K-1 SB
ROTOR HEAD
STABILIZER SYSTEM

KALT

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

This instruction manual is written for installing the head to the helicopter. If you change your rotor head to the K-1 SB head, follow after step 9. In this case, the length of each linkage rod will be different. Readjust them refering to this instruction manual.
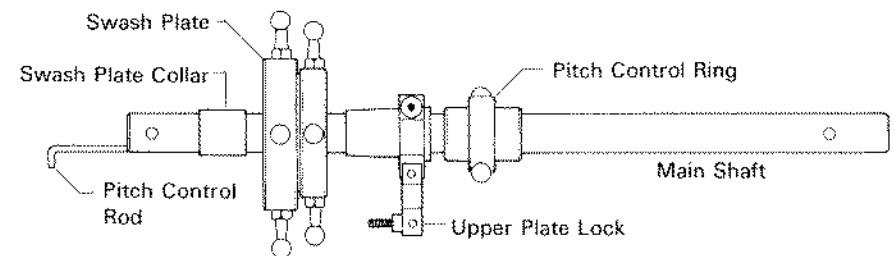
Installation

1 Insert one end of the pitch control rod into the hole in the pitch control ring, then slide the unit about half way onto the main shaft, as shown in drawing.
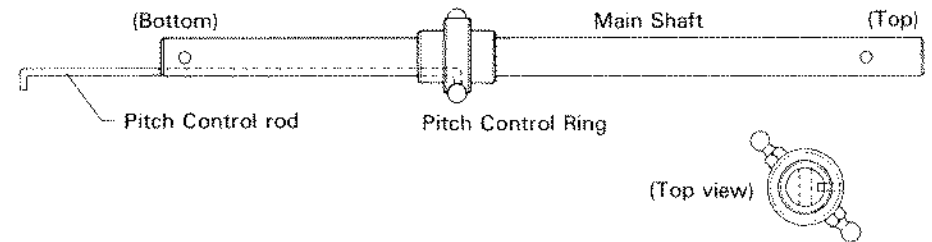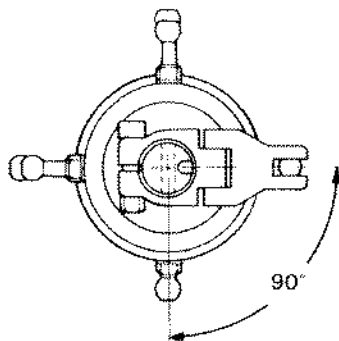

2 Insert the upper plate lock, swash plate and the swash plate collar, in that order, from the bottom of the main shaft, as shown in drawing.

3 Insert the main shaft through the top bearing, then insert the bent end of the pitch control rod into the 2mm hole of the slide ring, then drop the main shaft into the bottom bearing.

Notice : The pitch control rod must move freely in the main shaft. If there is any friction, check to see that the bent ends are exactly 90 degrees.

4 Adjust the stroke of the pitch control servo so the pitch control ring moves 9 ~ 10mm. If you installed a scissors arm instead of a pitch control ring, the stroke must be changed. Refer to the explanation of the scissors arm.

5 Connect up the radius support and the short arm of the swash plate with two universal links and threaded rod. Adjust the length of the rod so that the short arm of the swash plate is 90 degrees to the center line of the frame.

6 Link up the pitch (elevator) and roll (aileron) servos to the swash plate.

7 Pull the main shaft upwards, and push down the upper plate lock, then tighten up the bolt on the upper plate lock. At this time, the upper plate lock must be 90 degrees from the 3mm hole in the main shaft.

90°

8 ※ When using the plastic upper plate lock.
Attach a ball joint to the upper plate lock. Connect the ball joint and the arm of the swash plate with two universal links and a threaded rod. Adjust the length of the rod so that the upper plate lock and swash plate arm are at right angles to each other.

※ When using the metal upper plate lock.
Screw the short universal link (contained in the same place as the upper plate lock) to the threaded tip of the swash plate arm.

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

10 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 25mm from each tip of the bar, and screw on the stabilizer blade to exactly line up with the mark.

Mark

25mm
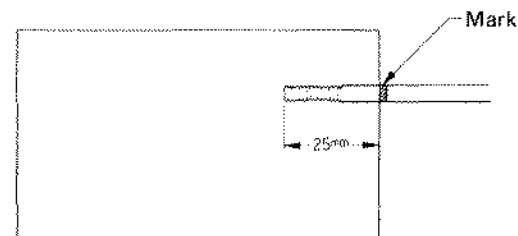
11 Adjust the chord lines of the two stabilizer blades so that they are exactly parallel and face in opposite directions. Secure them into position, when satisfied, with cyanoacrylate.

Parallel

12 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.

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

14 Shave down the root end of the main rotor blades to an 8mm thickness. Add the blade reinforcement, drill 3mm 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.

Drill 3mm Hole

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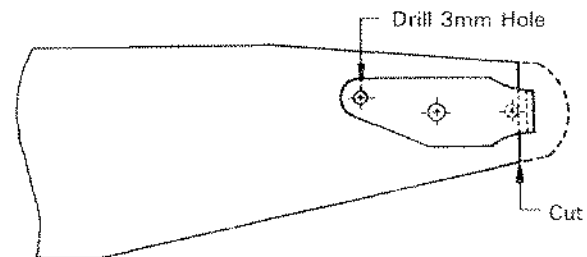
15 Hold the stabilizer bar horizontally and balance the blades. If they are not in balance, apply vinyl tape to the lighter blade tip. Even if the blades are in balance, place different colored tape on each blade tip for tracking adjustment.

16 Attach the completed rotor head to the main shaft. Make sure that the clearance between the main and tail rotor blades is more than 10mm. If necessary, cut the main rotor blades to make the clearance over 10mm.
Notice : If the diameter of your main shaft is 8mm, use the ϕ8 collar contained in the kit.

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

18 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.

19 Connect up the control lever and the swash plate with two universal links and M2.3 × 120 threaded rod. Adjust the length so that the swash plate and the chord lines of 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.

20 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 the kit. See drawing.

Stabilizer Bar

Pitch Gauge

Main Rotor Blade
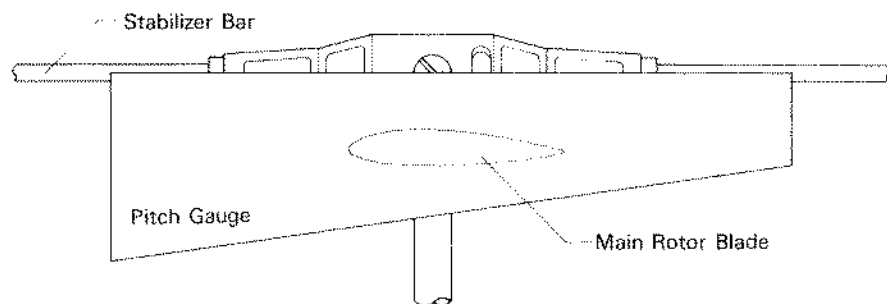
Utilize a Kalt universal pitch gauge for exact measurment.

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 drawings

1 Looseness of four M5 × 8 set bolts. These bolts are paint locked. Check the paint whether cracked or not.

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

3 Clearance of axial way of the blade grips. If there is a clearance, check the looseness of above-mentioned bolts.

4 Looseness of four M3 × 8 cap bolts which are fastening the pitch arms. At the same time check the M2 × 12 cap bolts of ball joint.

5 Looseness of the two see-saw screws.

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

7 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 rotors refering to the instruction book of 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 standard set up, adjust maximum pitch so that the RPM of rotor blade does not over rotate during hovering. (approx. 1,000 ~ 1,100 RPM) And when the throttle is opened suddenly the rotation speed does not come down. Adjustment of the minimum pitch is set for auto rotation flight. When closing the throttle, during level flight, if the helicopter moves pitch up (nose up), decrease the pitch. If nose comes down and sinks rapidly, increase the pitch.

3 The flapping damper is adjusted at the factory for a large sized helicopter. If your helicopter shakes during hovering, the flapping damper is too hard. Remove the damper and cut it a little and try again.

After Flight Check

Check all parts and bolts the same as 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-1 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 Spindle

Loosen the M5 × 8 set bolts, remove the blade grip assembly and replace the spindle. At this time the M4 × 12 cap bolt must be fastened firmly with lock tite (glue). Insert the spindle to the blade grip, put the spindle spacer and insert it to the gimbal yoke. Then push the spindle slightly using the 3mm hex wrench, and temporarily screw a M5 × 8 set bolt. Make sure that the blade grip moves smoothly and without clearance between the gimbal yoke. Screw down the two M5 × 8 set bolts firmly with lock tite.

Notice : After screwing down the set bolts, paint them to check for looseness. The tip of these set bolts are special shaped (called double point), so be sure to use our bolts.

2 Replacement of the See-Saw

Remove two see-saw screws. Put a little lock tite on the screw hole of the center hub and attach the new see-saw to the center hub with see-saw screw. When changing the dry bearings, do not scratch their surface.

3 Replacement of the See-Saw Arm and the See-Saw Arm Shaft.

The see-saw arm shaft can be adjusted for axial way clearance. Adjust the nut (thick one) so that the shaft turns smoothly, and screw the see-saw arm firmly. Then screw on the nut (thin one) for a double lock.

4 Replacement of the Flapping Damper.

Remove the M3 nylon nut and M3 × 35 cap bolt. Remove the damper caps from the gimbal yoke and replace the damper. When putting the new damper into the center hub, put a little grease on the damper, then push and turn it and place it in the center of the hub.

5 Replacement of the Center Hub

Remove the flapping damper and loose the M4 × 4 set bolt of the center hub and pull out the gimbal shaft. When reassembling, make sure that the flat face of the gimbal shaft is placed toward the set bolt.

6 Other Parts Replacement

When replacing the dry bearings, refer to the above and pay attention not to scratch the surface. The ball bearings of the blade grip assembly cannot be replaced.

Spares can be obtained from your dealer, using the parts number and name.
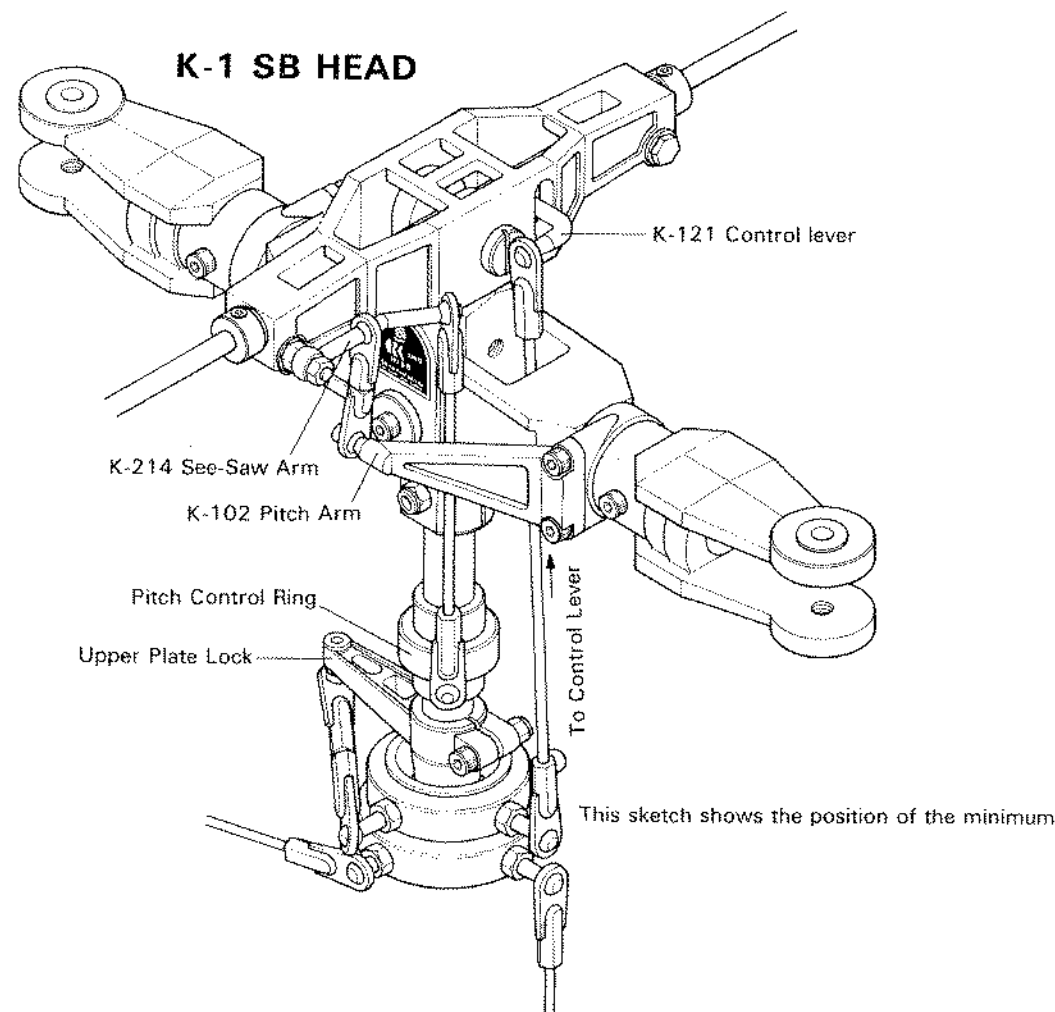
K-1 SB Attached Parts

K-1 SB Head Parts List

No.	Name
K-101	Blade Grip Assmbly (w/ball bearings)
K-102	Pitch Arm (SB) (w/ball joint)
K-104	Gimbal Yoke (SB)
K-106	Center Hub (SB)
K-108	Gimbal See-Saw
K-109	Hub Spindle (SB)
K-111	Spindle Washer
K-112	Spindle Spacer
K-113	See-Saw Screw
K-114	See-Saw Arm
K-115	See-Saw Arm Shaft
K-116	See-Saw Arm Shaft Nut & M3 Nut
K-117	Flapping Damper Cap (tapped)
K-118	Flapping Damper Cap (w/o Tap)
K-119	Flapping Damper (w/shaft)
K-120	Gimbal Shaft
K-121	Control Lever
	Blade Reinforcement
K-127	ϕ8 Main Shaft Collar
0303-7	Dry Bearing
0409-4	Dry Bearing
0504-10	Dry Bearing
0505-10	Dry Bearing
	M2 × 12 Cap Bolt
	M3 × 8 Cap Bolt
	M3 × 35 Cap Bolt
	M4 × 12 Cap Bolt
	M4 × 28 Cap Bolt
	M4 × 4 Set Bolt
	M5 × 8 Set Bolt(Double Point)
	M3 Nylon Nut
	M4 Nylon Nut
	Ball Joint

EXAMPLE OF ROTOR HEAD LINKAGES

These illustrations show the linkage between the stabilizer system rotor head and the swash plate with pitch control ring or scissors arm. In other cases, the linkage is the same way.

K-1 SB HEAD

K-121 Control lever

K-214 See-Saw Arm

K-102 Pitch Arm

Pitch Control Ring

Upper Plate Lock

To Control Lever

This sketch shows the position of the minimum

0504-10

0404-9

K-113 See-Saw Screw

K-115 See-Saw Arm Shaft

K-108 Gimbal See-Saw

K-113 See-Saw Screw

M3 × 8 CAP B.

0303-7

0404-9

0303-7

K-116 See-Saw Arm Shaft Nut

K-106 Center Hub (SB)

M3 N.

K-114 See-Saw Arm

Ball Joint

K-102 Pitch Arm (SB)

M2 × 12 CAP B.

K-101 Blade Grip Ass'y

0505-10

0505-10

M4 × 4 SET B.

K-120 Gimbal Shaft

M5 × 8 SET B. (W POINT)

K-109 Hub Spindle (SB)

K-112 Spindle Spacer

K-104 Gimbal Yoke (SB)

M5 × 8 SET B. (W POINT)

K-119 Flapping Damper

M3 N.N.

M5 × 8 SET B. (W POINT)

K-118 Flapping Damper Cap

K-112 Spindle Spacer

K-109 Hub Spindle (SB)

M4 × 28 CAP B.

K-117 Flapping Damper Cap

M5 × 8 SET B. (W POINT)

M2 × 12 CAP B.

M3 × 35 CAP B.

Ball Joint

K-111 Spindle Washer

M3 × 8 CAP B.

K-102 Pitch Arm (SB)

M4 N.N.

M4 × 12 CAP B.

BLACK HEADSB

B-019 Control Lever

B-002 See-Saw Arm

B-004 Pitch Arm

Upper Plate Lock

Scissors Arm (B) Type
Minimum Pitch Position

To See-Saw Arm

To Control Lever

Scissors Arm (A) Type
Neutral Position

pitch.

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