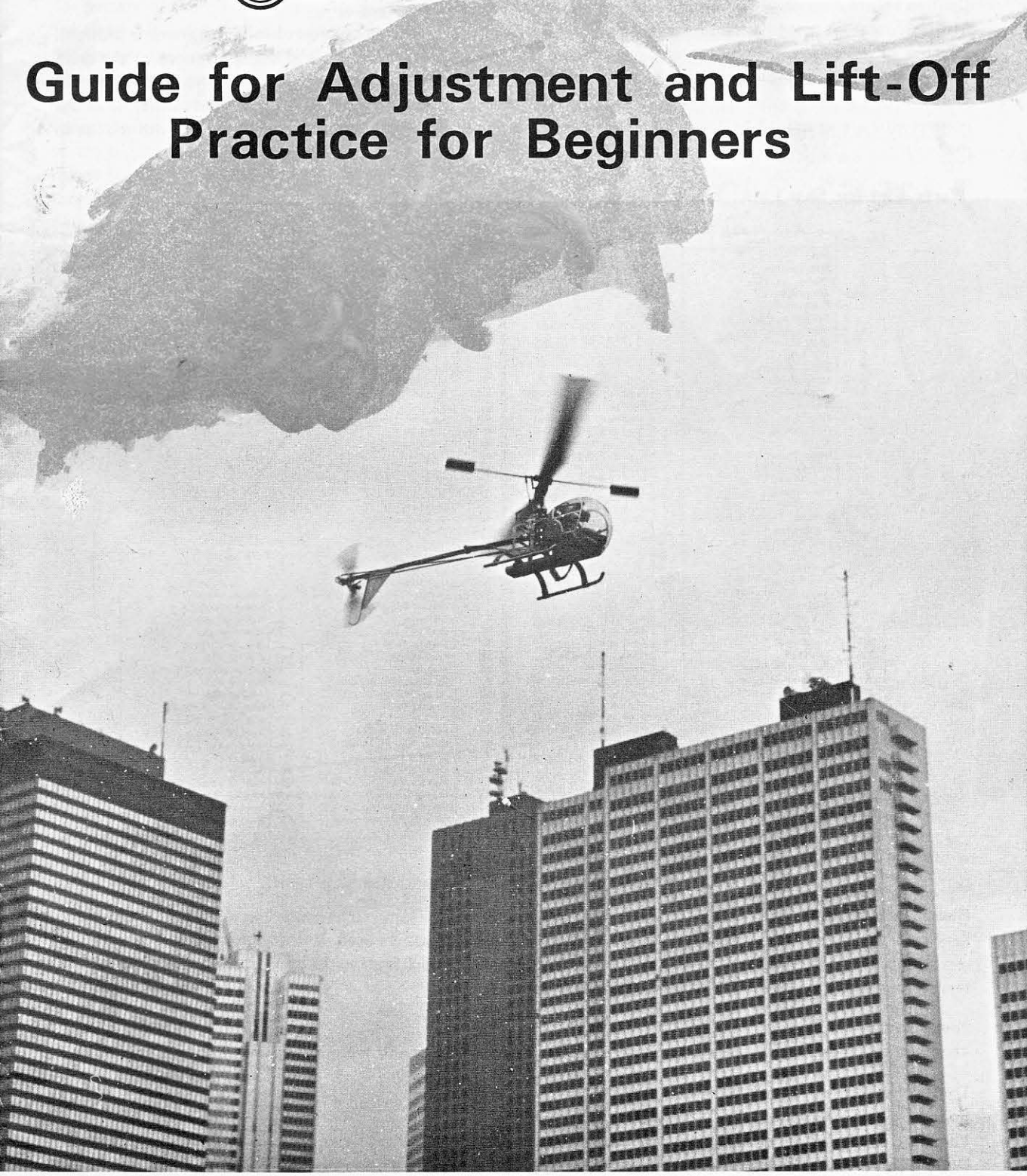
Sky Lark EH-1

ELECTRIC POWER RADIO CONTROL HELICOPTER

Guide for Adjustment and Lift-Off Practice for Beginners



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ISHIMASA CO.,LTD.

Thank you for purchasing the Sky Lark, EH-1, the first electric model helicopter in the world. It flies without noise enabling you to fly it almost anytime and anywhere, presenting you with enjoyment different from gas engine powered model helicopters. It has established another field in radio controlled models. In order to keep your Sky Lark in tip top condition and acquire most pleasure from flying it, you should thoroughly read through this instruction manual.

Caution before Assembly

The helicopter kit is semi assembled in the factory to save your time and assure you of earlier enjoyment of flight. Because of electric motors, the drive power available is just sufficient to fly it and the adjustment of the drive unit is mandatory to avoid any loss of power. As described in the manual, all nuts and bolts should be tightened firmly with a small amount of "thread lock" at each assembly step. Although the quantity and quality of all the components are examined before shipping from the factory, please check the contents of the kit with the list to make sure.

Parts List for Sky Lark, EH-1

Part No.	Item	Q'ty	Availability as Spare Parts
1	Mast	1	Avail as #1
2	Mast Stopper	1	Avail in Stopper Set #59
3	Frame	1	Available as Frame Assembly #3
4 - 1	Frame Post A	1	Available as Frame Assembly #3
- 2	Frame Post B	1	Available as Frame Assembly #3
- 3	Tail Boom Stay	1	Available as Frame Assembly #3
5 - 1	Mast B Holder	1	Available as Frame Assembly #3
- 2	Shaft B Holder	1	Available as Frame Assembly #3
6	Top Frame	1	Available as Frame Assembly #3
7	Mast Housing	1	Available as Frame Assembly #3
8	Motor Mount	1	Available as Frame Assembly #3
9	Shaft Stopper	1	Avail in Stopper Set #59
10	Shaft Pulley	1	Avail as #10
11	Shaft	1	Avail as #11
12	Primary Gear	1	Avail as #12
13 - 1	Motor	2	with Elec Wire #13-1
- 2	Motor Pinion Gear	2	Avail as #13-2
14	Secondary Gear	1	Avail as #14
15 - 1	Swash Plate	1	Avail as #15-1
15 - 2	Pivot Bolt A	2	Available as #15-2/3
15 - 3	Pivot Bolt B	3	Available as #15-2/3
16	Retainer Rod for Swash Plate	1	Avail in Rod Set #56
17 - 1	Upper Lock	1	Avail in Upper Lock Set #17
- 2	Rod for Upper Lock	1	Avail in Upper Lock Set #17
18 - 1	Skid	2	Available as Skid Set #18
- 2	Skid Beam	2	Available as Skid Set #18
- 3	Skid Support Tube	4	Available as Skid Set #18
- 4	Rubber Shock Absorber	4	Available as Skid Set #18
- 5	Skid Reinforcing Plate	2	Available as Skid Set #18
19	Battery Hook	4	Non-Available
20	Tail Boom	1	Avail as #20
21	Tail End	1	Avail as #21
22	Tail Shaft	1	Avail as #22 w/26-2
23	Tail Shaft Pulley	1	Avail as #10
24	Tail Shaft Stopper	1	Avail in Stopper Set #59
25	Tail Rotor Hub	1	Avail as #25
26 - 1	PC Rod	1	Avail as #26
- 2	PC Rod Journal	2	Avail in #22
- 3	PC Rod Stopper	2	Avail in Stopper Set #59
27	Tail Rotor Blade	2	Avail as #27
28	Tail Rotor Blade Holder	4	Avail as #28 w/bolt, nut
29	PC Plate	1	Avail as #29
30	Tail Boom Clamp	1	Non-Available
31 - 1	Tail Boom Support	2	Avail as Tail Boom Support Set #31
- 2	Support Clamp (same as #30)	1	Avail as Tail Boom Support Set #31
- 3	Clamp Plate	1	Avail as Tail Boom Support Set #31
32	Flexible Rod	1	Avail as #32

Part No.	Item	Q'ty	Availability as Spare Parts
33	Drive Belt	1	Avail as #33
34	Tail Fin	1	Avail as #34
35 - 1	Servo Mount	2	Non-Available
- 2	Servo Band	1	Non-Available
36	Bell Crank	3	Avail as #36
37 - 1	Controller	1	Controller Set #37 is available, also indiv. #37-2/3/4 available.
- 2	Controller Bar	1	Controller Set #37 is available, also indiv. #37-2/3/4 available.
- 3	Wiper Blade	1	Controller Set #37 is available, also indiv. #37-2/3/4 available.
- 4	Resistor	1	Controller Set #37 is available, also indiv. #37-2/3/4 available.
38	Main Rotor Blade	2	Avail as #38
39	Main Rotor Blade Holder	4	Avail as Main Blade Holder Set #39 w/bolt, nut
40	Blade Holder Spacer	2	Avail as Main Blade Holder Set #39 w/bolt, nut
41	Stabilizer Blade	2	Avail as #41
42	Stabilizer Bar	1	Avail as #42
43	Stabilizer Stopper	2	Avail in Stopper Set #59
44	Rod for Stabilizer	1	Avail in Rod Set #56
45	Control Lever	1	Avail as #45
46	Gimbal Head	1	Available as Gimbal Head Assembly #46
47	Stabilizer Journal	2	Available as Gimbal Head Assembly #46
48	Gimbal Shaft	1	Available as Gimbal Head Assembly #46
49 - 1	Center Shaft Pipe	1	Available as Gimbal Head Assembly #46
- 2	Center Shaft	1	Available as Gimbal Head Assembly #46
- 3	Center Shaft E Ring	2	Available as Gimbal Head Assembly #46
50	Gimbal Yoke	1	Avail as #50
51 - 1	Canopy A	1	Avail as Canopy Set #51
- 2	Canopy B	1	Avail as Canopy Set #51
52 - 1	Ball Joint (Plastic Part)	9	Non-Available
- 2	Ball for Ball Joint	2	Non-Available
- 3	Ball Joint Rod	2	Non-Available
53	Rod Adjuster	2	Non-Available
54	Battery Band	2	Non-Available
55	Pitch Gauge	1	Avail as #55
56	Rod Set	1	Composed of #16, #44
57	Connector (to Battery)	1	Avail as #57
58	Connector (to Motor)	1	Avail as #58
59	Stopper Set	1	Composed of #2, #9, #24, #26-3, #43
60	Bolt 2.6 x 8	20	Avail as #60
61	Nylon Nut 2.6	20	Avail as #61
62	Bolt 2.6 x 12	20	Avail as #62
63	Bolt 2.6 x 20	20	Avail as #63
64	Bolt 2 x 10	20	Avail as #64
65	Bolt & Nut 2 x 5	20/20	Avail as #65
66	Bolt & Nylon Nut 3 x 1.5	20/20	Avail as #66
67	Pivot Bolt 30 mm Long	2	Avail as #67

Additional Items Required for Flying the Sky Lark

Radio Control Unit

Any proportional radio control unit with 4 channels and 4 servos can be used. It is recommended to mount mini servos and mini batteries since light weight is very important. For flights using the power cord and a 12 V car battery, servos and a battery of ordinary size can easily be used.

Power Source

There are two methods as explained on the next page. Please select one of them or both.

Tools Required

Following is the minimum of necessary tools;

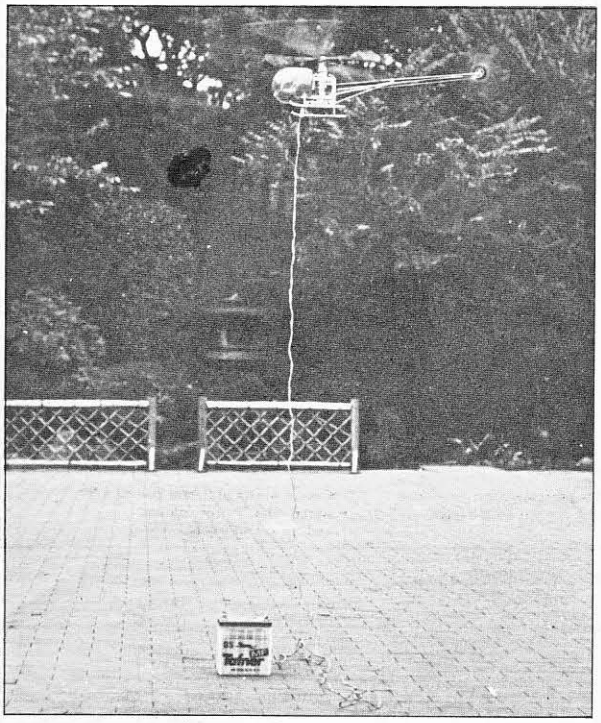
Large and small Phillip Screwdrivers, Side Cutting Pliers, Socket Wrench of 5.0 mm and 5.5 mm, Awl, Vinyl Tape, Double Sided Tape. Other tools may be found to be convenient to assist assembly.

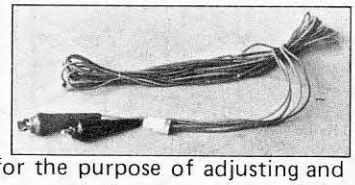
Power Source for Flight

There are two possible ways:

1. Practice Flight with Power Cord

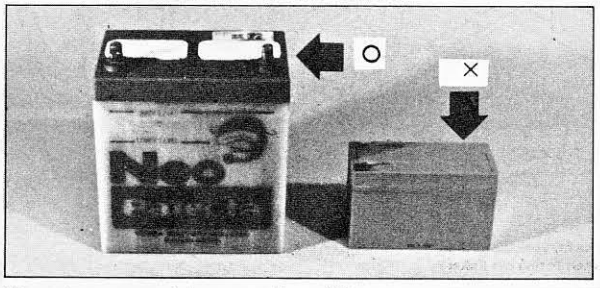
This method of flight uses the power cord and a 12 V car battery of more than 40 amp/hours. It is suitable for flight adjustment and hovering practice. Batteries for starting model engines (5 – 6 A) are not powerful enough for this purpose. The power cord is manufactured specially and cannot be substituted by other types of wire. The length of the cord is 7 meters long, so the flight range is within a semisphere of 7 meters radius with the battery as the center of the range. With a fully charged 40 A/hr battery, you can fly the Sky Lark for about one hour.





Power Cord

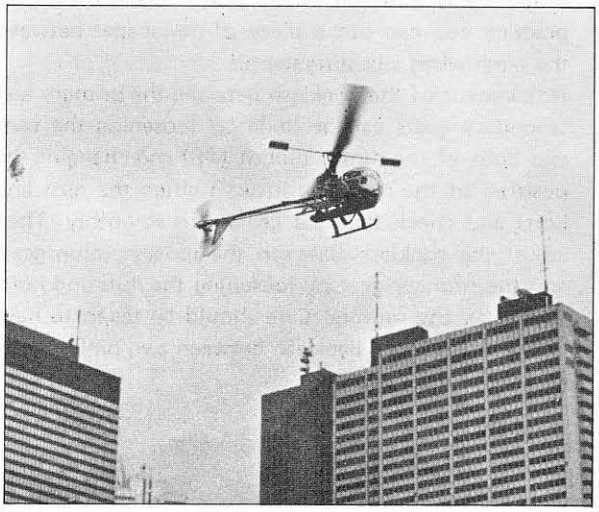
This is a cord made for the purpose of adjusting and practice flight of the Sky Lark. The lead is insulated with silicon rubber and fitted with alligator clips at one end and connector at the other.

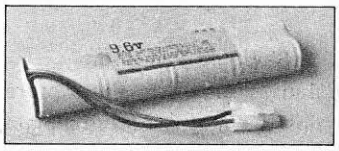


Use a battery with more than 40 amperes.

2. Free Flight with Flight Pack

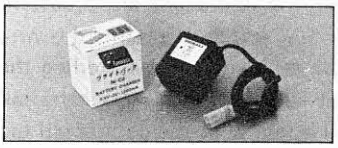
The flight pack (Ni-Cad batteries 8N x 1200) is mounted on the helicopter and will fly freely like a gas engine powered helicopter. The flight pack is composed of nickel cadmium batteries specially designed for low internal resistance. Since the gross total weight of the Sky Lark is increased with the flight pack fitted, servos and the battery for the R/C units should be lightweight types to make the whole weight less than 1.8 kilo grammes. With a fully charged flight pack, it flies for about two minutes. There are two kinds of battery chargers available, an ordinary type for an electric outlet of alternating current and a quick charger for DC 12 V source.





Power Pack

9.6 V Ni-Cad battery pack designed for the Sky Lark.

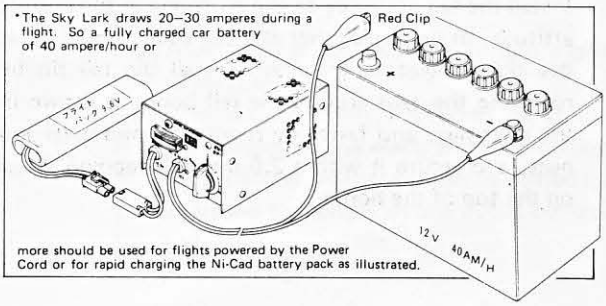


AC Charger

This charges the power pack from a 100 V household outlet in about 14 hours.

Quick Charger

Incorporating a transformer circuit, it charges in about 15 minutes from a DC 12 V source.

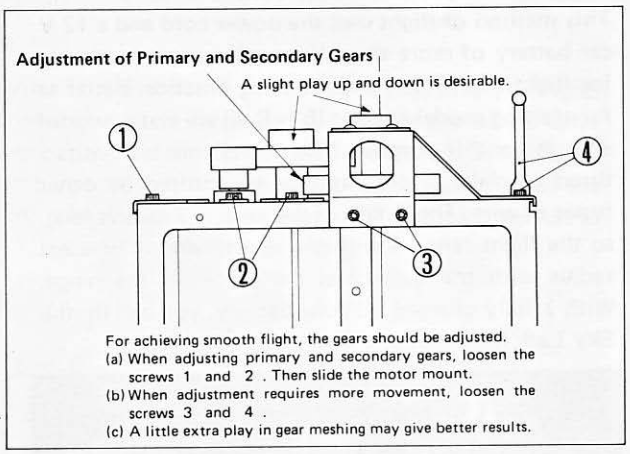


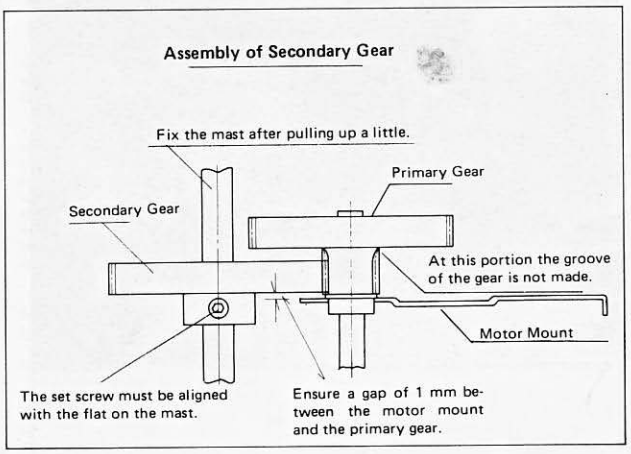
ASSEMBLY

1. Setting of Mast and Gears

The mast is housed in the frame. Pull up the mast a little and fix it temporarily by lowering upper lock (Part #17). The stoppers are set at the bottom of the mast and the secondary gear shaft. Note that the stepped side of the stoppers is to face against the inner race of the bearings. There should be some play between the stoppers and the bearings, so that the shaft can be moved up and down slightly. Take care that no oil is ever sprayed onto the belt and pulleys. The gears should be set with a backlash of 0.1–0.2 mm between the gear teeth so that the maximum efficiency is achieved in the power transmission. In practice you can put a piece of newspaper between the teeth when adjusting them.

Adjustment of the backlash between the primary and secondary gears can be done by loosening the nuts and bolts of the motor mount (#8) and changing the position of the motors a little. Tighten the nuts and bolts and check that the gears turn smoothly. Then adjust the backlash between the motor pinion gears and the primary gear by loosening the nuts and bolts which fix the motors. Care should be taken to have the same degree of backlash between two pinion gears and the primary gear.

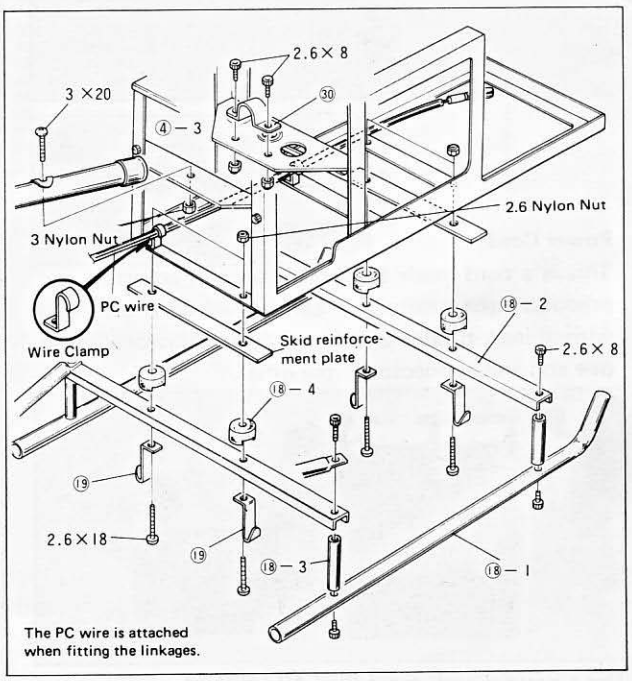


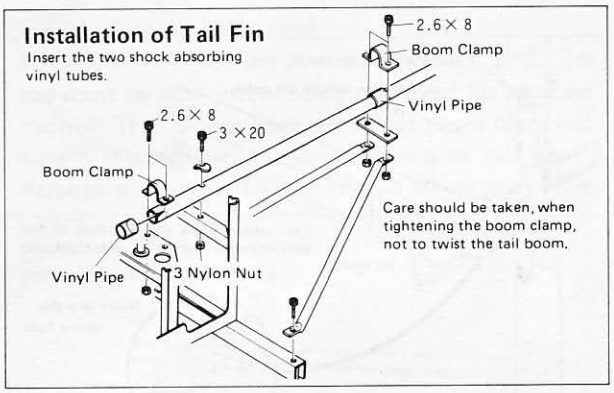


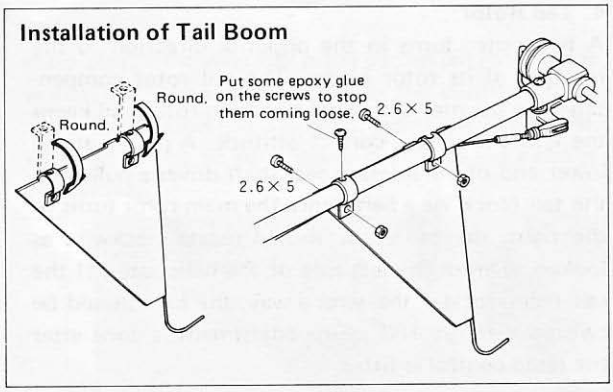
2. Installation of Landing Skid and Tail Boom

Assemble the landing skid as shown in the picture. Each 2.6 x 18 bolt retains the skid reinforcing plate, a rubber shock absorber, the skid beam, and a battery hook. In addition the rear left bolt retains the wire clamp. The rear outside nuts and bolts fastening the skid beam and support tube will also secure the tail boom support. The tail boom with the completed tail mechanism should be assembled as illustrated on the next page with boom clamp (#30) and 3 x 15 bolt and nut. The connection of tail boom and tail support should be made with the tail clamp and the clamp plate.

Install the tail assembly to the air frame in the correct attitude, in particular that the tail shaft should be at the right angles to the mast. Install the tail fin by rounding the tabs around the tail boom as shown in the next page and fastening it with 2.6 mm bolts and nuts, and secure it with a 2.6 mm self-tapping screw on the top of the boom.

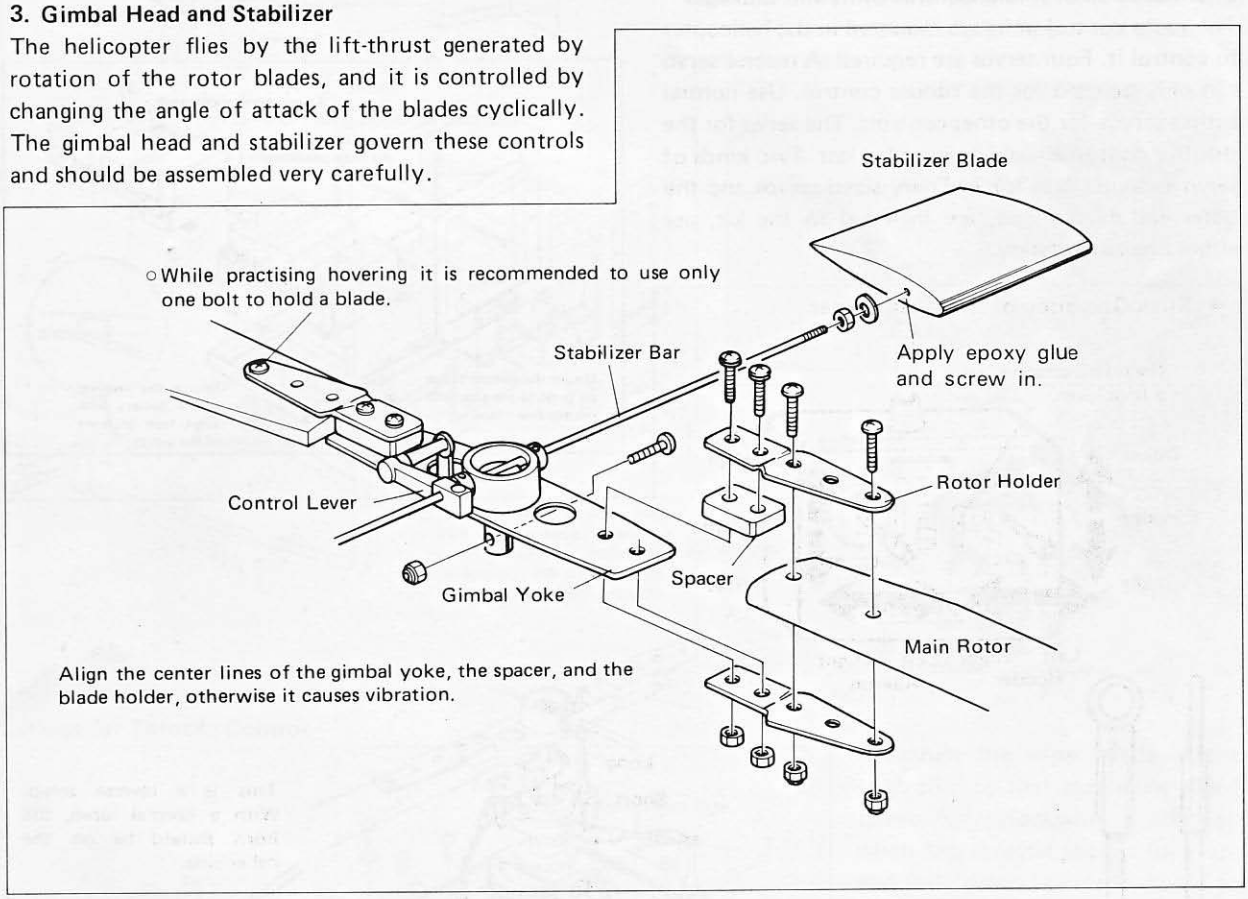




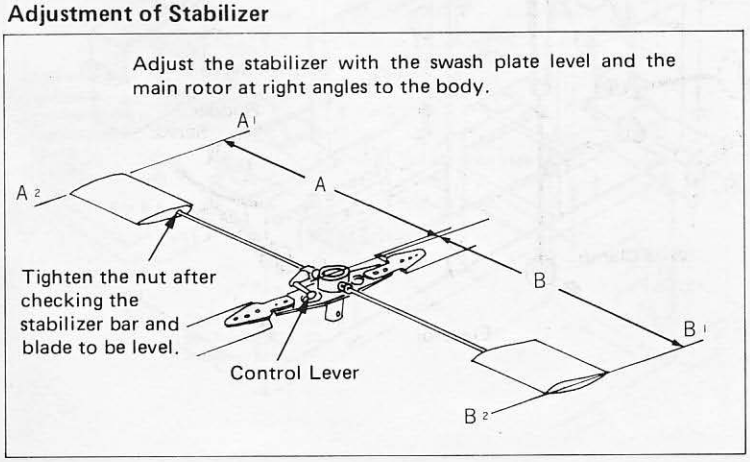


3. Gimbal Head and Stabilizer

The helicopter flies by the lift-thrust generated by rotation of the rotor blades, and it is controlled by changing the angle of attack of the blades cyclically. The gimbal head and stabilizer govern these controls and should be assembled very carefully.



Adjustment of Stabilizer



(a) A = B. They should be the same length. Adjust the length by loosening the stoppers and moving the stabilizer bar.

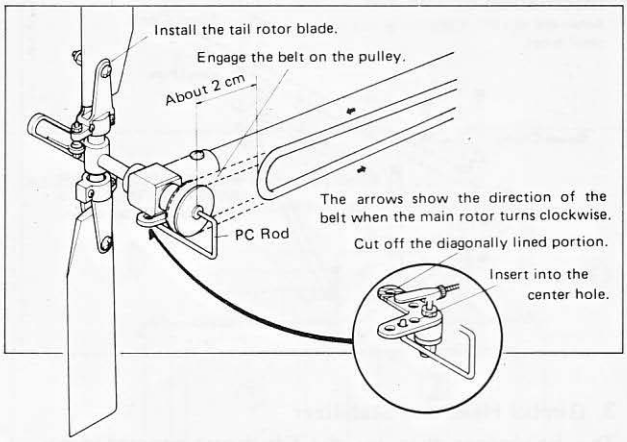
(b) A = B should be the same in weight. When different, wrap the lighter one with vinyl tape.

(c) $A^1 A^2 = B^1 B^2$ parallel and at right angles to meet the mast.

(d) Also set the control lever to be at the right angles to the mast, and then tighten the set screw. Alignment can be gained by adjusting the length of the cyclic control rod.

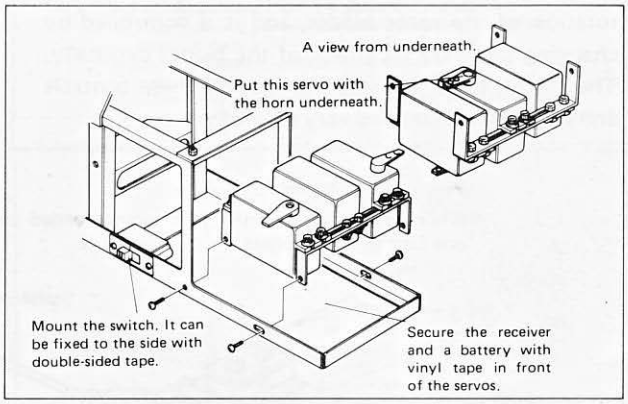
4. Tail Rotor

A helicopter turns in the opposite direction to the rotation of its rotor blades. The tail rotor compensates the counter torque of the main rotor and keeps the chopper in the correct attitude. A pulley at the lower end of the primary gear shaft drives a pulley on the tail block via a belt. Since the main rotor turns to the right, the tail rotor should rotate clockwise as looked at from the left side of the helicopter. If the tail rotor rotates the wrong way, the belt should be twisted through 180°. Fine adjustment is done after the radio control is fitted.

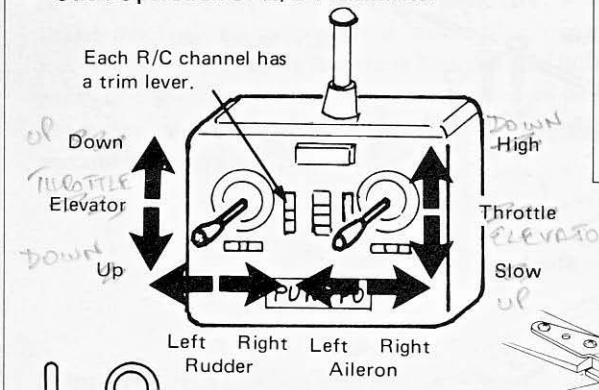


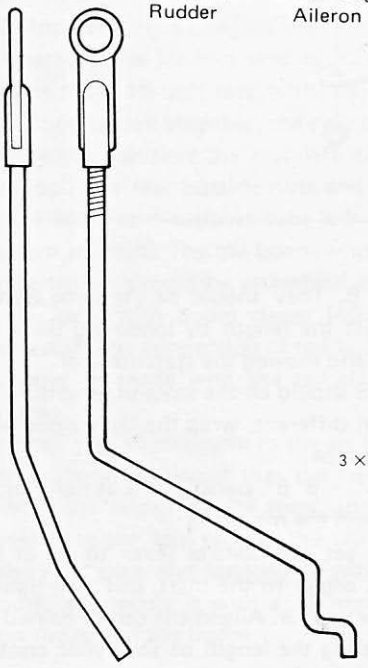
5. Installation of Radio Control Units and Linkages

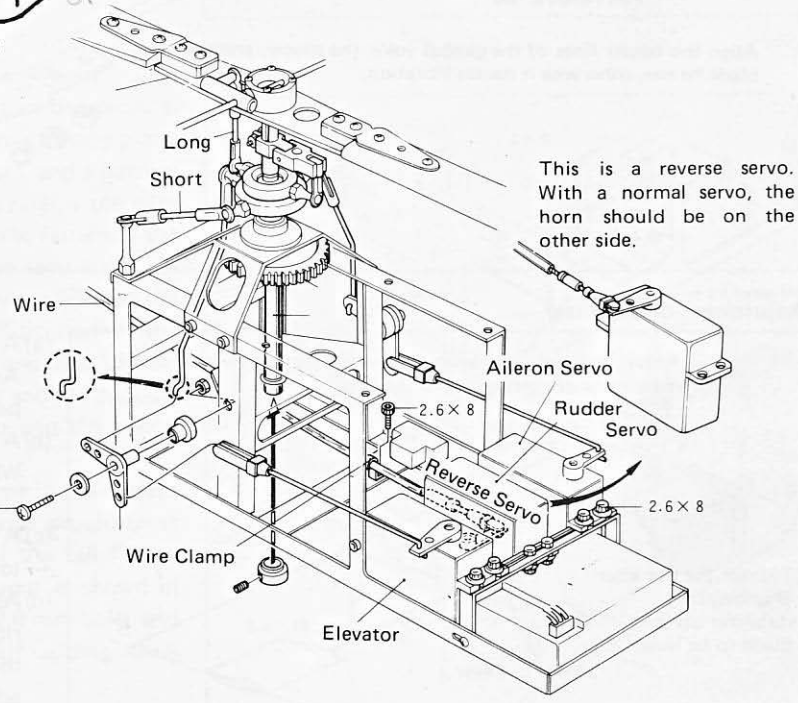
The radio control units are mounted in the helicopter to control it. Four servos are required. A reverse servo can only be used for the rudder control. Use normal action servos for the other controls. The servo for the throttle control should be installed last. Two kinds of servo mounts, one for ordinary sized servos and the other for mini servos, are included in the kit, use either one as necessary.



• Stick Operation of R/C Transmitter

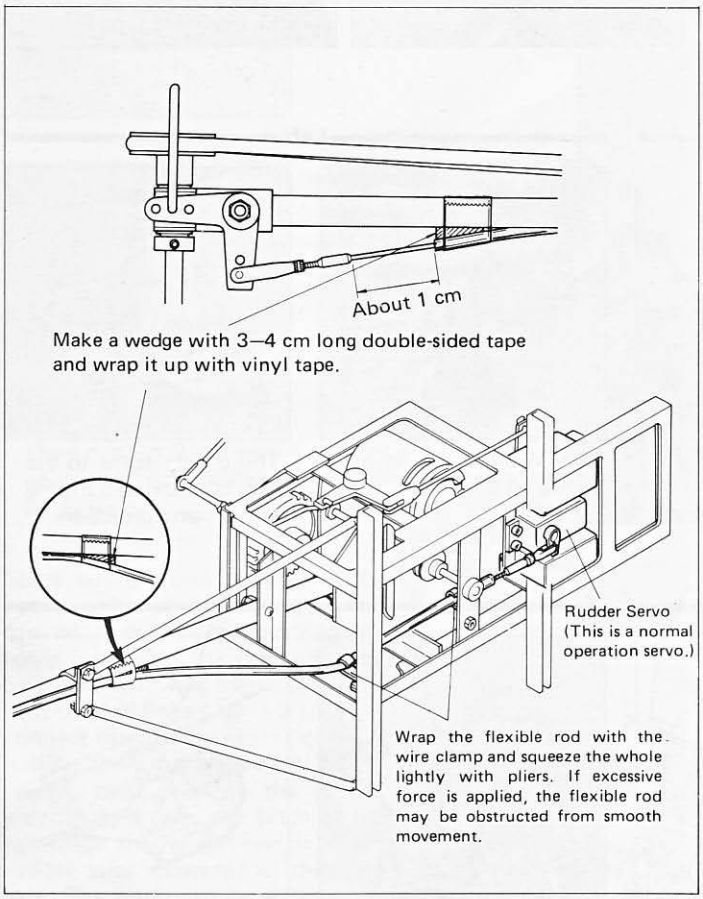


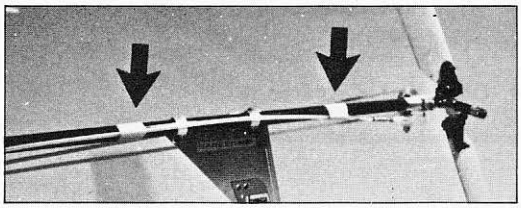




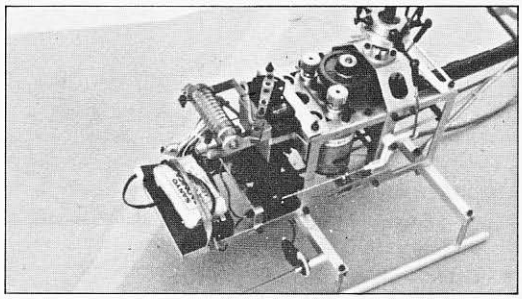
Linkage for Rudder Control

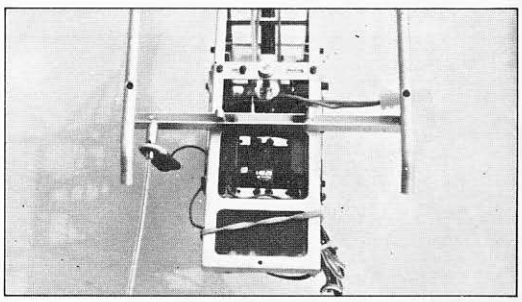
The rudder is controlled through the flexible rod. The rod must be firmly connected and fixed for accurate control. This is very important even adept fliers will have difficulty if care is not taken with this work. Arrange the rudder linkage in such a way that there is no play, otherwise the pitch of the tail rotor blade would not respond correctly to the control of the servo. The flexible rod is to be set as straight as possible. Where it has to be bent, make it with as big a radius as possible.



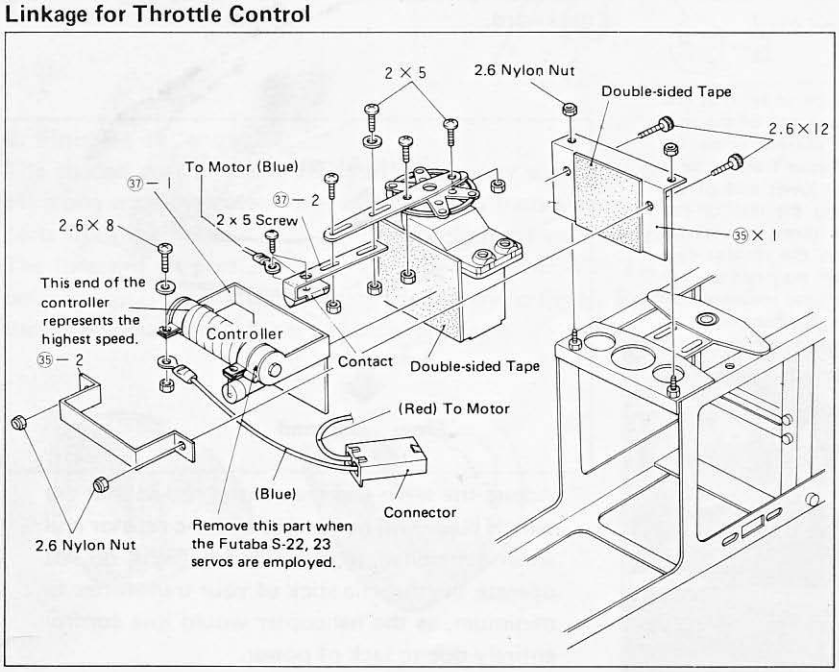


Secure the flexible rod at several points with vinyl tape to avoid slack. Both ends should be firmly fixed.





Linkage for Throttle Control

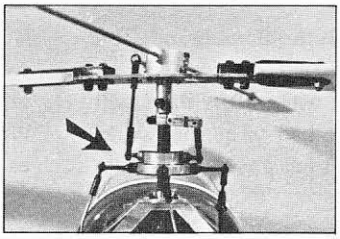


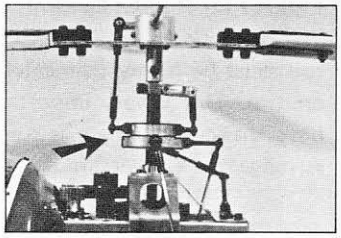
Construct the wiper blade of the controller so that maximum speed (servo fully clockwise) is achieved when the throttle stick is fully up; and fully down the blade should go over beyond the resister coil of the controller. Care should be taken when assembling the controller to accomplish smooth movement yet definite contact.

• Checking of Linkages

Correct and accurate linkages (connection between servos and various controls) are the most important matter. When examining them, keep all trim levers in the neutral position (in the center). With the aileron and elevator control sticks at neutral, the swash plate should be level. If not, adjust it so by varifying the length of the control rods.

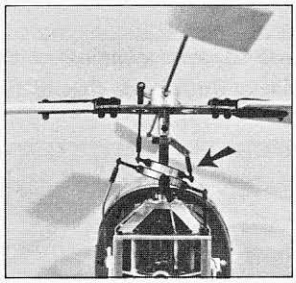
Swash Plate Portion



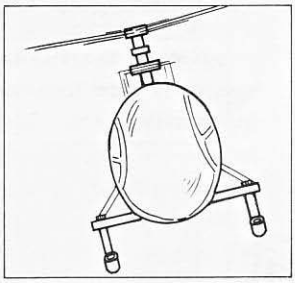


• Operation of Aileron Control

Right

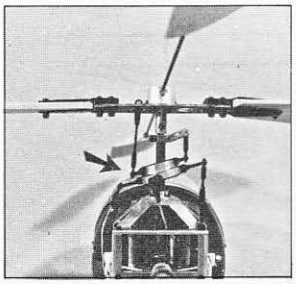


The swash plate is tilted to the right.

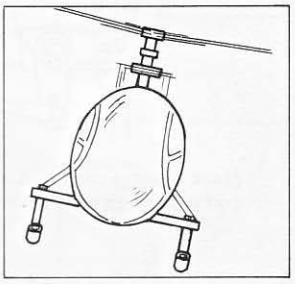


The copter turns to the right, banking and sliding in the same direction.

Left



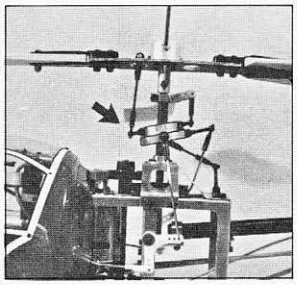
The swash plate is inclined to the left.



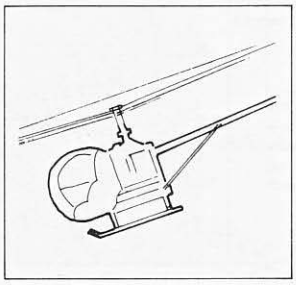
The copter turns to the left, banking and sliding in the same direction.

• Operation of Elevator Control

Down

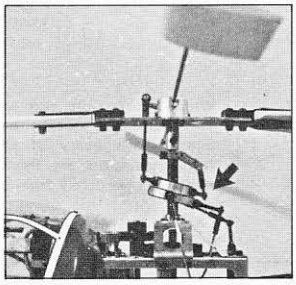


The swash plate is tilted forward.

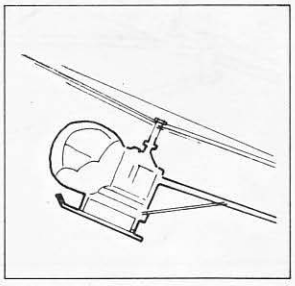


The body advances inclining forward.

Up



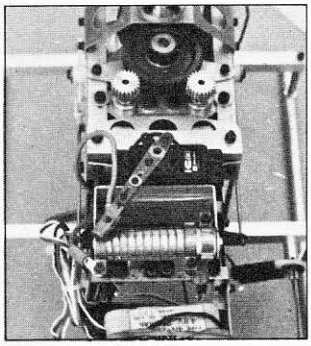
The swash plate is tilted backward.

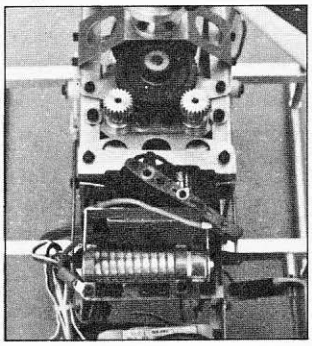


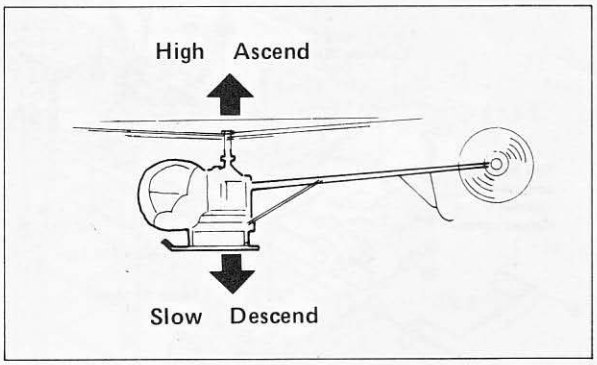
The body goes rearward leaning backward.

• Operation of Throttle Control

The working sweep of the servo should be so set that one end of the sweep stops the wiper on one end of the controller resistor to draw the maximum current when the engine control stick (throttle stick) of your transmitter is operated to the high speed end; at the lower end of the control the wiper blade must be beyond the resistor coil to cut off the current. Care should be taken so that the wiper blade keeps in good contact with the resistor coil. In case of poor contact, sufficient power may not be realized; in case of excessively hard contact, the movement of the servo will be affected resulting in sluggish control.

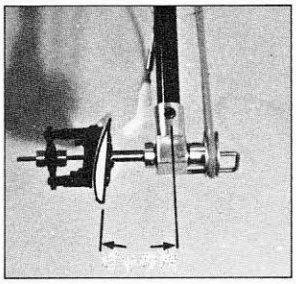




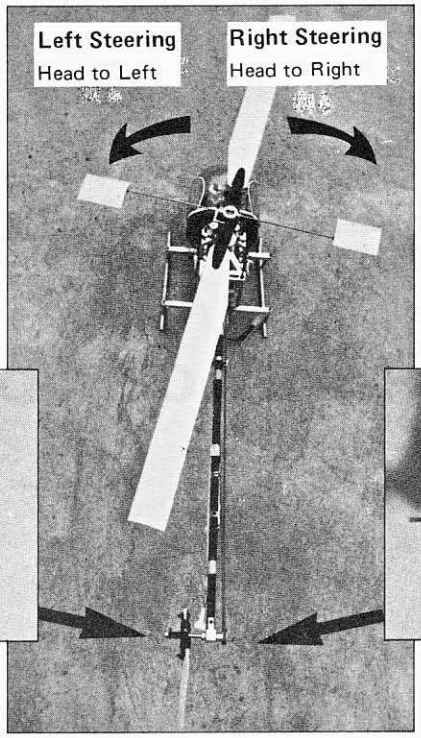


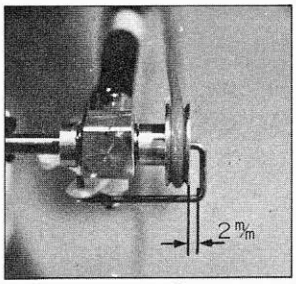
Adjust the servo and the control rod so that the switch blade will not go beyond the resistor end when controlled to high. During flight, do not operate the throttle stick of your transmitter to minimum, as the helicopter would lose control entirely due to lack of power.

- **Operation of Rudder Control**



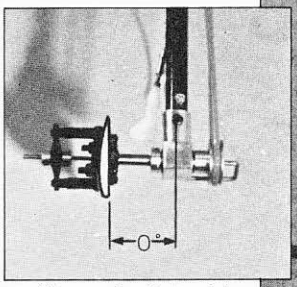
The angle of attack of the tail rotor blade will be varied in accordance with the rudder control.





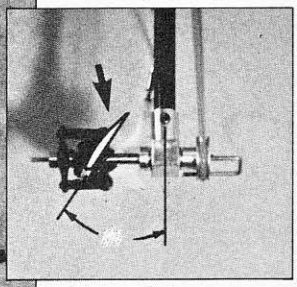
There must be 2 mm gap when the PC rod is pushed all the way.

Turning to Left



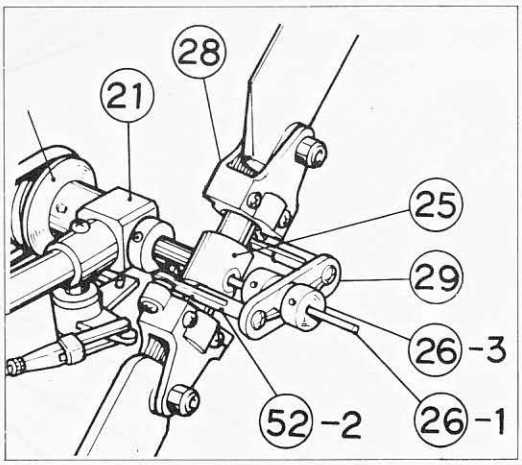
The angle of attack is being reduced. The minimum degree must be close to 0°.

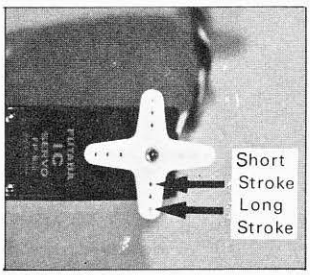
Turning to Right



The angle is being increased. Maximum movement is 40°, if the movement is too great, relocate the control rod to an inner hole of the servo horn to gain the correct throw.

Some servos are so geared that the rudder will operate in reverse, this can be corrected by resetting the servo horn into the opposite side, or by the following method; disconnect the ball links (㊷ - 2) and reconnect them to the other side blade holder, then the blades will be reversed, twist them to the correct way. In any case, the pitch of the tail blade should increase with the rudder stick operated to the right side. The pitch can be adjusted by sliding the stoppers (㉖ - 3) which hold the PC plate ㉙ .

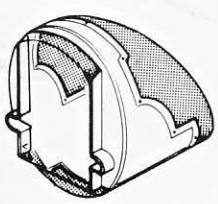


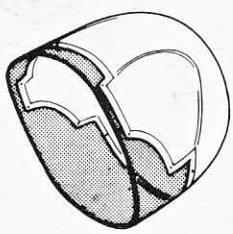


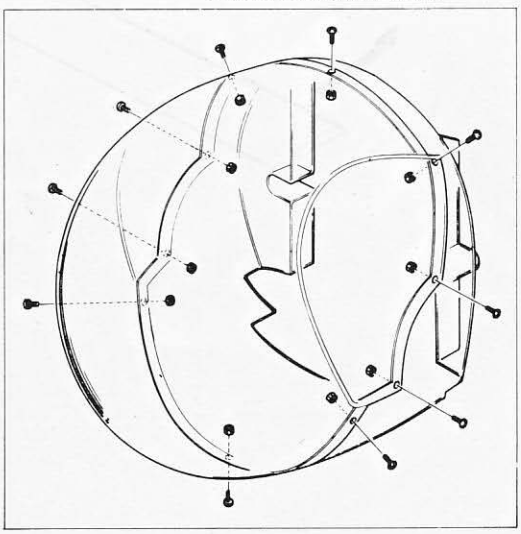
The stroke of a control rod is smaller when attached to an inner hole of a servo horn. It will be increased when connected to outer holes.

6. Finishing of Canopy

The shaded part in the drawing of the canopy should be cut off along with the cutout line. Paint window frames and other parts from the inside of the canopy in colours of your choice. The fore and aft portions are to be bolted together with 2 x 5 bolts and nuts. The installation of the canopy to the air frame should be done with 2.6 x 5 self-tapping screws.





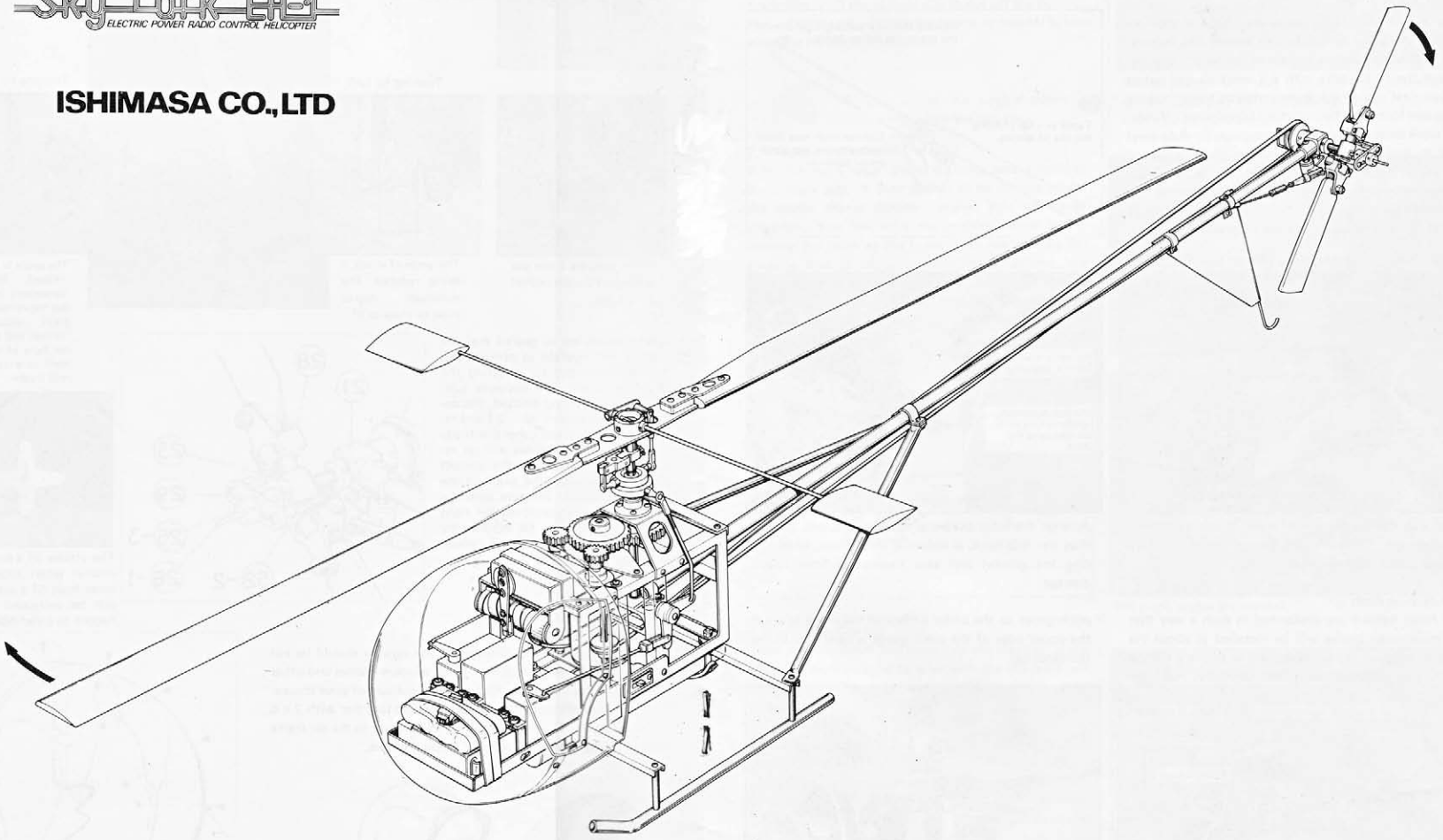


JEM

Sky Lark EH-1

ELECTRIC POWER RADIO CONTROL HELICOPTER

ISHIMASA CO., LTD



ADJUSTMENT

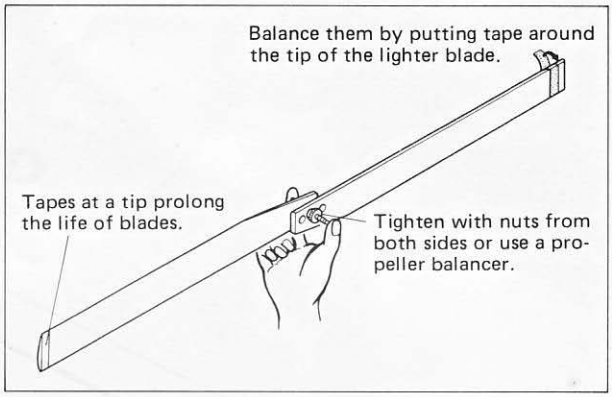
No radio controlled models are complete without adjustment after assembly. Above all the model helicopter requires more strict adjustment than any other model. Both accurate assembly and precise adjustment are mandatory to make a flight successful.

* Before adjustment check that all rotating parts are not binding.

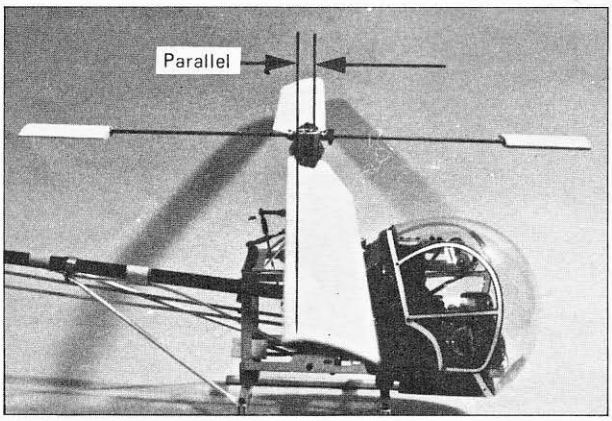
1. Adjustment of Main Rotor

- Balance in Weight

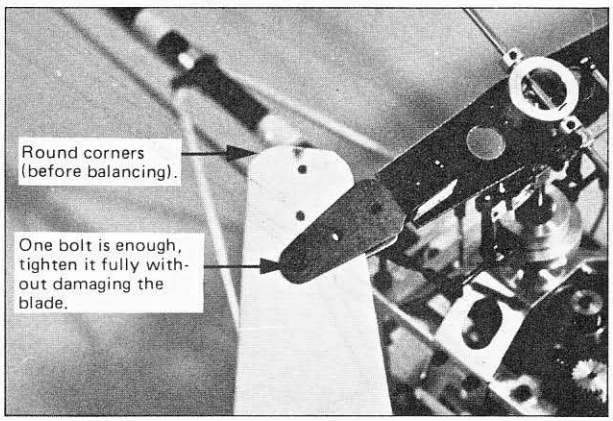
Your set of main rotor blades are paired at approximately the same weight before leaving the factory, still it is recommended to balance the weight exactly. Fasten the two blades with a 3 mm bolt and nut at an identical one of the three installing holes, making a see-saw form, and balance them (a propeller balancer will work better, which is sold separately). Add vinyl tape to the outer tip of the lighter blade, adjusting the weight by cutting the tape. Brightly coloured tape is recommended, since it will be prominent in the tracking adjustment which comes later. The tail rotor blades should be balanced in the same way.



- Alignment of Center Line of Rotor Blades



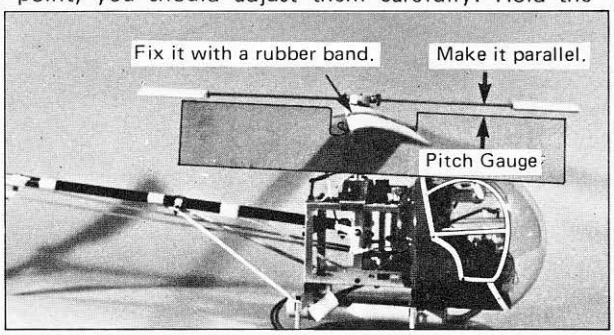
When you tighten the blade holder, they may get out of alignment. Correct them into a straight line by loosening and retightening the bolts.



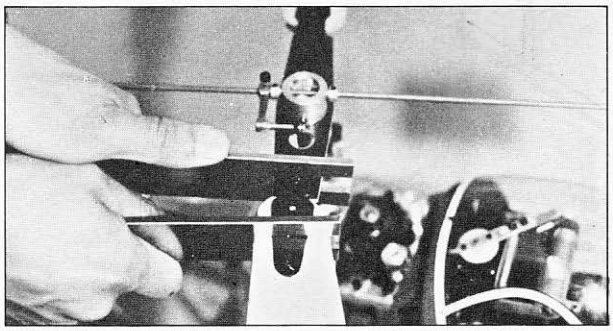
Arrange the rotor blades as instructed above, so that they can fold back, as shown in the picture, when hitting the ground and save themselves from heavy damage.

- Adjusting Pitch

The rotor holders are preformed in such a way that the main rotor blades will be installed at about the correct angle of attack. However, as this is a critical point, you should adjust them carefully. Hold the pitch gauge to the under surface of the blade to see if the upper edge of the pitch gauge is parallel with the stabilizer bar.



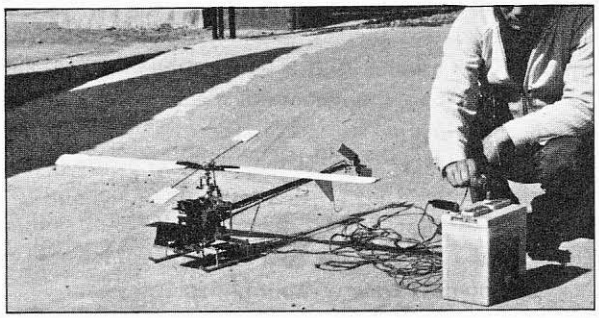
Correct the angle of attack so that the upper edge of the pitch gauge becomes parallel with the stabilizer bar.



Adjustment of the pitch can be done by twisting the rotor blade holder with a pitch wrench or a crescent wrench. (See page 17)

Adjustment hereinafter will be done with the main rotor blades rotating. Select a flat place with no obstacles around and with no wind blowing. Before connecting the power source, switch on your radio control units and put the engine control stick to the lowest position to see if the wiper blade of the speed controller is off the resistor coil to cut off the current. For safety's sake, unplug the power connector whenever you handle the helicopter.

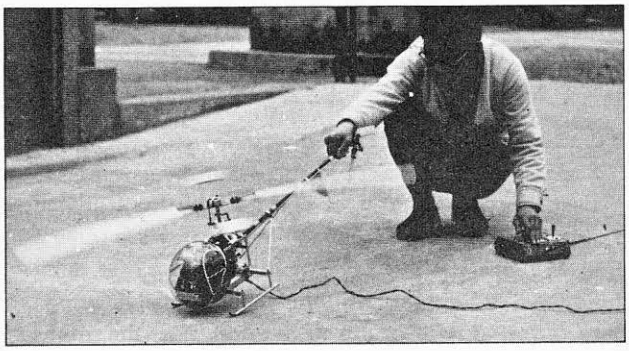
Connection to the electric power source should be the last step. ➡



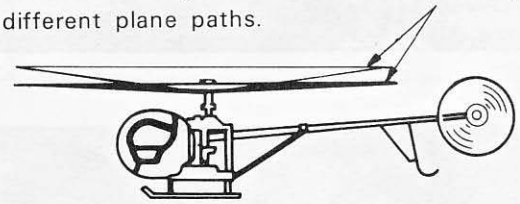
Switch on the R/C unit and check that the electric current is cut off by the speed controller. Then connect to the power battery.

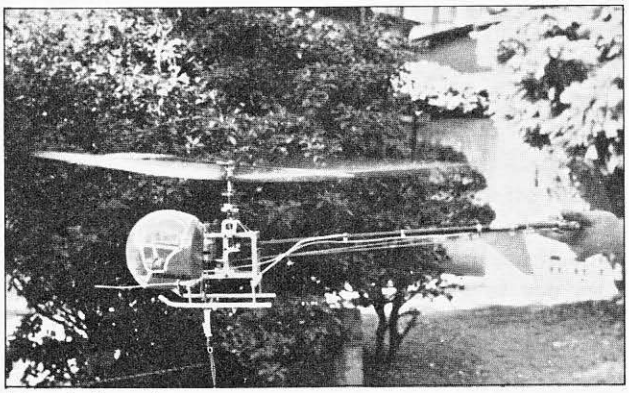
2. Tracking Adjustment

With the main rotor blades turning, take a look at them from side. If they appear to be on two levels, the blades are at different angles. This will cause vibration. You can solve the problem either by increasing the pitch of the lower rotor blade, or by decreasing that of the upper one. In either case, the pitch must not be far away from the angle designated by the pitch gauge. Tape or colour marking on the tip of the rotor blade would be a great help to distinguish one blade from the other.



The left and right rotor blades are making different plane paths.

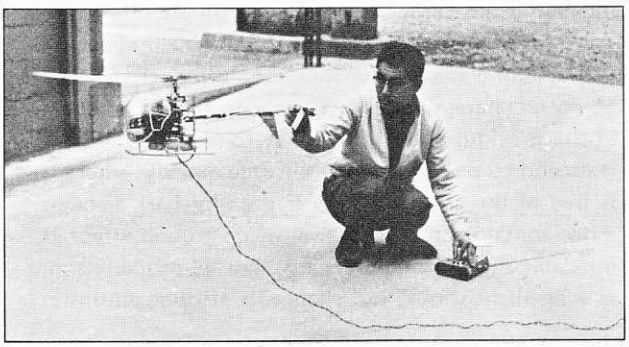




The pitch angles are correct.

Aileron Trim Control

Hold the tail boom and accelerate the rotation of the rotor blade. (It would be safer with the tail drive belt disengaged.) When the revs are sufficient, the Sky Lark will lift off. If it rises into the air tilting to the right or left, move the aileron trim lever in the opposite direction a little at a time checking the response. If it ascends straight, manupilate the aileron (stick right and left to learn the action of the aileron) control and reaction of the helicopter. A copter with the rotor turning clockwise tends to tilt to the left side at the lift-off point. If this is the case, compensate it by operating the aileron stick to the right.



Elevator Trim Control

Bring the rotation of the main rotor blades close to the lift-off point. If either the fore or aft of the Sky Lark rises sooner than the other, and the helicopter begins to slide in the opposite direction, move the elevator trim lever to make the body level or slightly nose-down.

Rudder Trim Control

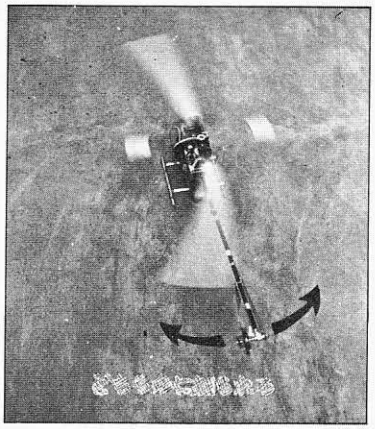
A helicopter is apt to kick in the opposite direction when the rotor starts turning on the ground. This is because the initial torque reaction is so strong. The tail rotor is to counteract this torque and for controlling the helicopter's attitude and directing its course. The rudder control is achieved by changing the pitch of the tail rotor blades. As soon as the rotation of the main rotor has settled, correct the attitude with the rudder control.

Inexperienced pilots should hold the tail boom at the start. As the rotor is revved up, the force of the counteraction is increased requiring alteration of the rudder control, otherwise the copter will yaw.

Following are the 3 ways, usually adopted, for setting the basic pitch of the tail rotor with the rudder stick in neutral position;

(1) The pitch is set to counteract the torque at lift-off.
(2) The pitch is set for hovering.
(3) The pitch is set for forward flight.

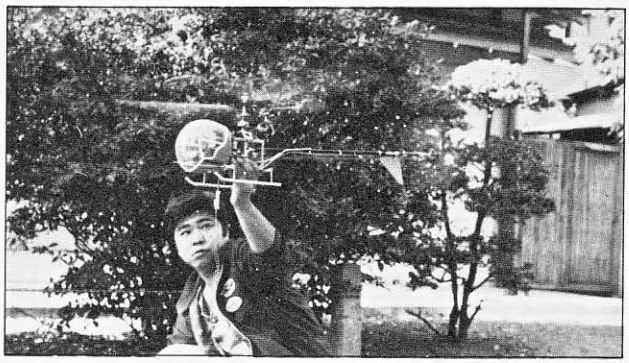
You can choose any of these; however, it is recommended for a beginner to select (1) initially, then to employ (2) and (3).



Will swing either side.

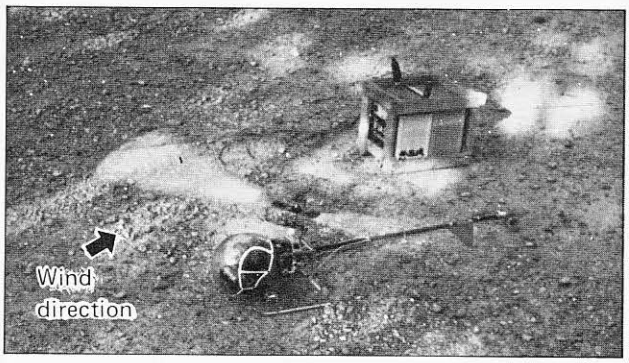
Trim Lever Adjustment for Hovering

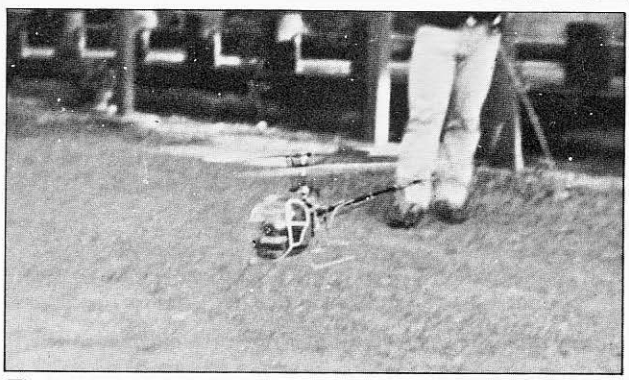
To adjust the trim levers for hovering the safest and easiest way is to hold your Sky Lark by the landing skid with your both hands high in the air. Have someone else operate the radio control transmitter and hold the Sky Lark over your head horizontally, facing into the wind. Rev up the motors and, after the rotor speed has settled, loosen your hands slightly to see the reaction of the copter. Adjust all trim levers to keep it in a stable attitude for hovering.



- **Lift-off should be made into the wind.**

When a helicopter is lifting off, it will be unbalanced until it rises more than 50 centimeters from the surface due to the ground effect. Fine control of the control sticks of your R/C transmitter is required till it reaches up to one meter altitude. Place the Sky Lark on the ground toward the wind, and increase the rotor speed. The first reaction should be that the tail swings, correct it with the rudder control, and keep increasing the rotor speed. It will lift off tilting one way or the other. Counteract the inclination by manupilating the control stick. The trim levers should be correct here, since they have been already adjusted in the previous chapter. The key to success is to have it ascend to over one meter altitude quickly, where it is free of the ground effect. If the Sky Lark assumes a horizontal posture at a level of no ground effect, it indicates that all trim levers are adjusted properly and, as a result, it should not change its attitude abruptly.





The secret of success is to take off quickly.

When using a radio control unit with a mixer function for helicopters, read the instruction thoroughly.

MAINTENANCE

- Cause and Remedy of Vibration

Vibration is produced when any rotating part is unbalanced. Make every effort to eliminate vibration, since it impedes the lift and gives poor control.

(1) A crooked mast
The mast may be bent when the rotating blades hit the ground. In such a case, the mast must be replaced with a new one.

(2) Unbalanced pair of main or tail rotor blades
Balance should be corrected. If blades are badly damaged, replace them.

(3) A warped stabilizer bar
It can be straightened up to a point. An excessively warped one must be renewed.

(4) Improper tracking adjustment

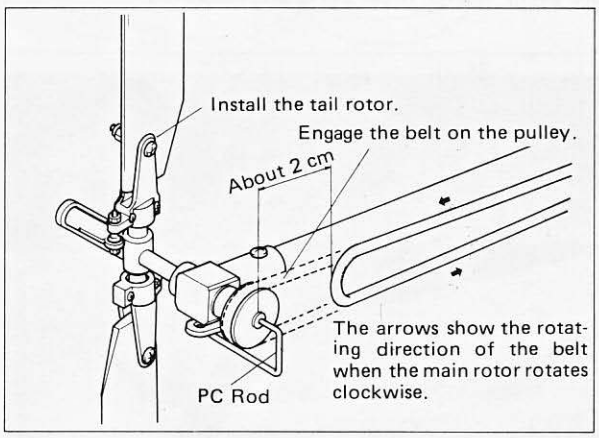
(5) A curved tail shaft
It must be changed.

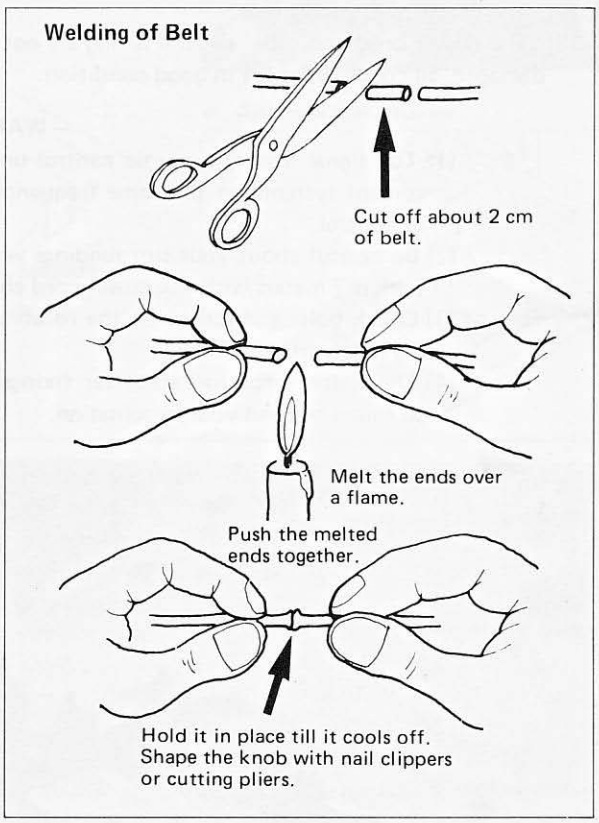
(6) Loose bolts and nuts
They may cause vibration. Check them now and then.

(7) Deterioration of resilience of gimbal yoke from fatigue
Exchange it.

- Tail Rotor Belt

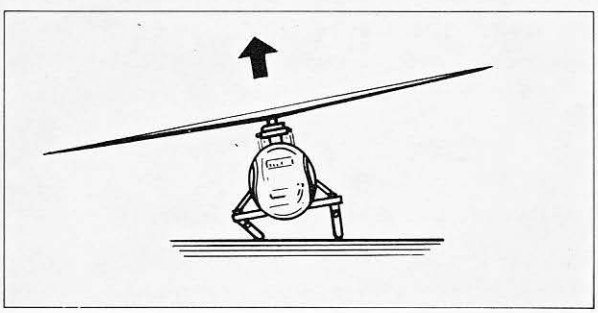
Sometimes you may find the rudder is not controlling properly, because the tail rotor belt slips and does not transmit enough power. Wipe the belt with alcohol once in a while. Also the belt may stretch and slip. Shorten it as shown in the illustration. Those who have no confidence in mending it can renew it. It is recommended to disconnect the belt after flights to avoid stretching. The tail rotor blades are important, they should be replaced with new ones before they get heavily damaged.





- Warp of Landing Skid

After repeated rough landings during practice, the landing skid can get distorted. It is impossible for a helicopter to lift off properly with a warped skid, because the rotor is no longer parallel to the ground. It should be level lengthways and crossways.



It lifts off obliquely on a distorted skid. ➡

- When the Main Rotor Does Not Rotate Rapidly Enough.

The following are check points;

(1) Both of the motor pinion gears should be in correct mesh.

(2) Motor Trouble

The life of the motors are limited. Check them by removing one of the two pinion gears and run the motors slowly one at a time. If the each one drives the rotor in the same way, it is a sign that the both motors run properly. Another way to check the motors is to feel them with your finger after running. An inefficient motor produces less heat.

(3) The power battery is charged sufficiently.

(4) The wiper blade of the controller is in good contact.

(5) After a crash, the air frame may be distorted resulting in poor rotation.

(6) The pitch of the rotor blade is correct.

(7) The gears are in good shape.

(8) The power cord and other electric wiring are not damaged, all connections are in good condition.

- When the Helicopter Does Not Lift Off with the Rotor Rotating Well.

(1) Damaged Rotor Blade

Tips of the rotor blades may be damaged after hitting the ground. The tips generate the most lift, since they travel fastest.

(2) When the pitch of the rotor blades is too small, the rotor rotates quickly without producing enough lift-off thrust.

(3) Weight

When it weighs too much, it will not fly. Do not install too heavy a landing skid, or gyro. Limit the weight of the Sky Lark to 1.4 kg when powered through the power cord, and 1.8 kg with a Ni-Cad battery pack mounted. By installing mini-servos and mini receiver battery, you can save 100—120 grams. Making the helicopter as light as possible is important to improve performance.

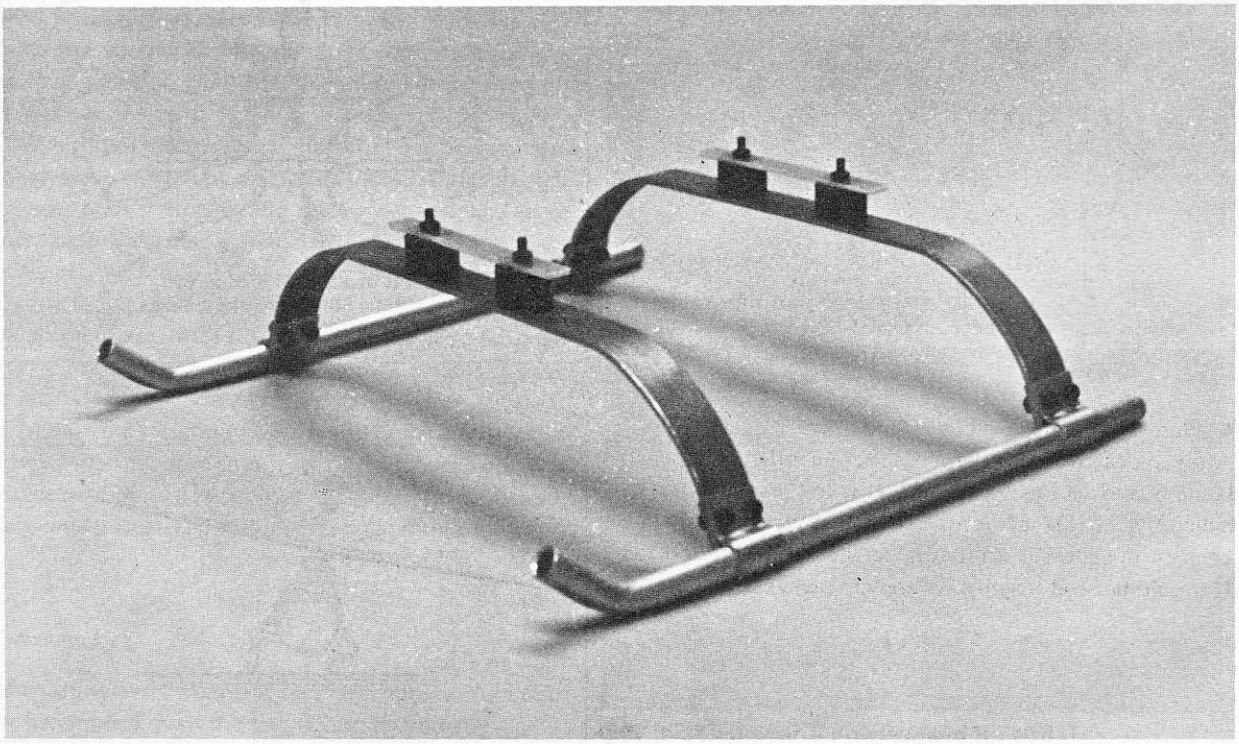
— WARNINGS —

(1) The signal from your radio control unit is allocated a number of frequencies. Radio control systems on the same frequency will interfere with each other and cause loss of control.

(2) Be careful about your surroundings when flying. The sphere of the flight of the Sky Lark is 7 meters with the power cord connected.

(3) Check bolts and screws on the rotating components. When loose they may be hurled off by centrifugal force.

(4) Check the rotor and stabilizer fixings before every flight. These parts are subjected to forces beyond your imagination.

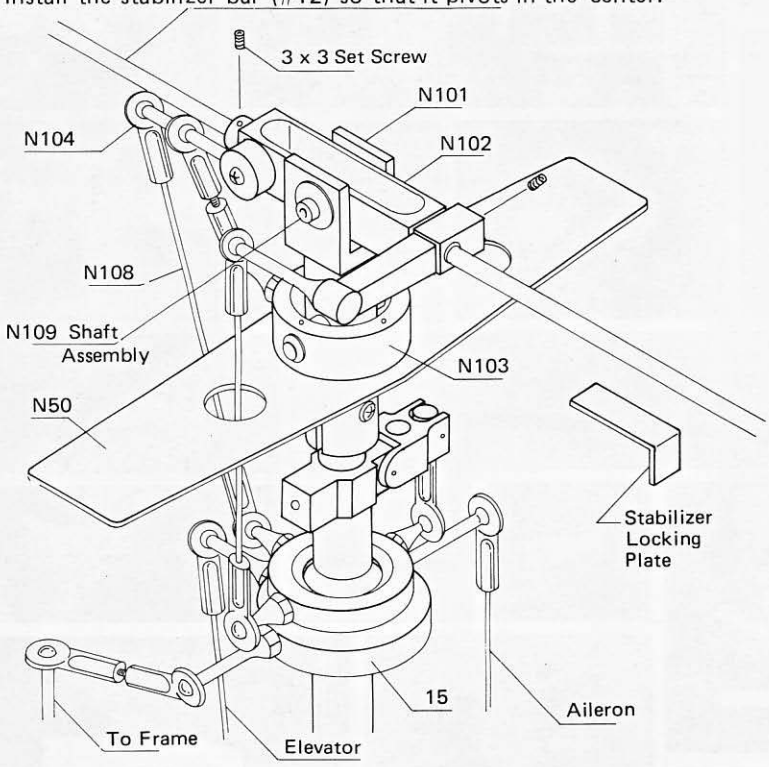


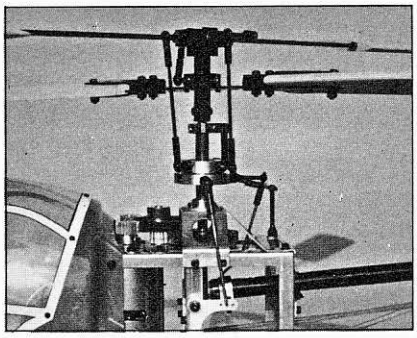
● Bell-Hiller System

Bell-Hiller System Assembly

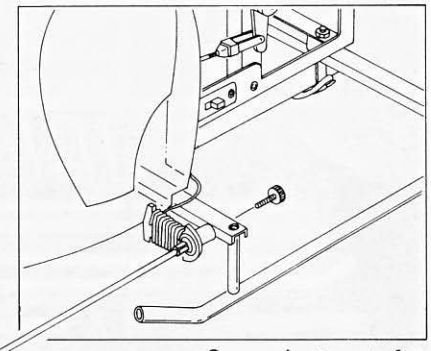
This Bell-Hiller System is a better control system than the Hiller System which is included in the kit. It has a quicker response and ideal for hovering and flights in a small place.

Install the stabilizer bar (#42) so that it pivots in the center.



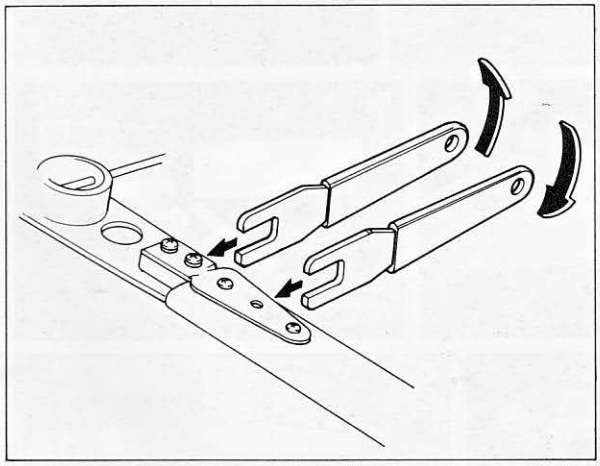


● Antenna Coil Holder



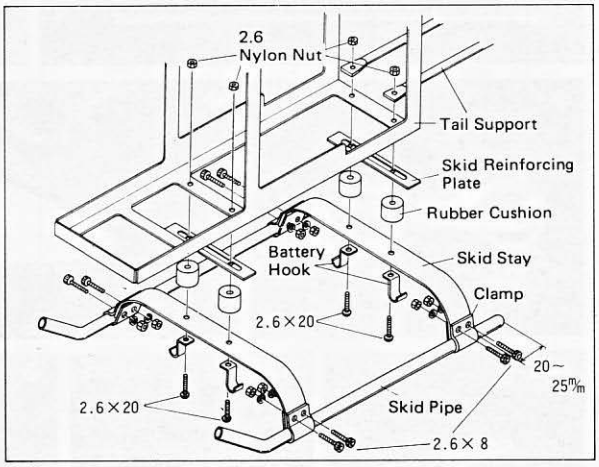
Convenient parts for fixing the antenna

● Pitch Wrench



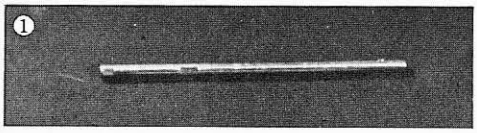
This is a must for adjusting the pitch of the main rotor blade and the tracking plane.

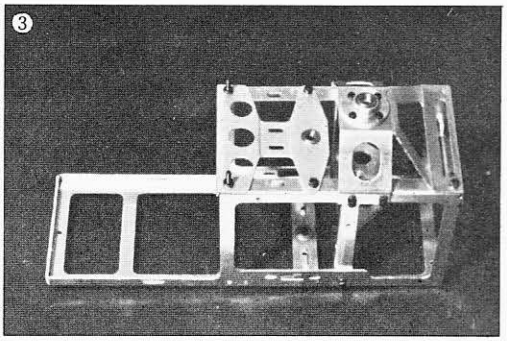
● Trainer's Skid

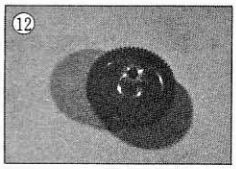


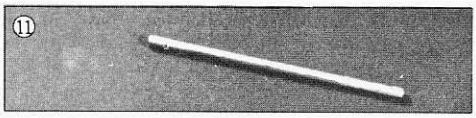
A very durable skid bearing the shocks of rough landings during practice flights.

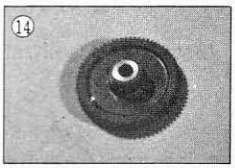
List of Spare Parts Grouping

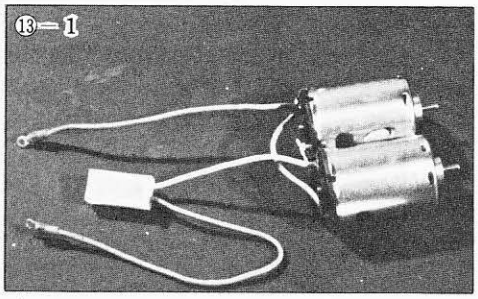


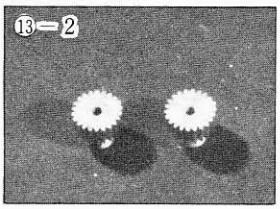


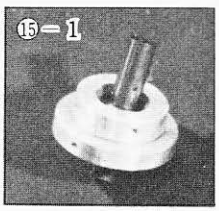


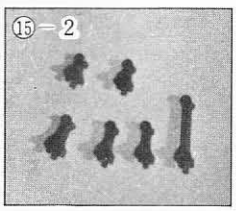


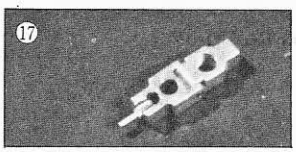


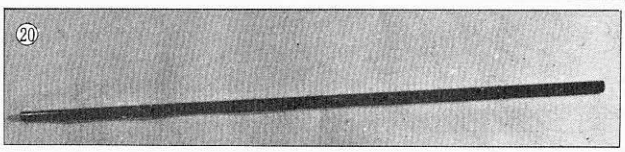


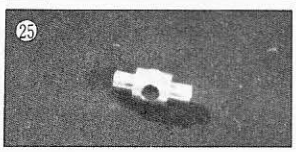


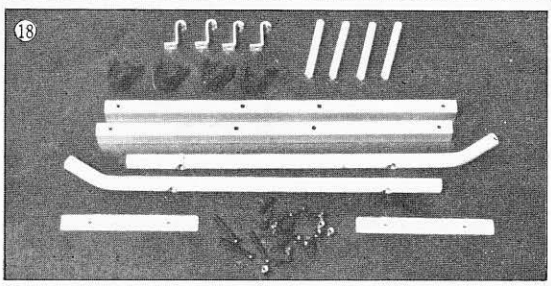


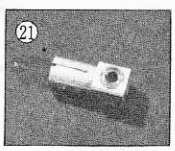


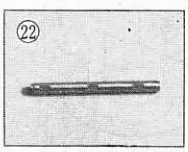


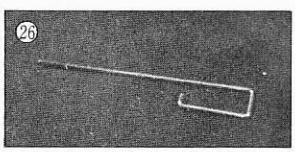


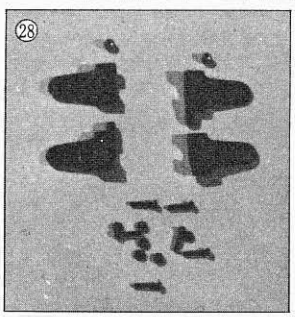


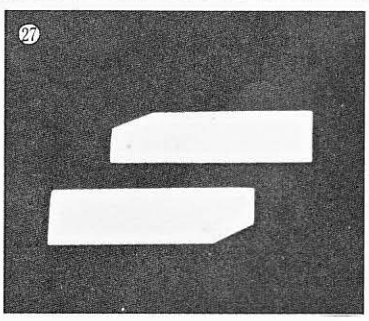


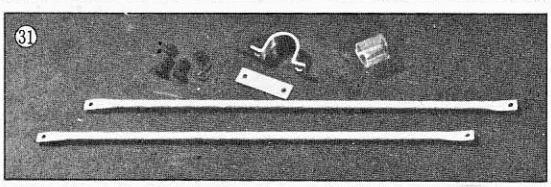


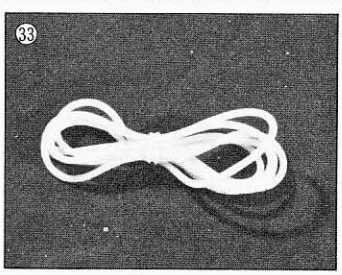


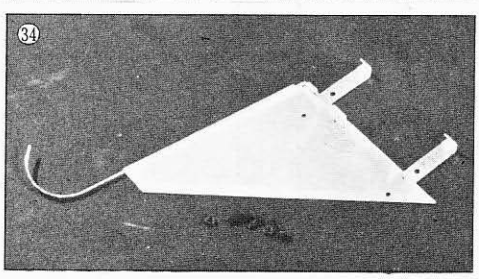


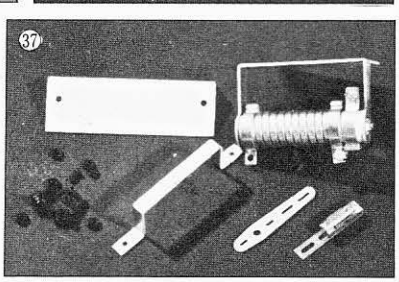


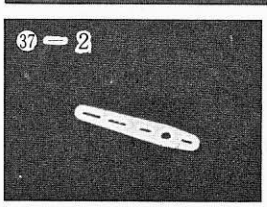


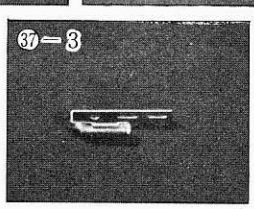


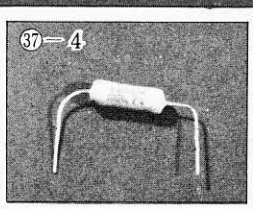


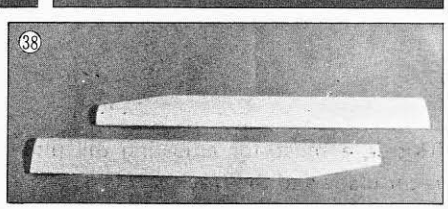


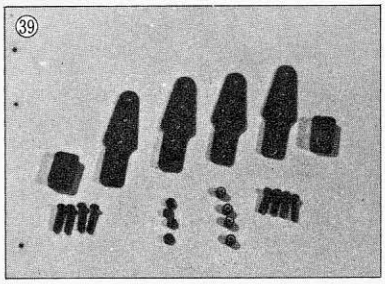


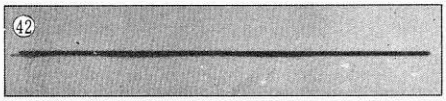


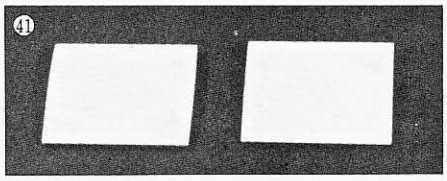


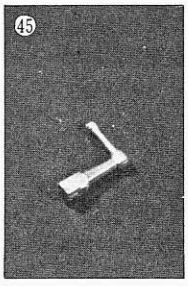


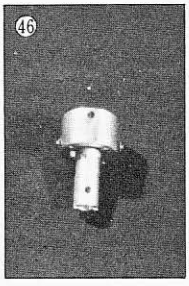


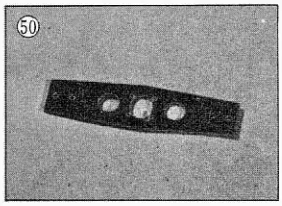


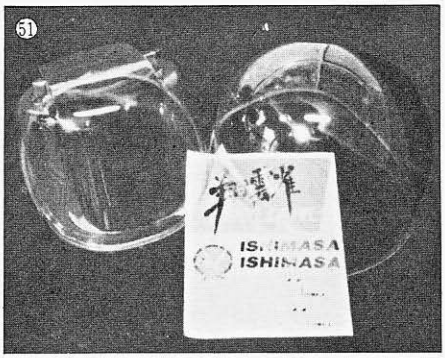


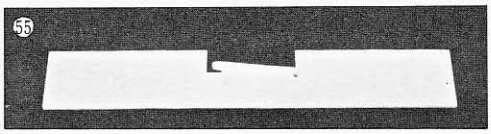


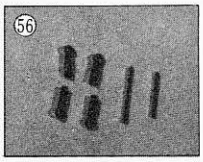


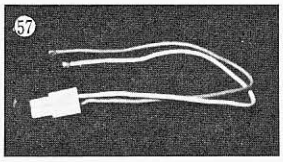


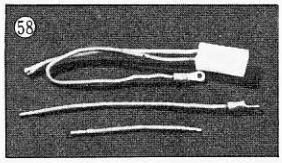


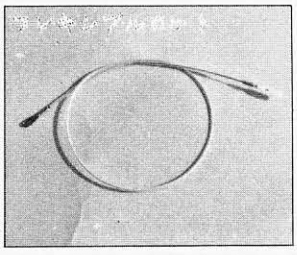


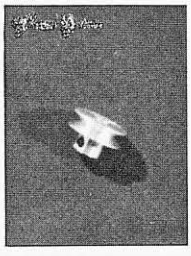


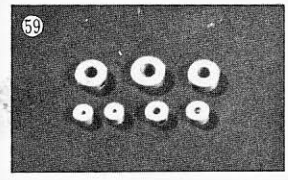


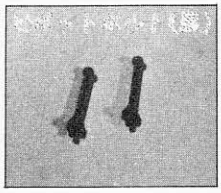


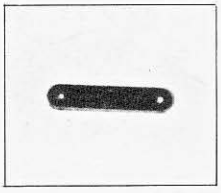












Spare Parts #	Spare Parts		Components
#1	Mast	1	Mast
#3	Frame Assembly	1	Frame
		1	Frame Post A
		1	Frame Post B
		1	Tail Boom Stay
		1	Mast B Holder
		1	Top Frame
#10	Shaft Pulley	1	Pulley
#11	Shaft	1	Shaft
#12	Primary Gear	1	Primary Gear
#13-1	Motor	2	Motors with Elec Wire
#13-2	Motor Pinion Gear	2	Motor Pinion Gears
#14	Secondary Gear	1	Secondary Gear
#15-1	Swash Plate	1	Swash Plate
#15-2	Pivot Bolt Set	2	Pivot Bolt A
		3	Pivot Bolt B
		1	Pivot Bolt 30 mm
#17	Upper Lock Set	1	Upper Lock
		1	Rod for Upper Lock
#18	Skid Set	2	Skids
		2	Skid Beams
		4	Skid Support Tubes
		4	Rubber Shock Absorbers
		2	Skid Reinforcing Plates
#20	Tail Boom	1	Tail Boom
#21	Tail End	1	Tail End
#22	Tail Shaft	1	Tail Shaft
		2	PC Rod Journal
#25	Tail Rotor Hub	1	Tail Rotor Hub
#26	PC Rod	1	PC Rod
#27	Tail Rotor Blade	2	Tail Rotor Blades
#28	Tail Rotor Blade Holders	4	Tail Blade Holders
#29	PC Plate	1	PC Plate
#31	Tail Boom Support Set	2	Tail Boom Supports
		1	Support Clamp
		1	Clamp Plate

Spare Parts #	Spare Parts		Components
#32	Flexible Rod	1	Flexible Rod
#33	Drive Belt	1	Drive Belt
#34	Tail Fin	1	Tail Fin
#37	Controller Set	1	Controller
		1	Controller Bar
		1	Wiper Blade
		1	Resistor
#37-2	Controller Bar	1	Controller Bar
#37-3	Wiper Blade	1	Wiper Blade
#37-4	Resistor	1	Resistor
#38	Main Rotor Blade	2	Main Rotor Blade
#39	Main Rotor Blade Holder Set	4	Main Blade Holders
		2	Blade Holder Spacer
#41	Stabilizer Blade	2	Stabilizer Blades
#42	Stabilizer Bar	1	Stabilizer Bar
#45	Control Lever	1	Control Lever
#46	Gimbal Head Assembly	1	Gimbal Head
		2	Stabilizer Journals
		1	Gimbal Shaft
		1	Center Shaft Pipe
		1	Center Shaft
		2	Center Shaft E Rings
#50	Gimbal Yoke	1	Gimbal Yoke
#51	Canopy Set	1	Canopy A
		1	Canopy B
#55	Pitch Gauge	1	Pitch Gauge
#56	Rod Set	1	Retainer Rod for Swash Plate
		1	Rod for Stabilizer
		4	Universal Links
#57	Connector (to Battery)	1	Connector
#58	Connector (to Motor)	1	Connector
#59	Stopper Set	1	Mast Stopper
		1	Shaft Stopper
		1	Tail Shaft Stopper
		2	PC Rod Stopper
		2	Stabilizer Stopper
#67	Pivot Bolt	2	Pivot Bolt 30mm long