K-3 SB
ROTOR HEAD
STABILIZER SYSTEM

KALT

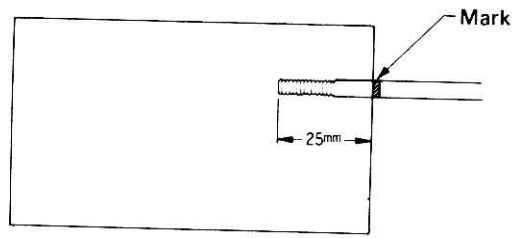
Become thoroughly familiar with this manual prior to construction and flying.

Installation

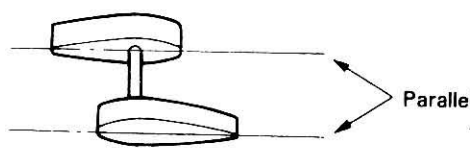
Install the main shaft, swash plate and pitch control ring (or scissors arm) according to the instruction manual of your helicopter. If you use a scissors arm system, read its manual.

1 Place the control lever into the see-saw, insert the stabilizer bar to the see-saw and control lever.

2 Put two stabilizer retainers to both sides of the see-saw. Screw stabilizer blades to the both ends of the bar. At this time make a mark 25 mm from each tip of the bar, and screw on the stabilizer blade to exactly line up with the mark. Make sure of the direction of the stabilizer retainer. The small diameter side must be facing the see-saw bearing.



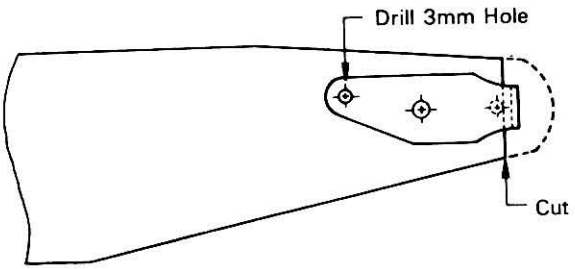
3 Adjust the chord lines of the two stabilizer blades so that they are exactly parallel and face in opposite directions. Secure them into position with cyanoacrylate.



4 Two stabilizer retainers are properly positioned when the distance between the two stabilizer blades and the see-saw is equal. At this time there must be a little clearance between the see-saw and retainers for smooth operation.

5 Secure the control lever to the stabilizer bar with a M4 ×4 set bolt. At this time secure the ball joint of the control lever to the same level as the blades.

6 Shave down the root end of the main rotor blades to an 8 mm thickness. Add the blade reinforcement, drill 3 mm holes and bolt them to the blades with M3 × 18 cap bolts and nylon nuts. Install the rotor blades to the blade grip of the rotor head. Do not tighten down the screws too tightly as the blades must be free to move. Centrifugal force keeps them in position during rotation.



7 Hold the stabilizer bar horizontally and balance the blades. If they are not in balance, apply vinyl tape to the lighter blade tip. Even if the blades are in balance, place diffrent colored tape on each blade tip for tracking adjustment.

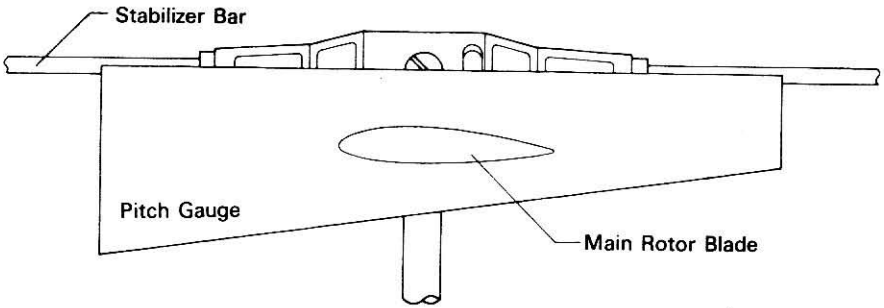
8 Attach the completed rotor head to the main shaft. Make sure that the clearance between the main and tail rotor blades is more than 10 mm. If necessary, cut the main rotor blades to make the clearance over 10 mm.

9 Cut four universal links 6 mm from the end and screw M2.3 × 17 threaded rods into them. Connect to the center ball of see-saw arm and pitch arm.

10 Connect the ball joint of the pitch control ring and tip of the see-saw arm with M2.3 × 85 threaded rods and universal links. The little bent side of the rods must be on the bottom side. Adjust the length of the rods (both are same length) so that when the pitch control servo is in neutral position, the see-saw arm is horizontal.

11 Connect up the control lever and the swash plate with two universal links so that the chord lines of the stabilizer blades are parallel.
Notice : In case it is necessary to adjust the length of the M2.3 × 120 threaded rod to fit your helicopter, cut the rod and shape the cut end with a file, then screw on the universal links.

12 Adjust the throw of the pitch control, using your transmitter. The maximum pitch is approximately 8 degrees. The minimum pitch is approximately ± 0 degree. These adjustments must be made by adjusting the rod length between the pitch arms and see-saw arms. For measuring blade pitch, using the plywood pitch gauge included in your helicopter kit. See drawing.
Utilize a Kalt Precision Pitch Gauge for exact measurement.



After Construction Checklist

Upon completion of this kit, go back over every step to make sure that there are no loose nuts, bolts, misalignment or binding of movable components. Check all linkages for proper movement by using the transmitter. Check following refering to the construction drawing.

1 Looseness of the two M4 × 12 cap bolts which are in the blade grips.

2 Looseness of four M3 × 8 cap bolts which fasten the pitch arms. At the same time check the M2 × 12 cap bolts of ball joints.

3 Looseness of the M4 × 8 cap bolts attaching the see-saw.

4 Looseness of the see-saw arm shafts and nuts.

5 Looseness of the M4 × 28 cap bolts attaching the rotor blades.

In Flight Adjustment

1 Start the engine and adjust the tracking of the main rotor refering to the instruction book for your kit.

2 The main rotor pitch may vary according to factors such as total weight, engine power, the main rotor diameter and your own preference. For a standerd set up, adjust maximum pitch so that the RPM of rotor blade does not over speed during hovering, (approx. 1,100 ~ 1,200 RPM) and when the throttle is opened suddenly the rotation speed does not come down. Adjustment of minimum pitch is set for auto rotation flight. If the helicopter moves pitch up (nose up), decrease the pitch. If nose comes down and sinks rapidly, increase the pitch.

3 If your helicopter shakes from resonance during hovering, change the RPM of main rotor by adjusting the pitch angles.

4 The standerd hub plate of K-3 SB head is 1.8 mm thick. Additional 1.6 mm and 2.0 mm thick hub plates are available. If you want more rigidity for aerobatics, change to the 2.0 mm hub plate.

After Flight Check

Check all parts and bolts the same as in the after construction check. Should you have an accident or crash the helicopter, check all parts refering to the following.

Repairing And Adjusting

The surface of the cast parts of the K-3 SB head are of special finish. In case of impact on these parts, the surface will be cracked. If you find such cracks or damage, do not use the parts.

1 **Replacing the Hub Plate**
Remove the two hub spindles and the center hub, and replace with a new hub plate. When tightening the four M3 × 15 cap bolts, pull the hub spindles to the outside. The hub plate of the K-3 SB head is specially hardened. If it is bent, change to a new one. If you re-bend it, not only will it not work well, but it may fail during flight.

2 **Replacing the Spindle**
Remove two M3 × 15 cap bolts and M3 nylon nuts. Insert 2.5 mm hex. wrench to the 3 mm hole, and remove M4 × 12 cap bolt. Fasten M4 × 12 cap bolt and spindle washer to the new hub spindle, insert it to the blade grip, and attach it to the hub plate. Put a little Kalt Tite to the M4 × 12 cap bolt and fasten it firmly using 3 mm hole and 2.5 mm hex. wrench. This M4 cap bolt must be fastened before the spindle is attached to the hub plate. If you fasten it after attaching to the hub plate you cannot fasten it firmly and the hub plate will be warped.

3 **Replacement of the See-Saw**
Remove two M4 × 8 cap bolts. Make sure that there are small thin washers (4 × 6.5 × 0.3) at the both sides of 840 ZZ ball bearings. When attaching the new see-saw, do not forget these washers.

4 **Replacement of the See-Saw Arm and the See-Saw Arm Shaft**

Remove M3 nut, see-saw arm and see-saw arm shaft nut, in that order. When attaching the new one, make sure of the direction of the see-saw arm shaft nut. The cut side must be facing the ball bearing. There must be a little clearance between the shaft nut and bearing for smooth operation. Fasten the M3 nut firmly.

5 **Replacement of the Center Hub**

Remove the see-saw and hub plate. Attach the new center hub. At this time do not forget the small thin washer of the see-saw bearing. Refer to the paragraph of replacement of the see-saw.

6 **Replacement of the Pitch Arm**

Obtain the pitch arm of SB head. We have another pitch arm for RD head, but it is not used for the SB head.

Other parts replacement

The ball bearings of the blade grip assembly cannot be replaced. Use a little Kalt Tite to all screws. Be careful not to get any Kalt Tite into bearings or moving parts. Spares can be obtained from your dealer, using the parts number and name.

Attention

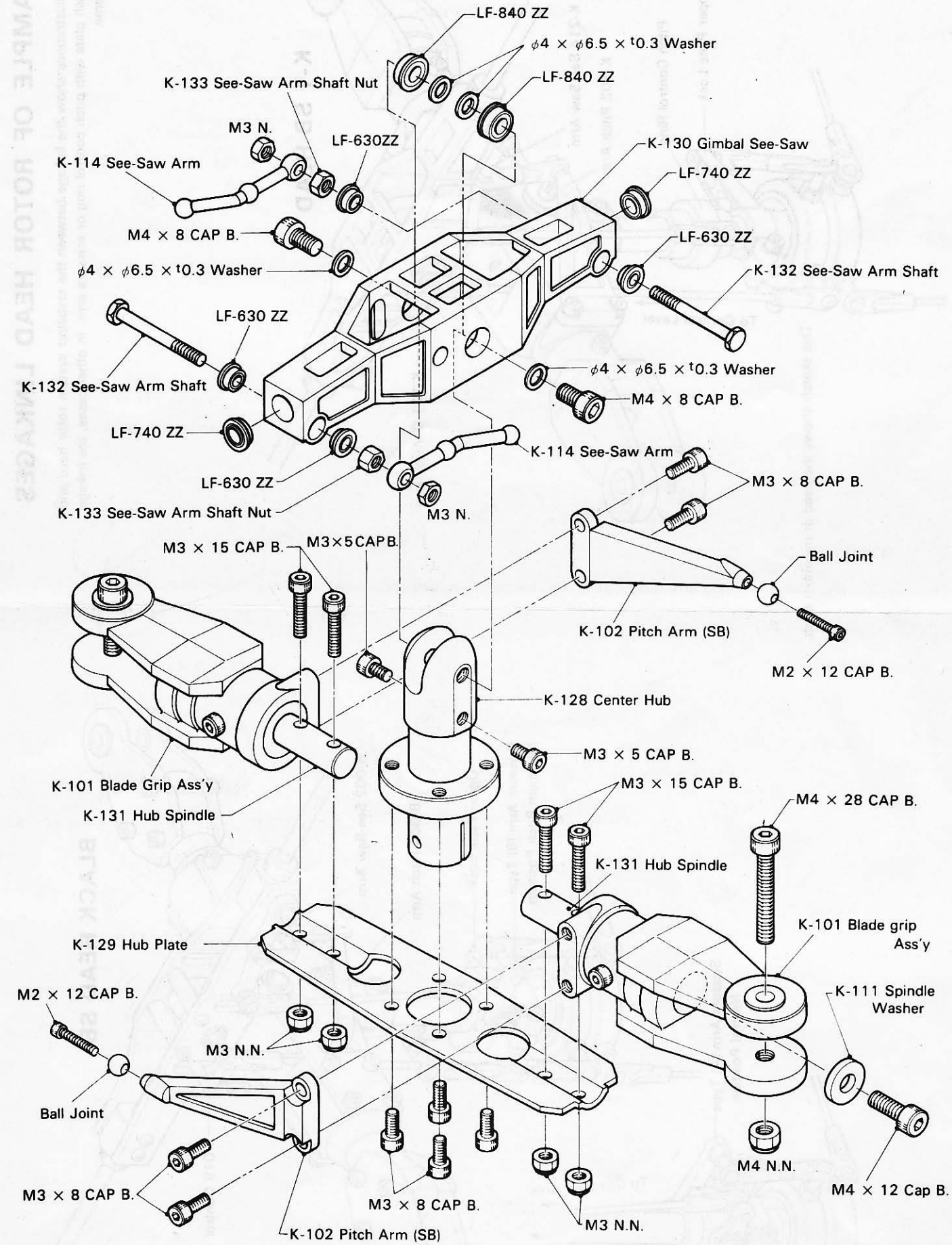
The K-3 SB Head is a precision mechanism. Do not fly the helicopter in a dusty place. Keep it clean and put some oil on all bearings. The hub plate of this rotor head is very critical. Do not use it for hanging the helicopter or transporting it. When folding up the rotor blades remove the universal links of the pitch arms and tie the blades to the tail boom.

K-3 SB Head Attached Parts

Control Lever (with／M4 × 4 Set Bolt) 1
Blade Reinforcement 2
M3 × 18 Cap Bolt 2
M3 × 22 Cap Bolt 1
M3 Nylon Nut 3
M4 × 28 Cap Bolt 2
M4 Nylon Nut 2
M2.3 × 17 Treaded Rod 2
Universal Link 4

K3-SB PARTS LIST

No.	Name
K-101	Blade Grip Assembly (w／ball bearings)
K-102	Pitch Arm (SB) (w/ball joint)
K-114	See-Saw Arm
K-121	Control Lever
K-122	Blade Reinforcement
K-128	Center Hub
K-129	Hub plate (1.8 mm Thick)
K-130	Gimbal See-Saw (w/ball bearings)
K-131	Hub Spindle
K-111	Spindle Washer
K-132	See-Saw Arm Shaft
K-133	See-Saw Arm Shaft Nut, M3 Nut
K-134	Hub Plate (2.0 mm Thick)
K-135	Hub Plate (1.6 mm Thick)
	LF-630 ZZ Ball Bearing
	LF-740 ZZ Ball Bearing
	LF-840 ZZ Ball Bearing


LF-840 ZZ
φ4 × φ6.5 × t0.3 Washer
LF-840 ZZ
K-133 See-Saw Arm Shaft Nut
M3 N.
LF-630ZZ
K-114 See-Saw Arm
K-130 Gimbal See-Saw
LF-740 ZZ
M4 × 8 CAP B.
LF-630 ZZ
φ4 × φ6.5 × t0.3 Washer
K-132 See-Saw Arm Shaft
LF-630 ZZ
K-132 See-Saw Arm Shaft
φ4 × φ6.5 × t0.3 Washer
M4 × 8 CAP B.
LF-740 ZZ
K-114 See-Saw Arm
LF-630 ZZ
M3 × 8 CAP B.
K-133 See-Saw Arm Shaft Nut
M3 N.
M3 × 15 CAP B.
M3×5CAP B.
Ball Joint
K-102 Pitch Arm (SB)
M2 × 12 CAP B.
K-128 Center Hub
M3 × 5 CAP B.
K-101 Blade Grip Ass'y
K-131 Hub Spindle
M3 × 15 CAP B.
M4 × 28 CAP B.
K-131 Hub Spindle
K-101 Blade grip Ass'y
K-129 Hub Plate
K-111 Spindle Washer
M2 × 12 CAP B.
M3 N.N.
Ball Joint
M4 N.N.
M4 × 12 Cap B.
M3 × 8 CAP B.
M3 × 8 CAP B.
M3 N.N.
K-102 Pitch Arm (SB)