CENTURY HELICOPTER PRODUCTS

HK1020 Kit Phoenix 4 Stroke Instruction Manual

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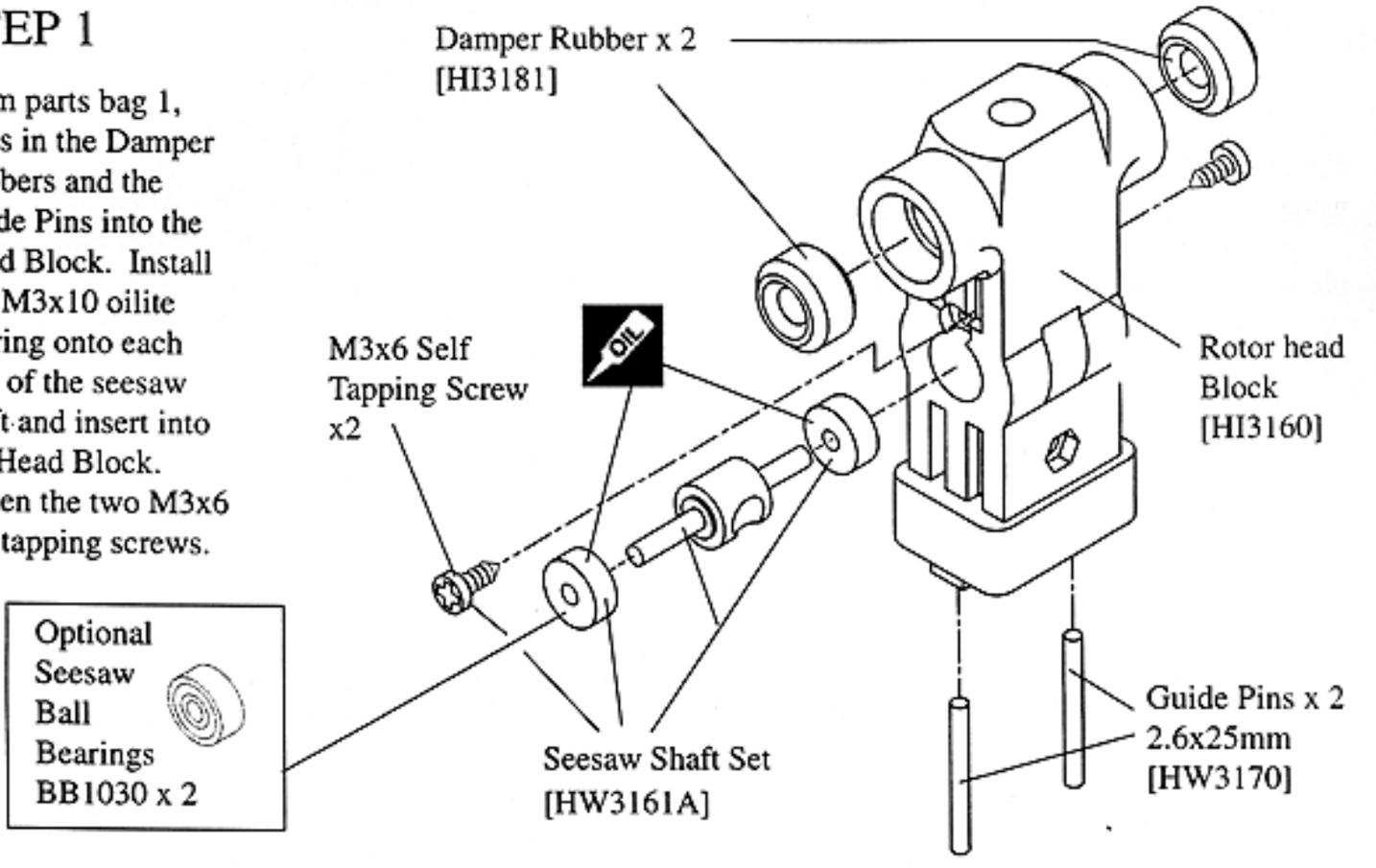
STEP 1-2 Main Rotor Head

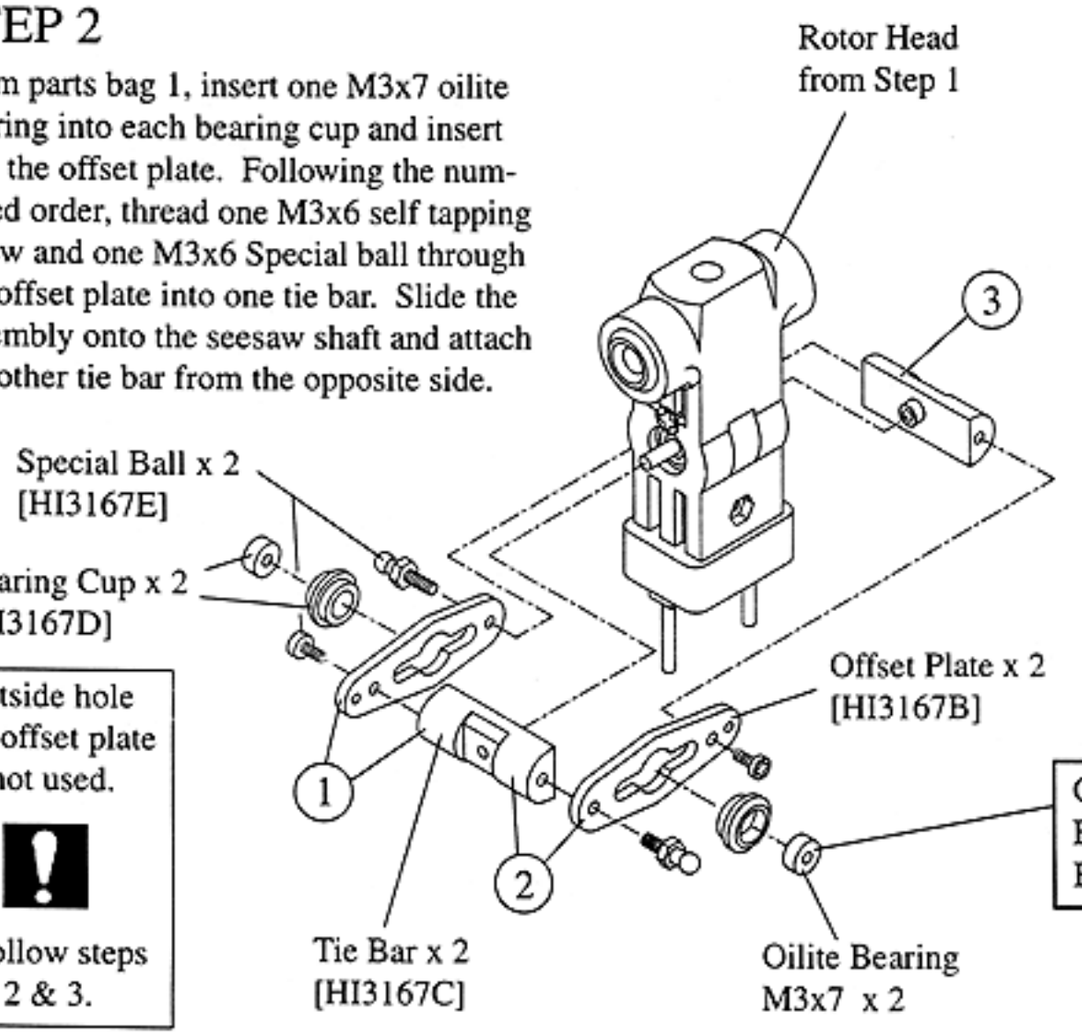
STEP 1

From parts bag 1, press in the Damper Rubbers and the Guide Pins into the Head Block. Install one M3x10 oilite bearing onto each side of the seesaw shaft and insert into the Head Block. Fasten the two M3x6 self tapping screws.



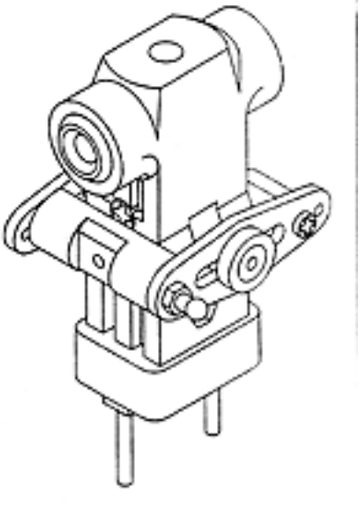
STEP 2

From parts bag 1, insert one M3x7 oilite bearing into each bearing cup and insert into the offset plate. Following the numbered order, thread one M3x6 self tapping screw and one M3x6 Special ball through the offset plate into one tie bar. Slide the assembly onto the seesaw shaft and attach the other tie bar from the opposite side.



Outside hole on offset plate is not used.

Follow steps 1, 2 & 3.

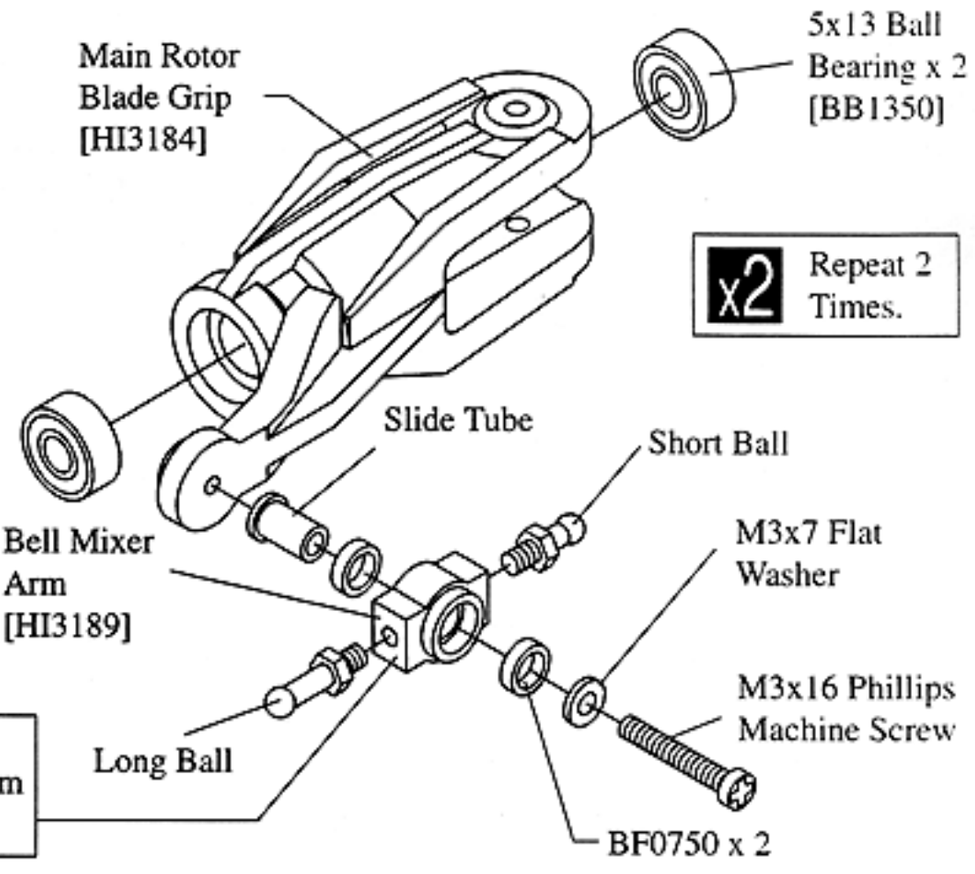


Completed rotor head.

STEP 3-4 Main Blade Grips

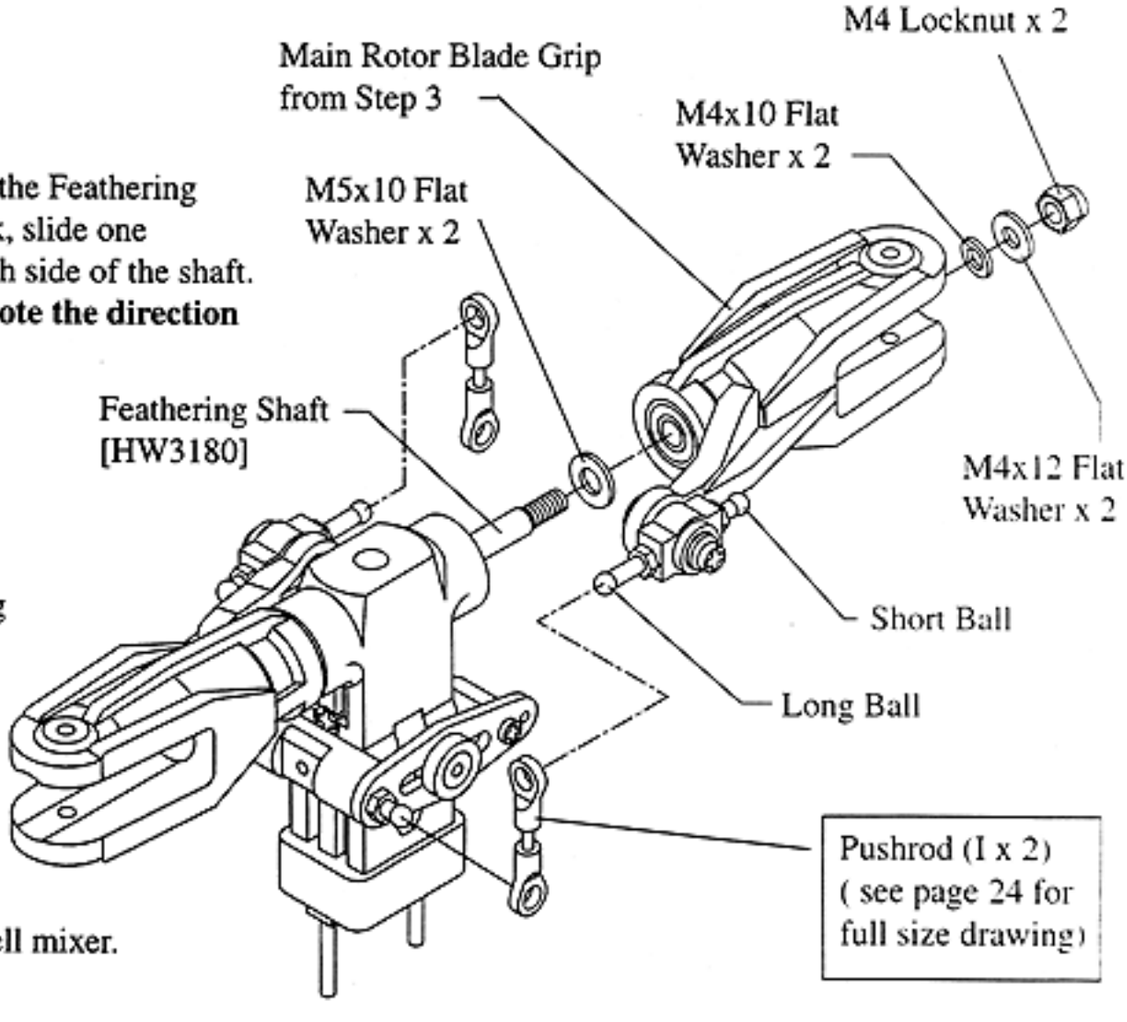
STEP 3

From parts bag 1, install one Long Ball and one Short Ball into the Bell Mixer, insert the slide tube into the bell mixer arm (**Note: the oilite bearing are pre-installed**) and secure onto the blade grip with one M3x16 Phillips machine screw and M3x7 Flat washer. Install two M5x13 Ball Bearings into both ends of the blade grip assembly. Complete the second blade grip in exactly the same way.



STEP 4

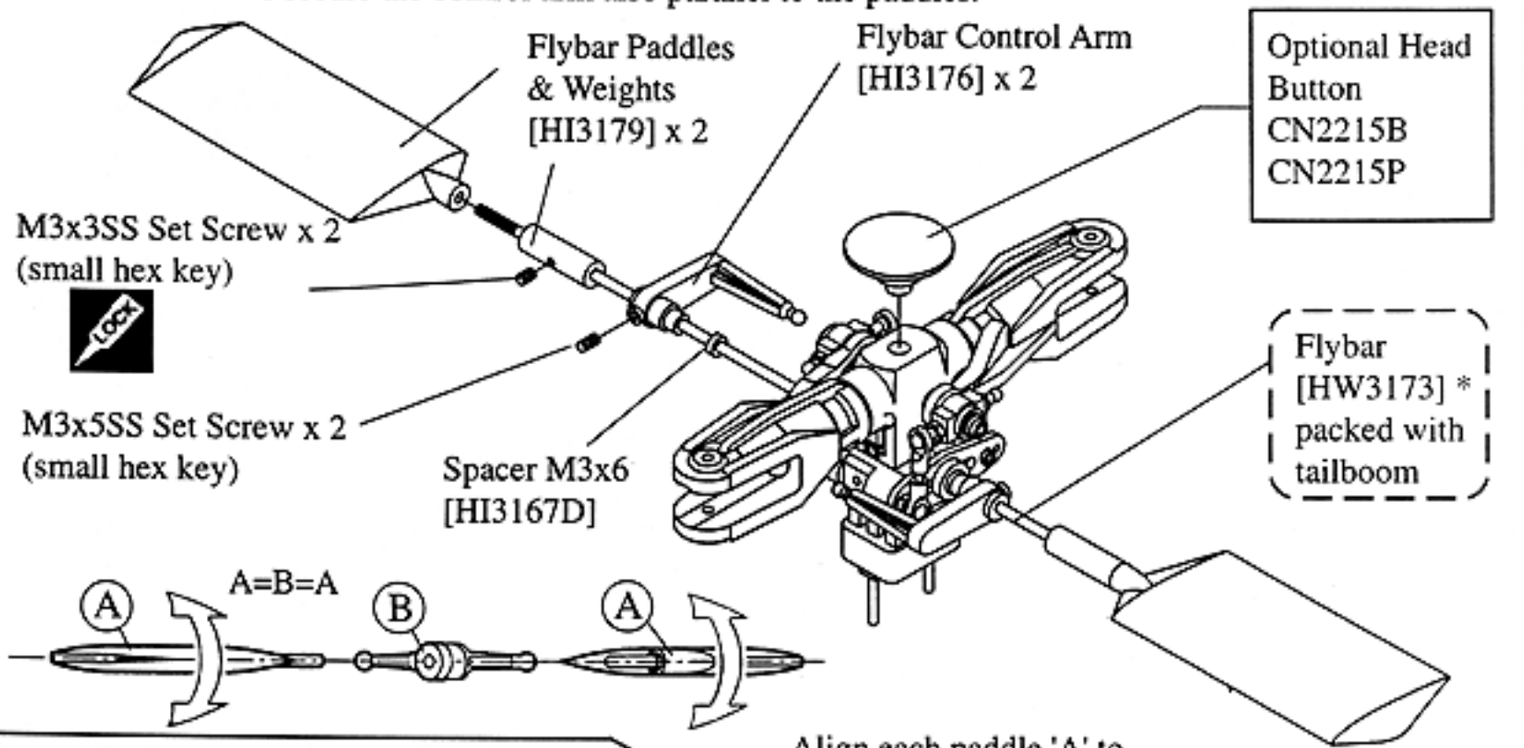
From parts bag 1, insert the Feathering Shaft into the head block, slide one 5X10mm Washer on each side of the shaft. Install the blade grip (**Note the direction of the bell mixer arm**) followed by one 4x10mm Washer, one 4x12mm Washer and one 4mm Locknut. Assemble Pushrod I x 2, measuring 35mm end to end distance following the diagram on page 24, and connect the seesaw arm to the long ball on the bell mixer.



STEP 5-6 Flybar, Paddles & Washout

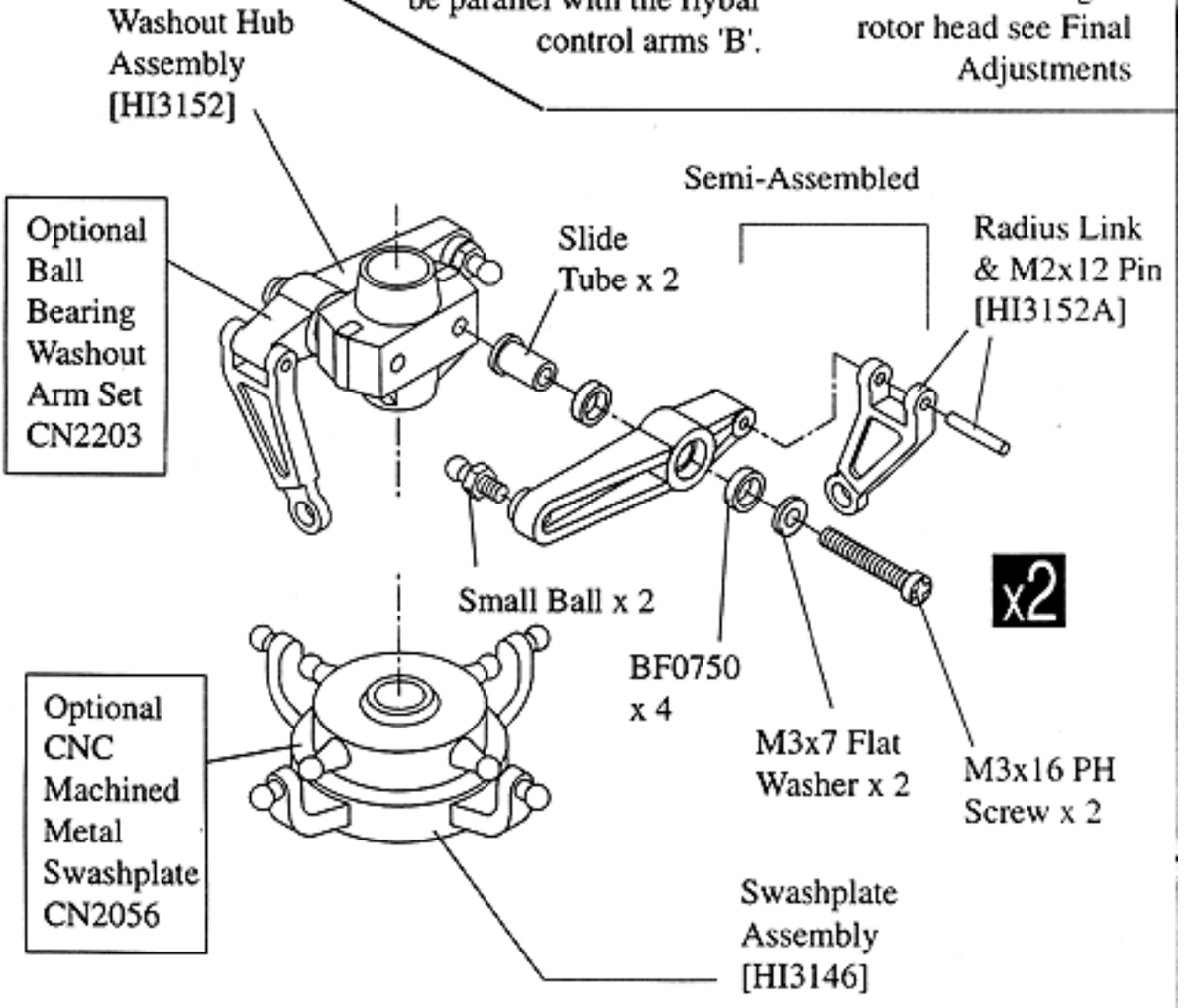
STEP 5

From parts bag 1, slide the Flybar through the seesaw arm assembly. Slide the Spacer, Flybar Control Arm and the Flybar Weight on the flybar. Screw on the Flybar Paddle completely onto the flybar and align the paddles parallel. Using two 3x3mm Set Screws secure the weight using threadlock, using two 3x5mm Set Screws secure the control arm also parallel to the paddles.



STEP 6

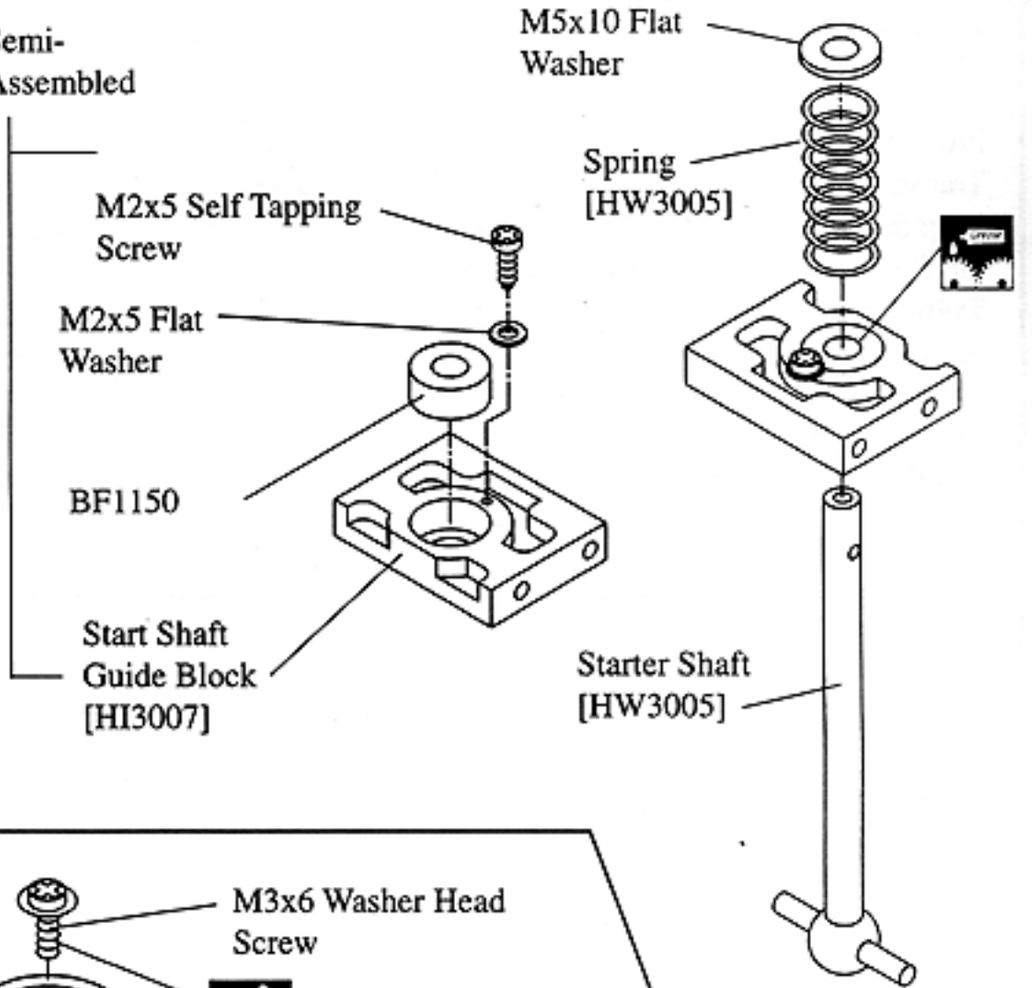
Attach two Short Balls to the Washout Mixing Arms (**Note, attach from the flat side of the arm**). Secure the semi-assembled mixing arms onto the Washout Hub using one slide tube inserted from the flat side and secured using one 3x16mm Phillips Machine Screw and 3x7mm Flat Washer per arm. Press the radius link on to the inner balls on the Swashplate.



STEP 7-8 Start Shaft

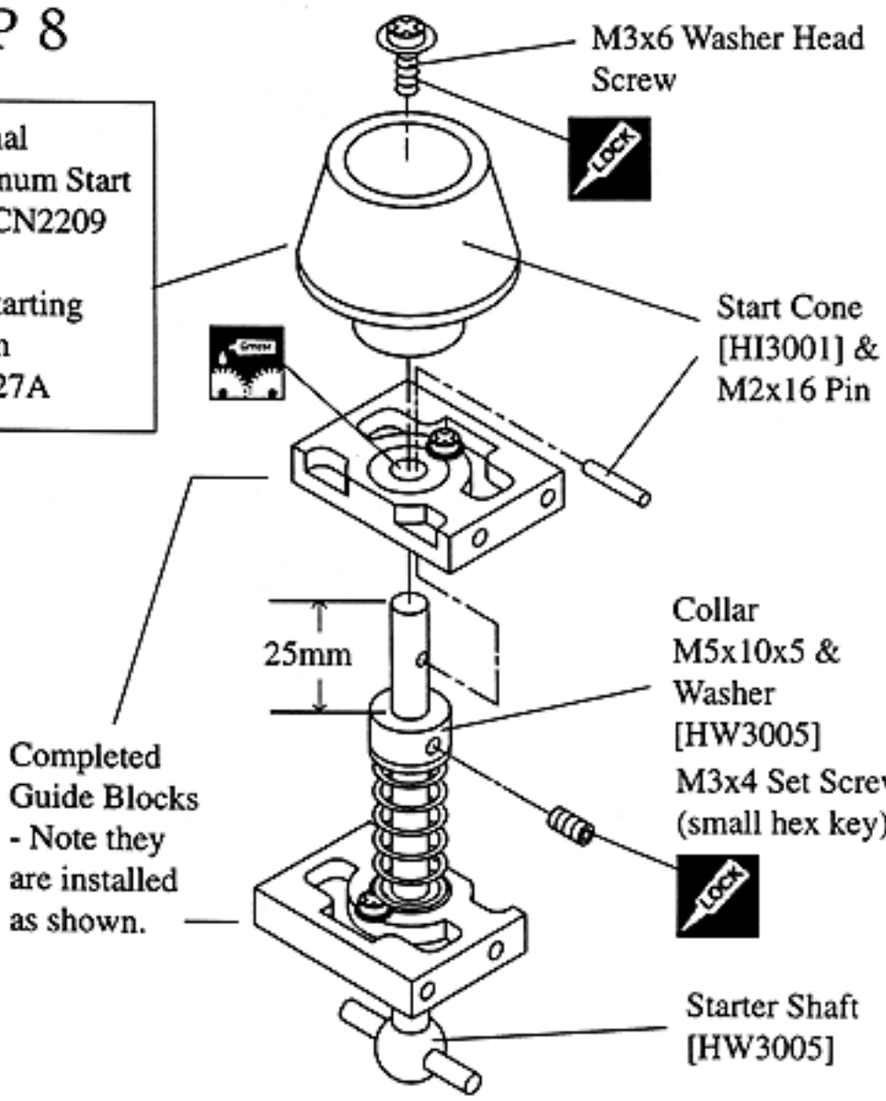
STEP 7

From parts bag 2, the Start Shaft Guide Blocks are pre-assembled. Slide the Starter Shaft through one of the block assemblies with the oilite bearing facing up and slide the spring and 5mm Washer onto the shaft.



STEP 8

Optional Aluminum Start Cone CN2209 & Hex Starting System CN0427A

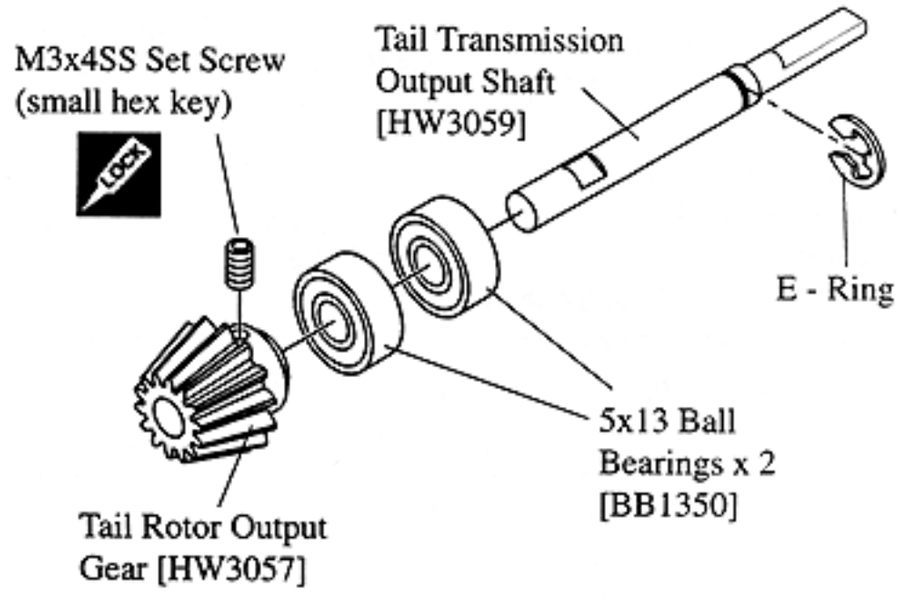


From parts in bag 2, slide the M5x10 Collar spaced 25mm from the top of the start shaft and secure with one M3x4 Set Screw using threadlock. Assemble the Starter Cone by installing the second Guide Block onto the start shaft, insert the pin through the hole in the top of the shaft and press the Start Cone over the pin, finally secure with one M3x6mm Washer Head Screw from inside the cone using threadlock. Apply some lubricant on the shaft after assembly to ensure smooth operation.

STEP 9-10 Output Shaft & Counter Gear

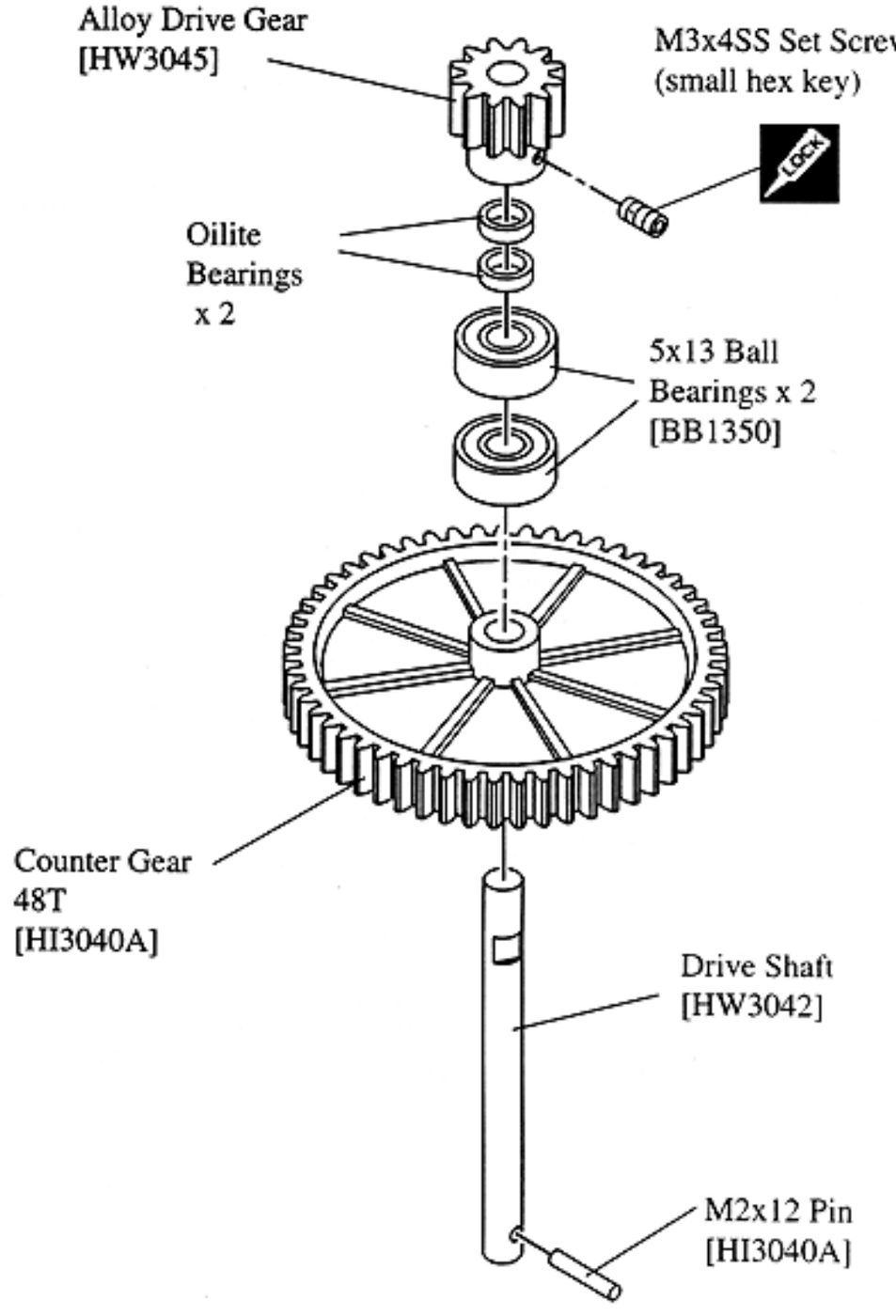
STEP 9

From parts bag 2, assemble the Tail Transmission Output Gear. Install the E-Ring then slide two Ball Bearings onto the Tail Rotor Output Shaft. Insert one 3x4mm Set Screw using threadlock into the gear, note where the flat spot is on the shaft and slide the gear on and tighten the set screw (**Make sure the set screw is positioned over the flat spot**).



STEP 10

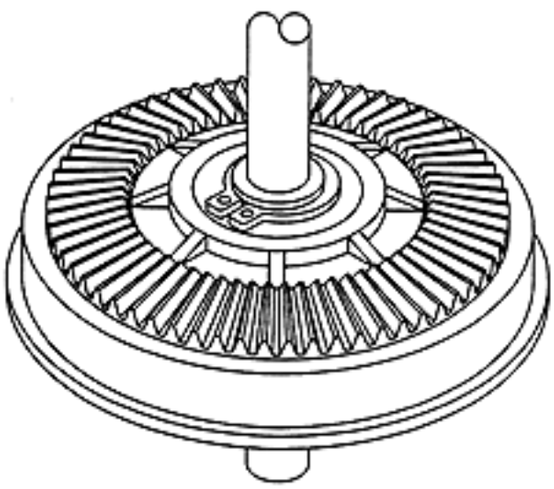
From parts bag 2, assemble the engine drive gear assembly, start by pressing the guide pin into the hole in the end of the Drive Shaft. Insert the shaft through the Counter Gear (**make sure the pin is fully seated in the recessed side of the gear**) then slide the two Ball Bearings followed by two oilite Bearings. Insert one 3x4mm Set Screw into the Alloy Drive Gear, then slide the gear onto the shaft taking care to position the set screw over the flat spot on the shaft. Test fit the gear assembly into one half of the upper side frames. The gear should not slide up the shaft, if it does, readjust the top pinion to remove the slop.Tighten the set screw using threadlock.



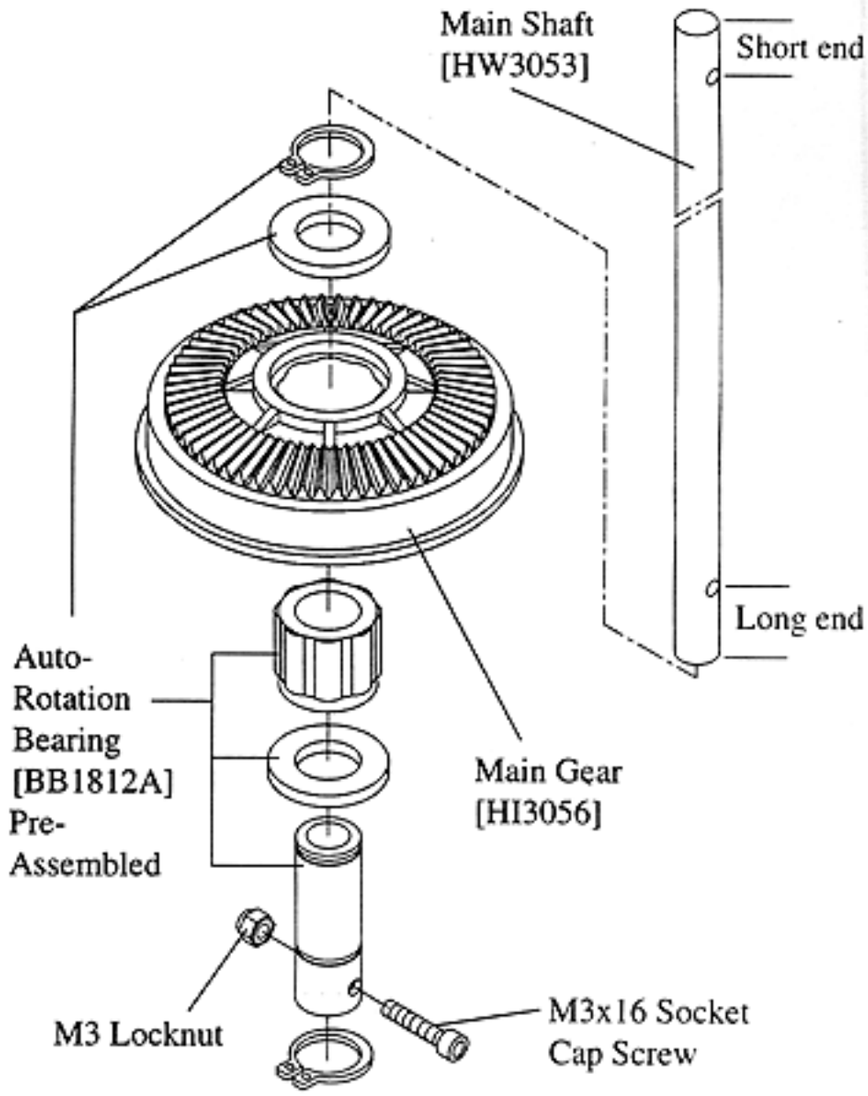
STEP 11-12 Auto Rotation, Main Gear & Elevator Bellcrank

STEP 11

The Main Gear is pre-assembled with the Auto-Rotation Bearing installed. From parts bag 2, the Main Shaft has two holes one farther from one end of the shaft, this end is the bottom of the shaft. Insert the bottom end through the auto rotation gear assembly aligning the holes and secure the Main Shaft using one 3x16mm Socket Cap Screw and one 3mm Locknut.

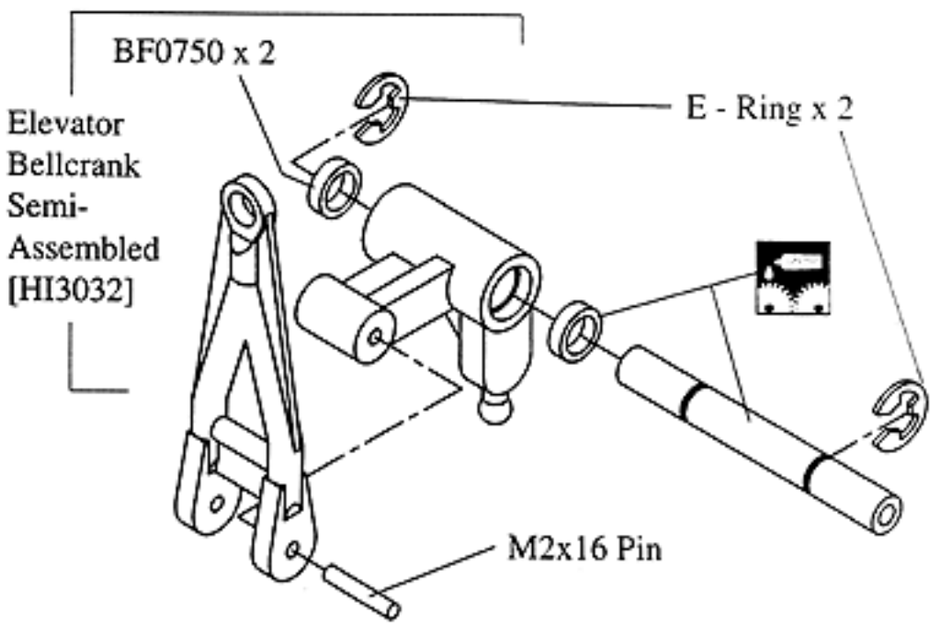


Completed Main Gear & Main Shaft



STEP 12

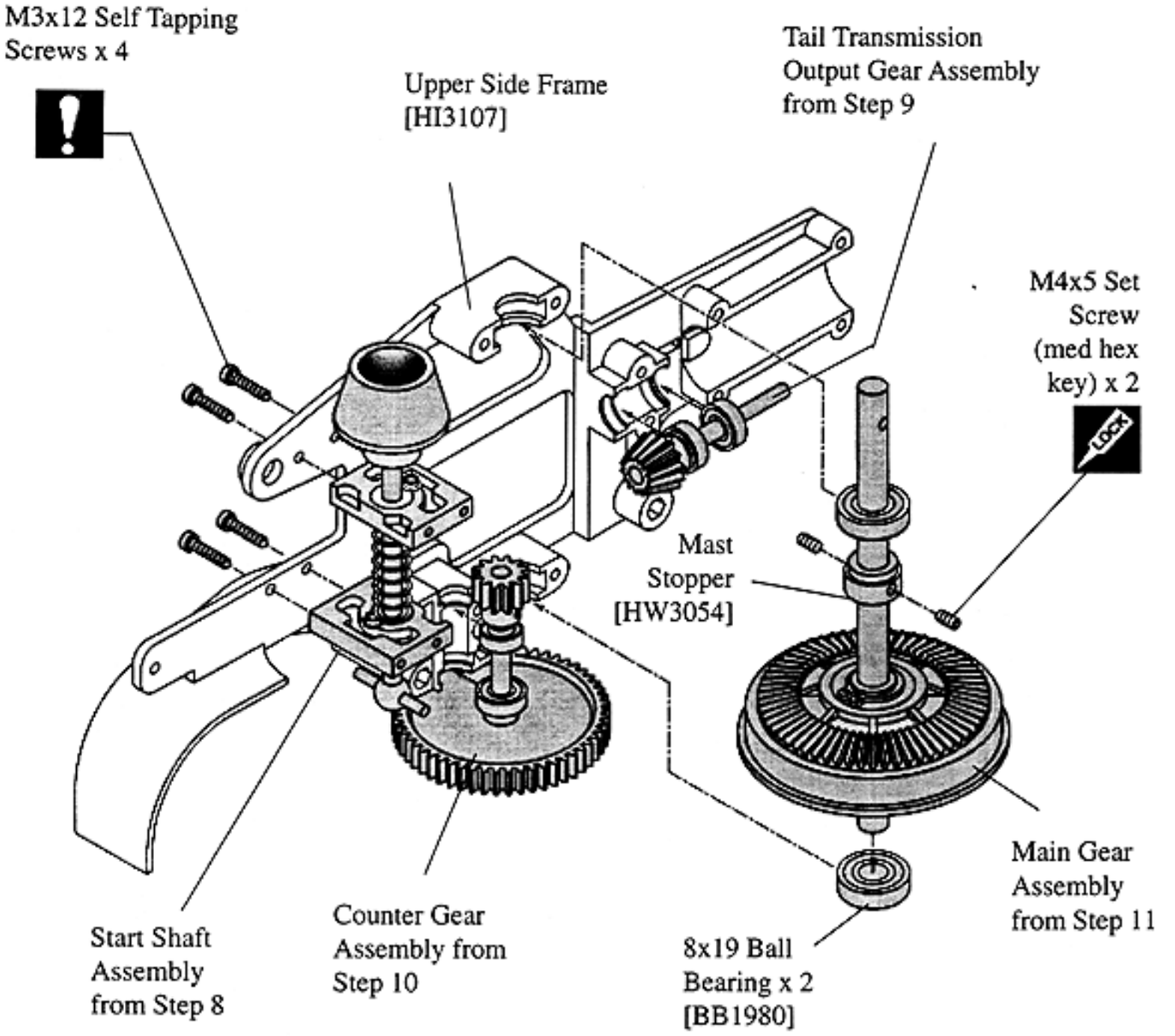
From parts bag 2, the elevator bellcrank assembly is semi-assembled, apply a small amount of lubricant to the elevator axle and slide through and secure with two E-Rings. The 2x16mm pin is assembled, just insure the elevator radius link moves freely against the Bellcrank.



STEP 13

From parts bag 2, install two 4x5mm Set Screws on the Mast Stopper then slide the mast stopper on the main shaft. Slide one M8x19 Ball Bearing on each end of the main shaft against the mast stopper and auto rotation assembly.

Attach the starter shaft assembly with four 3x12mm Self Tapping Screws[1] (**observe the correct direction of the block assemblies**). Position the auto rotation gear assembly, the elevator assembly, the counter gear assembly and the tail transmission output shaft assembly at the locations on the diagram into the upper right side frame (**Make sure the bearings are fully seated in the recesses.**)

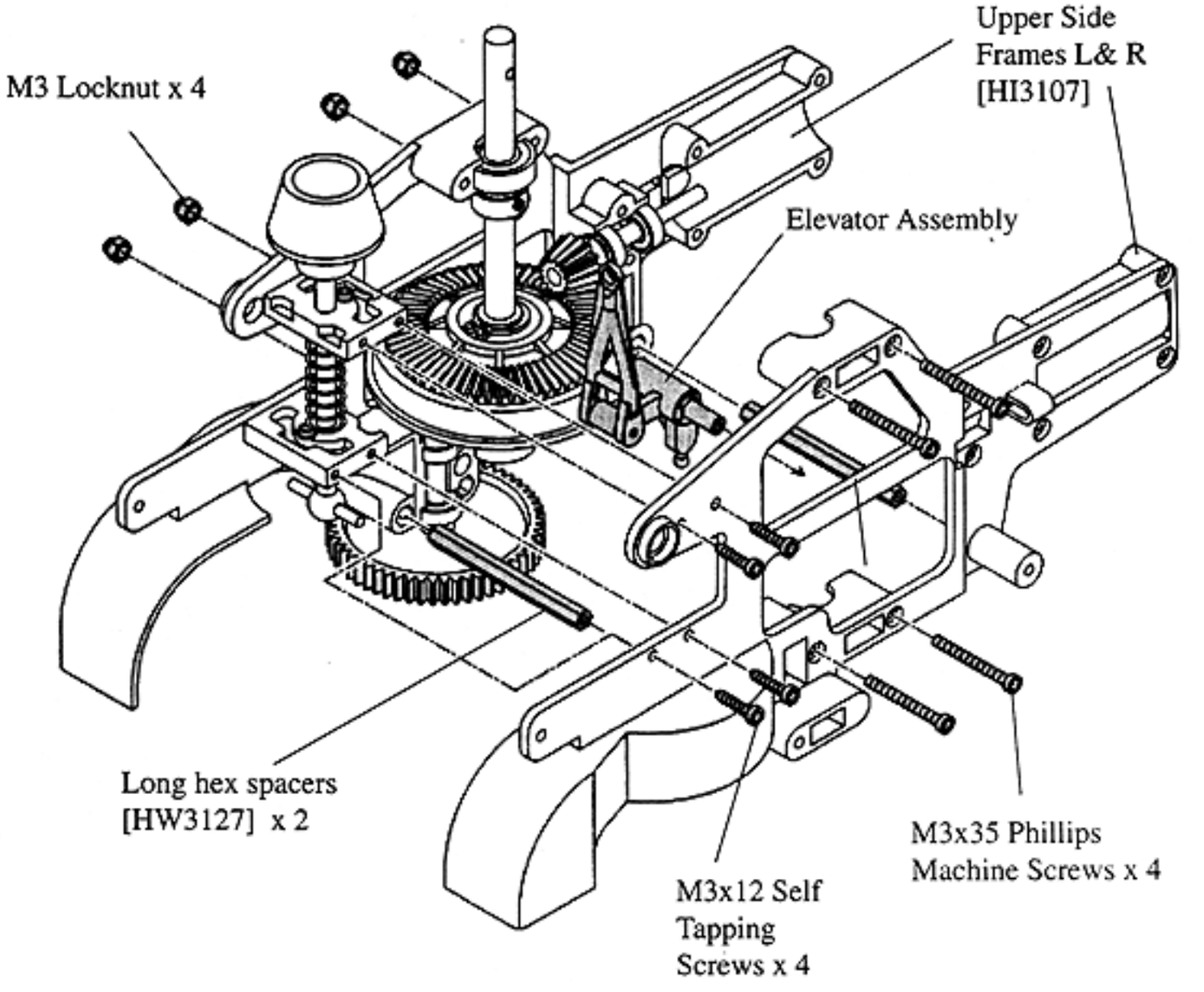


Note 1: Be careful when tightening the eight 3x12mm self tapping screws into the start shaft block assemblies as excessive force will strip out the plastic holes.

STEP 14

From parts bag 2, insert two long Hex Spacers at the specified locations in the diagram, note that the front hex spacer is installed into the forward-most hole. Install the upper left side frame, taking care that the bearings are aligned with the mating recesses and secure the frames with four 3x35mm Phillips Machine Screws through the main shaft bearing block positions and four M3 locknuts. It is advised to position the elevator assembly between the side frames at this time to reduce the amount of disassembly later.

While pulling up on the main shaft (make sure the main gear rotates), push the mast stopper against the upper ball bearing, apply threadlock to the set screws and tighten in place.



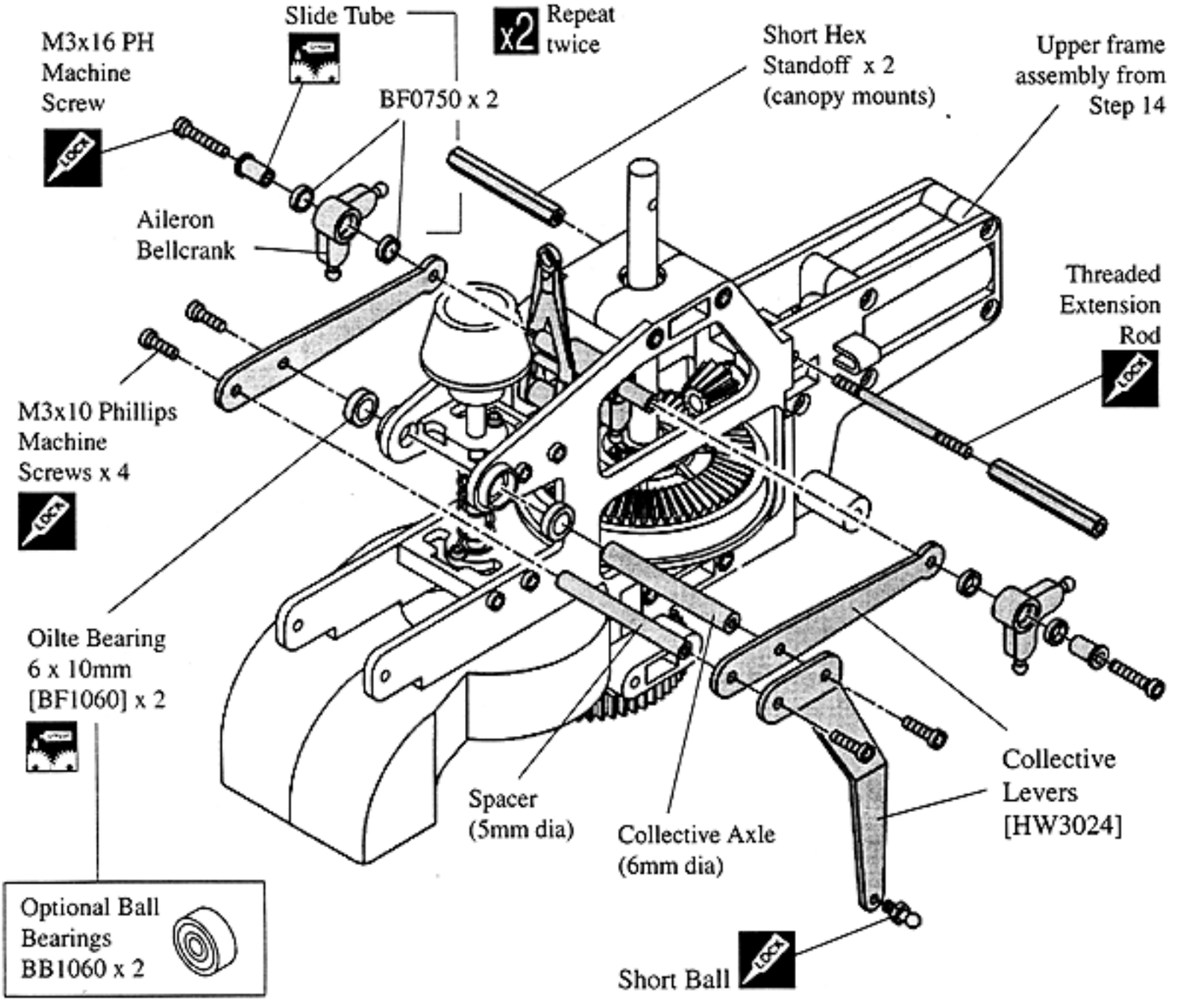
Note : The gear mesh between the main gear and the tail transmission output shaft should be a snug fit and will become smooth after a few flights, this is the normal wear in process.

STEP 15

From parts bag 2, press in two oilite Bearings into the front side frames for the collective axle. Attach the Front Collective Arm Spacer (5mm dia) and the Collective Axle (6mm dia) to the Right Collective arm (notice that the larger axle is attached at the middle hole) using two 3x10mm Phillips Machine Screws using threadlock. Slide the assembly through the Bronze Bearings in the upper frame sides from the right and attach the two Left Collective Arms with two 3x10mm Phillips Head Screws using threadlock (tighten the screws until the collective levers move freely with no side to side play.) Install one Short Ball on to the collective lever using threadlock.

The left Aileron Bellcrank has the two oilite Bearings pre-installed into the bellcrank, insert the slide tube through the bellcrank using a small amount of lubricant (**the bellcrank is offset, make sure the slide tube is inserted from the flat side**). Attach the bellcrank using one M3x16PH Phillips Machine Screw using threadlock through the collective lever, into the elevator bellcrank axle. Repeat for the other side.

Slide one Threaded Extension Rod through the upper position of the tail output bearing recess and secure two Short Hex Standoffs (one per side) using threadlock (these are to attach the canopy).

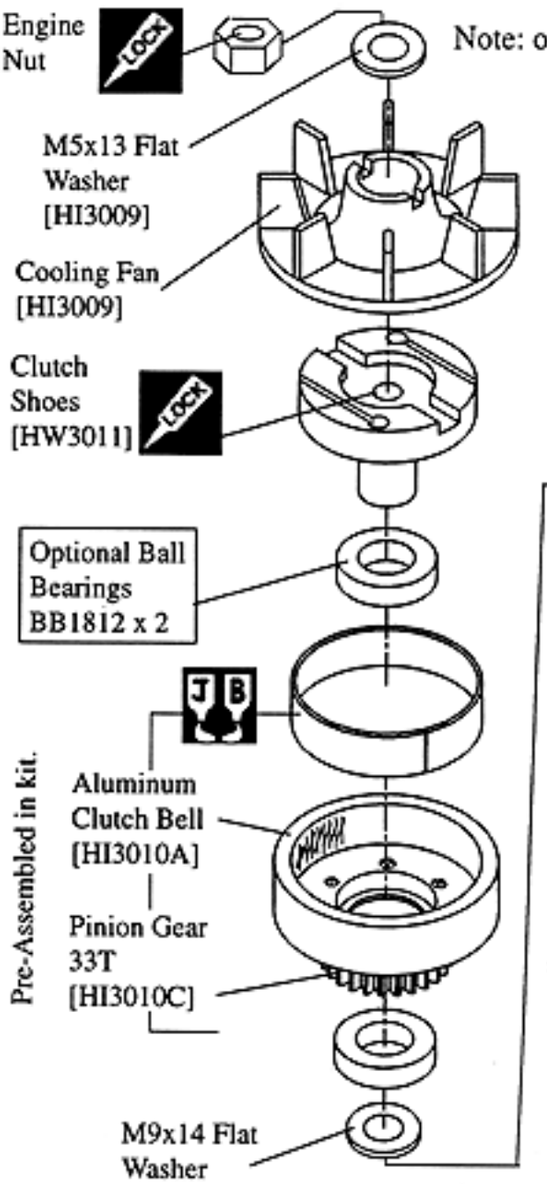


STEP 16-17 Clutch, Fan & Engine

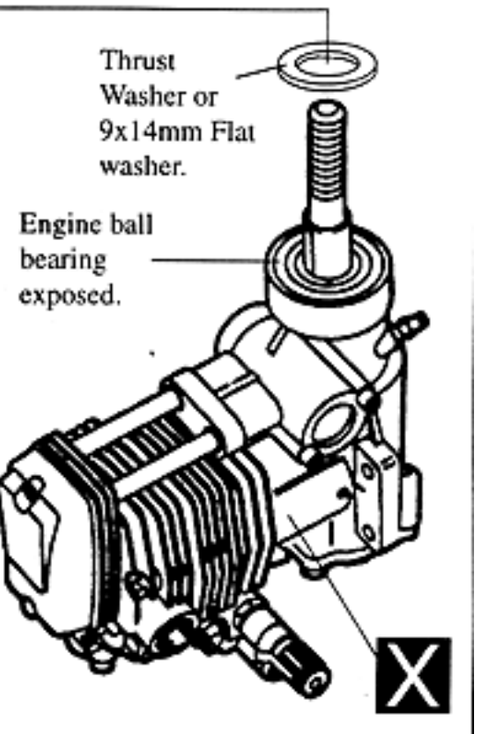
STEP 16 From parts bag 3.

Bond the Clutch Liner into the Clutch Bell by roughening the inside surface of the clutch bell with medium #320 grit sandpaper or scratch into the aluminum surface with an exacto knife. Trial fit the lining and trim in small increments until the lining fits snugly inside the clutch bell when placed end to end. Permanently glue the lining into the clutch bell with JB Weld. Use a piece of paper to set the clearance between the clutch and the bell while drying, remember to remove before final assembly.

Remove all parts from the engine crankshaft until you can see the front ball bearing, install the 9x14mm Flat washer, insert the oilite bearings into the clutch bell assembly and place on the crankshaft. Apply threadlock on the engine crankshaft threads nearest the bearing and on the threads in the clutch and tighten. In order to tighten the clutch and the engine nut the backplate and carburetor have to be removed. With this done, insert a wooden clothes pin to hold the crankshaft and connecting rod from moving.



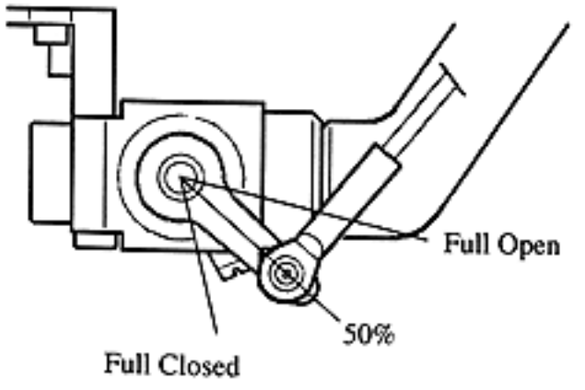
Note: only use a soft wooden tool here as not to damage the engine. Press on the fan and engage into the clutch followed by one 6.5x13mm Washer. Apply a liberal amount of threadlock to secure the nut that came with the engine from the inside of the fan assembly using.

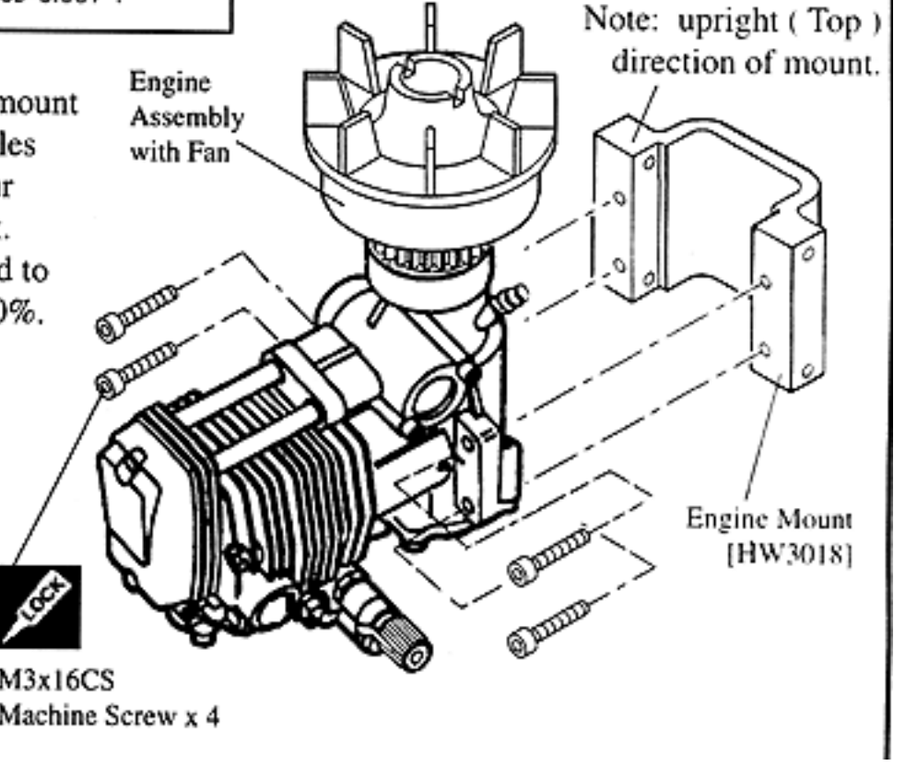


! It is critical that the gap between the clutch shoe and the lining be 0.005-0.007".

STEP 17

Secure the engine assembly on to the engine mount (make sure the mount is installed with the holes closest to the bottom of the engine) using four 3x16mm Socket Cap Screws using threadlock. The plastic throttle arm has to be re-positioned to get equal throw, both open and closed from 50%.

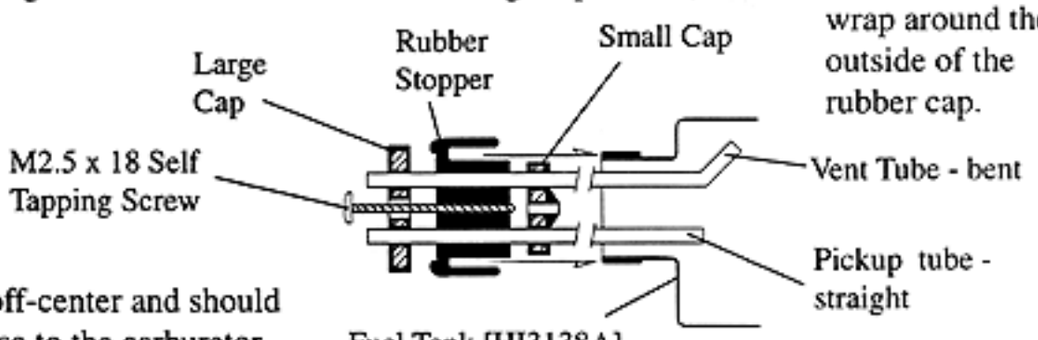




STEP 18-19 Fuel Tank & Lower Frames

STEP 18

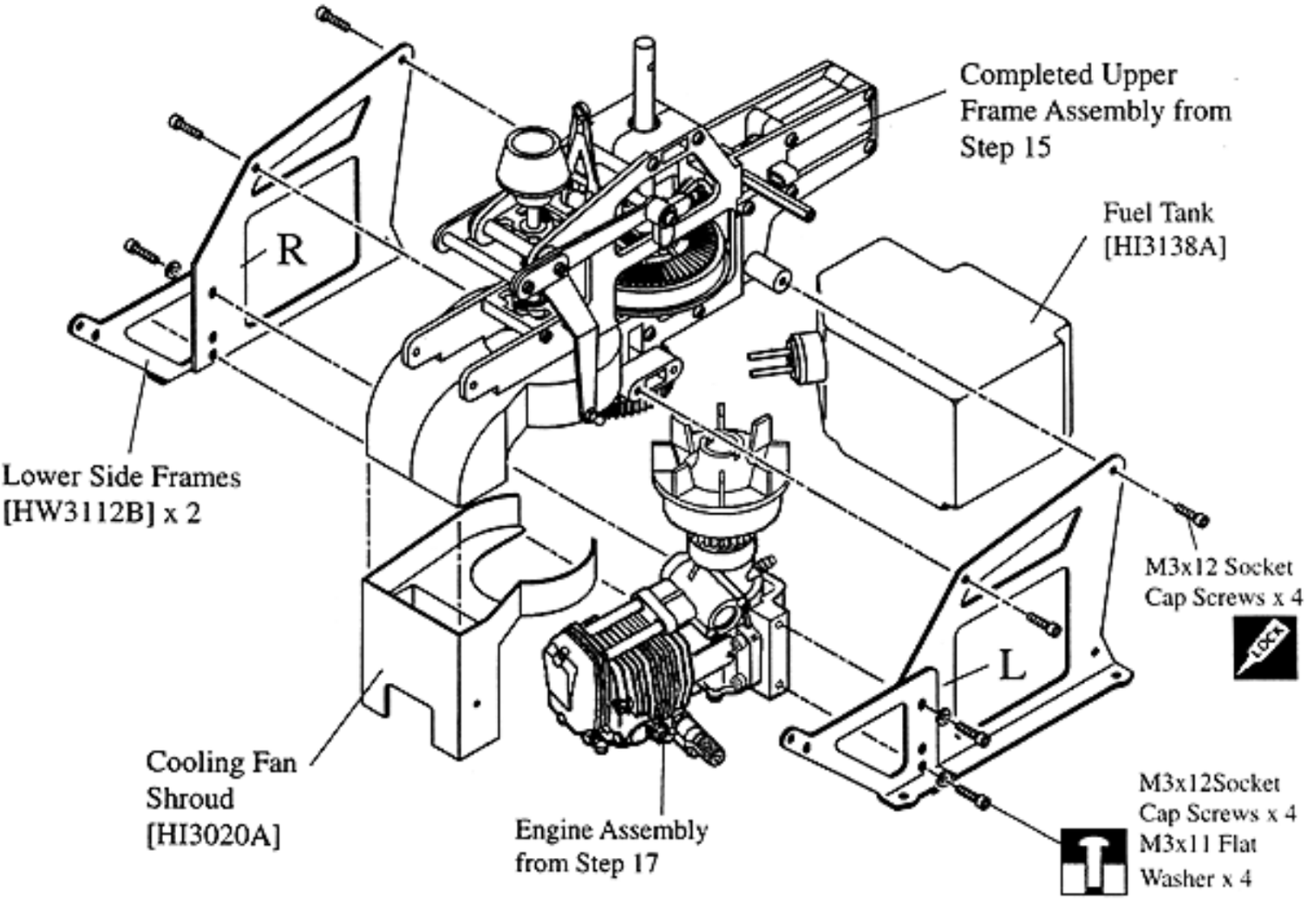
From parts bag 3, insert the two pieces of aluminum tubing through the large cap, rubber stopper and small cap, bend the long aluminum tube upwards and attach the short piece of fuel line and clunk to the short straight piece of tubing. Test fit the assembly into the Fuel Tank and make sure that the clunk reaches the end but moves freely and the vent tube is near the top of the tank but does not touch. Finally tighten the long self tapping screw to seal the tank. For the higher pressure, install the included tie wrap around the outside of the rubber cap.



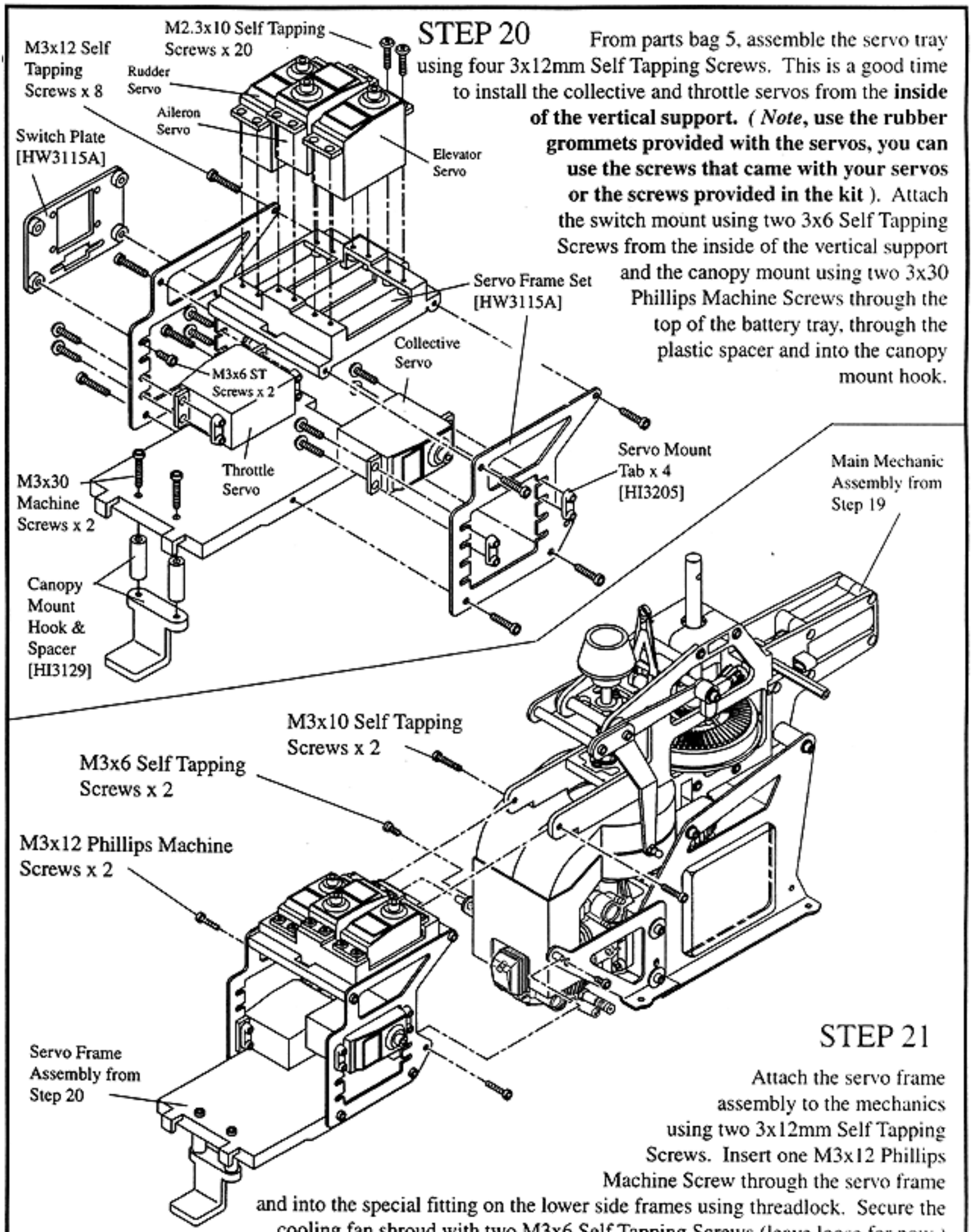
Note: The fuel tank opening is off-center and should be installed upwards to align close to the carburetor.

STEP 19

Attach the right lower frame(R) to the upper frame assembly with two 3x12mm Socket Cap Screws using threadlock. Slide the cooling Fan Shroud over the engine head and position the engine assembly into the upper frames while attaching the two M3x12 Socket Cap Screws through the R side frame (leave these loose for now). Slide the fuel tank assembly through the frame and attach the left lower side frame (L) to the upper side frames using two M3x12 Socket Cap Screws using threadlock. Attach two M3x12 Socket Cap Screws and two M3x11 Flat Washers to the engine mount, loosely for now.



STEP 20-21 Servo Frames & Main Mechanics



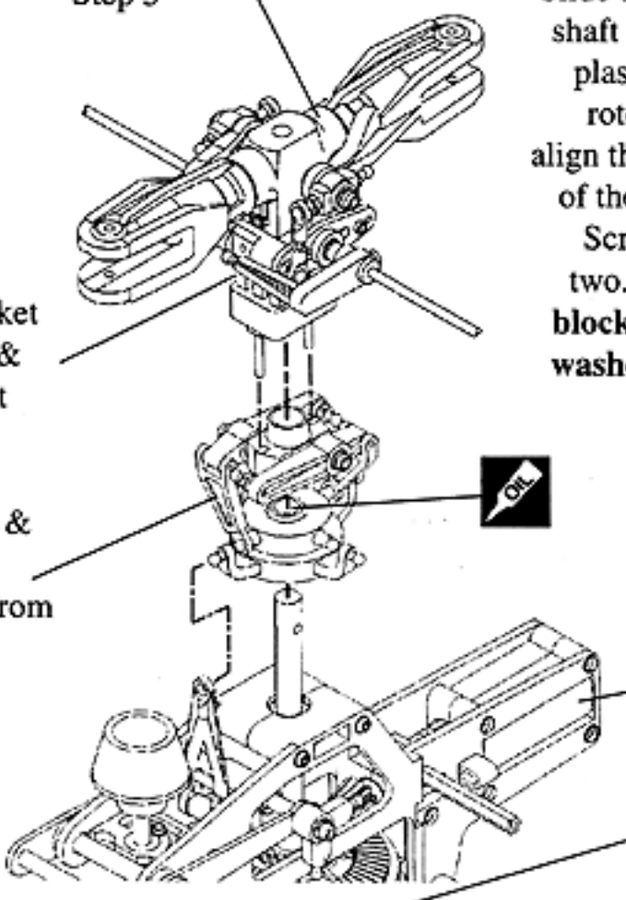
STEP 20

From parts bag 5, assemble the servo tray using four 3x12mm Self Tapping Screws. This is a good time to install the collective and throttle servos from the **inside of the vertical support.** (*Note*, **use the rubber grommets provided with the servos, you can use the screws that came with your servos or the screws provided in the kit**). Attach the switch mount using two 3x6 Self Tapping Screws from the inside of the vertical support and the canopy mount using two 3x30 Phillips Machine Screws through the top of the battery tray, through the plastic spacer and into the canopy mount hook.

STEP 21

Attach the servo frame assembly to the mechanics using two 3x12mm Self Tapping Screws. Insert one M3x12 Phillips Machine Screw through the servo frame and into the special fitting on the lower side frames using threadlock. Secure the cooling fan shroud with two M3x6 Self Tapping Screws (leave loose for now)

STEP 22 Final Rotor Head Assembly



STEP 22

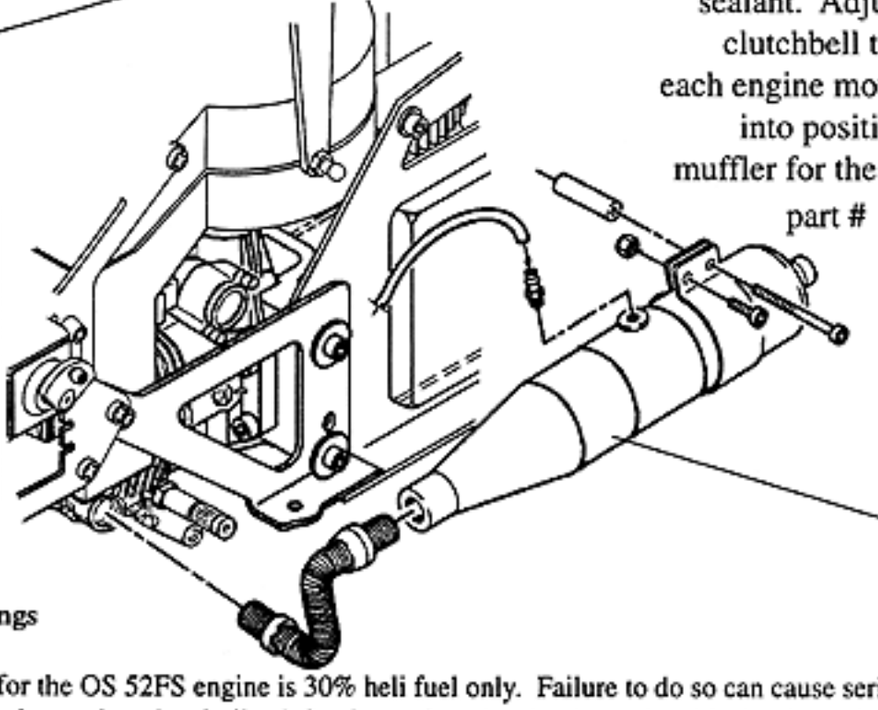
Slide the washout assembly from Step 6 onto the main shaft and snap the elevator radius arm onto one of the plastic balls on the swashplate. Slide the completed rotor head assembly from Step 5 onto the shaft and align the hole in the head block with the hole in the top of the main shaft and insert one 3x16mm Socket Cap Screw and 3mm locknut (from Bag 2) to secure the two. **(Note: Make sure the pins in the rotor head block are aligned and inserted into the holes in the washout unit.)** Apply some oil sparingly to the oilite Bearings to insure they slide smoothly.

Folllowing assembly, if swashplate or washout do not move smoothly, bend the washout pins in slightly with pliers until free movement is attained.

STEP 23

Attach the muffler to the engine with the hardware provided with the muffler using a high temperature automotive sealant. Adjust the engine height so clutchbell turns freely and remove each engine mount bolt and threadlock into position. The recommended muffler for the Phoenix kit is optional part # CN3047A or CN3048.

After adjusting the engine height threadlock the four M3x12 Socket Cap Screws in position.



Optional CN3048 Muffler. CN3047A Super Mini Tune Pipe System

X Not Included

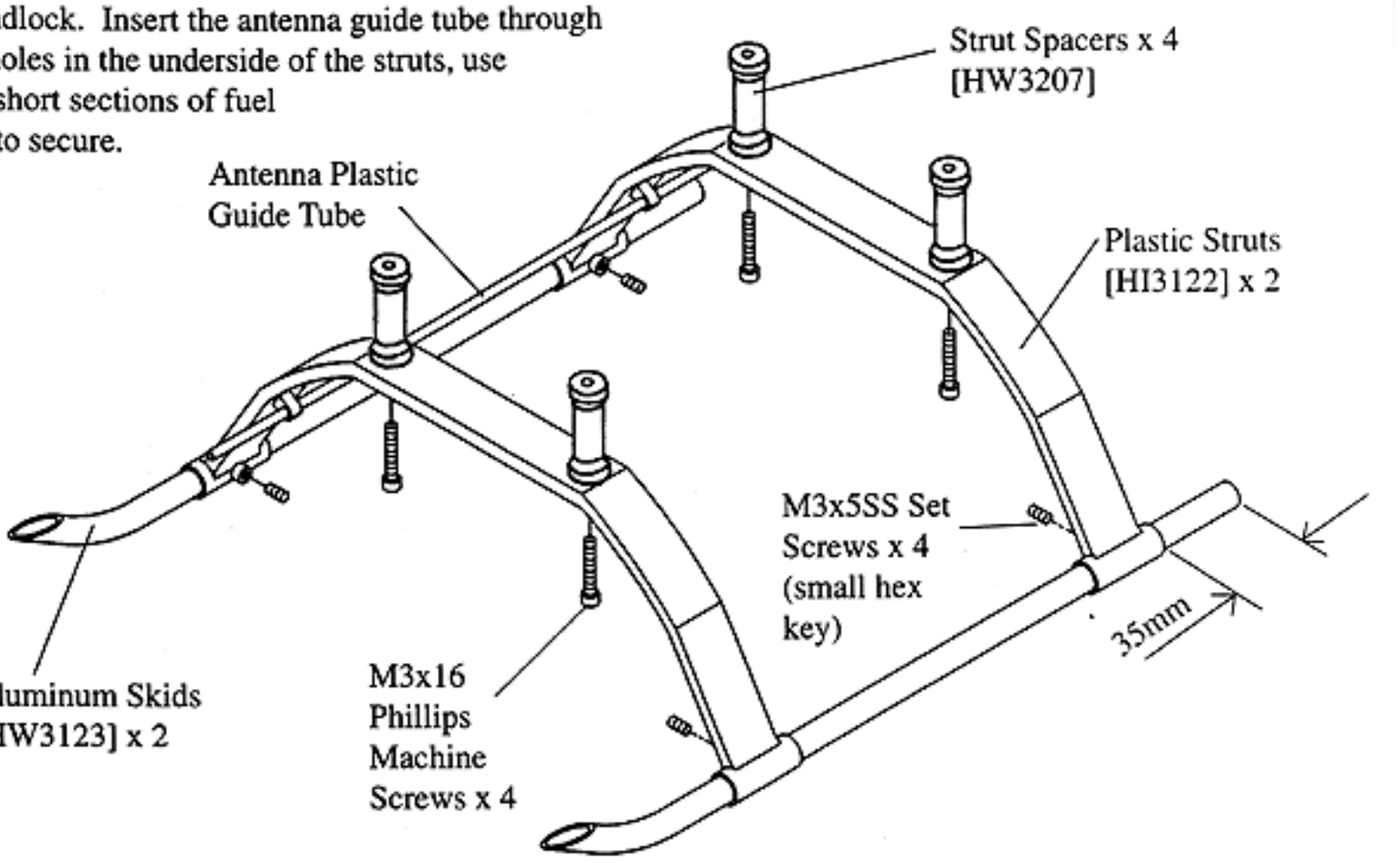
Adjustments & Warnings

1. The only fuel to use for the OS 52FS engine is 30% heli fuel only. Failure to do so can cause serious problems.
2. As the engine RPM is lower than the similar 2-Stroke engine, the clutch gap is critical to have the minimum clearance.
3. The sound from the engine is barely detectable, you will not be able to tell if the engine is running lean while flying! The exhaust is also a false reading, the engine will produce thick white smoke at all times, there will be no thining or changing to a grey colour common on 2- Stroke engines.
4. If the helicopter appears to be losing power, verify that the engine is not running lean and overheating. Richen the engine.
5. Due to the high torque from the engine, the rudder pushrod needs to be shorten slightly to retrim the tail.

STEP 24-25 Landing Gear & Tail Output Shaft

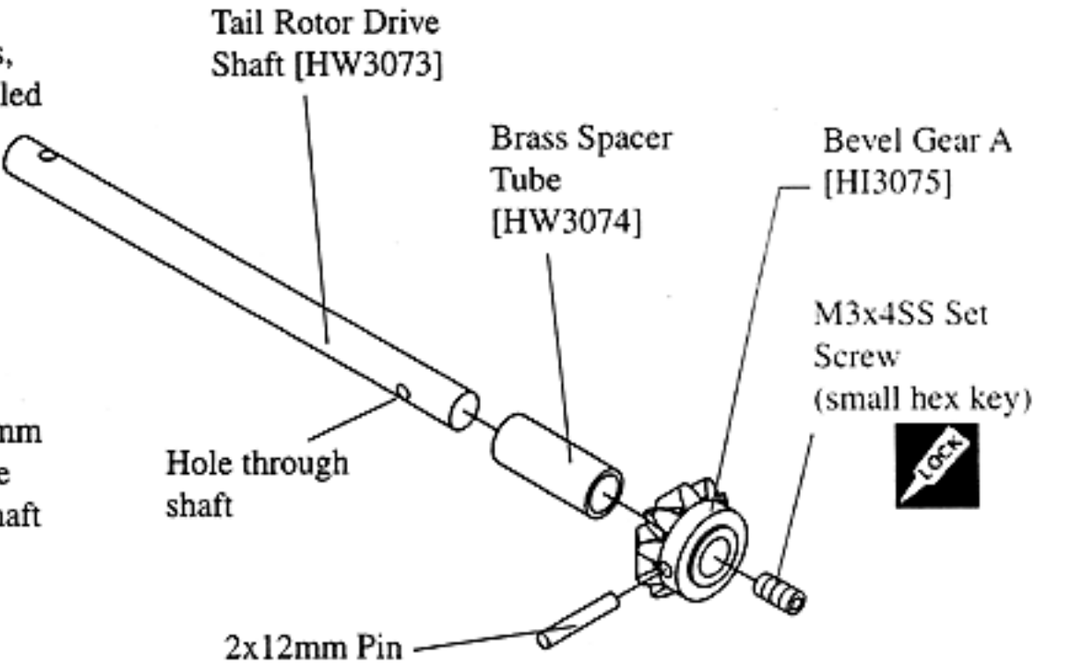
STEP 24

From parts bag 6, assemble the landing gear by attaching the Aluminum Skids through the Struts, securing them with four 3x5mm Set Screws. Set the distance from the rear of the skid to the strut at 35mm. Position the front strut to align with the front hole on the lower side frames. Attach the spacers to the struts using four 3x16mm Phillips Machine Screws using threadlock. Align the struts to the holes in the lower side frames and secure with four 3x8mm Socket Head Cap Screws using threadlock. Insert the antenna guide tube through the holes in the underside of the struts, use two short sections of fuel line to secure.



STEP 25

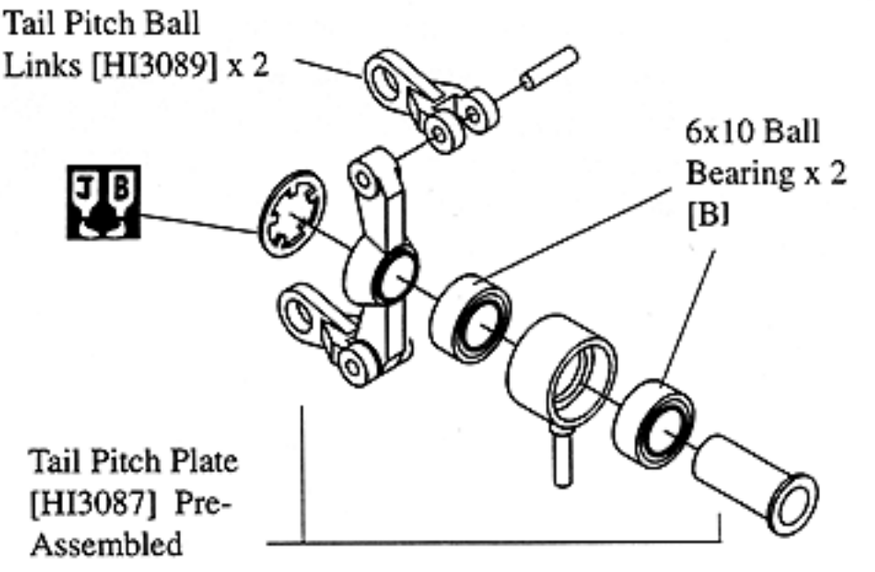
From parts bag 7, notice that the Tail Rotor Drive Shaft has 2 holes, one through the shaft and one drilled partially into the shaft. Slide the small Bevel Gear with the teeth facing the shaft from the end with the through hole and position the gear aligning the holes. Press the 2x12mm Pin through and secure with one 3x4mm Set Screw using threadlock. Slide the Brass Spacer Tube onto the shaft and position against the gear.



STEP 26-28 Tail Rotor Output Assembly

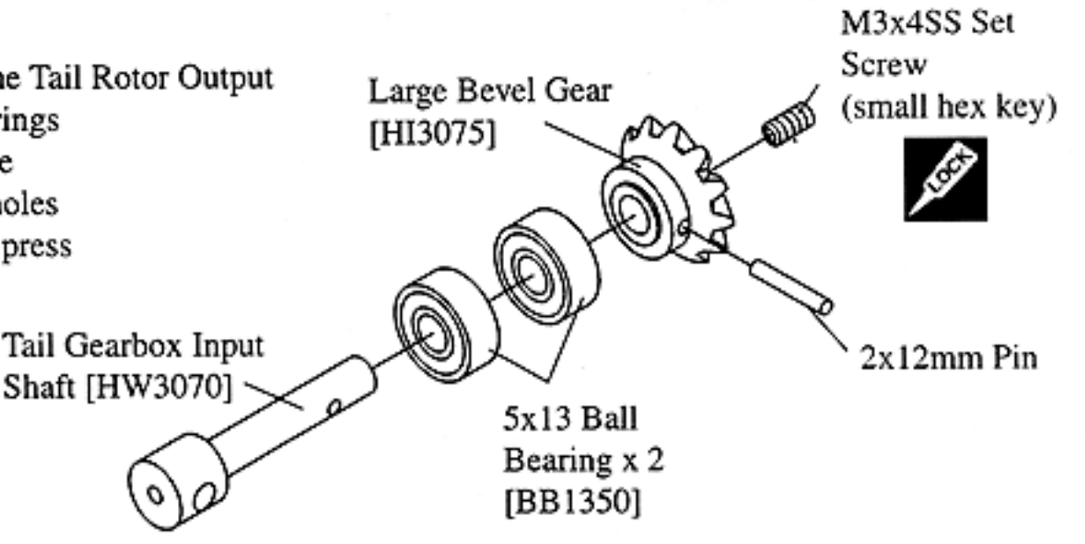
STEP 26

From parts bag 7, the Tail Pitch Plate and Tail Pitch Ball Links are pre-assembled. **(Note: apply some JB weld to the outside of the lock ring to avoid the assembly loosening.)** Put this assembly aside for now.



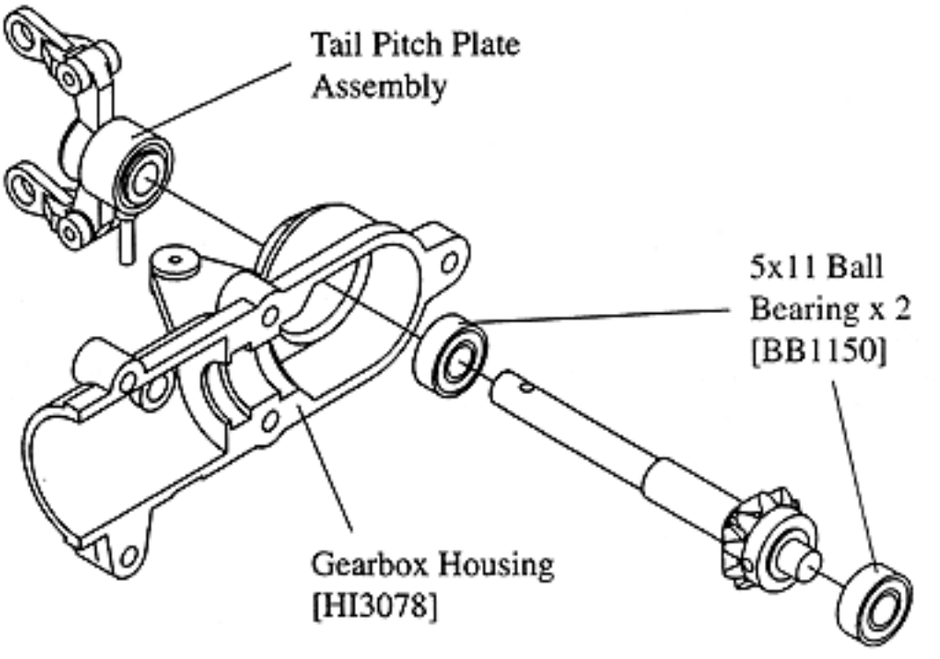
STEP 27

From parts bag 7, assemble the Tail Rotor Output Shaft by sliding two Ball Bearings on to the shaft followed by the large Bevel Gear. Align the holes on the gear with the shaft and press in one 2x12mm Pin and secure with one 3x4mm Set Screw using threadlock.



STEP 28

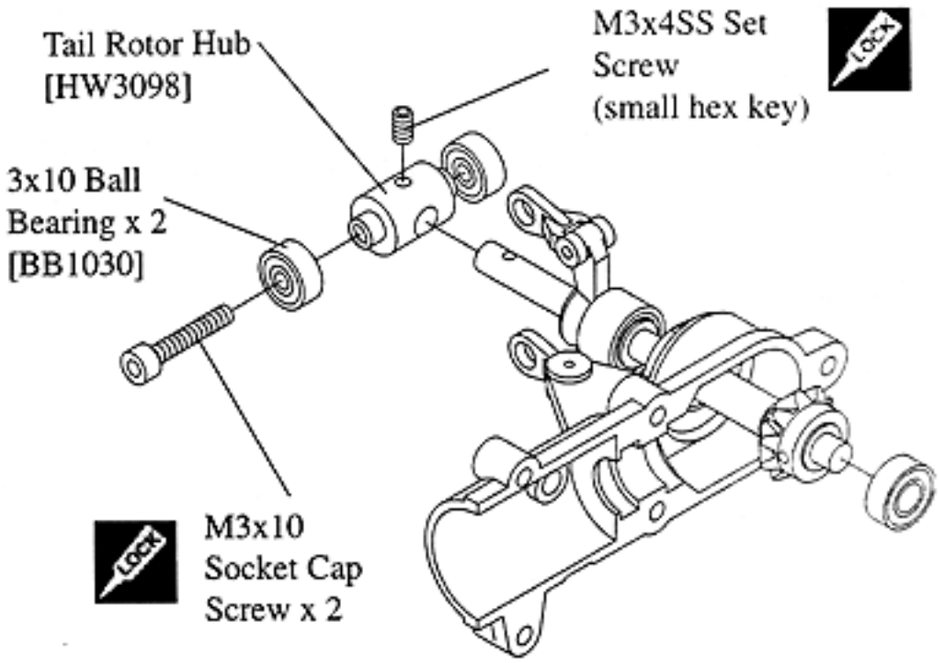
Slide two Ball Bearings on each side of the Tail Rotor Drive Shaft assembly and insert through the right side of the Tail Rotor Gearbox Housing, make sure the bearing is fully seated into the recess. Slide the tail rotor pitch plate assembly on the shaft.



STEP 29-30 Tail Rotor Hub & Tail Rotor Grips

STEP 29

From parts bag 7, install the Tail Rotor Hub on to the tail rotor drive shaft, (**position the hub so the hole is aligned over the notch in the shaft**) and secure with one 3x4 mm Set Screw using threadlock. Using one 3x16mm Socket Cap Screw , attach one Ball Bearing on each side of the hub assembly using thread-lock (**apply the threadlock to the threads in the hub to avoid getting threadlock into the bearings**).

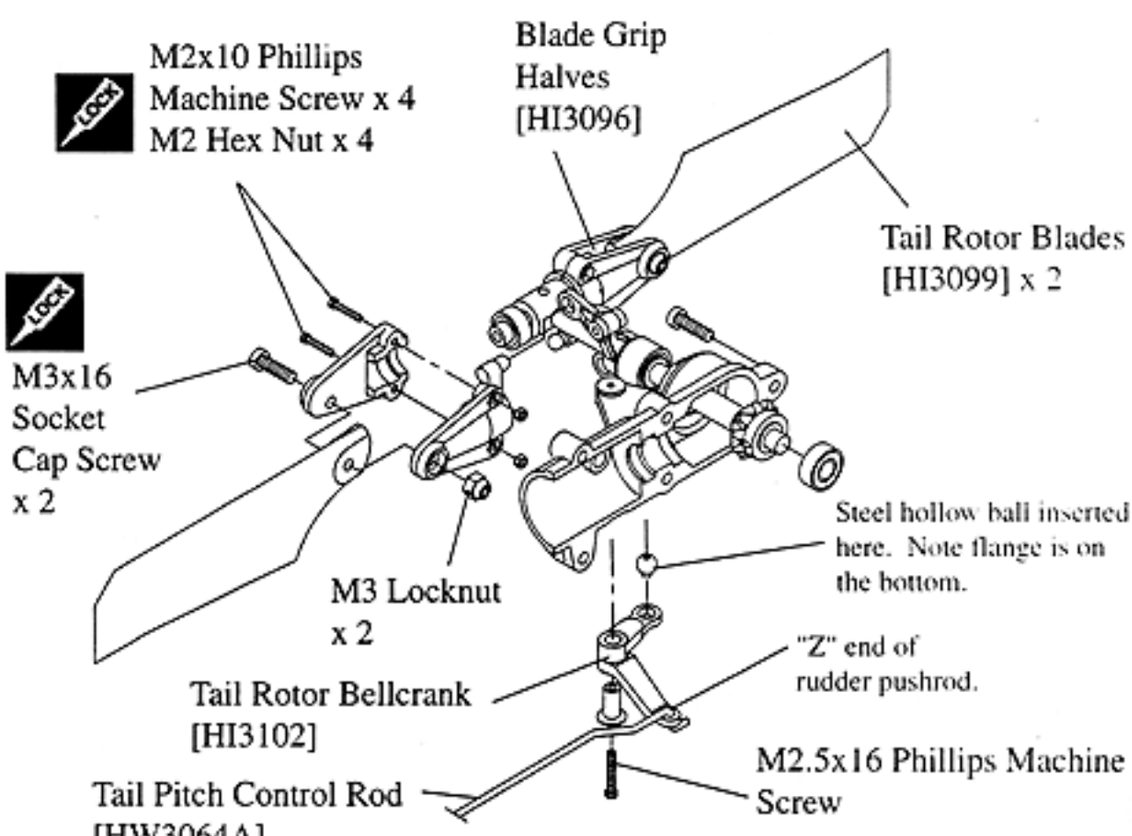


STEP 30

From parts bag 7, assemble the Blade Grip Halves over the bearings with the nuts on the gearbox side using two 2x10mm Phillips Machine Screws and 2mm Nuts using threadlock. Snap the ball on the tail rotor grip into the adjoining pitch slider link on both sides.

Install the Tail Rotor Blades using two 3x16mm Socket Cap Screws and M3 locknuts. Note the direction of the blades on the diagram, the leading straight edge of the blade should be on the same side as the ball on the blade grip.

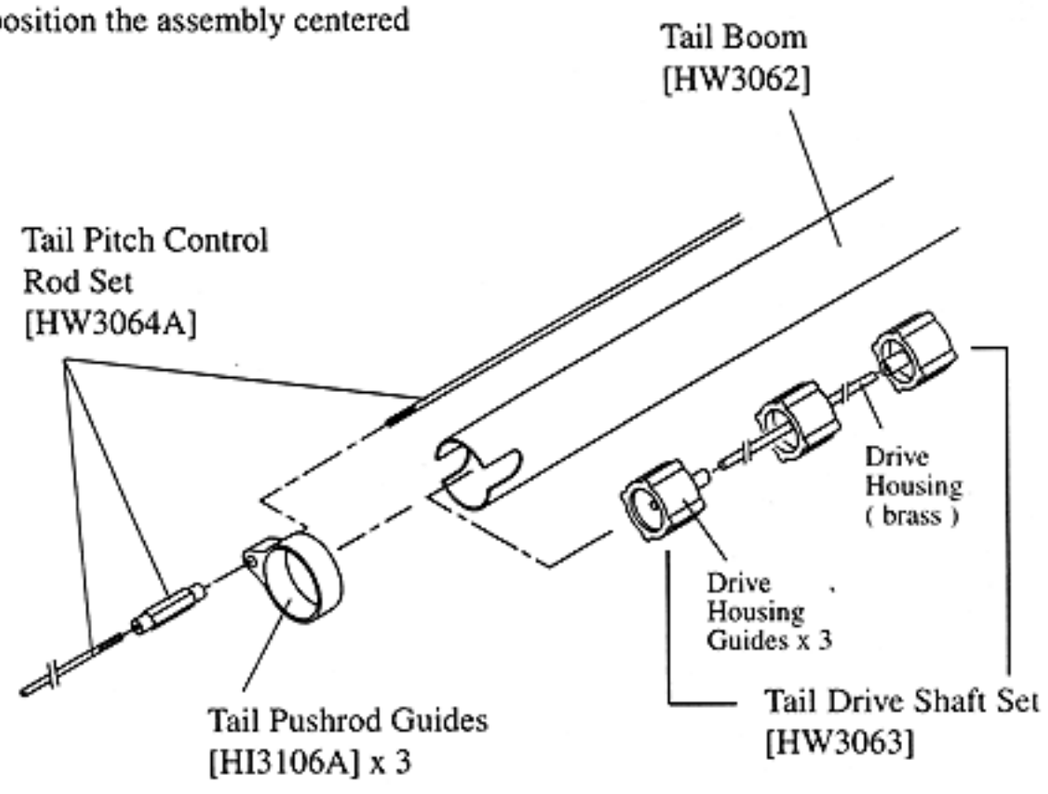
Press a steel hollow ball with the flange on the bottom into the Tail Rotor Bellcrank, install the rudder pushrod "z" bend, inserted from the top of the bellcrank and install the bellcrank arm on to the tail rotor gear box with one 2.5x16mm Phillips Machine Screw, in-serted through the brass bushing with the washer side on the bottom (**make sure the steel ball is engaged on the pin of the tail rotor pitch slider assembly**).



STEP 31-32 Tail Guide & Tail Drive Shaft

STEP 31

From Bag 7, insert three tail drive shaft Guides on to the Brass Tail Drive Housing, found in the bottom of the box (**Note that one guide has a larger center hole than the others, slide this one to the center of the brass tube**), add the remaining two onto the ends. Glue the guides into position using Zap Ca on the brass tube. Insert the rod guide assembly into the tailboom from the end with the 2 holes and position the assembly centered in the tailboom (**gentle tapping with a wooden dowel will easy the insertion of the guides**). Slide thethree tail pushrod guides onto the tailboom engaging tail pushrod. Thread the pushrod connector onto the long pushrod, the short pushrod will be attached in Step 36.

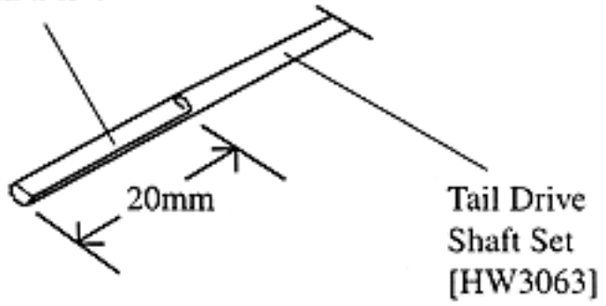


Make sure the brass tubing is glued to the internal guides for the tail boom. Also, after radio set up is complete glue the pushrod guides using a single drop of Zap Ca. One drop will stop the pushrod from binding and still be able to remove them later.

STEP 32

The Tail Drive Shaft has one end flattened to engage into the main mechanics the other end needs to have a flat spot 20mm long filed on the round end of the shaft for the two 4x4mm Set Screws in the tail rotor input shaft. Thoroughly grease the tail drive shaft and insert the newly filed end into the tailboom end with the slots into the drive shaft housing assembly (**ensure the end with the new flat spot exits the tailboom end with the round holes**) and degrease both ends of the shaft.

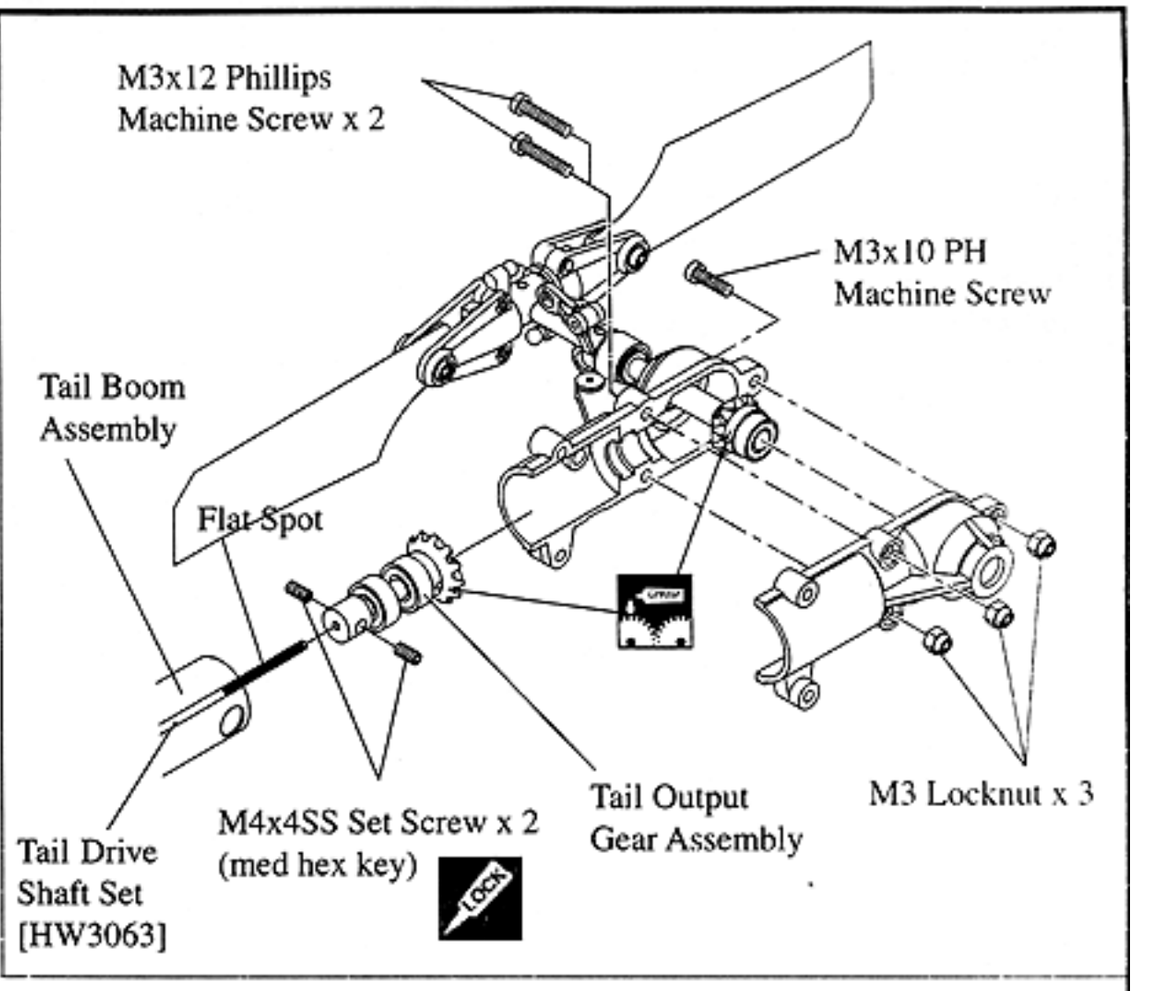
Put a flat spot on the the round end of the Tail Drive Shaft.

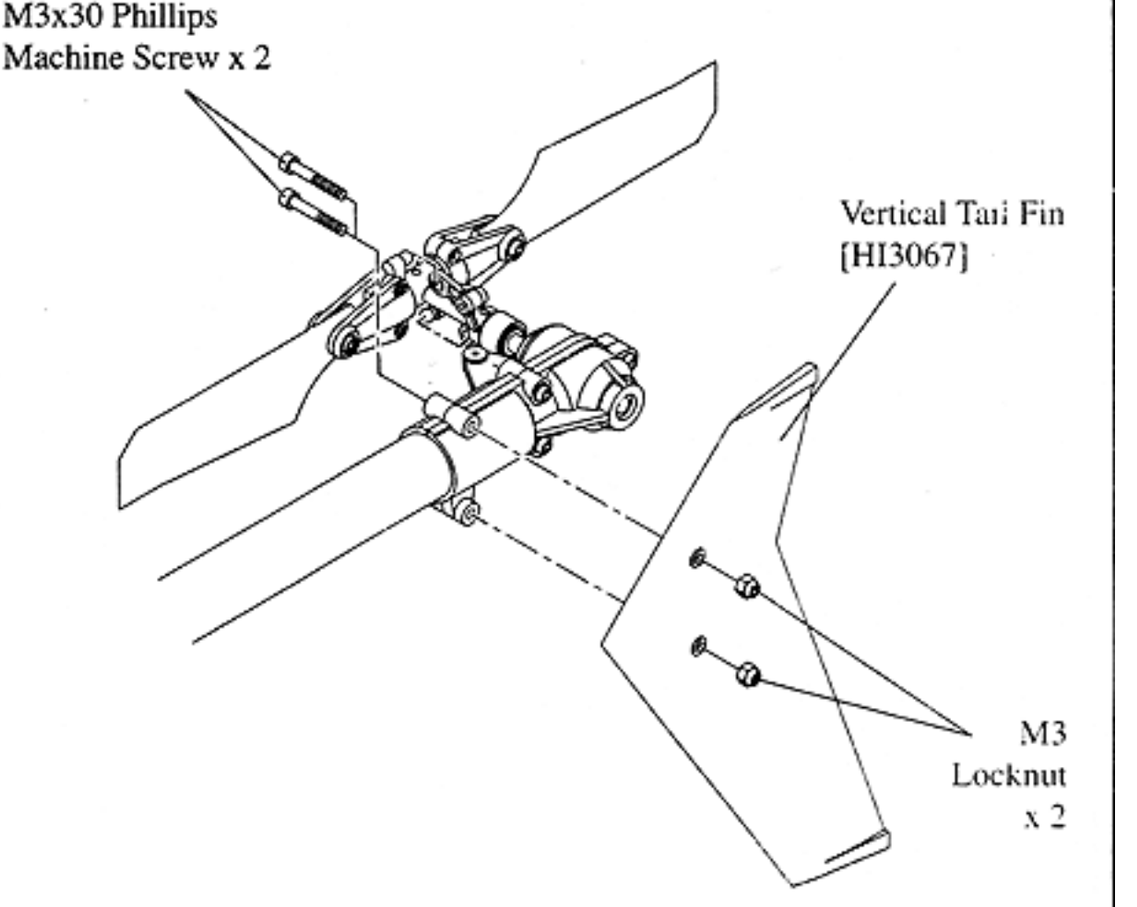


STEP 33 Tail Gearbox

STEP 33

From Bag 7, attach the tail output gear assembly on to the drive shaft with two 4x4mm Set Screws (**make sure the flat spot is aligned with one of the set screws**) using threadlock. Position the output gear assembly into the right gear box half (**insure the 2 bevel gears are meshed properly and the ball bearings are fully seated in their recesses**) and liberally grease the gears before closing the gearbox. Position the gear box halves over the holes in the end of the tail boom and secure with one 3x10mm Phillips Machine Screw and M3 locknut at the end of the gearbox and two 3x12mm Phillip Machine Screws with M3 locknuts at the center of the gearbox. Install the Vertical Fin with two 3x30mm Phillips Machine Screws and M3 locknuts through the mounts in the front end of the tail rotor gearbox.



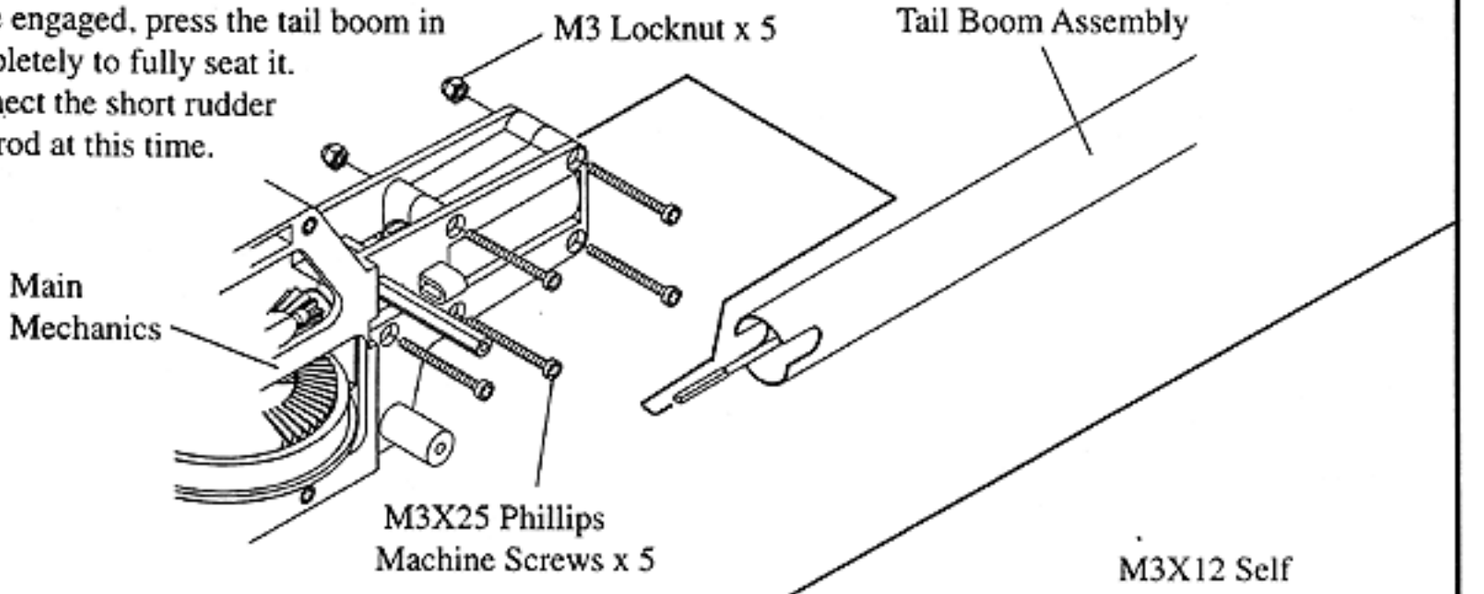


STEP 34-35 Tailboom & Horizontal Fin

STEP 34

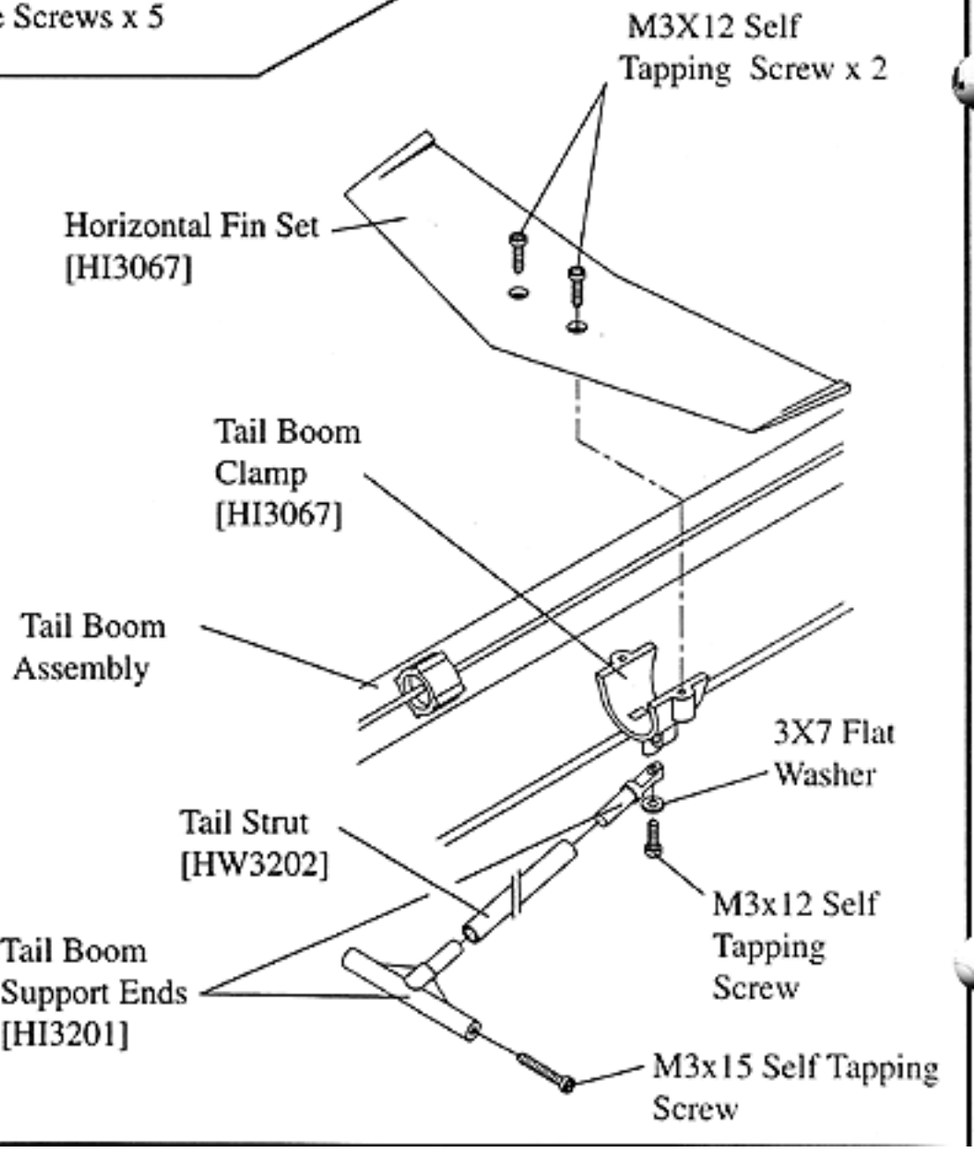
From Bag 7, attach the tail boom assembly to the main mechanics by sliding the tailboom tube into the hole in the rear of the upper frame using five 3x25mm Socket Cap Screws (from Bag 4) and M3 Locknuts, slowly press the tailboom in, being careful to engage the drive wire the flattened end into the tail rotor output gear shaft. The slots on the end of the tailboom will self align with molded pins inside the upper side frame. As the upper frame is assembled at this point, just take your time and the wire will slide in.

Once engaged, press the tail boom in completely to fully seat it. Connect the short rudder pushrod at this time.



STEP 35

From Bag 7, insert the two tailboom Strut Fittings into the aluminum strut. Attach the Horizontal Fin on the tailboom using two 3x12mm Self Tapping Screws into the Tailboom Clamp and space the fin along the tailboom at the position where the Tail Boom support & Tail Strut is attached. **Note: the mount for the strut is angled, test fit the strut to position the clamp in the correct direction**) then secure the strut one 3x12mm Self Tapping Screw and one 3mm Washer. Attach the lower fitting to the lower frame assembly using two 3x15mm Self Tapping Screws. Finally apply some Zap Ca glue to the fittings onto the strut.



STEP 36 Pushrod Setup and Adjustments

STEP 36

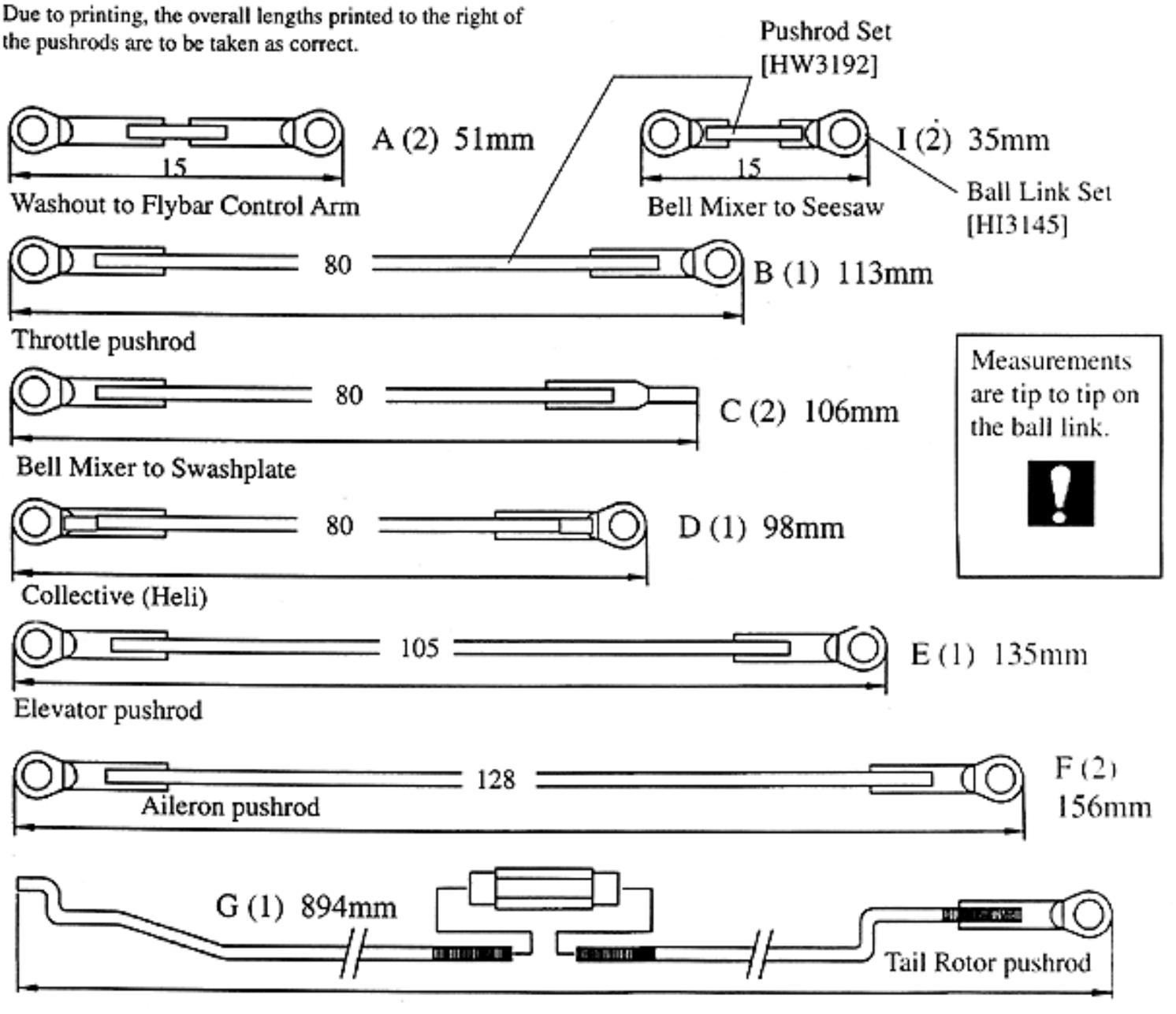
Make up all the control pushrods according to the specified lengths shown in the drawing. These are full scale drawings so you can easily match each pushrod to the page. Please note that these dimensions are from end to end of the plastic rod-ends and are only guidelines, depending on the radio system you are using, some fine tuning may be required for your particular servos. The numbers in the center of the pushrod drawings are the actual length of the rods to help select the correct pushrod for each control surface.

Setup for the 5 Channel Helicopter radio, there will be one extra 105mm.
Setup for the 4 Channel Airplane radio, connect the throttle and collective servo using a "Y" harness and connect to the throttle channel on the receiver.

Note: It is very important that before you install the pushrod linkages that you first charge your radio then remove all the servo horns from the servos and center all the mechanical or electronic trims on the radio.

1:1 All pushrods are shown full size.

Due to printing, the overall lengths printed to the right of the pushrods are to be taken as correct.



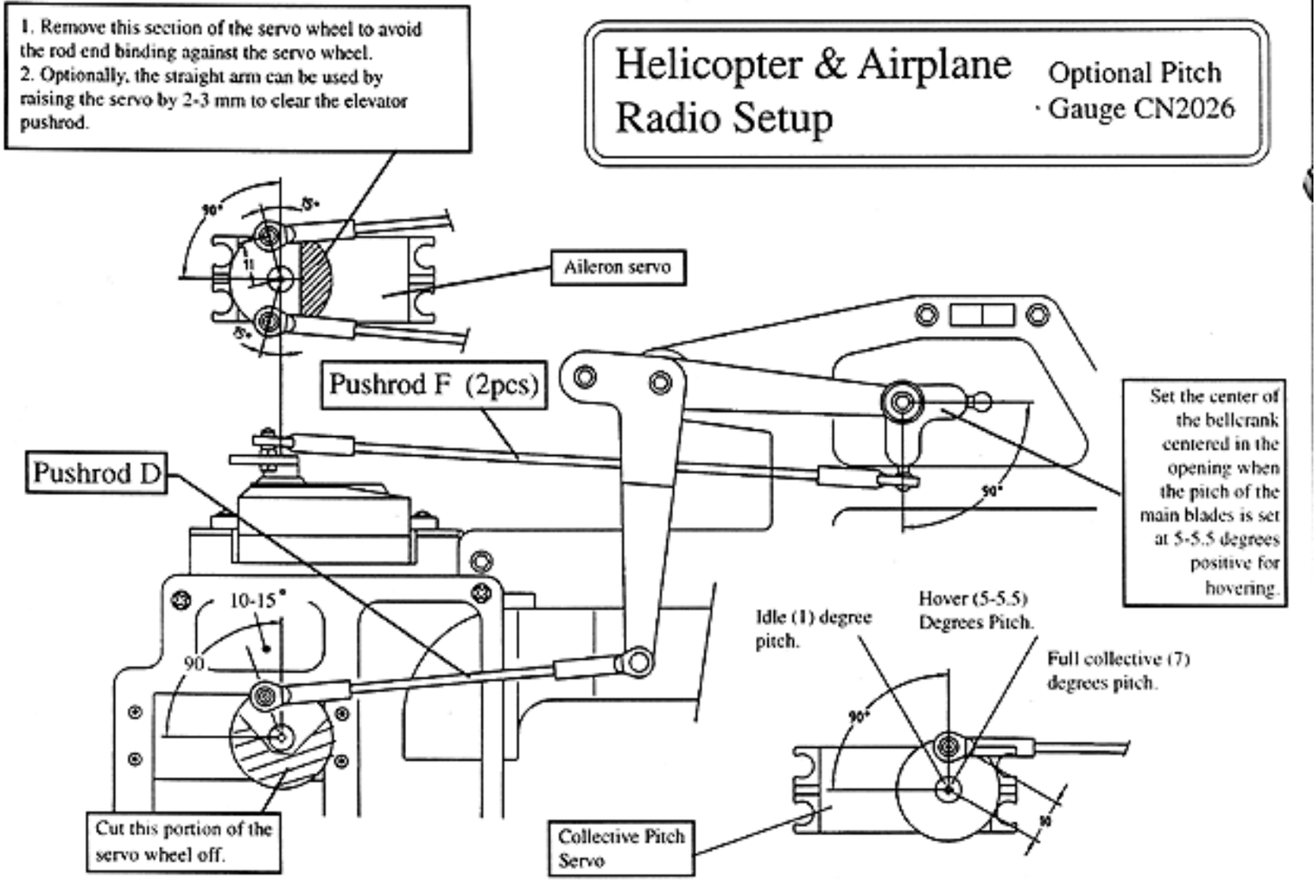
Measurements are tip to tip on the ball link.

STEP 37

The Aileron linkage controls the side to side tilt of the swashplate which in turn causes the helicopter to pitch to the left or right (hence roll cyclic pitch).

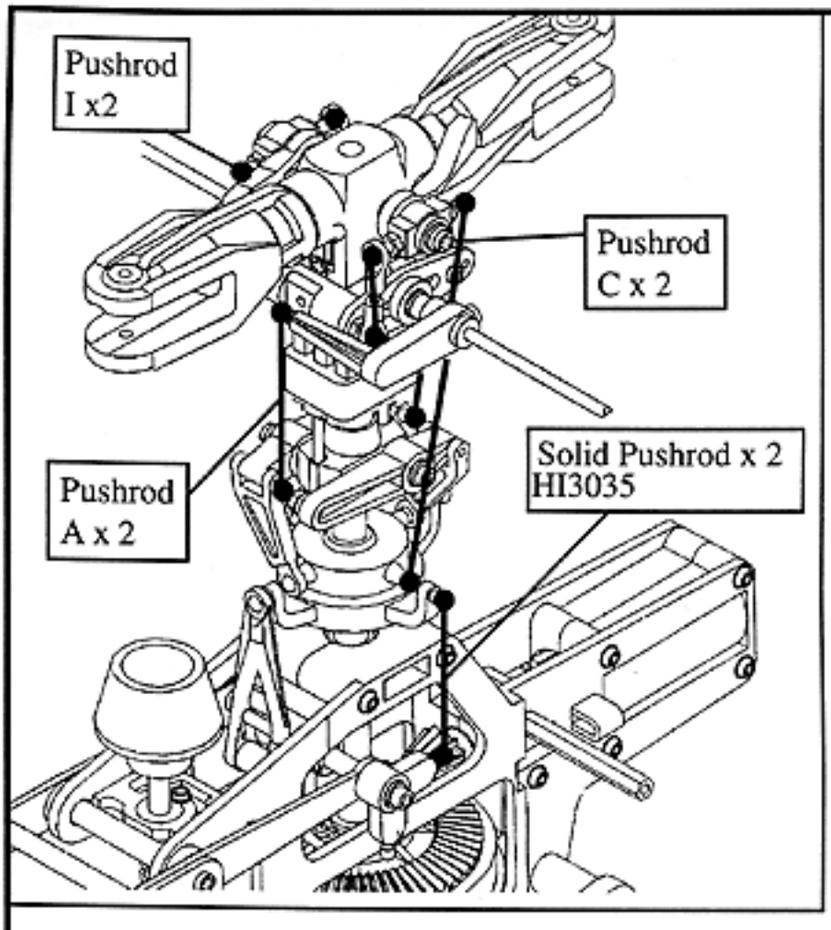
From bag 4, attach two steel balls and two 2mm nuts at a distance of 10-11mm from the center of the servo (this range may vary depending on your particular radio) and 12-15 degrees ahead of the center of the servo using threadlock. The angle offset will eliminate any stress (wear) on the servo. With the radio turned on and the trim centered, attach the servo horn (see note) and Aileron Bellcrank Pushrods (**F**). some slight adjustment maybe necessary to bring the bellcranks to the position shown below. Move the Aileron stick completely in both directions to insure that there is no binding in the linkages.

For the Collective Servo, attach one steel ball and one 2mm nut to the servo horn at a distance of 10-12mm from the center of the servo and using threadlock. With the Collective/Throttle stick on the radio in the center press the servo horn onto the collective servo so the ball is at 70-85 degrees to the servo as shown. **It is important that the swashplate sits level or 90 degrees to the main shaft.** Attach the Collective Arm Pushrod (**D**) and move the Collective stick completely in both directions to insure that there is no binding in the linkages.



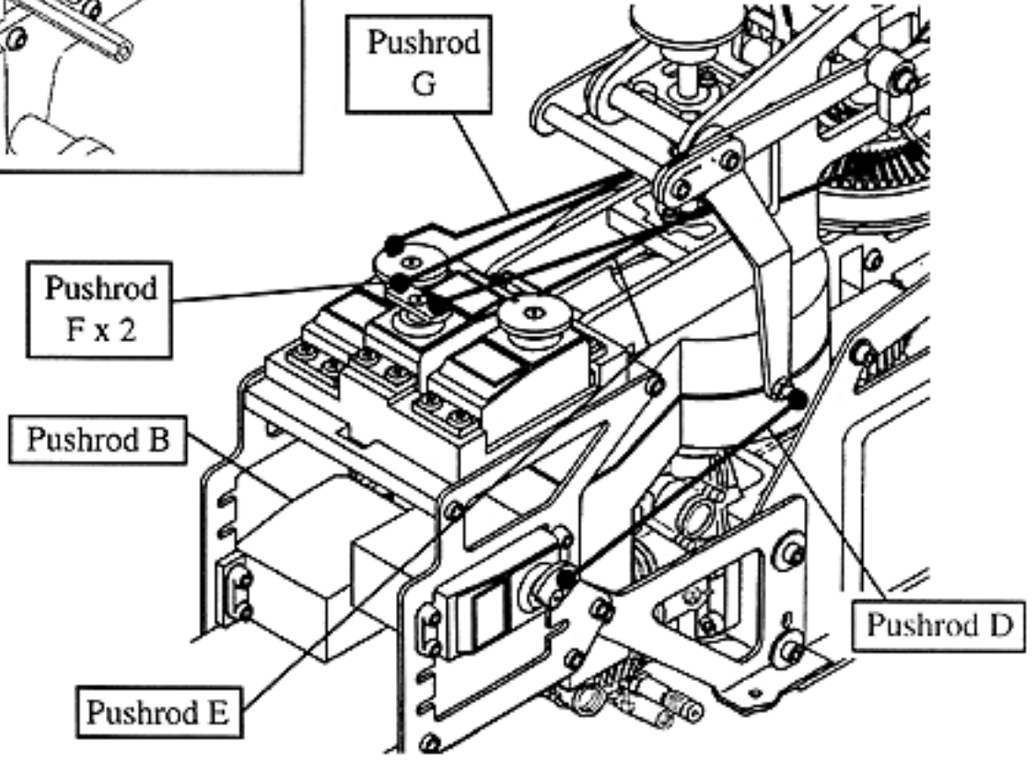
Note: Futaba, JR, Airtronics and Hitec servos have slightly different hole positions, we recommend that you choose the closest holes on your servos to match our measurements. Also, the servo wheel can be rotate on the servo shaft to get very accurate angles, look for the small numbers on the servo wheels.

STEP 38-40 Rotor Head Linkages & Elevator Linkage



Step 38

When attaching all pushrods, make sure same length pushrods are actually the same length from the beginning otherwise it will be difficult later to figure out where the linkage problems are coming from. The entire rotor head is set up the same way for both types of radios. Attach the two Pitch Arm to Washout pushrods (**A**), the two Bell Mixer to Inner Swashplate pushrods (**C**) and the two solid pushrods from the Aileron Bellcrank to both sides of the swashplate.



Step 39

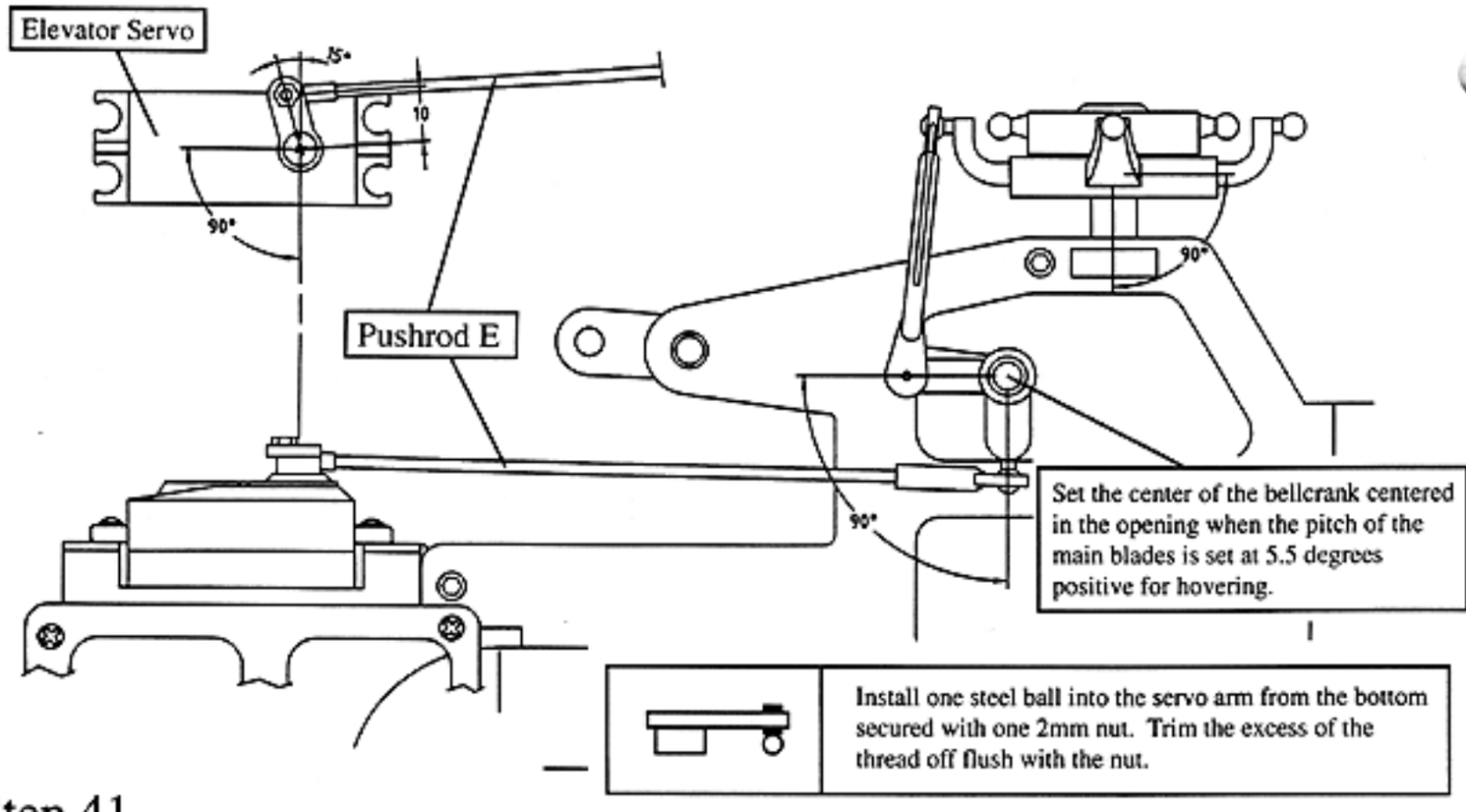
The lower linkages are shown here to illustrate the general setup and layout of the servo linkages to the respective control surfaces.

Step 40

The elevator pushrod controls the tilt of the swashplate forward and backward which causes the helicopter to pitch forward or backward (hence fore-aft cyclic pitch).

From Bag 4, use a servo horn in the shape of a cross and trim the 3 of the 4 arms off. Install one steel ball and one 2mm nut at a distance of 10-11mm from the center of the servo (**mount the ball directly against the bottom of the servo arm and tighten the nut on top, trim off the screw level with the nut to avoid hitting the Aileron pushrods**), remember to use threadlock. With the radio on and the elevator trim set at the center, attach the elevator pushrod (**E**) to the elevator bellcrank, then attach the servo horn at an angle of 10-15 degrees ahead of the center of the servo (the offset enables an equal throw of the swash-plate). **It is important that the swashplate sit at 90 degrees to the main shaft.** Some slight adjustment maybe necessary to bring the elevator bellcrank to 90 degrees and centered in the upper frame space.

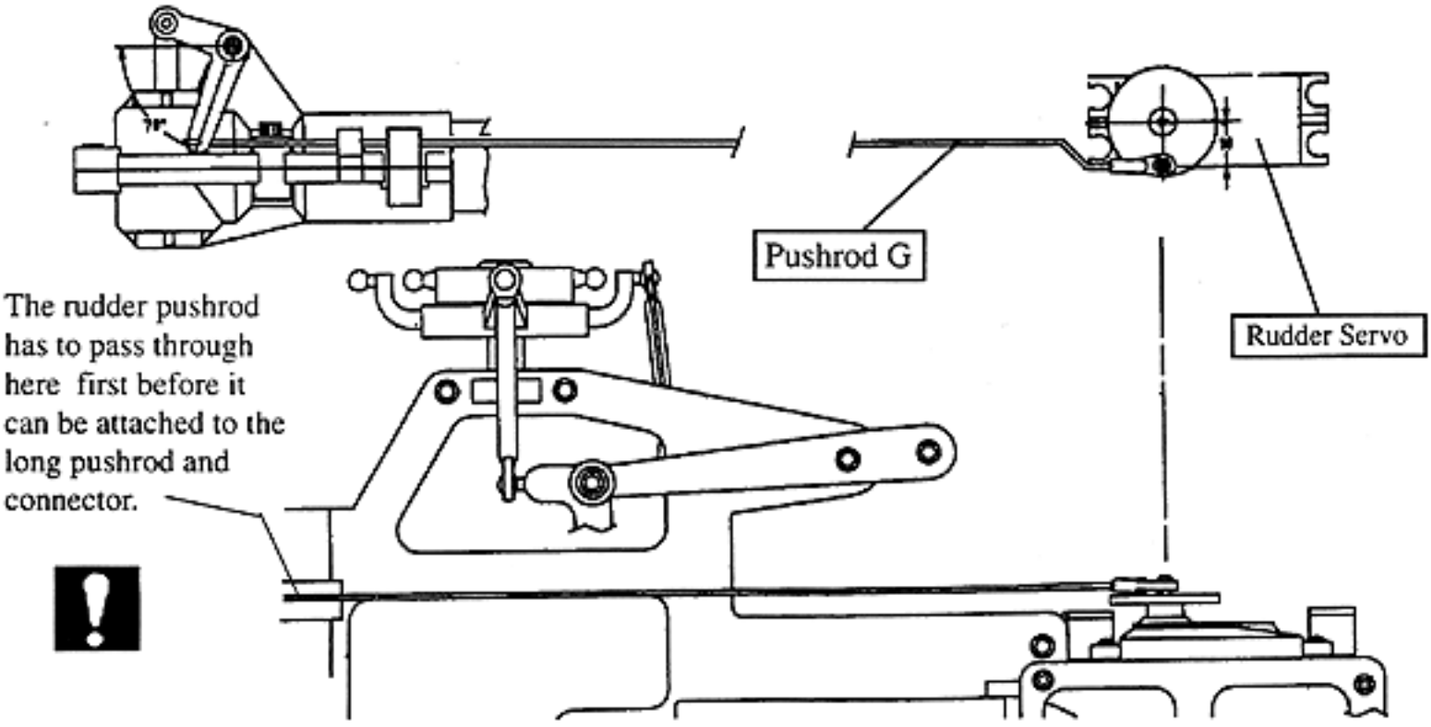
STEP 41 Elevator & Rudder Linkage



Step 41

The Rudder linkage for the tail rotor is set up the same for both Helicopter and Airplane radios, the pushrod changes the pitch of the tail rotor blades to increase or decrease the torque compensation to rotate the nose of the helicopter about the main shaft.

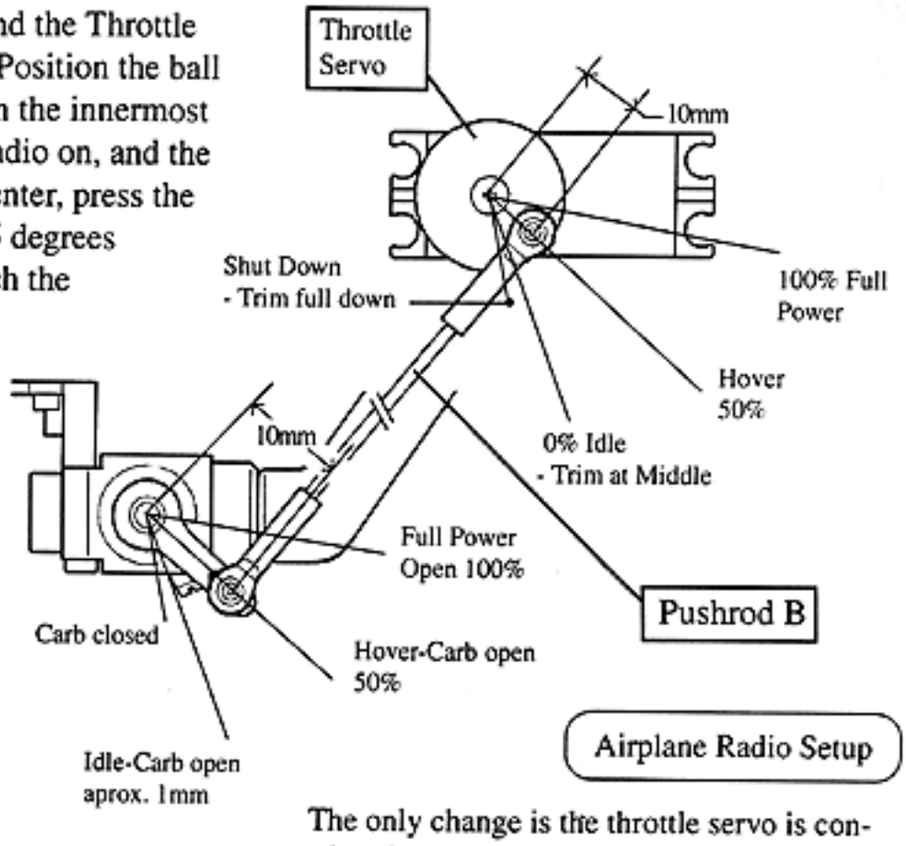
Use a servo horn in the shape of a cross and trim the 3 of the 4 arms off. From Bag 4, install one steel ball one 2mm nut at a distance of 10-11mm from the center of the servo remember to use threadlock. The Rudder Pushrod (G) will at this point be installed up to the upper frames from Step 31, holding the pushrod hex connector thread the short rudder pushrod and attach the special ball link provided to the servo end. Having the radio on and the rudder trim centered press on the servo horn onto the servo set at 90 degrees to the servo and align the rudder bellcrank to 70 degrees as shown in the diagram.



STEP 42-43 Throttle Linkage & Main Blades

Step 42

From Bag 4, attach one steel ball with one 2mm nut, to both the Throttle servo horn and the Throttle Extension from Step 17 using threadlock. Position the ball at 10mm from the center of the servo and in the innermost hole on the plastic throttle arm. With the radio on, and the throttle stick centered and the trim in the center, press the servo hornonto the servo so the ball is at 45 degrees to the servo (the hovering position). Attach the throttle pushrod (**B**) to the steel balls, the carburetor throttle should be 50% open. Move the throttle stick to the low/idle position and check that in the low position the carburetor has about a 1mm wide opening for idling and finally as the trim is moved fully down the carburetor closes completely to shut the engine off. Also check that in the high position the carburetor is fully open. The throttle lever screw may have to be loosened and the lever repositioned to operate as recommended.

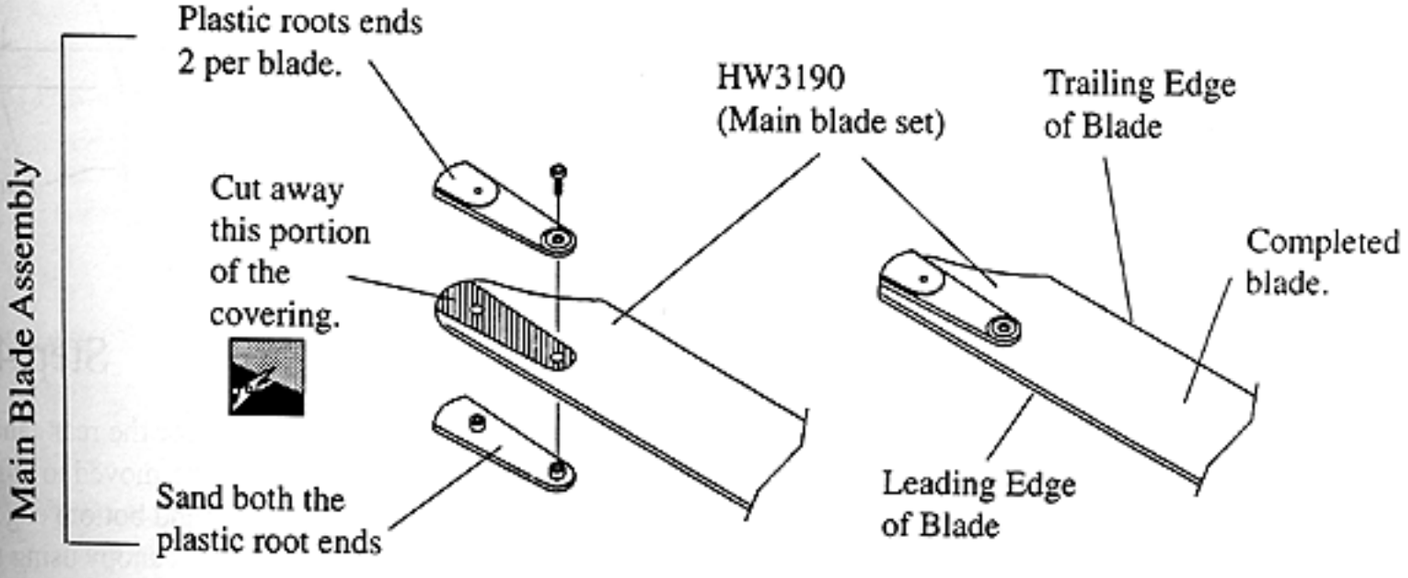


Airplane Radio Setup

The only change is the throttle servo is connected to the collective servo by means of a "Y" connector and plugged into the throttle channel

Step 43

The Main Rotor Blades in the Phoenix kit are pre-built and balanced, the only work required is to glue the blade grip root ends to the blades (**Please note that this step is to avoid the blades separating from the helicopter during flight!!**). Temporarily install the root ends (see note) onto the blades by cutting the covering over the holes and mark with a pencil, the outline of the plastic parts on the covering, remove the root ends and mark a second line about 3mm inside the first and trim away this internal portion of the covering with a knife. Using some sandpaper roughen the plastic root ends and glue them in place with Slo CA glue. After the glue has completely dried, attach to the rotor head.



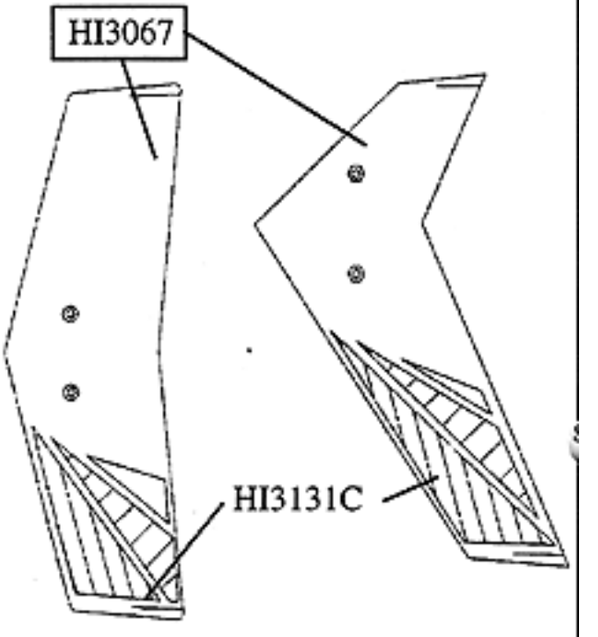
Note: The plastic blade grips have a top and a bottom which are different when viewed from the large end. Test fit the parts to be sure that the total thickness of the blades are 14mm.

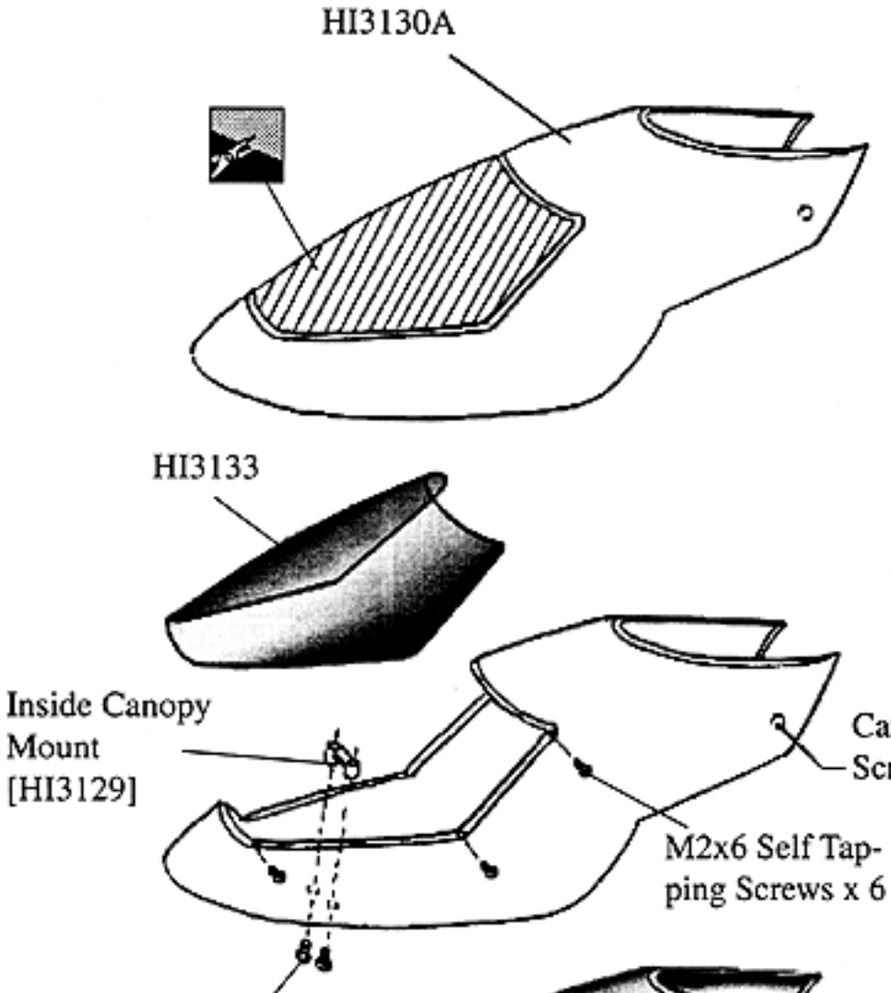
STEP 44-45 Canopy & Decals

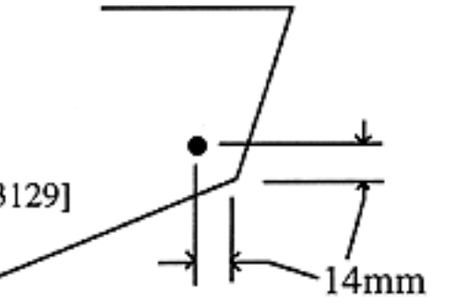
The Canopy has a line molded into the plastic to follow when trimming the windshield part out, be careful, trim the innermost line leaving the 6mm band for attaching the windshield. Using a sharp hobby knife carefully scribe a line several times into the plastic until you cut through the material. Similarly trim the clear windshield along the provided line, to make it easier to see the line, use a non-permanent marker and trace the line, any extra ink can be removed with rubbing alcohol.. Test fit the canopy together by taping it to the canopy, some additional trimming maybe necessary to get a good fit. From Bag 5, the inside canopy mount can be installed (**note the direction of the mount**) with two 3x6mm Self Tapping Screws,(**note: the location for the mount has to be moved 8mm forward of the marked location on the bottom of the canopy**). The clear windshield can be attached using six 2x6mm Self Tapping Screws in Bag 4, drill six 1mm holes at the locations shown.

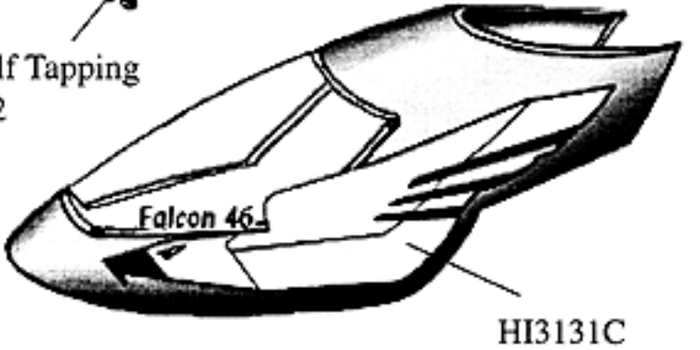
To inprove the adhesion of the decals to the body, peal the decal off the backing and apply one coat of spray adhesive (spray glue) to the sticky side, commonly found in your hobbyshop. For those who would prefer to paint the canopy, the common vinyl automotive bumper paint will bond to the plastic.

Step 44









Step 45

The two holes for the rear canopy mount have to be moved to 14mm from the rear and bottom edge as shown. Attach the canopy using two Canopy Retaining Screws.

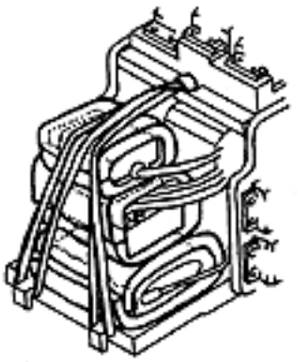
Radio Components & Balancing

Optional Equipment
PG2000 II Piezo Gyro
CN2018

Gyro Having completed all the assembly for the helicopter, all that remains is mounting the radio receiver, receiver battery and the gyro.

Mount the gyro on the radio tray, some rearrangement from the picture is required to mount everything. If using the PG-01T, the gyro can be mounted between the collective & throttle servos and the right servo frame side. It is extremely important that the gyro is attached using only the supplied two sided tape onto a clean flat surface. Keep all wires and components away from the gyro housing. Do not use straps or elastics to secure the gyro.

Install the gyro using double sided foam tape (supplied with gyro) put a full strip along the bottom of the gyro unit and press onto the surface. For a good bond make sure both surfaces are clean and dry.

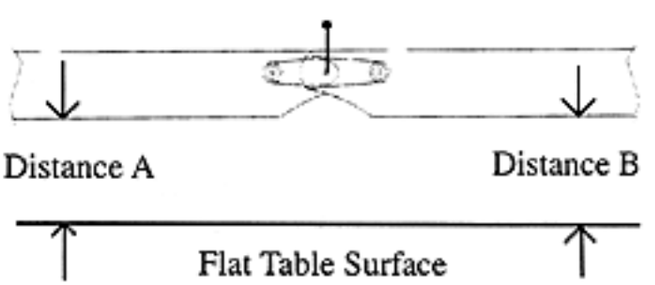


Receiver, Battery Pack and Gyro Controller

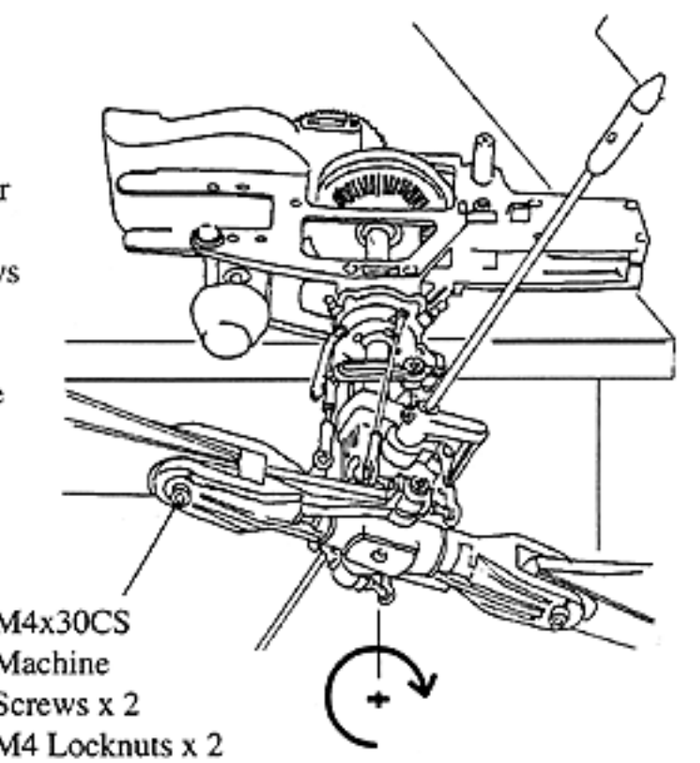
Using the foam rubber, wrap the battery pack, receiver and gyro controller separately, allowing wires to be collected and tied together. Using two elastics looped through the front of the top servo tray, secure the components to the two hooks on the lower servo tray. ** The actual arranged components will be different than the picture illustrates.

Balancing the Rotor Head

Balance is the most important part in maintaining a safe and reliable helicopter. First check the blades for balance, this can be done on a balancer but can be done directly on the helicopter by tipping the helicopter on its side at the edge of a table and attaching the blades with two 4x30mm Socket Head Cap Screws and 4mm locknuts. Temporarily remove the bolt to secure the autorotation bearing so the head spins free (remember to replace this bolt!!). If one blade stops at the same spot add some tape to the lighter blade to balance the rotorhead. The same procedure can be used to balance the flybar without the main blades attached.



Bolt the blades together and support by the ends of the bolt off a flat surface. If one blade tips to one side add small pieces of tracking tape until both blades hang an equal distance from the table (Distance A = B). Attach the Main Blades to the helicopter using two 4x30mm Socket Head Cap Screws and M4 Locknuts.



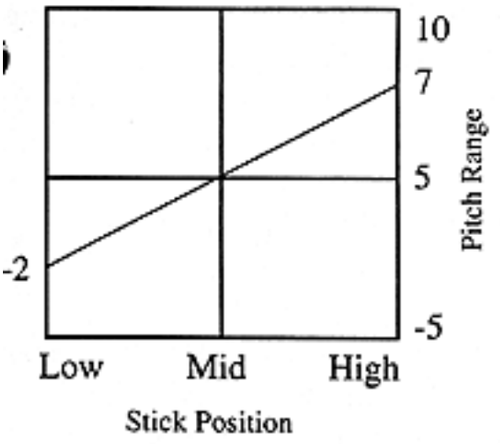
When attaching the main blades, the direction of rotation is clockwise, when looking on top of the helicopter.

Pitch & Throttle Curve Settings

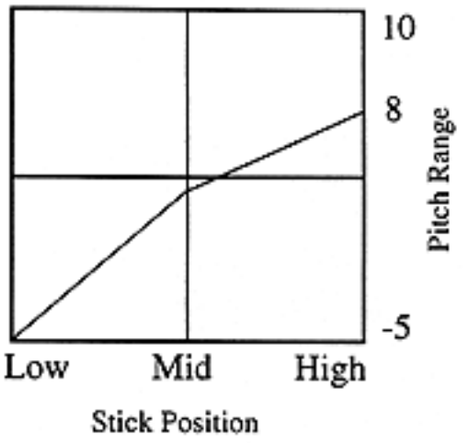
Throttle Curve Adjustments

After several tanks of fuel the engine will be run-in, at this time you can modify throttle settings but remember that the smoother the engine the less adjustment required. Not all engine / muffler / fuel combinations are the same which will shift some of the values shown below.

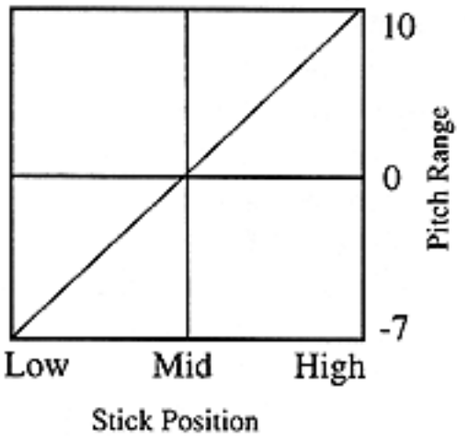
Hovering - (linear) Normal Flight Mode



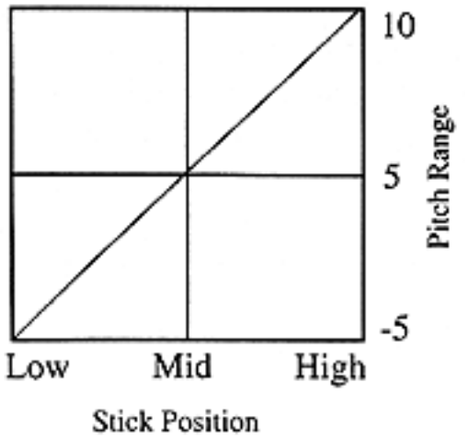
Aerobatic Flying - Flight Mode 1



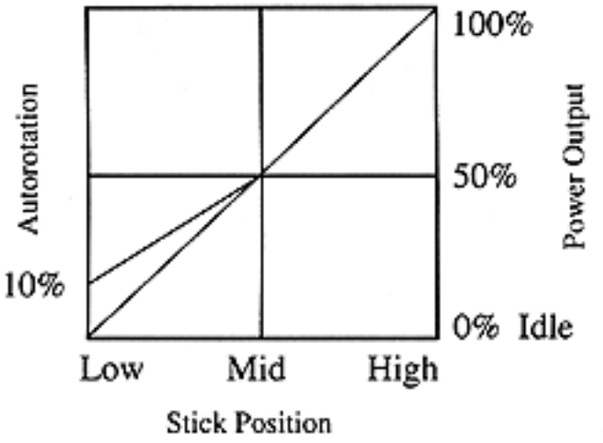
3D Flying - Flight Mode 2



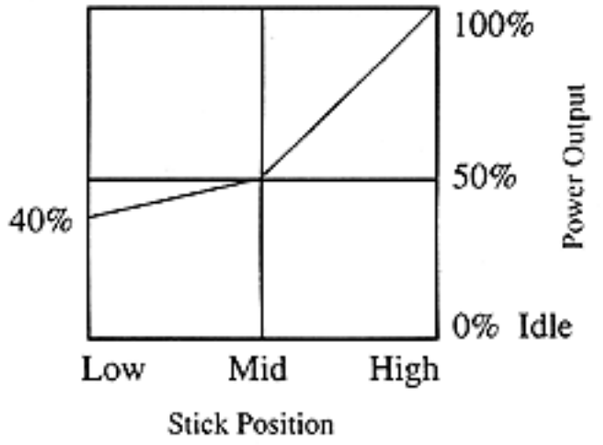
Autorotation - Throttle Hold



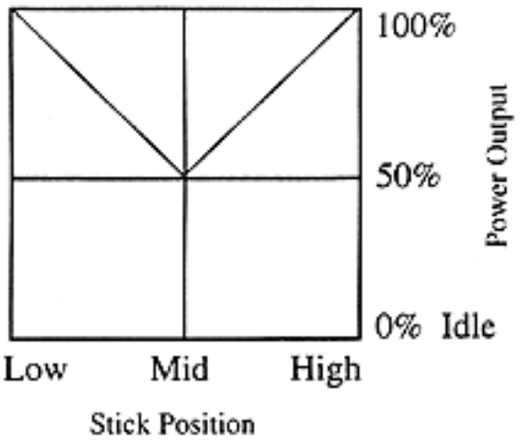
Hovering - (linear) Normal Flight Mode



Aerobatic Flying - Flight Mode 1



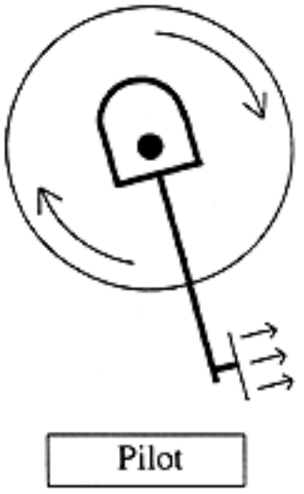
3D Flying - Flight Mode 2



Tail Rotor Setup

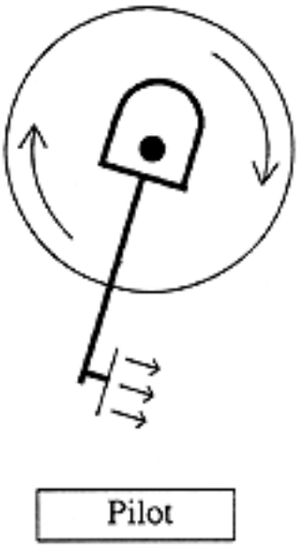
What separates airplane radio equipment from the helicopter version is in the control of the individual curves discussed earlier and in the Revo-mixing.

Take a moment to consider the helicopter <u>hovering</u> in front of you.



1 Nose rotates left at hover.

Problem: Not enough pitch in tail rotor to match torque setting of engine.
Action: Increase pitch by shortening the rudder pushrod.



2 Nose rotates right at hover.

Problem: Too much pitch in tail rotor to match torque setting of engine.
Action: Decrease pitch by lengthening the rudder pushrod.

Once the tail rudder pushrod is adjusted correctly so the tail does not rotate (don't consider wind now) the revolution mixing can be adjusted.

Revolution Mixing

The revolution mixing function allows the helicopter to climb or descend without the tail rotating. There are generally a high & low setting on the helicopter radio.
The values shown will vary depending on engine, blade pitch and fuel but provide a starting point for the beginner.

For each flight mode setting, there will be different Revo-mixing amounts. For forward flight the settings will be lower than hovering due to the aerodynamic forces effecting the helicopter. Here is a starting point for revo values:

High Stick Setting	- 40	Normal Flight
Low Stick Setting	- 20	Mode

These values correspond to the total travel for the tail rotor pitch. To adjust the high setting, hold the helicopter at hover and increase the throttle so the helicopter climbs steadily. Notice the direction the nose rotates:

	Nose rotates	
High & Low	left	increase revo value to increase tail pitch.
	right	decrease revo value to decrease tail pitch.

To adjust the low setting, start from a high hover and decrease the throttle to descend, notice which direction the helicopter rotates.

Gyro Gain Adjustment

The gyro assists in holding the tail rotor, actually compensating for changes in wind direction or quick movements.

First check that the gyro is installed correctly by watching the rudder servo. While holding the rotor head move the rudder stick to the right and observe the direction the servo arm moves. Now quickly rotate the nose to the left, the servo horn should move in the same direction. If the rudder servo horn moves in the opposite direction reverse the gyro direction.

Generally the starting setting for the gyro gain is 60%, keep increasing the gain setting until the tail starts oscillating back and forth, then reduce the setting slightly.

Problem: Tail rotor makes sudden uncontrolled rotations.
Solution: The gyro direction is possibly set in the wrong direction.

Before Flying your Phoenix 4-Stroke Helicopter

Before each flight, check that all bolts and screws are tight. Simply flying your helicopter, will loosen any screws which are not threadlocked or secured with a lock nut.

First Flights For the beginner pilot, a training pod is strongly recommended to assist in learning to hover the helicopter with substantially reduced risk of crashing. These systems provide an on ground training capability to allow pilots to become familiar with the helicopter before actually leaving the ground.

Starting Your Engine

Fuel 30% Helicopter fuel only is recommended containing more oil. Use a fuel filter between the fuel gallon and the heli to remove any dirt that could stall the engine. Fuel the helicopter by removing the fuel line from the carburator and replace when finished. **Use a fuel line cut off or plug at all times, otherwise the engine will flood and fuel will empty through the carburetor.

Needle Valve On the OS52 close the main needle and open to 2 1/4 turns, the idle is factory set. As the engine breaks in, lean the engine one click of the main needle at at time until 2 turns open is reached. This will vary slightly.

Radio Always turn the transmitter on first, then the helicopter & gyro and reverse when finished, turn off the heli & gyro first then the transmitter. If the radio acts erratically or intermittent, find the problem before starting the engine.

Glow Plugs Using a glow plug connector, remove the canopy or optionally use a remote glow plug connector to heat the glow plug. Warning!! glow plugs operate at 1.5V not 12V. Only use OS "F" type four stroke glow plugs.

Engine Before starting the engine, check the correct direction of rotation and make sure the electric starter is turning the same direction.

Starting Start the engine from low throttle with the trim centered. Holding the rotor head in one hand, angle the starter and press down slightly to engage the starting shaft into the fan. Start the electric starter until the engine starts. If the engine does not start recheck all previous points. The main blades will not turn until the engine RPM is above idle.

Stopping To stop the engine, with the throttle stick in the low position, move the trim all the way to the low position.

If the Engine Does Not Start

Q. The engine does not turn easily with the starter.
A. The starter battery may be too weak or the engine is flooded. For flooding, remove the glow plug and turn the engine over several times to clear the combustion chamber of fuel and retry.

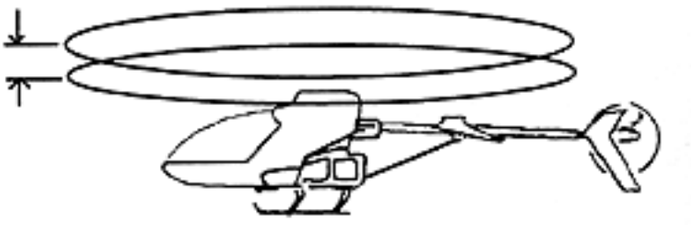
Q. The engine rotates and tries to start but doesn't.
A. Too much fuel in the carburator (pinch fuel line with fingers until mixure leans out and engine starts) The glow plug may be getting old. The glow plug batteries are weak. The starter may be turning the wrong direction.

Q. The engine just does not start.
A. The glow plug may be burned out. Fuel may not be getting to the engine, check for a clogged fuel line, dirt in the carburator or the main needle needs to be opened out slightly.

Q. The engine starts but immediately stops.
A. There is a clog in the fuel line, the carburator is not open enough at idle- open the throttle trim by 1-2 clicks. Helicopter engines have a low speed needle which is factory set, beginners should not adjust it!!

Adjusting the Blade Tracking

Pitch In steps 37-38 you setup the pitch range usin a pitch gauge and setting the pushrods on the servo horns at specific distances. Once the helicopter is flying the pitch setting have to be fine tuned. Using appropriate training gear, increase the throttle until jus before the helicopter lifts off and sight the rotor disk from 15' back. If there appears to be 2 rotor disks ther adjust Pushrod C until only one disk appears. Using colored tape mark one blade so you can adjust the correct blade.



Basic Hovering

Hovering When all is set, ready and checked, attach your training gear/pod and start the engine.

(1) Place the helicopter pointing into the wind and stand behind the model about 15' away.
(2) Always watch the nose of the helicopter, move the rudder left and the nose will move left.
(3) Start by increasing the throttle slowly until the helicopter rises 2-6 inches off the ground then set it back down.
(4) Repeat this process until you become comfortable with the holding the model in the same spot for a few seconds then land it.

After some time at this you can increase the height slightly up to 1 foot (be very carefull not to get too high) as you are practising taking off and landing. This is the most basic but required skill for the beginner to learn.

Beyond Hovering

It cannot be stressed enough that mastering the hovering skill is crucial to becoming a good helicopter pilot. As you progress in your learning, always practise hovering until you are completely comfortable in holding the helicopter in any direction at any altitude. Perfecting hovering enables you to learn all the types and styles of helicopter flying, forward flight, loops and rolls, 3D (aerobatic flying) and anything you want to do with your Pheonix helicopter as it can be set up for beginner through to expert. Lastly, have fun!!

PRE-FLIGHT CHECK UP & TRIM ADJUSTMENTS

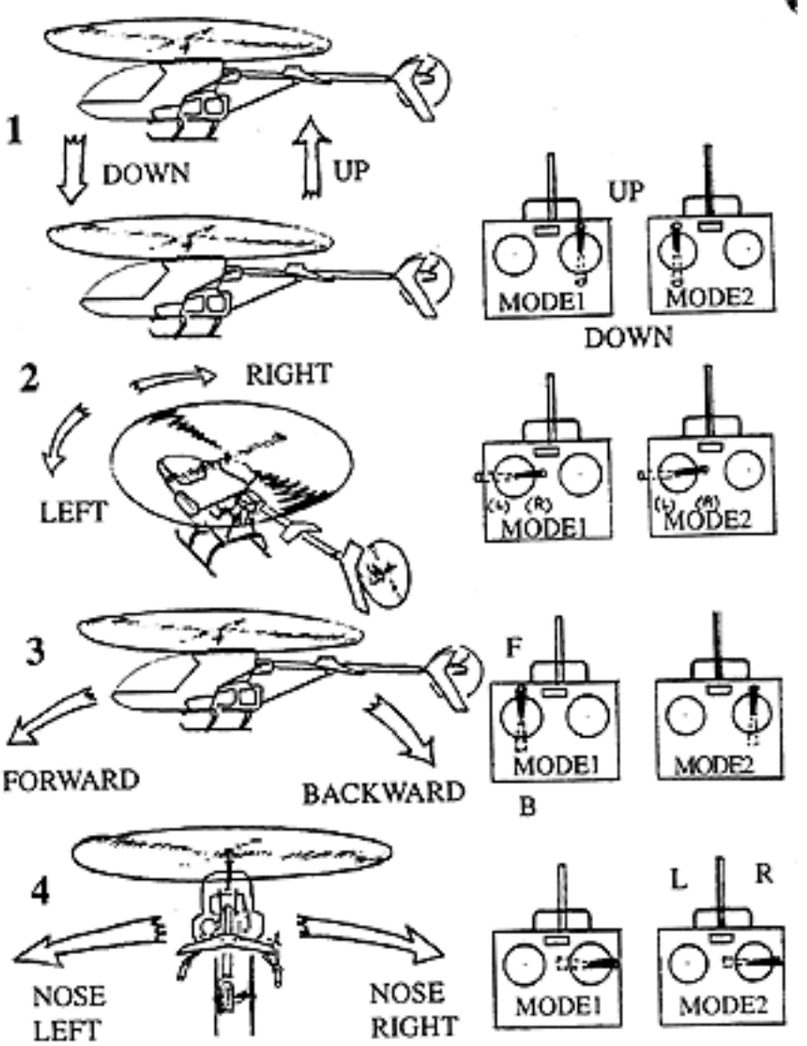
All trim adjustments are to allow you to lift the helicopter straight up and can be made one click or detent at a time on the radio.

(1) **Collective & Throttle:** Slowly raise the throttle stick, the helicopter should lift off at half stick. If it tends not to lift off increase the hover pitch on the radio or increase the throttle trim. If the helicopter lifts off before mid stick decrease these settings.

(2) **Rudder:** When the helicopter is ready to take off, make a correction trim first then use the rudder stick to control the Left & Right. Note, now is a good time to make a final adjustment on the gyro, see gyro manual.

(3) **Elevator:** If at hover the helicopter tends to move forward, move the trim down, if it moves backward move the trim upwards Use the elevator stick to control the Forward & Backward.

(4) **Roll (Aileron):** If at hover the helicopter tends to move left, move the trim right, if the helicopter moves to the right move the trim left. Move the Aileron stick to control the slide of the helicopter to the Right & Left.



Final Adjustments - Radio Setup

Now that the servo installation into the helicopter is finished the following pages should be reviewed. As various types of radios can be used to setup the helicopter, some of the following information may not apply.

Servo Direction (Servo Reversing)

Check that all servos move in the correct directions, see the diagram on pg 36.

Dual Rates

For beginners (using the flybar weights) the dual rate values should be set at 100% for both switch positions until hovering has been mastered.

Normal position: (high rate) 100%
Switch position 1: (low rate) 75%

Exponential

The exponential function allows adjustment of how sensitive the cyclic controls are when the machine is hovering. This should be left at 0% (linear) until all trimming is complete.

Sub Trims

The sub trims on the outside of your transmitter are used to fine tune the servo center positions while testing or in-flight. If the trim has to be moved more than 2-3 divisions then readjust the linkage length to set the trim back in the center.

Pitch & Throttle Curve Adjustments

The ultimate goal for adjusting the curves on your helicopter is to reduce how much the tail rotor moves during flight and aerobatics. This leads to maintaining a consistent main rotor RPM which can only be achieved through adjusting the individual values which control the pitch and throttle at a given stick position.

Pitch Curve Adjustment

The following chart shows the values for the collective pitch measured in degrees which are made on the helicopter using a pitch gauge. The Travel Adjustment function (if available makes these settings easy).
For the beginner it is recommended to set the low stick position to 0 degrees to avoid damaging the helicopter while reducing the power during the first few flights. These settings will need slight adjustment to keep the helicopter at a consistent height at mid stick.

Pitch Curve Values

All pitch readings were made using the CN2026 pitch gauge.

Flight Mode	Setup Method	Low Pitch (low stick)	Hovering (mid stick)	High Pitch (high stick)
N	Beginner	0	5	7
N	Hovering	-2	5	7
1	Stunt & Aerobatics	-5	5	8
2	3D**	-7	0	10
H	Autorotation	-5	5	10

(N - Normal flight mode, 1 - Stunt mode one, 2 - Stunt mode two, H - Throttle hold-autorotation)

Note** In order to avoid binding at high pitch angles the flybar control arms need to be reset at an angle of 10-15 degrees down from parallel.

Travel Adjustment (endpoints)

Using endpoints to adjust to the limits of how far the servo is allowed to move is very convenient for fast set-up. If binding occurs simply reduce the travel in that direction. ** Note: by changing one side only (high or low stick) the servo travel is no longer linear which will tend to make that control surface unstable. It is better to set the high/low adjustments the same, or make actual pushrod adjustments.

Phoenix 4-Stroke Bag Parts List

Bag 1

Rotorhead Block	1
Offset Plate	2
Tie Bar	2
Center Hub	1
Bearing Holder	2
Spacer M3x6x1.5	2
Bearing Brass M3x7x3	2
Bearing Brass M3x10x4	2
M3x6 Self Tapping Screw	4
Special Ball M3x6	2
Main Blade Grip	2
Bell Mixer	2
Slide Tube	2
Short Ball	2
Long Ball	2
M3x16 Phillips Mach Screw	2
M3x7 Flat Washer	2
Flybar Paddles	2
Flybar Weights	2
M3x4 Set Screw	2
Washout Hub	1
Washout Arm Assembly	2
Slide Tube	2
Short Ball	2
M3x16 Phillips Mach Screw	2
M3x7 Flat Washer	2
Swashplate	1
Feathering Shaft	1
Damper	2
Bearing M5x13x5	4
Short Ball	2
M4 Locknut	2
M2.5x25 Pin	2
M5x10 Flat Washer	2
M4x10 Flat Washer	2
M4x12 Flat Washer	2
Flybar Control Arms	2
Rod M2x15	4
Long Ball Link	4
Short Ball Link	4
M3x5 Set Screw	2

Bag 2

Left Upper Sideframe	1
Right Upper Sideframe	1
Main Gear Assembly	1
Main Shaft	1
Tail Rotor Output Gear	1
Tail Trans. Output Shaft	1
Bearing M5x13x4	4
E-ring	1
M3x4 Set Screw	2
Counter Gear	1
Alloy Drive Gear	1
Oilite Bearing M5x7x2	2
Primary Drive Shaft	1
M2x12 Pin	2
Solid Links	2
Elevator Assembly	1
Roll Cyclic Bellcrank	2
Slide Tube	2
M3x16 Phillips Mach Screw	2
Collective Shaft 6mm ø	1
Collective Spacer 5mm ø	1
Collective Lever	1
Collective Arm	2
Oilite Bearing M6x10x3	2
Short Ball	1
M3x10 Phillips Mach Screw	4
Mast Stopper	
Bearing M8x19x6	
M3x16 Socket Cap Screw	
M3x20 Socket Cap Screw	
M3 Locknut	
M4x4 Set Screw	
Long Hex Spacer	
Short Hex Spacer	
Canopy Thumb Screws	
M3x40 Threaded Stud	
M3x35 Phillips Mach Screw	
M3x7 Flat Washer	
Start Cone	
Start Shaft	
Collar M5x10x5	
M3x4 Set Screw	
Start Shaft Block Assembly	
Spring	
M2x16 Pin	
M5x10 Flat Washer	
M3x12 Self Tapping Screw	
M3x6 Washer Head Screw	

Bag 3

Clutch Shoe	1
Clutch Bell w/Gear	1
Oilite Bearing M12x18x3	2
Cooling Fan	1
Engine Mount	1
M3x12 Socket Cap Screw	4
M3X16 Socket Cap Screw	4
M3x11 Flat Washer	4
M5x13 Flat Washer	1
M9x14 Flat Washer	1
Left Lower Sideframes	1
Right Lower Sideframes	1
Cooling Fan Shroud	1
M3x12 Self Tapping Screw	2
M3x7 Flat Washer	2
Fuel Tank	1
Fuel Line 90mm	1
Short Pickup Tube	1
Long Vent Tube	1
Rubber Stopper	1
Large Cap	1
Small Cap	1
Clunk	1
M2.5x18 Self Tapping Screw	1

Bag 4

Fuel Line	1
Rod - Aileron M2x128	2
Rod - Elevator M2x105	1
Rod - Coll/Swash M2x80	4
Rod - Throttle M2x75	1
M4x30 Socket Cap Screw	2
M4 Locknut	2
M2.3x10 Servo Screw	20
M3x25 Phillips Mach Screw	5
M3 Locknut	5
M2x6 Self Tapping Screw	6
Hex Key M1.5	1
Hex Key M2.0	1
Hex Key M2.5	1
Long Ball Link	14
Steel Ball w/2mm Thread	7
M2 Hex Nut	14
Servo Mount Tabs	4
Pushrod Coupler	1
Special Rudder Ball Link	1

Bag 5

Servo Tray Top
Servo Frame Side
Switch Mount
Battery Tray
Inside Canopy Mount
Canopy Mount Hook
Canopy Mount Spacer
Spacer 3x9x4
M3x12 Phillips Mach Screw
M3x30 Phillips Mach Screw
M3x6 Self Tapping Screw
M3x15 Self Tapping Screw
M3x12 Self Tapping Screw
M3x7 Flat Washer
M3 Locknut

Bag 6

Landing Struts - Plastic
Landing Skids - Metal
M3x4 Set Screws
M3x16 Phillips Mach Screw
Strut Spacers
M3x8 Socket Cap Screws

Bag 7

Tail Rotor Blade	2
Tail Gearbox (R)	1
Tail Gearbox (L)	1
Horizontal Fin	1
Vertical Fin	1
Tail Rotor Grip Half w/Ball	2
Tail Rotor Grip Half	2
Tail Rotor Hub	1
M3x4 Set Screw	1
M3x10 Socket Cap Screw	2
M2x8 Phillips Mach Screw	4
M2 Hex Nut	4
Bearing M3x10x3	3
Pitch Slider Assembly	1
M2x8 Pin	2
Tail Pitch Ball Link	2
Tail Pitch Bellcrank	1
M2x16 Phillips Mach Screw	1
M5x2 Steel Ball	1
M2x5 Flat Washer	1
Tube M3x8	1
M3x16 Socket Cap Screw	2
M3x16 Phillips Mach Screw	2
M3x10 Phillips Mach Screw	1
M3 Locknut	5
Large Bevel Gear	1
Small Bevel Gear	1
Tail Rotor Input Shaft	1
M2x12 Pin	2
M4x4 Set Screw	2
M3x5 Set Screw	2
Bearing M5x13x4	2
Bearing M5x11x4	2
Tail Output Shaft	1
Spacer Tube	1
Frame Strut Fitting	1
Fin Strut Fitting	1
Horizontal Fin Mount	1
Drive Shaft Guide - Center	1
Drive Shaft Guide - End	2
Pushrod Guide	3
M3x30 Socket Cap Screw	2
M3 Locknut	2
M3x15 Self Tapping Screw	2
M3x12 Self Tapping Screw	3
M3x7 Flat Washer	1

In Tailboom

Tail Boom	1
Flybar	1
Tail Drive Housing	1
Antenna Plastic Guide Tube	1
Short Rudder Pushrod	1
Long Rudder Pushrod	1
Tailboom Strut	1

In Box

Instruction Manual
Registration Card
Canopy
Windshield
Decal Sheet
Main Rotor Blades
Tail Drive Shaft

Phoenix 4-Stroke Kit Replacement Parts

HW3000	HARDWARE PACK	1
HI3001	STARTER CONE SET	1
HW3005	STARTER SHAFT SET	1
HI3007	STARTER SHAFT BEARING BLOCKS	2
HI3009	COOLING FAN	1
[illegible]3010A	MACHINED CLUTCH BELL & LINING	1
[illegible]I3010C	CLUTCH GEAR (4C) 33T	1
HW3011	CLUTCH SHOES	1
HW3018	ENGINE MOUNT (F, 4C)	1
HI3020B	COOLING FAN SHROUD (F, 4C)	1
HW3024	COLLECTIVE PITCH LEVER SET	1
HI3031	BELLCRANKS (L&R CYCLIC)	1
HI3032	FORE & AFT CYCLIC LEVER SET	1
HI3035	SOLID CYCLIC LINKS	2
HI3040A	COUNTER GEAR (4C) 48T	1
HW3042	PRIMARY DRIVE SHAFT	1
HW3045	ALLOY DRIVE GEAR	1
HW3050	AUTOROTATION ONE WAY BB SET	1
HW3053	MAIN SHAFT	1
HW3054	MAIN SHAFT LOCK RING	1
HI3056	MAIN GEAR	1
HW3057	TAIL DRIVE BEVEL GEAR	1
HW3059	TAIL DRIVE PRIMARY SHAFT	1
HW3062	TAIL BOOM (II, 4C)	1
HW3063	TAIL DRIVE SHAFT SET (II, 4C)	1
HW3064A	TAIL PITCH ROD & CONNECTOR (II, 4C)	1
HI3067	TAIL FIN SET	1
HW3070	TAIL GEARBOX INPUT SHAFT	1
HW3073	TAIL GEARBOX OUTPUT SHAFT	1
HW3074	TAIL SHAFT - SPACER TUBE	1
HI3075	TAIL GEAR SET	1
HI3078	TAIL GEARBOX L&R	1
HI3087	TAIL PITCH SLIDER SET	1
HI3089	TAIL PITCH BALL LINKS	2
HI3096	TAIL BLADE GRIP SET	1
HW3098	TAIL ROTOR HUB	1
[illegible]3099	TAIL ROTOR BLADES (PAIR)	1
[illegible]3102	TAIL PITCH LEVER SET	1
HI3106A	TAIL CONTROL ROD CLAMPS	3
HI3107	UPPER SIDE FRAMES	2
HW3112B	LOWER SIDE FRAMES (4C)	2
HW3115A	SERVO FRAME SET (F, 4C)	1
HI3122	LANDING STRUTS (PLASTIC)	2
HW3123	LANDING SKIDS (ALLOY)	2
HW3127	HEX FRAME SPACERS	2
HI3129	CANOPY SCREWS & MOUNT HDWR	1
HI3130A	CANOPY	1
HI3131C	DECAL SET (4C)	1
HI3132B	INSTRUCTION MANUAL (4C)	1
HI3133	WINDSHIELD FOR (HI3130A)	1
HI3138A	FUEL TANK (F, 4C)	1
HI3145	BALL LINKS (16 L, 6 S)	1
HI3146	SWASHPLATE SET	1
HI3152	WASHOUT SET	1
HI3152A	RADIUS LINK WITH PIN	2
HI3160	ROTOR HEAD BLOCK	1
HW3161A	SEESAW SHAFT SET (II, F, 4C)	1
HI3167A	FLYBAR SEESAW (II, F, 4C)	1
HI3167B	SEESAW OFF SET PLATE	2
HI3167C	SEESAW TIE BAR	2
HI3167D	SEESAW BEARING CUP	2
HI3167E	SPECIAL BALL M3X6	2
HW3170	WASHOUT PINS	2
HW3173	FLYBAR	1
HI3176	STABILIZER CONTROL ARM	2
HI3179	FLYBAR PADDLES	2
HW3180	FEATHERING SHAFT (II, 4C)	1
HI3181	DAMPING RUBBERS	2
HI3184	ROTOR BLADE GRIPS	2
HI3189	MIXING ARM SET	2
HW3190	MAIN ROTOR BLADES(PAIR) 550MM	1
HW3192	LINKAGE SET (11 RODS)	1
HI3201	T/B SUPPORT FITTINGS	1
HW3202	T/B SUPPORT STRUT (II, 4C)	1
HW3203	BRASS BEARING SET	1
HI3205	SERVO MOUNTING TABS (F, 4C)	10
HI3206	TAIL PUSHROD CONNECTOR (II, F, 4C)	1
HW3207	STRUT SPACER SET (4C)	4
BB1000	BALL BEARING SET (OP)	8
BB1030	BALL BEARING 3X10X4 (OP)	2
BB0730	BALL BEARING 3X7X3 (OP)	2
BB1350	BALL BEARING 5X13X4	2
BB1060	BALL BEARING 6X10X3 (OP)	2
BB1980	BALL BEARING 8X19X6	2
BB1812	BALL BEARING 12X18X4 (OP)	2
BB1150	BALL BEARING 5X11X4	2
BB1812A	BALL BEARING 12X18X16 one way	1

Phoenix 4-Stroke Upgrade Parts

CN0427A	Reversible hex start system w/hex adapter
CN0402	Hex start adapter only
CN0520	Torque Tube Tail Drive w/daul B.B. Supports
CN2007	Training Pod 30/46 size
CN2015	Hardened Tip Hex Wrench Set (4 piece ground tips)
CN2016	4.8V Battery monitor and alarm
CN2017	PG-01T Piezo Gyro (tokin sensor)
CN2028E	7" Aluminum Starter Extension(must use with#2209)
CN2052	Accuratech Blade Balancer (Blue Anodize)
CN2056	Machined aluminum swashplate
CN2076D	Diamond CNC metal rotor head w/wash out base
CN2079	Fast 3-D Hot dog fly bar paddles
CN2120	Daul Ball Bearing Tail Rotor Assembly
CN2120A	Daul B.B Machined Aluminum Tail Rotor Assembly
CN2122	Carbon fiber flybar stiffeners 30 size
CN2126H	Ultra Light Carbon Graphite Tail Boom
CN2127A	Ultra Light Carbon Graphite Tail Fin Set
CN2128	Ultra Light Carbon Graphite Tail Boom Support
CN2137	2 oz Header Tank (all 30 - 60 size)
CN2155	Piston Locking Tool (for all engines)
[illegible]2176	CNC Servo arm pack (5 pcs Fut. purple)
[illegible]2177	CNC Servo arm pack (5 pcs. JR purple)
CN2202	Aluminum turbo cooling fan
CN2203	Ball Bearing Washout Mixing Arm Set
CN2204	Ball Bearing Bell Mixer Arm Set
CN2205	Ball Bearing Aileron Bellcranks
CN2206	CNC Machined Flybar Control Arms (2)
CN2207	CNC Machined Washout Mixing Arm(2)
CN2208	Metal Swashplate Anti-rotation Bracket
CN2209	Machined Aluminum Start Cone
CN2210	Canopy Quick Mounts w/Grommets
CN2212P	Machined Aluminum Tail Rotor Grips(2)purple
CN2212G	Machined Aluminum Tail Rotor Grips(2)Gold
CN2212B	Machined Aluminum Tail Rotor Grips(2)Black
CN2213	2oz Header tank w/machined CNC mount-(purple)
CN2215B	Machined Head Button-Thr.Mount (Black)
CN2216	Rear Rudder Servo Mount
CN2217P	Anodized Color Caps (purple)
CN2217G	Anodized Color Caps (gold)
CN2217S	Anodized Color Caps (silver)
CN2217R	Anodized Color Caps (red)
CN2217B	Anodized Color Caps (blue)
CN2218P	Anodized Color Washers (purple)
CN2218G	Anodized Color Washers (gold)
CN2218S	Anodized Color Washers (silver)
CN2218R	Anodized Color Washers (red)
CN2218B	Anodized Color Washers (blue)
CN2219	Easy Ball Link Driver
CN2220	Main Shaft Thrust Bearing Kit
CN2221	6mm Head Axle Upgrade w/Thrust Bearings
CN2222	Remote Glow Plug Adapter
CN2400	Hurricane Carbon main blades 550mm fully Sym
CN2411	Hurricane Carbon fiber blades 550mm Semi Sym
CN3047A	4-Stroke Tune Pipe w/ Header-Polished Aluminum
CN3048	4-Stroke Speed Muffler