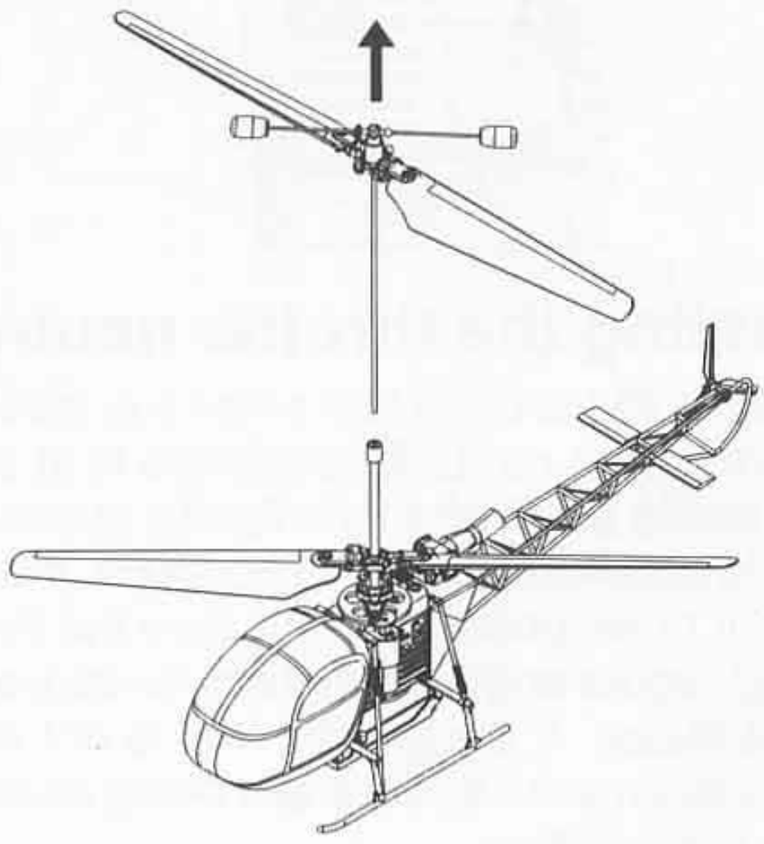
⃠ Do not use any parts other than those specifically designated main blade.

● Replacing the Main Mast

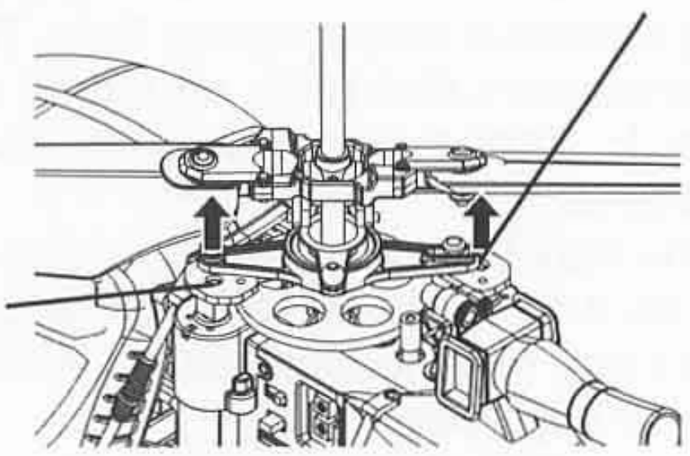


1. Use the L-shaped wrench supplied with the product to remove M2X4SS.
The size of this wrench is 0.89 mm. The screw has been fixed by a thread-locking agent so it sometimes is difficult to remove. If it is difficult to remove, it can be heated up a little by using soldering iron, which will make it easier to remove. (Be careful the soldering iron does not melt any of the surrounding plastic.)

2. Pull out the upper Rotor Head.

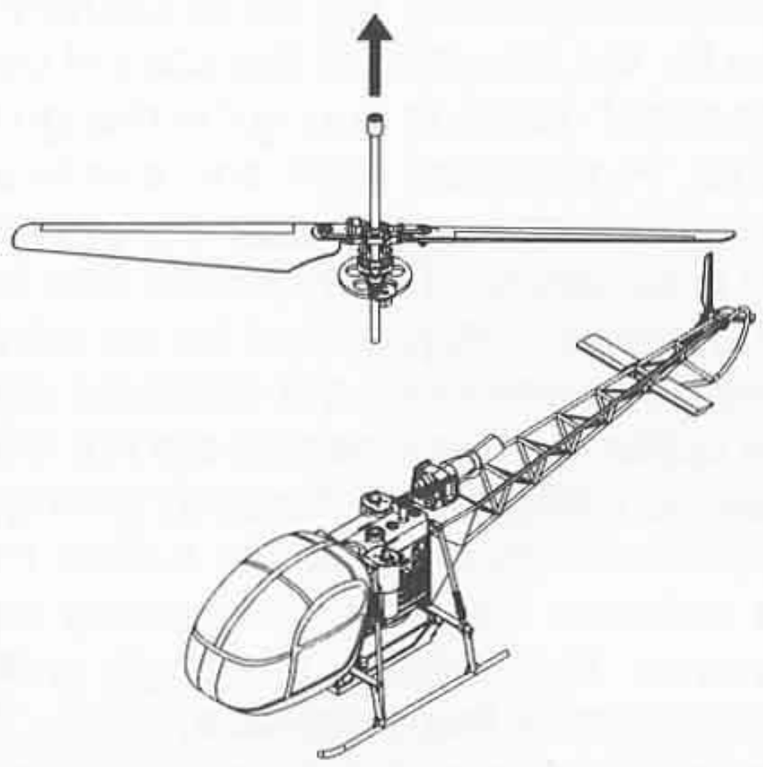


4. Using the + screwdriver, remove M1.4X5TS and pull up on the Servo Horn to remove it.



3. Using the + screwdriver, remove M1.4X5TS and pull up on the Servo Horn to remove it.

5. Pull out the lower Rotor Head.

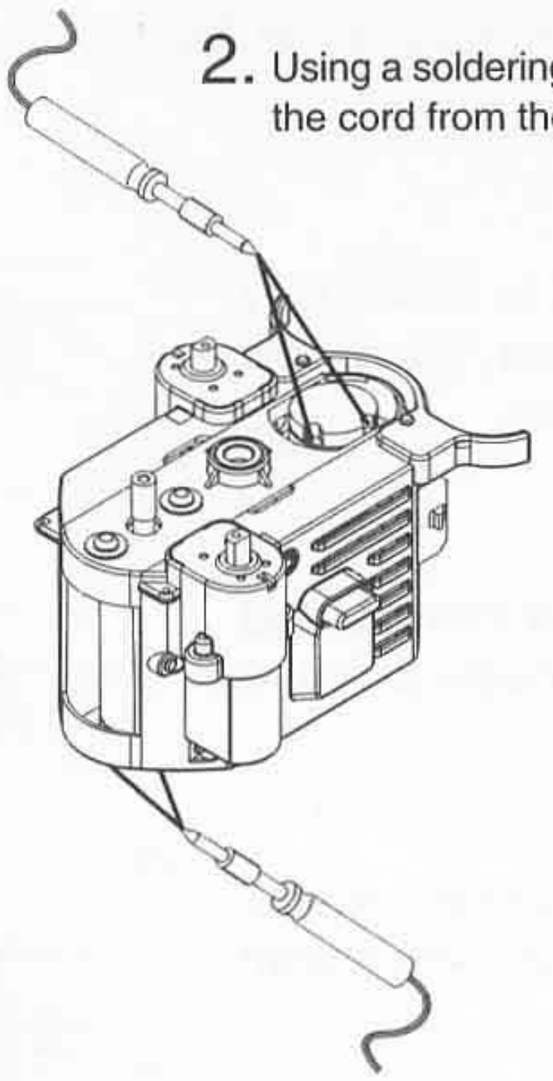


6. To reassemble, reverse the above steps.

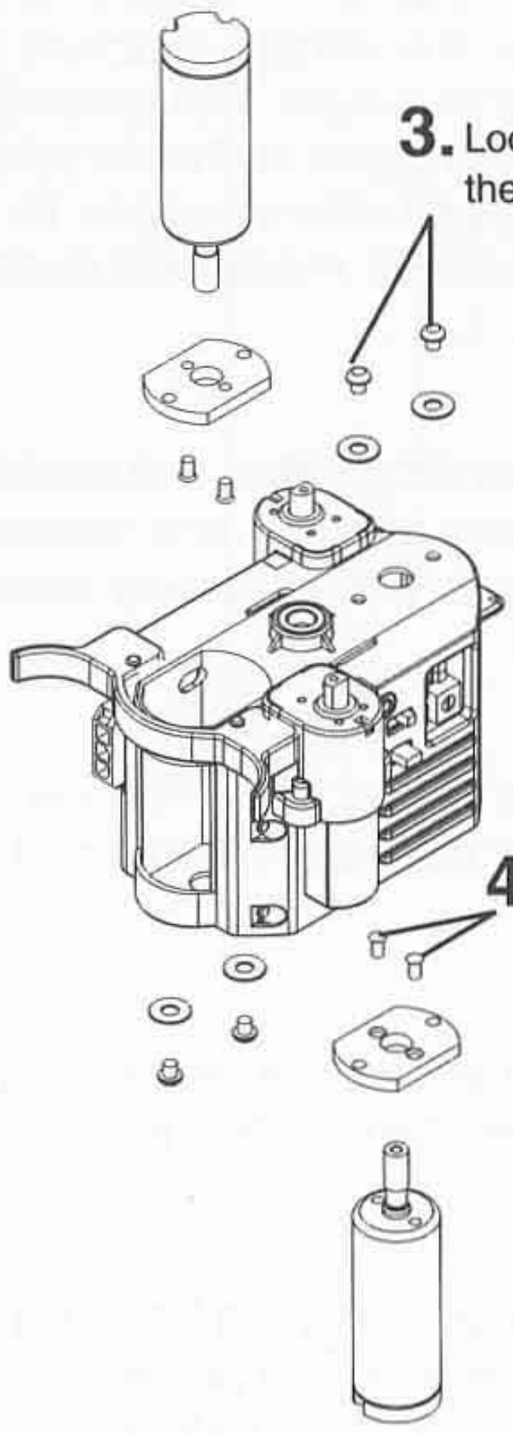
● Replacing the Motor

1. Remove the Cabin, Tail truss, Skid, and Main mast.

2. Using a soldering iron, remove the cord from the motor.



3. Loosen M2X4PH and remove the motor.



4. Loosen countersunk screw M1.7X3 and remove the motor plate.

5. To reassemble, reverse the above steps.

10.Flight Principles

Four basic systems are employed in helicopters. The coaxial contra-rotating system is employed in this machine. The structure consists of a single-rotor head above which a further rotor is mounted and which rotates in the reverse direction, thus canceling rotational torque during flight. This system is extremely rare among both full-size and radio controlled helicopters due to its structural complexity, and its ease of maintenance and maneuverability are inferior to other systems. On the other hand, it has a number of superior characteristics not found in other systems.

This system is such that maximum dimensions may be minimized, hovering is possible in a completely horizontal attitude, the helicopter is stable when turning left or right, and structural efficiency is superior. These characteristics are all absolutely necessary in helicopters flown indoors, and this is the primary reason for the adoption of the coaxial contra-rotating system.

An important question during the design process is that of how to ensure that the structure is as simple as possible. High-speed flight and stunts are not always required of indoor helicopters, indeed an overall consideration shows that sacrificing these characteristics for stable hovering, accurate movement, and safety is beneficial. This machine has been developed on this basis, and the use of the coaxial contra-rotating system has provided for an extremely simple structure.

The following describes the structure and control mechanism.

As the upper head and servos are not linked, control inputs from the pilot are not transmitted. The stabilizer senses the inclination of the body during rotation and induces cyclic operation in the rotor, and continually and automatically controls the rudder in the direction opposite to the inclination of the body. The phase angle between the rotor determining the rudder direction and the stabilizer bar is naturally of extreme importance. Theoretically this angle is 90°, however in practice it is determined through testing for rotors on helicopters of this small size.

The lower head is a stabilizer-less head. This system ensures extremely fast response to rudder inputs, thus permitting accurate control. The cyclic system employs a swash plate without the use of a spherical ball. The bearing is moved in the horizontal direction via two servos, and cyclic operation is induced in accordance with the direction and amount of this movement to control elevator and aileron inputs.

The sliding swash plate has been developed for this machine to prevent sliding friction with rudder inputs. In order to ensure that the motor is not subject to load, the yaw axis is stabilized while maintaining the upper-lower torque balance. The simple structure requires minimum space in the height direction, thus allowing a reduction in overall height - an advantage of this system. Control of the yaw axis (rudder) employs a specialized motor for upper and lower rotors, and differential rpm for the two rotors in conjunction with the throttle. The lightweight rotors provide for good throttle response at fixed pitch while ensuring safety. The following explains rotor movement during rotation.

①

Fig.1
As the upper head effects cyclic control automatically in order to continually maintain stability even without elevator and aileron rudder inputs, the pilot is able to maintain a stable hover with extremely small rudder inputs.

②

Fig.2
The instant of down elevator rudder input. The lower rotor is tilted forward, and the machine and upper rotor maintain a horizontal attitude and begin to move forward.

③

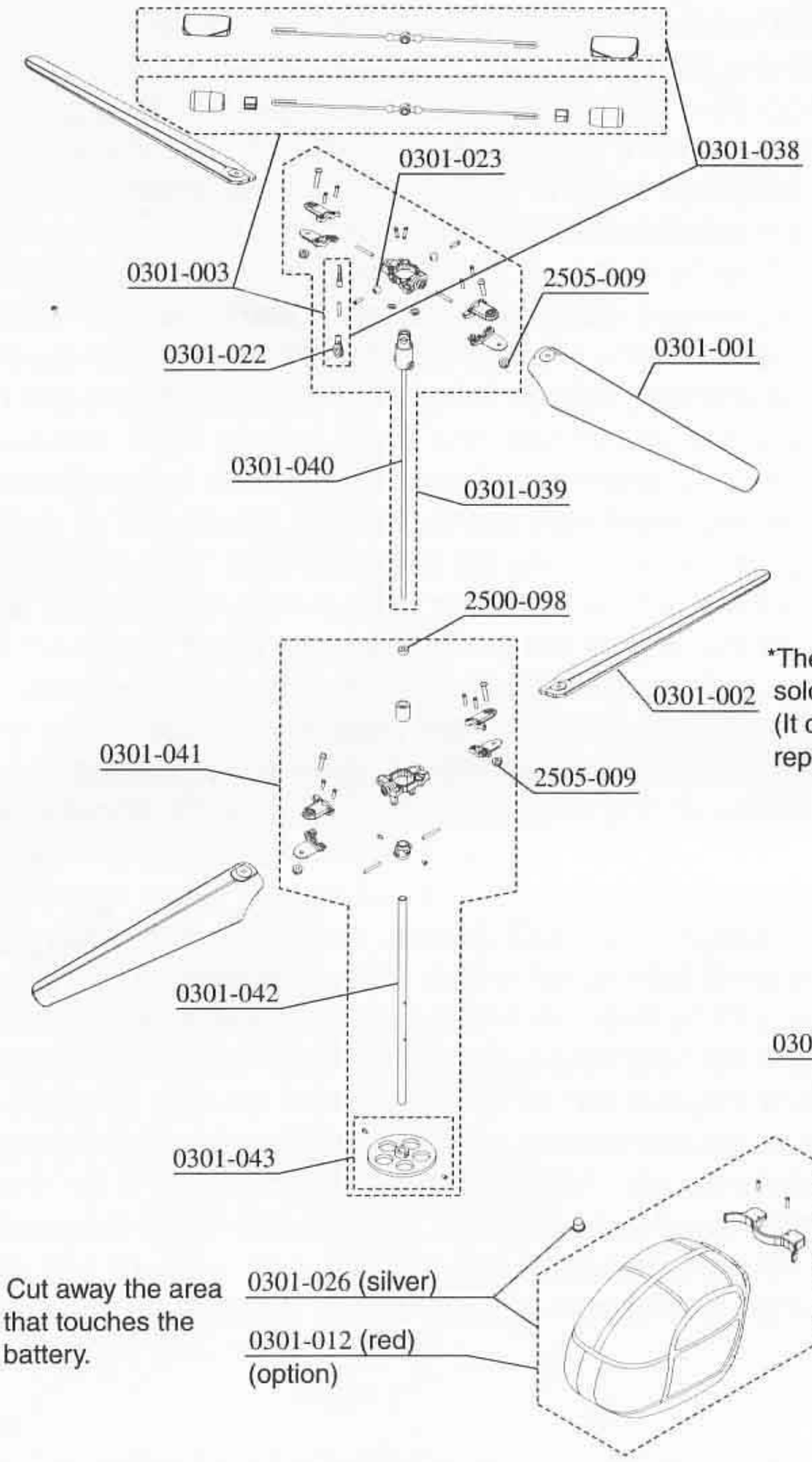
Fig.3
When rudder input is continued the machine tilts forward and increases speed, and when all components are tilted forward the machine is in the attitude shown in Fig.4.

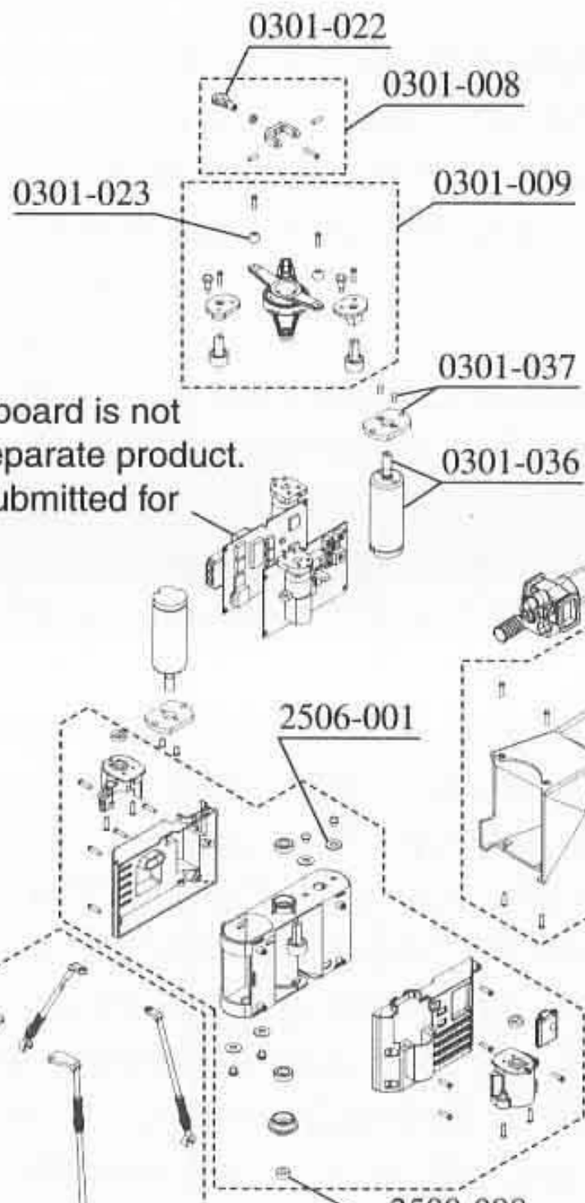
The attitude shown in Fig.3 is probably the limit for the cable-controlled machine, however when it is turned in flight it may progress to the attitude shown in Fig.4. In this attitude, control becomes more difficult and care is required until more flight experience is gained.

④

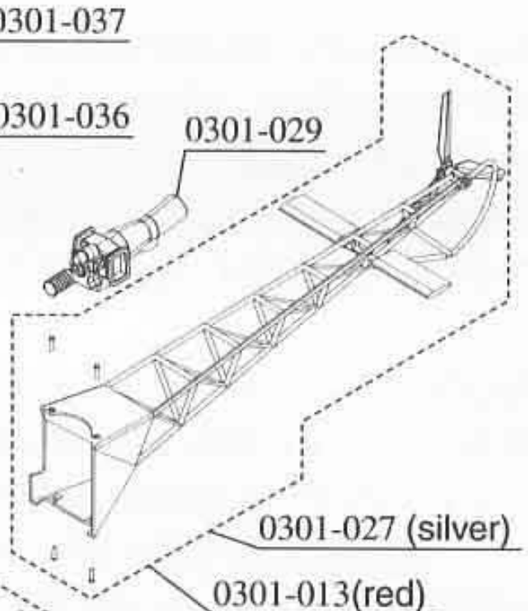
11. Parts List

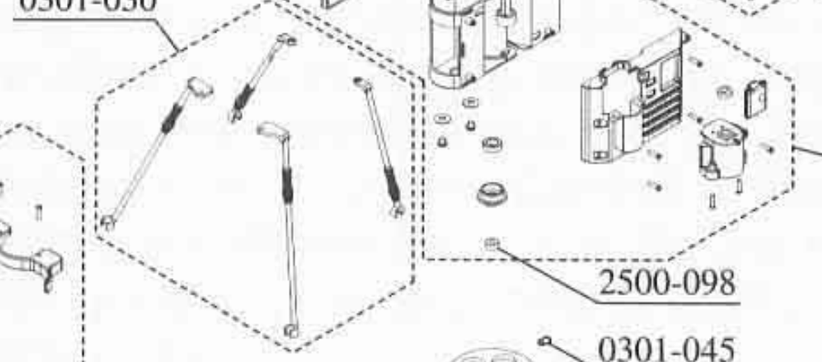
*The electrical components (motor, circuit board and frame) are not compatible with the cable-controlled product.

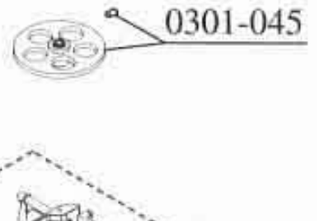




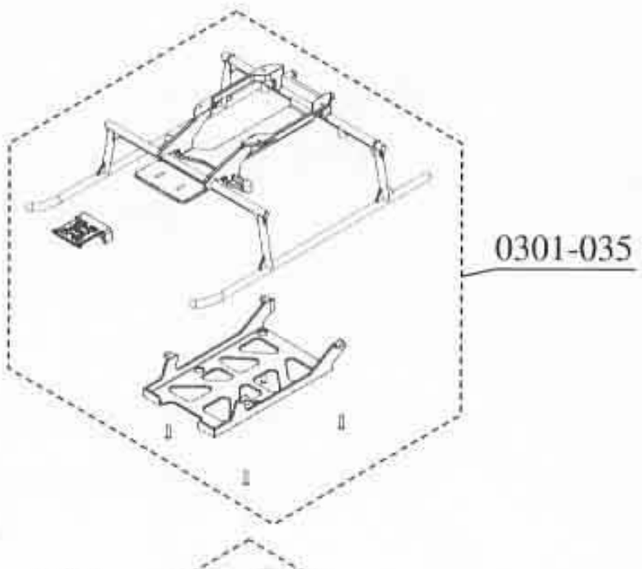
*The circuit board is not sold as a separate product. (It can be submitted for repair.)

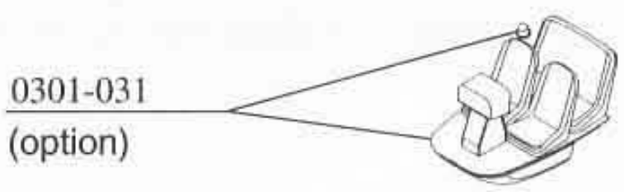


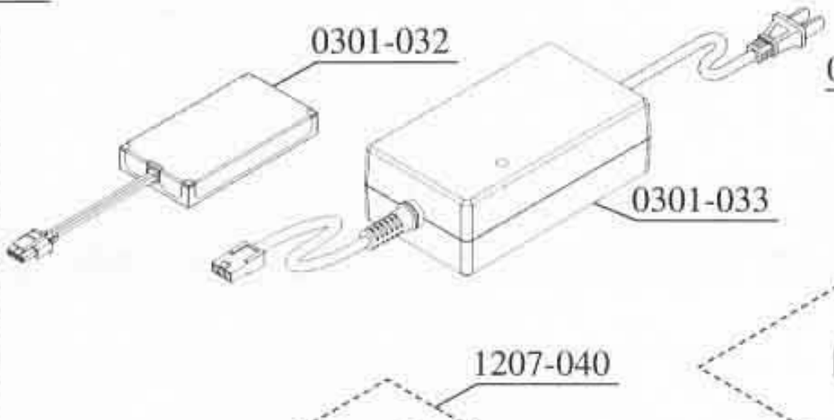


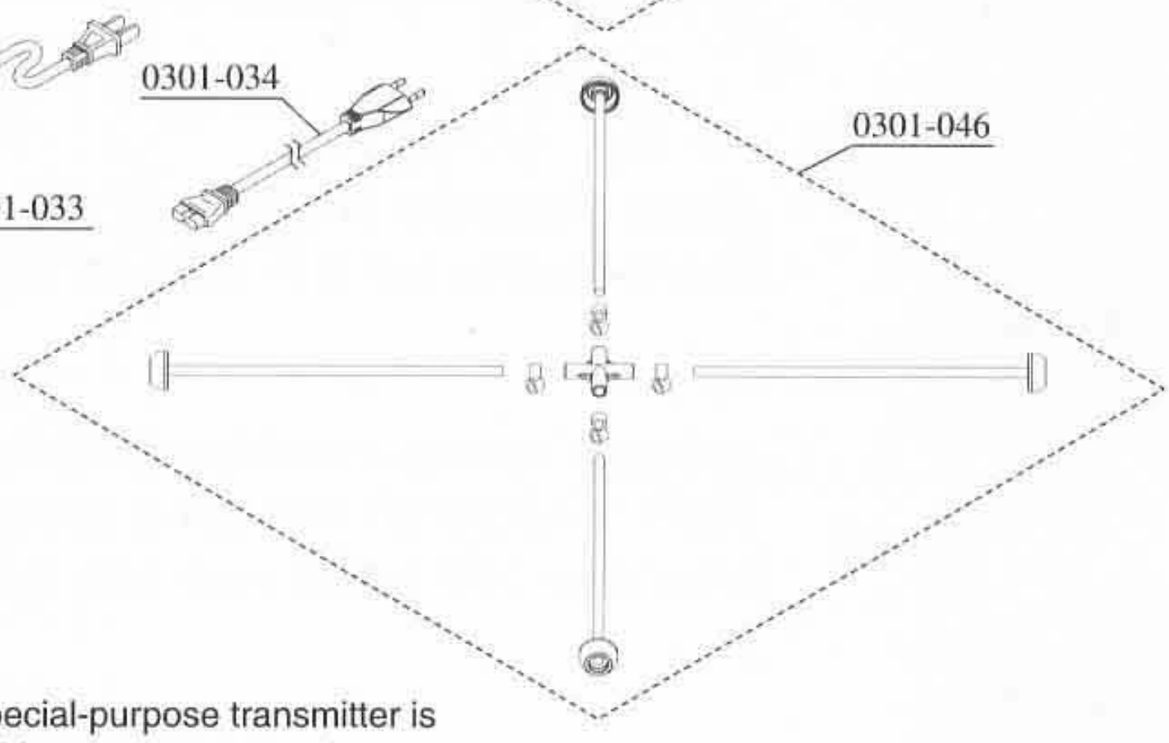


* Cut away the area that touches the battery.









* The special-purpose transmitter is not sold as a separate product.

*The prices in parentheses are the prices excluding consumption tax.

Cord No.	Part	Quantity	Price (Yen)	Remarks	Compatibility with cable-controlled product
0301-001	XRB upper main blade A	4 sets (8 pcs)	945 (900)		○
0301-002	XRB lower main blade B	4 sets (8 pcs)	945 (900)		○
0301-003	XRB stabilizer assembly	1 set	840 (800)	Assembled	○
0301-008	XRB control arm assembly	1 set	420 (400)	Comes with gear	○
0301-009	XRB swash plate assembly	1 set	1,260 (1,200)	Assembled, comes with BRG	○
0301-012	XRB lama cabin	1 set	1,260 (1,200)	Assembled and painted Cut away the area that touches the battery.	○
0301-013	XRB lama tail truss	1 set	945 (900)	Assembled and painted	○
0301-022	ø4 rod end	10	525 (500)		○
0301-023	EX ø4 ball	10	1,050 (1,000)		○
0301-026	XRB lama cabin (silver)	1 set	1,260 (1,200)	Assembled and painted Cut away the area that touches the battery.	○
0301-027	XRB lama tail truss (silver)	1 set	1,260 (1,200)		○
0301-029	XRB lama dummy engine	1 set	1,260 (1,200)		○
0301-030	XRB lama skid brace	1 set	840 (800)		○
0301-031	XRB lama cockpit	1 set	1,575 (1,500)		○
0301-032	Lipo battery 7.4V 720mAh	1	6,615 (6,300)		×
0301-033	Lipo battery charger 7.4V	1	7,875 (7,500)	With power code type A	×
0301-034	Power cord type C	1	630 (600)		×
0301-035	XRB-SR lama skid gray (with battery holder)	1 set	1,050 (1,000)		×
0301-036	XRB-SR coreless motor	1	4,515 (4,300)	Contains 7-tooth metal pinion gear press fit. Two items used in unit. Cannot be used for the cable-controlled product.	×
0301-037	Coreless motor mount	1	630 (600)		×
0301-038	XRB stabilizer assembly light weight type	1 set	840 (800)	Assembled	○
0301-039	XRB-SR upper rotor head assembly L=160	1 set	1,260 (1,200)	Assembled	Require 0301-041
0301-040	XRB-SR ø2 main mast L=160	1	525 (500)	Assembled	Require 0301-041
0301-041	XRB-SR lower rotor head assembly L=125	1 set	3,150 (3,000)	Assembled	Require 0301-039
0301-042	XRB-SR ø4 main mast L=125	1	1,050 (1,000)		Requires 0301-039 and 0301-041
0301-043	XRB-SR main gear (for ø4 main mast)	1	2,100 (2,000)	Cutting process	Requires 0301-039 and 0301-041
0301-044	XRB-SR main frame set (silver)	1 set	2,520 (2,400)		×
0301-045	XRB-SR main gear	1	2,100 (2,000)	Cutting process	○
0301-046	XRB-SR safety skid	1 set	840 (800)		○
0301-047	XRB-SR Users manual	1	2,100 (2,000)		×
0301-048	XRB-SR screws set	1 set	840 (800)	For one unit (screw, washer, rod, nut and pin)	×
0301-049	XRB blade balancer	1 set	525 (500)		○
0301-054	XRB-SR crystal [72MHz/36]	1	1,680 (1,600)		×
0301-055	XRB-SR crystal [72MHz/38]	1	1,680 (1,600)		×
0301-056	XRB-SR crystal [72MHz/40]	1	1,680 (1,600)		×
0301-057	XRB-SR crystal [72MHz/42]	1	1,680 (1,600)		×
0301-058	XRB-SR crystal [40MHz/50]	1	1,680 (1,600)		×
0301-059	XRB-SR crystal [40MHz/53]	1	1,680 (1,600)		×
0301-060	XRB-SR crystal [40MHz/54]	1	1,680 (1,600)		×
0301-061	XRB-SR crystal [40MHz/56]	1	1,680 (1,600)		×
0301-062	XRB-SR crystal [35MHz/64]	1	1,680 (1,600)		×
0301-063	XRB-SR crystal [35MHz/68]	1	1,680 (1,600)		×
0301-064	XRB-SR crystal [35MHz/72]	1	1,680 (1,600)		×
0301-065	XRB-SR crystal [35MHz/74]	1	1,680 (1,600)		×
1207-040	DRICON tool set	1 set	420 (400)		○
2500-098	BRG. ø2Xø5X2.3ZZ	2	1,260 (1,200)		○
2505-009	M2 nylon nut	10	840 (800)		○
2506-001	Flat washer 2X6X0.4T	20	105 (100)		○

* For optimum safety, the Main blades are made of styrofoam and should be considered replaceable parts. The main blade cannot be repaired.

12. Main Specifications

Body

Fuselage length:	360mm (lama) 62mm (frame)
Fuselage width:	90mm
Overall height:	160mm
Main rotor dia:	350mm
Overall weight:	195g (lama)
Gear ratio:	9.857:1
Motor:	XRB coreless

Lithium-polymer battery

Voltage:	7.4V
Capacity:	720mAh

Battery Charger

Input:	AC100~240V 50~60Hz
Output:	8.4V 0.65A

Patent applied for
Coaxial contra-rotating radio control helicopter: Patent 2004-121798