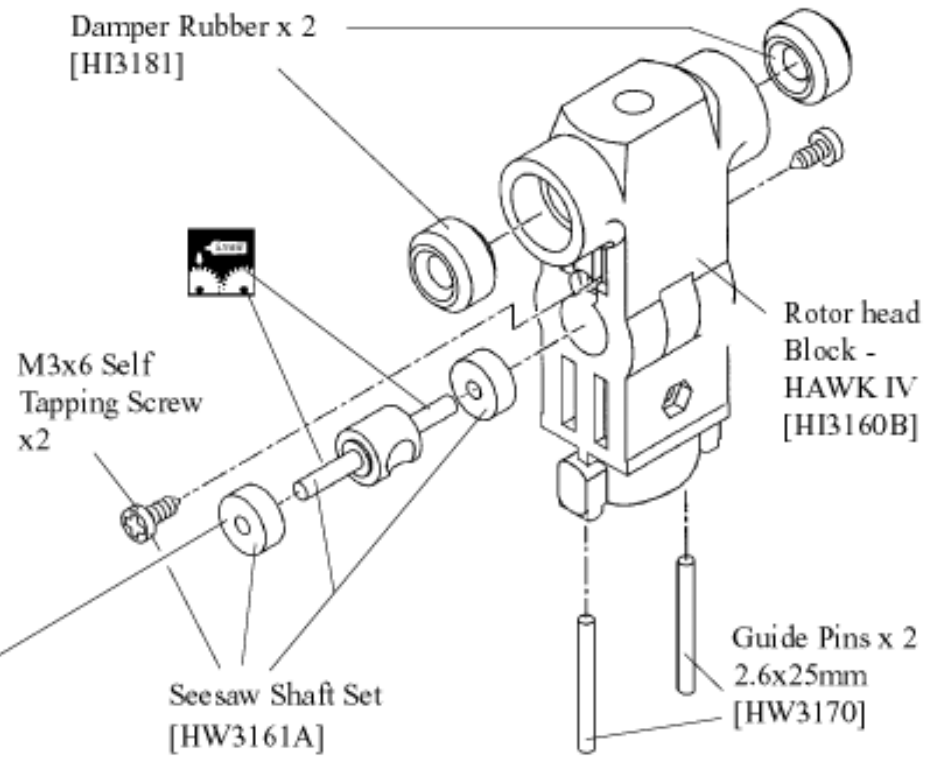
STEP 1-2 Main Rotor Head

STEP 1

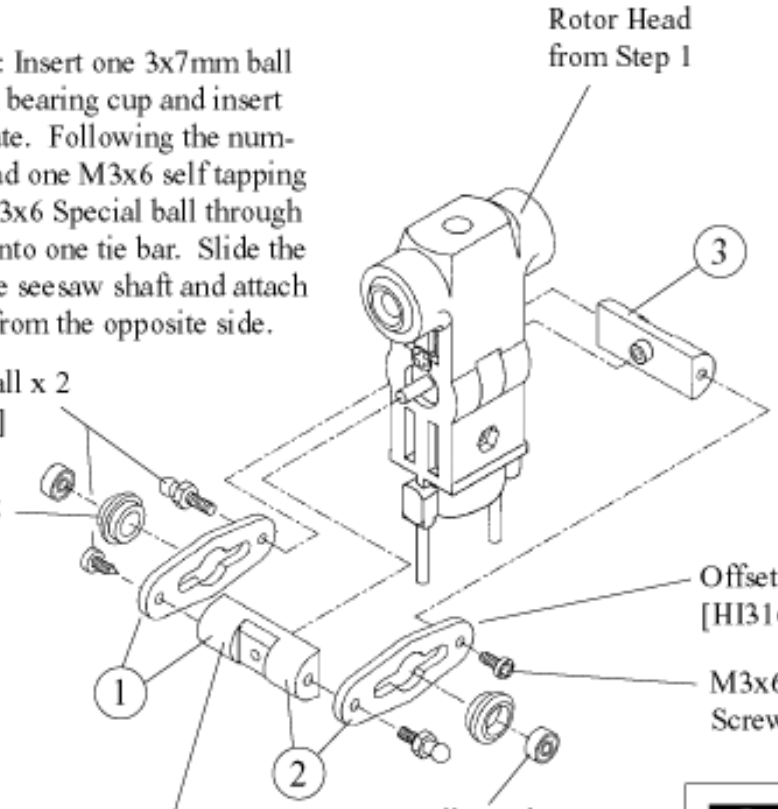
From parts bag 1: Press the Damper Rubbers and the Guide Pins into the Head Block. Apply one drop of thin CA glue to the pins after they are fully seated. Install one M3x10 oilite bearing onto each side of the seesaw shaft and insert into the Head Block. Secure with the two M3x6 self tapping screws.

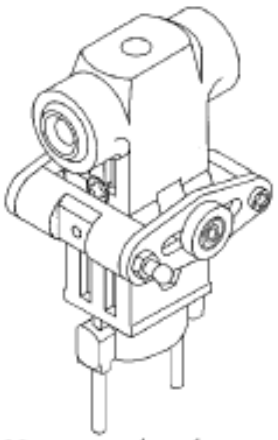


Optional SE Seesaw Ball Bearings CNBB1030 x 2

STEP 2

From parts bag 1: Insert one 3x7mm ball 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 plates into one tie bar. Slide the assembly onto the seesaw shaft and attach the other tie bar from the opposite side.





New completed rotor head with symetrical plate.

Outside hole on offset plate is not used.

Follow steps 1, 2, & 3.

Take notice of the location of the two steel balls on the offset plates.

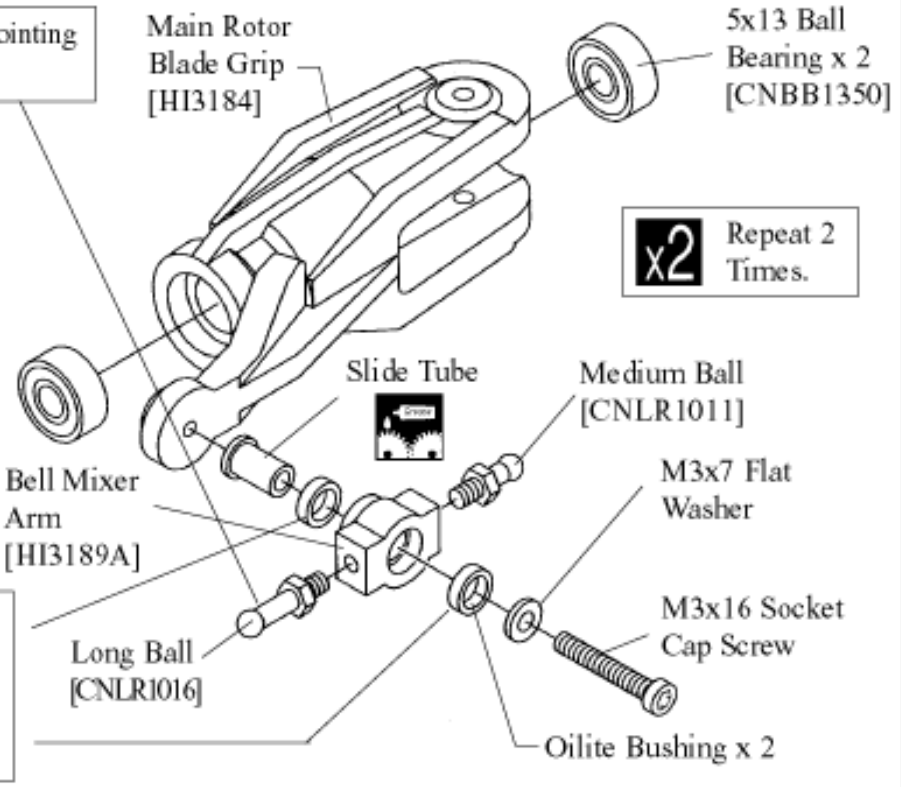
STEP 3-4 Main Blade Grip Assembly

Note, the long ball is installed pointing away from the the blade grip.

STEP 3

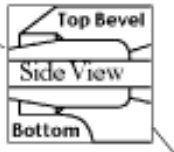
From parts bag 1: Install one Long Ball and one Short Ball into the Bell Mixer, insert the slide tube into the bell mixer arm (**Note: the oilite bearings are pre-installed**) and secure onto the blade grip with one M3x16 Socket Cap screw and M3x7 Flat washer. Install two M5x13 Ball Bearings into each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

Optional SE Ball Bearing Set is available to replace the two oilite bushings



STEP 4

Top of blade grip has Bevel.



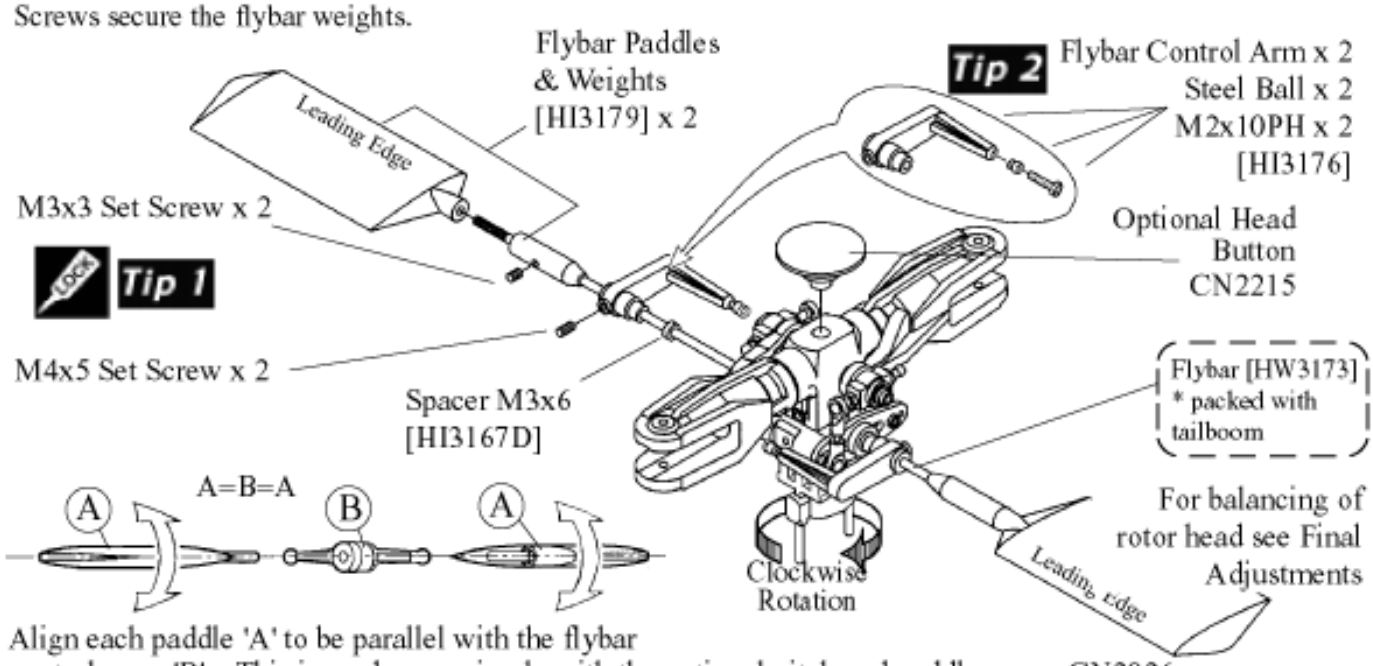
From parts bag 1: Insert the Feathering Shaft into the head block, slide one 5X10mm Washer on each side of the shaft. Install the blade grip (**Note the direction of the bell mixer arm with the beveled edge on top of the blade grip**) followed by one 4x10mm Washer, one 4x12mm Washer and one 4mm Locknut. Assemble Pushrod "I" x 2, measuring 34mm end to end distance following the diagram on page 26, and connect the seesaw ball to the long ball on the bell mixer.

Pushrod "I" will require a 32mm length for a 3D setup - see page 26.

STEP 5-6 Flybar, Paddles & Washout

STEP 5

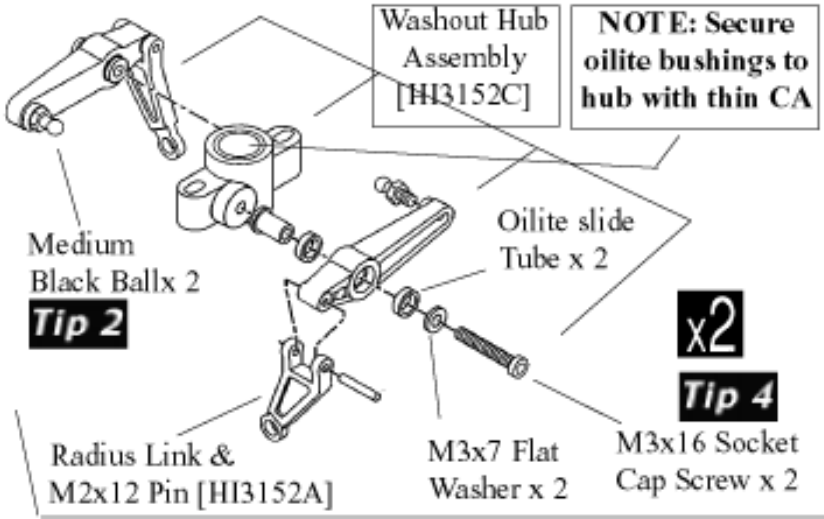
From parts bag 1, slide and center the Flybar through the seesaw arm assembly. Install one Steel ball onto each flybar control arm with one 2x10mm phillips screw. The hole on the flybar control arm may be too small, open slightly before inserting 2x10PH screw ***(Tip 2)*** Slide the Spacer and Flybar Control Arm onto the flybar. Loosely tighten the control arms. Using a ruler, check the distance between the end of the flybar and the control arm and adjust until the lengths are the same and there is no free play between the control arms and the rotor head. Remove one set screw at a time, apply threadlock (***Tip 1***) and tighten in place. Slide the Flybar Weight (Note: the flat end of the weight faces the paddle) and thread on the Flybar Paddle until all the threads are covered onto the flybar and align the paddles parallel. Again using the ruler, rotate one paddle or the other to get equal distances, remember leading edge of the paddles turn clockwise. Using threadlock on the two 3x3mm Set Screws secure the flybar weights.

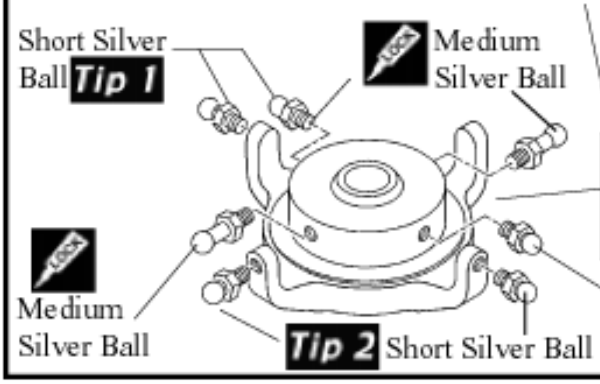


Align each paddle 'A' to be parallel with the flybar control arms 'B'. This is made very simple with the optional pitch and paddle gauge CN2026

STEP 6

Attach two Medium Balls to the Washout Mixing Arms (**Note, attach from the flat side of the arm**). Secure the semi-assembled mixing arms onto the Wash-out Hub using one slide tube inserted from the flat side and secured using one 3x16mm Socket Cap Screw and one 3x7mm Flat Washer per arm (**note, use the left side hole on the hub**). After attaching the balls to the swashplate, press the radius link onto the inner short balls on the Swashplate.





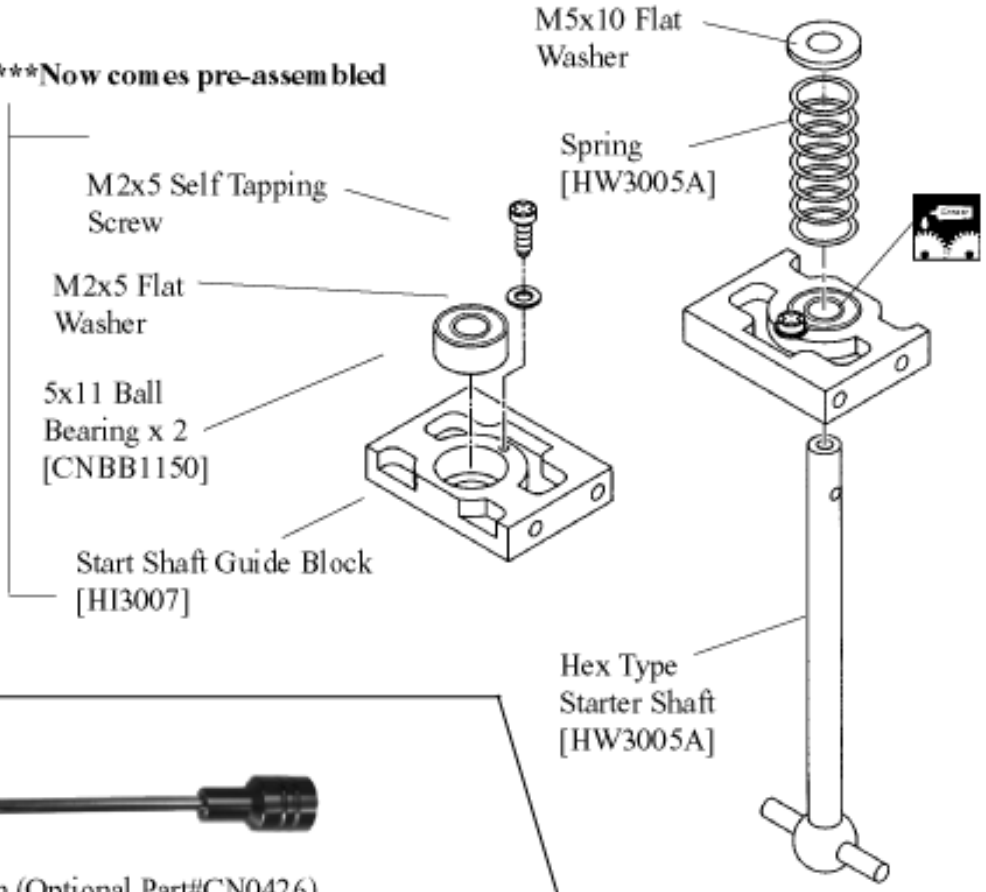
Starting with the inside race, apply thread-lock and attach two short balls (***Tip 1***) directly across from each other, similarly attach two medium balls to the remaining holes. Attach the three short balls (***Tip 2***) to the outside race. The rear location is not used now.

STEP 7-8 Starting Shaft

STEP 7

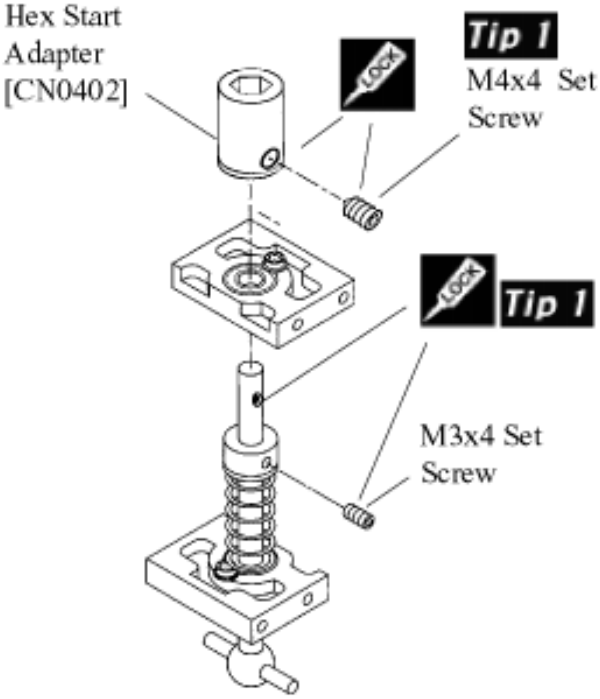
From parts bag 2: the Start Shaft Guide Blocks are pre-assembled. Slide the Starter Shaft through one of the block assemblies with the M5x11 Ball Bearing facing up and slide the spring and 5mm washer onto the shaft.

*****Now comes pre-assembled**



STEP 8

Hex Starter Extension (Optional Part#CN0426)



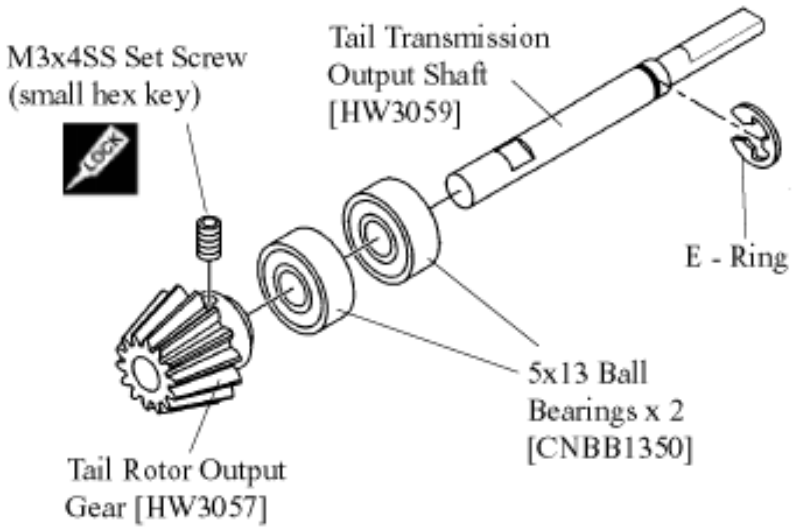
From parts in bag 2: Slide the M5x10 Collar spaced approximately 29mm from the top of the start shaft and partially tighten with one M3x4 Set Screw. The Hex start adapter must be attached to the HW3005A start shaft using threadlock on both the shaft and the **M4x4 set screw**. Align the point to fit into the machined indentation in the hardened start shaft. Apply some lubricant on the shaft after assembly to ensure smooth vertical movement inside the inner races of the bearings when engaging and disengaging of the start system.

Tip When removineg the hex start wand after the engine is started, it is recommended that you use a two step procedure.
STEP #1: Lift the hex wand upwards just enough to disengage the start system while keeping the wand inserted in the hex coupler (CN0402)
STEP #2: After the coupler has stopped turning, then remove the wand completely

STEP 9-10 Output Shaft & Counter Gear

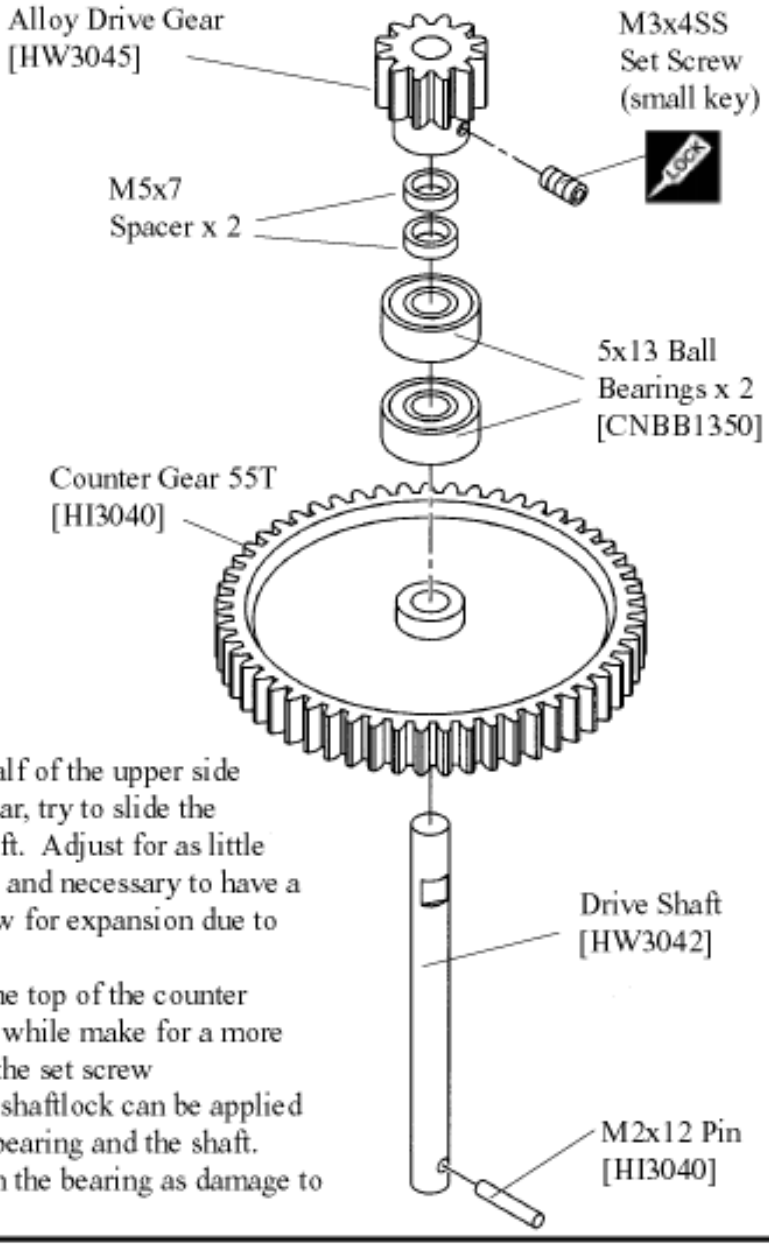
STEP 9

From parts bag 2: Assemble the Tail Transmission Output Gear assembly. Install the E-Ring (be careful not to lose it, it can easily spring away during installation). Slide the two Ball Bearings onto the front of the Tail Rotor Output Shaft. Using threadlock, insert one 3x4mm Set Screw into the gear, Note where the flat spot is on the shaft, 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 inserting 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 slot at the bottom of the gear**) then slide the two M5x13 Ball Bearings followed by the two M5x7 spacers. Using locktite, 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. Secure the drive gear to the shaft.



Tip 1 Test fit the gear assembly into one half of the upper side frames. While holding the pinion gear, try to slide the counter gear up and down on the shaft. Adjust for as little vertical play as possible. It is normal and necessary to have a small amount of vertical play to allow for expansion due to heat during operation.

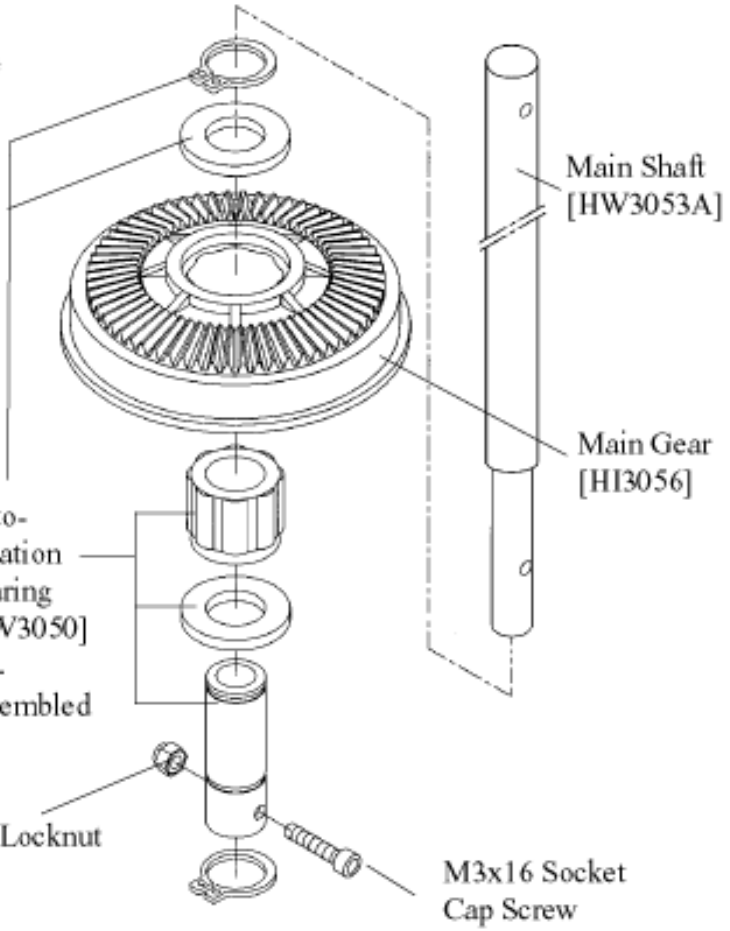
Tip 2 A small amount of red locktight to the top of the counter shaft, between it and the pinion gear while make for a more secure fit. Only use blue locktite on the set screw

Tip 3 A small amount of the special green shaftlock can be applied carefully on the shaft between each bearing and the shaft. **Warning**, do not get any shaftlock in the bearing as damage to the bearing may result.

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

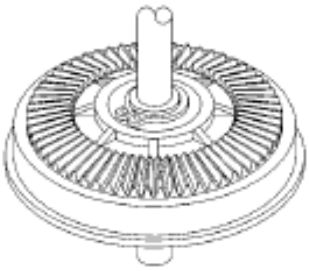
STEP 11

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



Tip 1 You can temporarily insert main shaft, main shaft bearing, stopper and head block screw to keep them from getting lost!
* Do not apply threadlock!

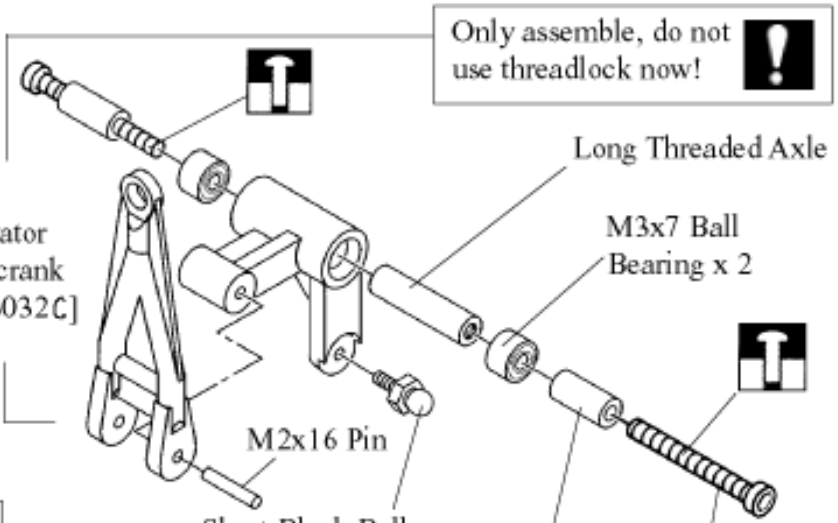
Completed Main Gear & Main Shaft



STEP 12

From parts bag 2, insert the long threaded axle and one M3x7 ball bearing from each end of the bellcrank. Slide one short spacer over one 3x30mm Socket Cap screw and attach to the threaded axle (**do not use threadlock here!**), repeat for other side. The 2x16mm pin is assembled, just insure the elevator radius link moves freely against the Bellcrank. Thread one short black ball into the elevator arm.

CNQSC04
Optional machined ball bearing elevator arm w/ adjustable ball link.

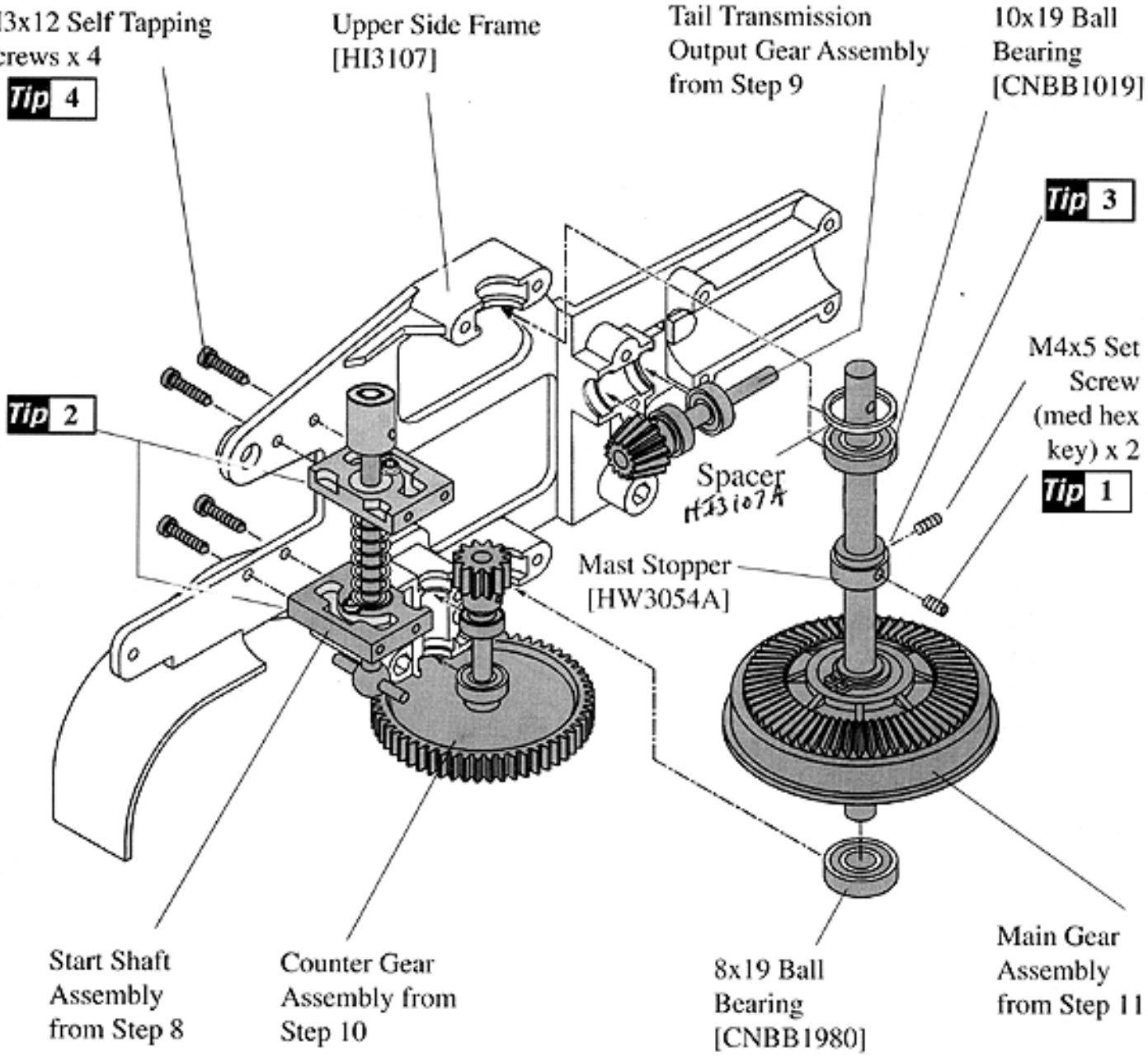


STEP 13 Upper Side Frames

STEP 13

From parts bag 2. Install two 4x5mm Set Screws (***Tip 1-do not apply locktite at this time***) on the Mast Stopper then slide the mast stopper on the main shaft followed by one M8x19 Ball Bearing on the bottom of the main shaft and one M10x19 Ball bearing from the top.

Attach the starter shaft assembly to the left side upper side frame with four 3x12mm Self Tapping Screws (***Tip 2*- observe the correct orientation of the block assemblies**). Position the main gear/main shaft assembly, (***Tip 3*-Note the orientation of the mast stopper, the raised inner diameter should be facing upward, towards the inner race of the top bearing**) the counter gear assembly and the tail transmission output shaft assembly in their designated locations (see diagram below) on the upper right side frame (**Make sure the bearings are fully seated in the recesses.**)

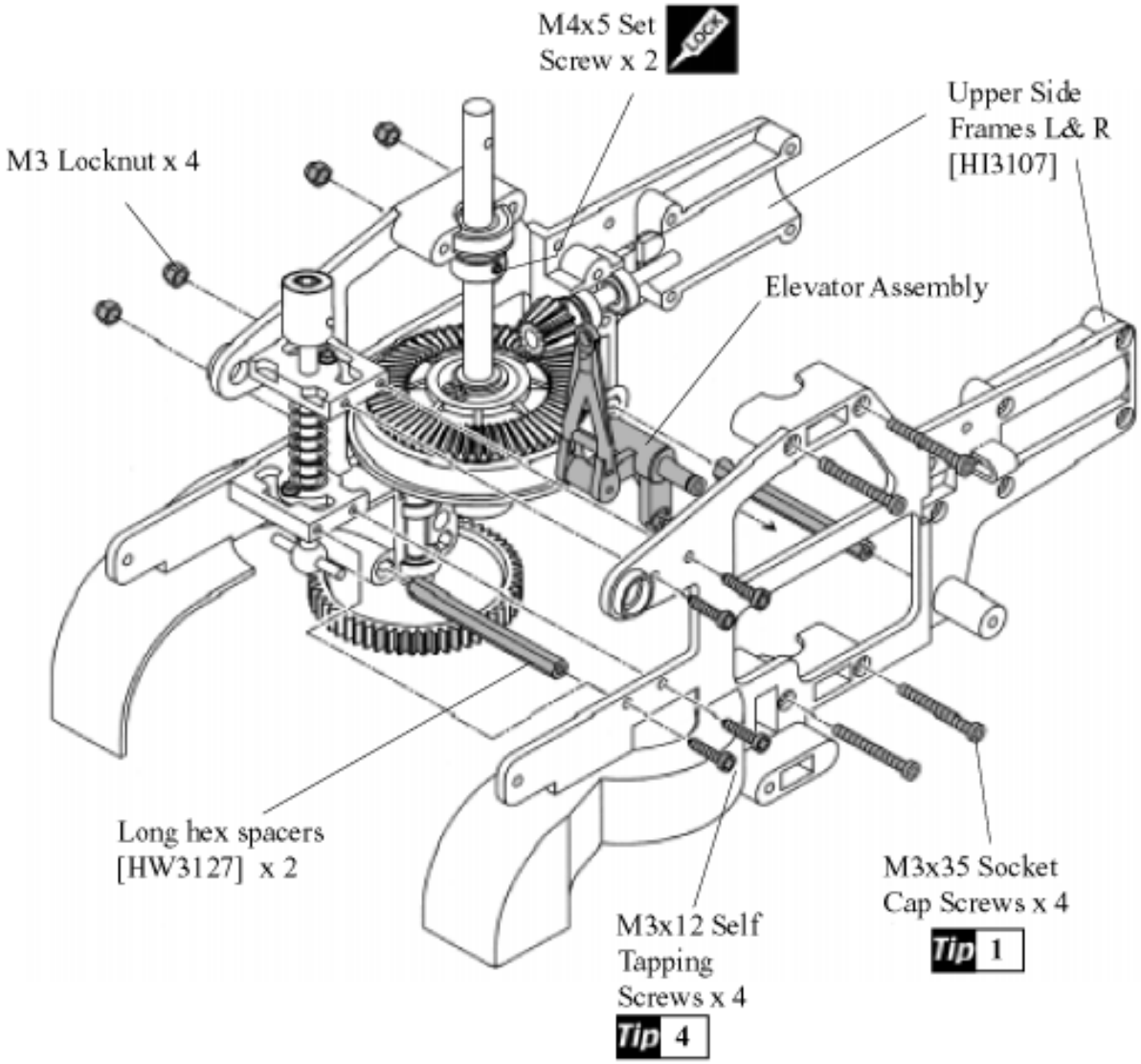


STEP 14 Upper Frame Assembly

STEP 14

From parts bag 2: Insert the two long Hex Spacers at the specified locations in the diagram. **Note: 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 Socket Cap Screws (***Tip 1-do not use threadlock when using locknuts***) 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 in order to reduce the amount of installation positioning later.

While pulling up on the main shaft (make sure the main gear rotates freely), push the mast stopper against the upper ball bearing insuring that the side of the stopper with the raised inner portion is facing upwards, Apply threadlock to the set screws and tighten in place. Attach the remaining four 3x12mm Self Tapping Screws(***see Tip 4 on page 11***) to the starting shaft blocks.



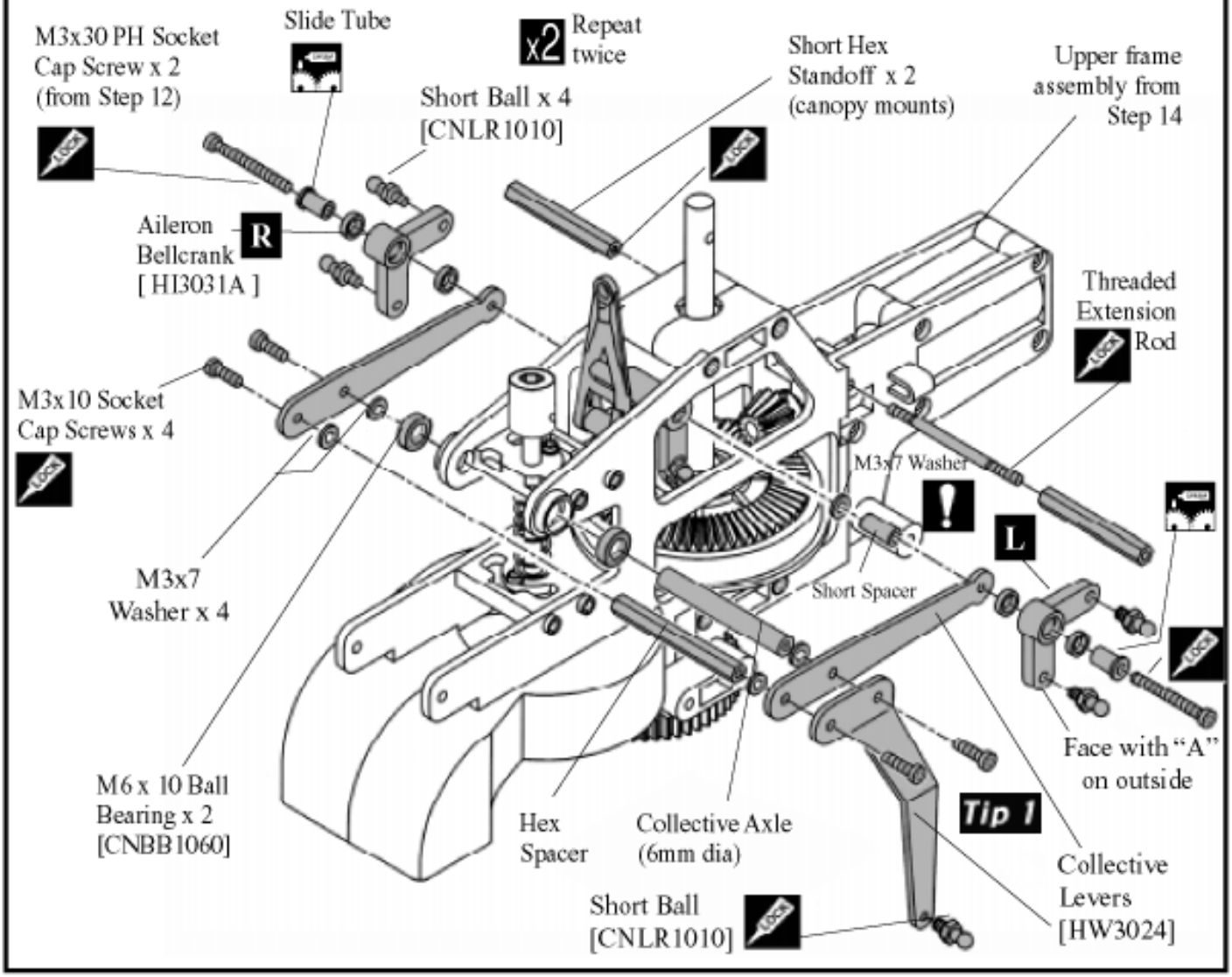
Note : The gear mesh between the main gear and the tail transmission output shaft may be a snug fit at first, but it will become smooth after a few flights. This is the normal wear in process.

STEP 15 Collective and Aileron Levers

STEP 15

From parts bag 2: Press in two M6x10 ball bearings into the front side frames for the collective axle. Attach the front Collective Arm Spacer (hex shape) and the Collective Axle (6mm) to the Right Collective arm (notice that the axle is attached at the middle hole) using threadlock and two 3x10mm Socket Cap Screws and two M3x7 spacers on the inside. Slide the assembly through the ball bearings in the upper side frames from the right. Using threadlock attach the Left Collective Arms with two 3x10mm Socket Cap Screws insuring the two M3X7 washers are on the inside. Tighten the screws insuring the collective lever move freely with no side to side play. Install one M3 Short Ball on to the collective lever using threadlock.

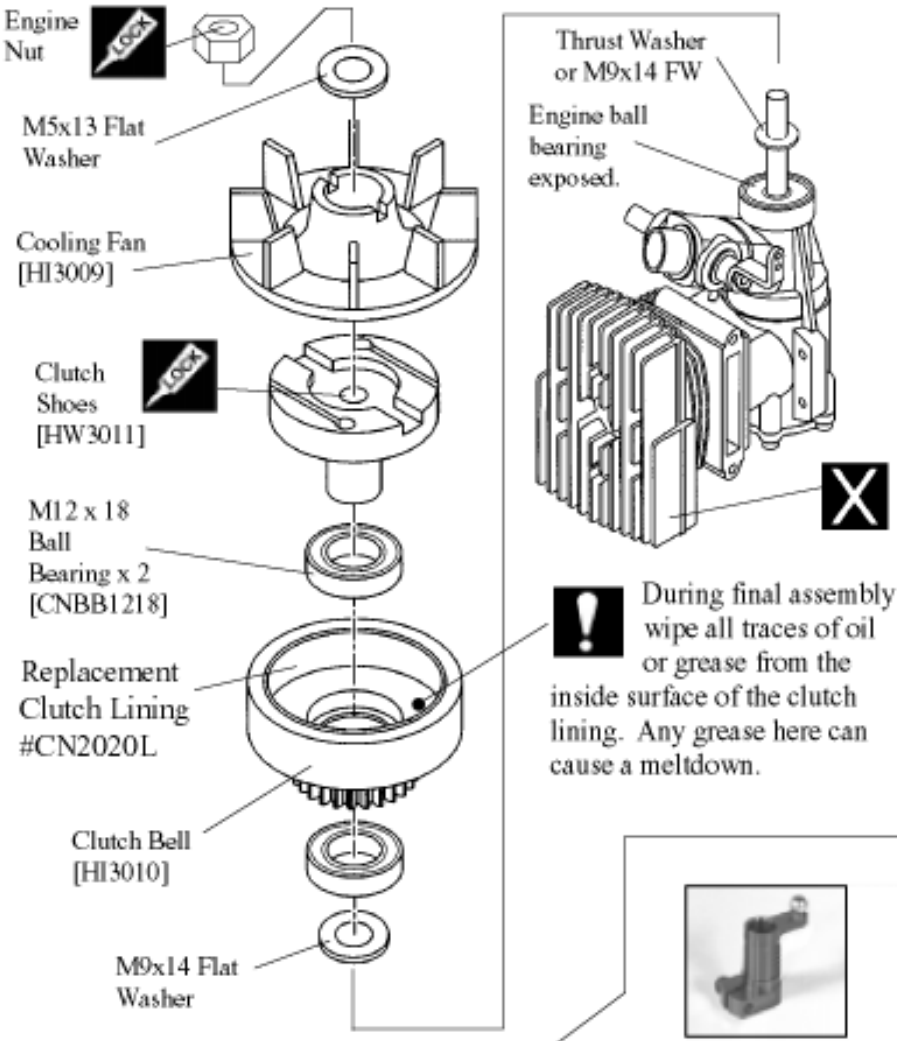
The left Aileron Bellcrank has two oilite bearings pre-installed into the bellcrank, install the two Short Balls to the "A" face and insert the slide tube through the bellcrank using a small amount of lubricant (**the bellcrank is offset, make sure the slide tube is inserted from the offset side**). Starting on the left side, remove the 3x30mm Socket Cap Screw, short spacer and washer from the elevator bellcrank (previously assembled in Step 12), slide the left aileron assembly onto the screw and insert through the left collective lever. Apply threadlock to the end of the screw threads now and slide the short spacer and the M3x7 washer before tightening 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 Mounting

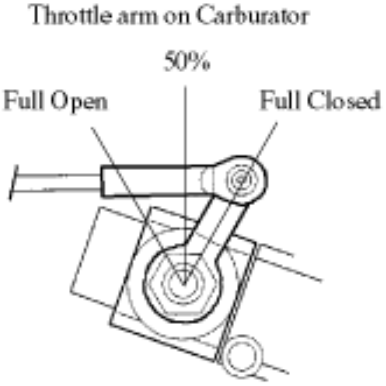
STEP 16 From parts bag 3.

Remove all parts from the engine crankshaft until you can see the front ball bearing. Install the 9x14mm Flat washer (or washer provided by engine manufacturer), insert the Ball Bearings into the clutch bell assembly and place on the crankshaft. Clean the threads on the crankshaft and on the clutch, carefully apply high strength red threadlock on the engine crankshaft threads nearest the bearing (be careful not to get threadlock into the ball bearings) and on the threads in the clutch. Thread the clutch onto the crankshaft until the crankshaft can be seen threough the top. Insert the fan, keying it to the clutch. Wrap a cloth over the fan (provides grip to the fan without breaking the fins) and tighten until the clutch stops, torque an additional 1/16 of a turn. Using a Piston Lock [CN2155 Optional Parts] makes this easier. Secure the fan with the 5x13mm Washer and the engines prop nut onto the crankshaft. **Apply some high strength red threadlock to the prop nut to insure its security** Again only torque the nut 1/16th of a turn more.

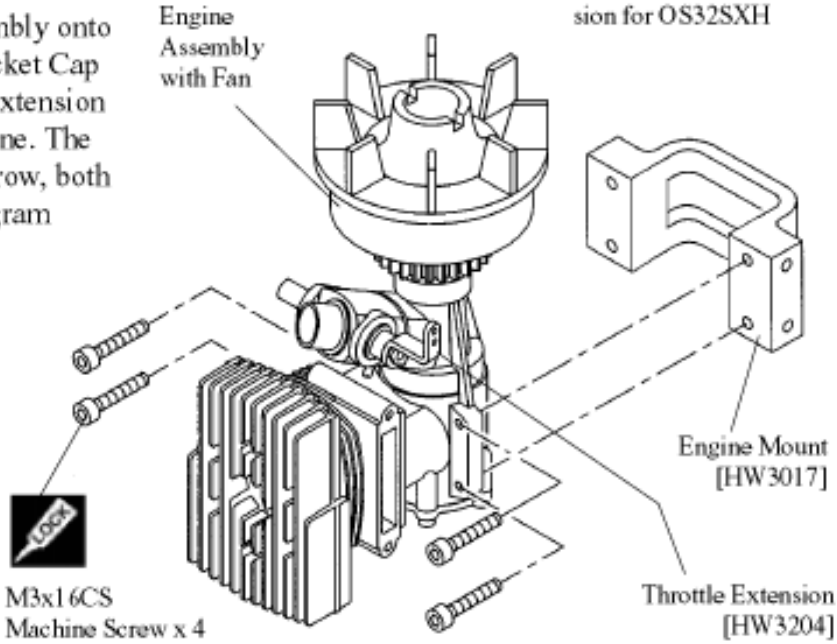


STEP 17

Using threadlock, secure the engine assembly onto the engine mount using four 3x16mm Socket Cap Screws. From bag 4, install the Throttle Extension by removing the arm supplied on the engine. The arm has to be repositioned to get equal throw, both open and closed from 50% as per the diagram below.



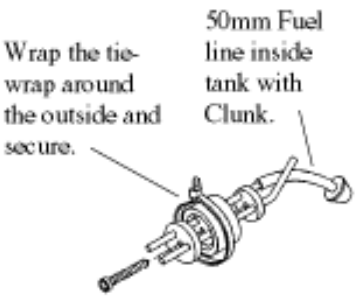
(Optional Parts) CN2153 Throttle Extension for OS32SXH

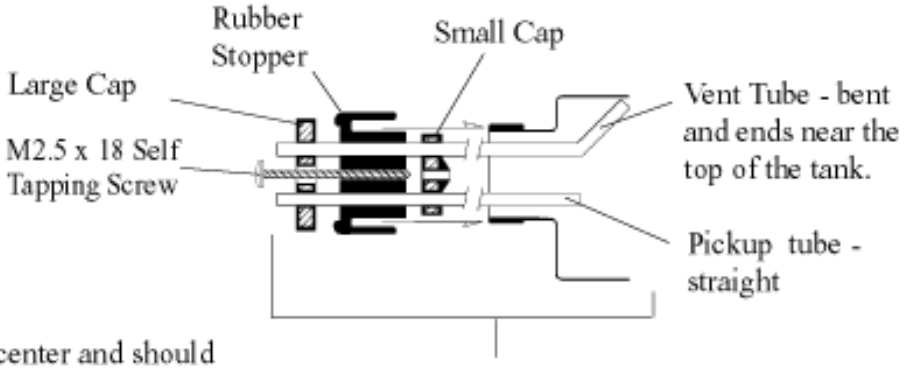


STEP 18-19 Fuel Tank & Lower Frames

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 vent tube upwards (make sure the tube comes to the top of the fuel tank) 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 to about 1/8" from the back of the tank and can move around freely. Insure the vent tube is near the top of the tank but does not touch it. Install the tie wrap around the outside of the rubber cap. Finally tighten the long self tapping screw to seal the tank.

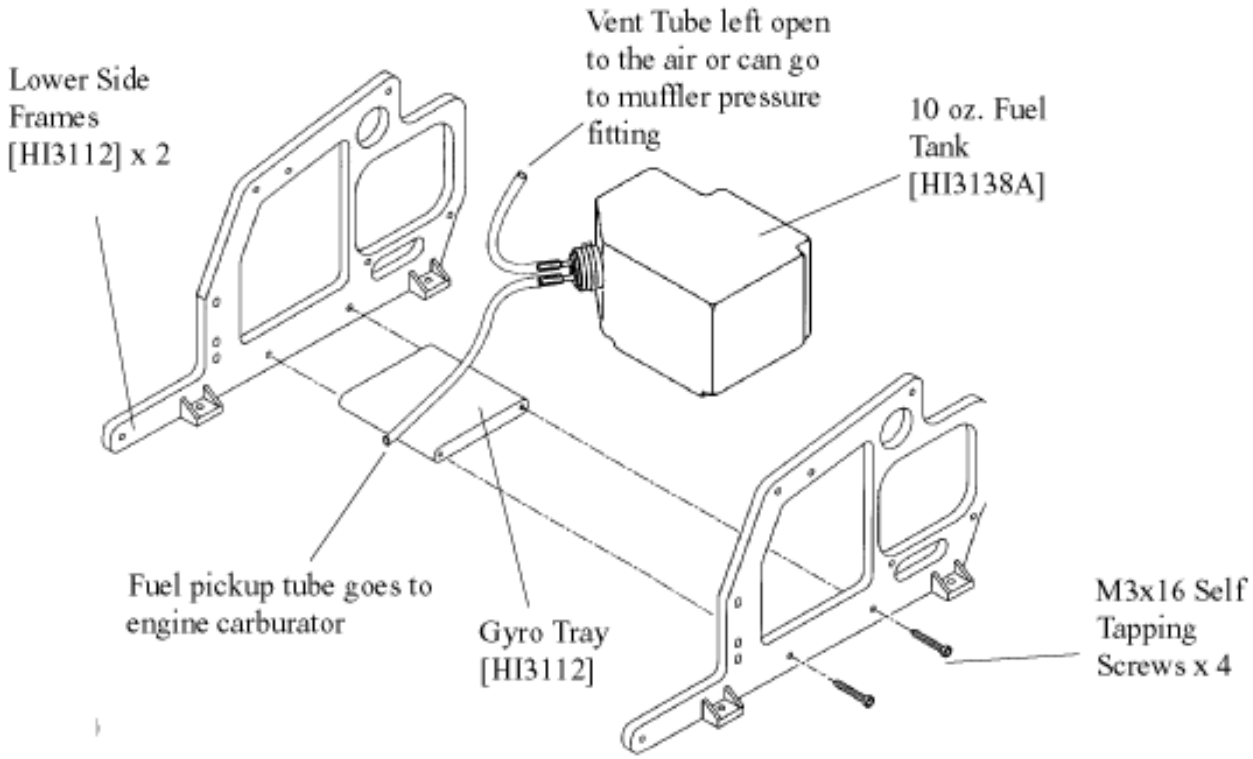




Note: The fuel tank opening is off-center and should be installed upwards to align closer to the carburetor.

STEP 19

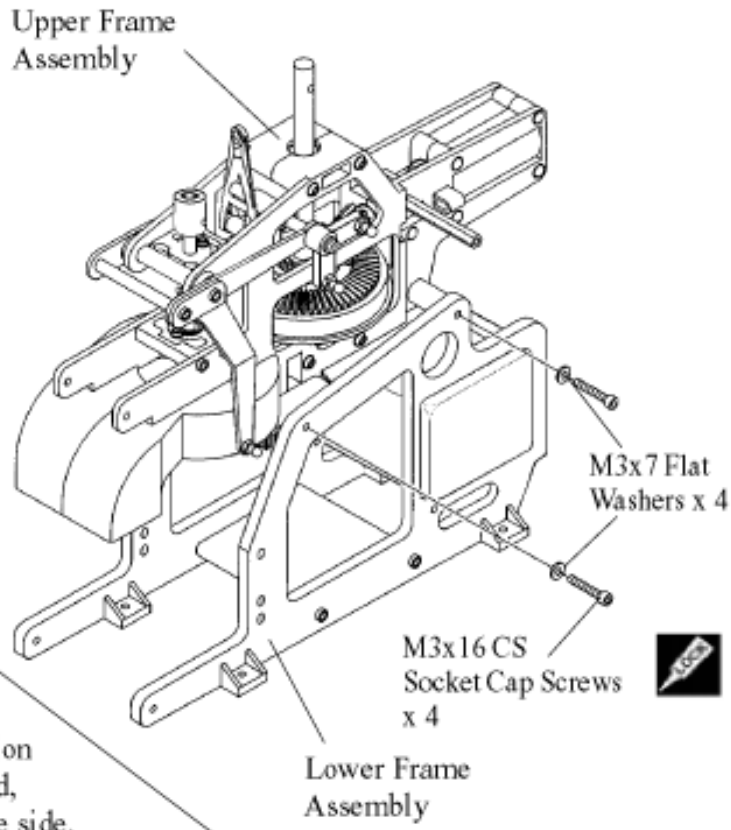
From parts bag 3: Slide the Fuel Tank into position and assemble the Lower Frames with four 3x16mm Self Tapping Screws into the gyro plate. **NOTE**: Lay the bottom of the sideframes on a flat surface to align the two sides when tightening the screws. The fuel tank opening should be installed with the fittings on the right side to insure they are on the side of the carburetor fuel inlet. The vent tube can later be plug into the muffler pressure fitting (see step 23) or left open to the air as some may prefer. The fuel pickup tube will be attached to carburator. (see step 21)



STEP 20-21 Upper & Lower Frames

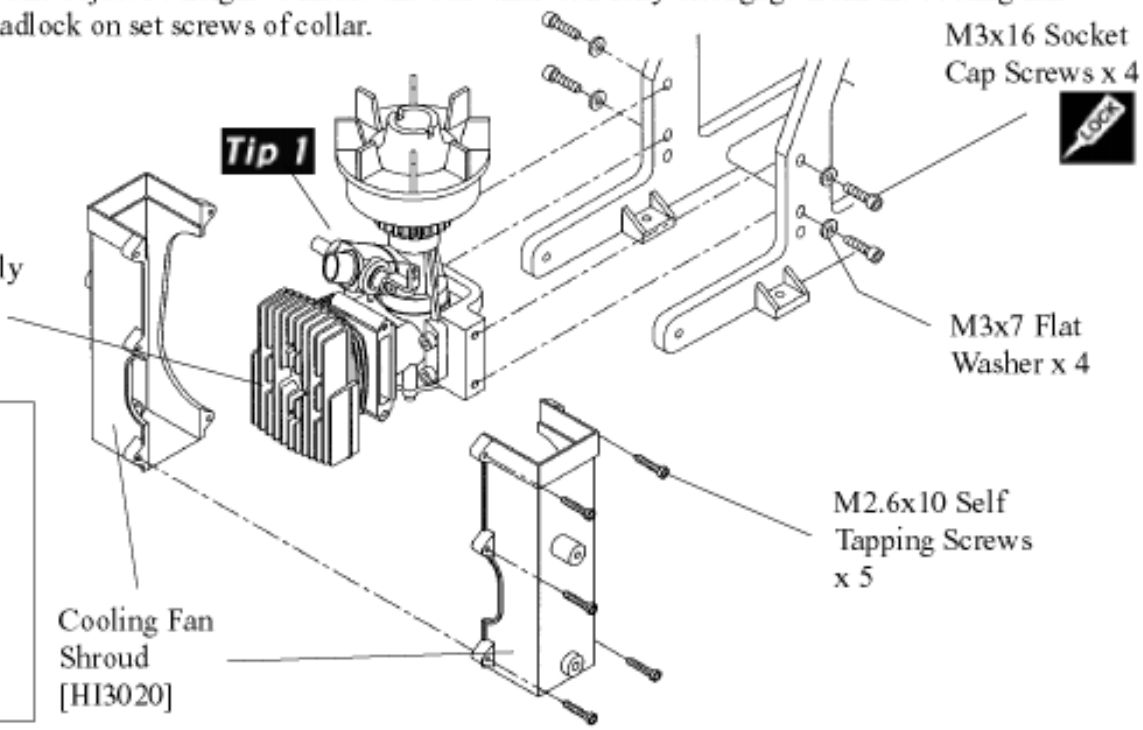
STEP 20

Using threadlock, attach the lower frame assembly to the upper frame assembly with four 3x16mm Socket Cap Screws and four 3x7mm Washers.



STEP 21

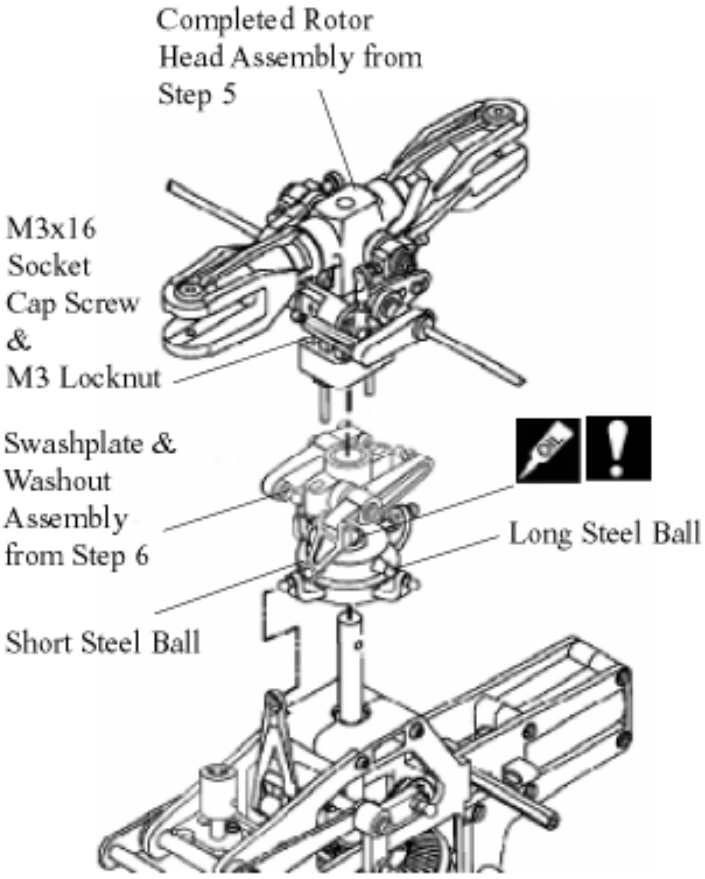
Assemble the Lower Cooling Fan Shroud over the head of the engine using parts from bag 3. Assemble the two halves using the five 2.6x10mm Self Tapping Screws. Loosely install the engine assembly into the lower side frames using four 3x16mm Socket Cap Screws and four 3x7mm Large Flat Washers. Position the lower shroud to overlap the upper shroud, adjust the engine height by sighting from the side. Slide the engine upwards until the clutchbell gear is properly meshed with the counter gear, then threadlock the screws in place. At this time, plug the fuel line to the carburator ***(Tip 1*** -installing a fuel filter between tank and carburator will help prevent any fuel contamination from entering the carburator and causing engine failure). Now check the starting shaft, loosen the collar and adjust its height to insure the start shaft can fully disengage from the cooling fan.
NOTE: use threadlock on set screws of collar.



For proper gear mesh, insure the counter gear has mimimum vertical play on it's shaft.

STEP 22-23 Final Rotor Head Assembly & Muffler

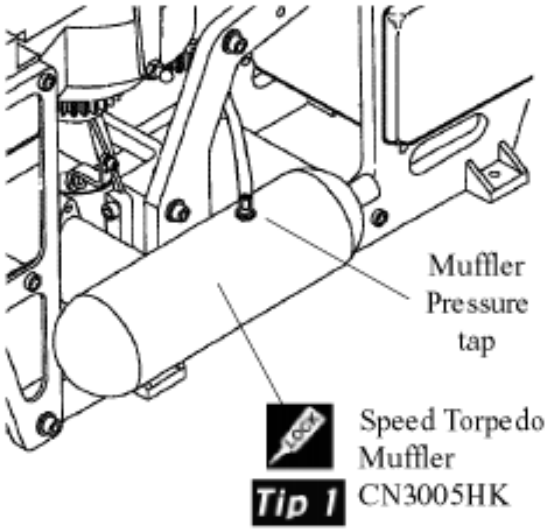
STEP 22



Slide the swashplate and washout assembly from **Step 6** onto the main shaft and snap the elevator lever arm onto one single front ball 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. 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 washout hub assembly to insure they slide smoothly.

Following assembly, move the collective lever fore and aft to the endpoints. The swashplate and washout unit should be very smooth throughout the movement range. If not, inspect the fit of the washout guide to the pins in the rotor head, these pins can be bent slightly if binding. Also check the collective axle, the screws here may be too tight. The fit of the ball links sometimes can cause binding, with time these will break in. These few points are the most common which will cause servo strain leading to premature wear and can make the collective control a little vague.

STEP 23



*Optional CN3055H High Performance Tuned Pipe or CN3033 Tuned Muffler are also Available.

Attach the muffler to the engine with the screws provided with the muffler (***Tip 1***- using hi-temp threadlock). Attach the pressure tap to the top of the muffler and the M4x6 Phillips Machine screw to the bottom hole in the muffler, remember to use hi-temp RTV sealer or threadlock on these parts.

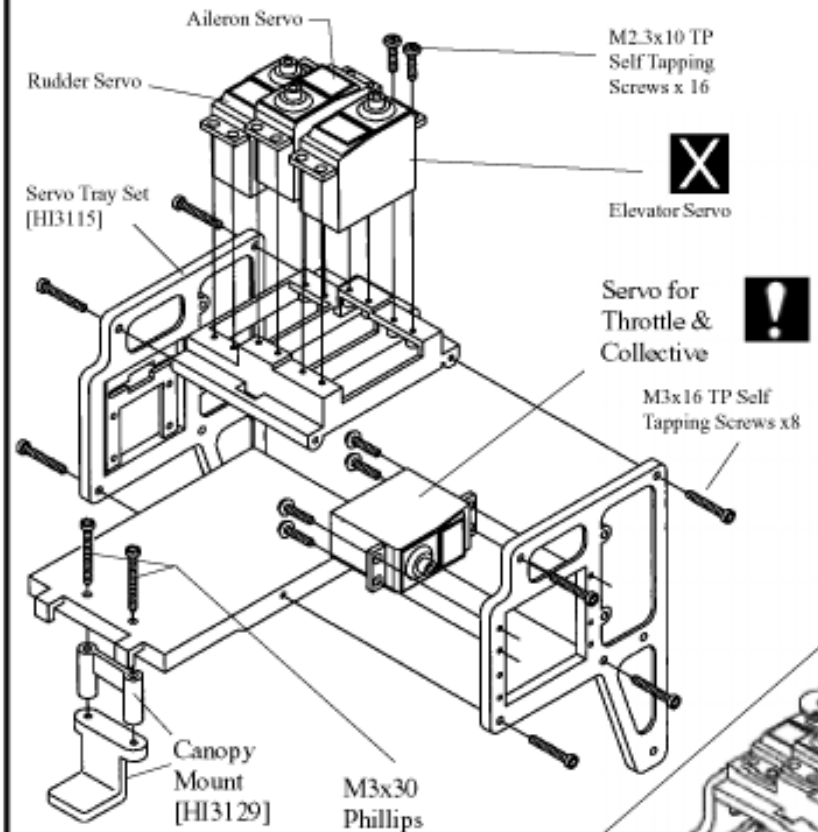
Tip For a good seal between the muffler and the exhaust port, use a gasket made from thin aluminum, brass or exhaust gasket material. To properly seal the fit, after running the engine for several minutes on the first run, shut down the engine and re-tighten the bolts, while the engine is still hot. The extra 1/8 to1/4 turn on the bolts will seat the muffler in place.

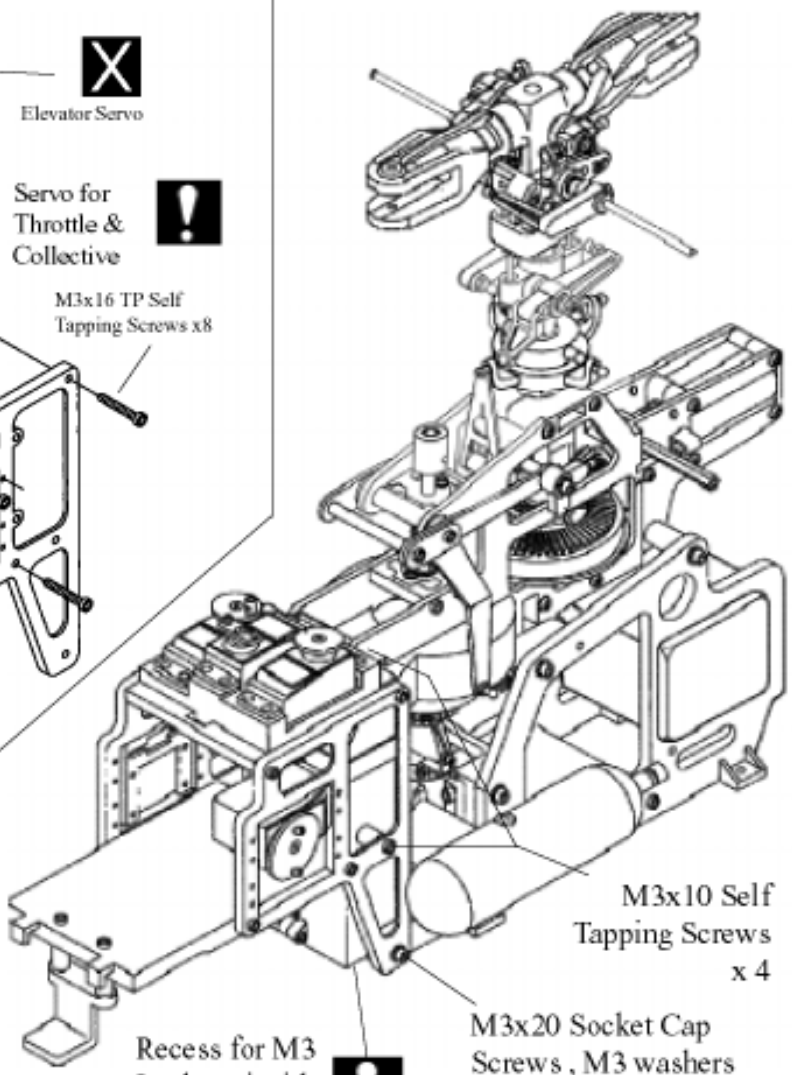
STEP 24 Servo Tray (**Airplane Radio**)

The Hawk helicopter can be operated with a 4 channel airplane radio but a 6 channel or better helicopter radio will greatly simplify the final setup and expand the flight capabilities. Step 24 shows the single collective/throttle servo location for an airplane radio whereas if you are using a helicopter radio skip to Step 25. Alternately for the 4-channel radio, a "Y" harness (optional) can be used with Step 25 plugged into the throttle channel on the radio (provides more torque to collective).

Airplane Radio 4 Channel Setup

STEP 24: From parts bag 5: Install the throttle/collective servo from the ***inside*** of the left 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**). Assemble the servo tray using eight 3x16mm Phillips Head Screws. Attach the rudder (yaw), aileron (roll cyclic) and elevator (fore/aft cyclic) servos, insuring proper orientation, to the top servo tray. Attach the front canopy mount using two 3x30 Phillips Head Machine Screws through the top of the lower servo tray, through the plastic spacer and into the canopy mount.





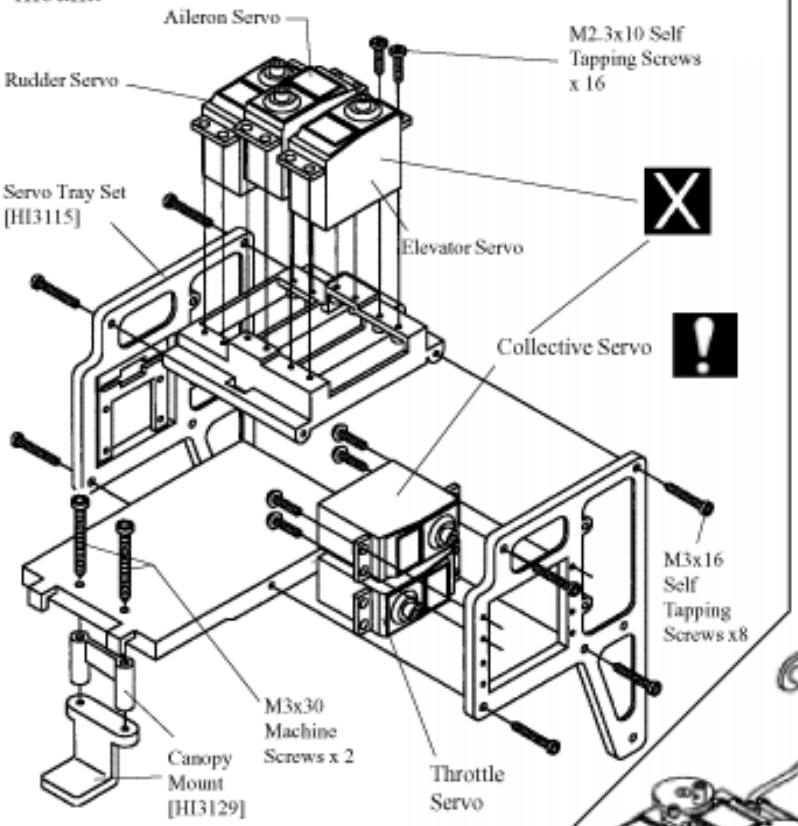
Attach the servo tray assembly to the mechanics using four 3x10mm Self Tapping Screws, two 3x20mm Socket Cap Screws and two M3 Washers. The two Locknuts for the cap screws are inserted into the recess inside the bottom of the fan shroud .

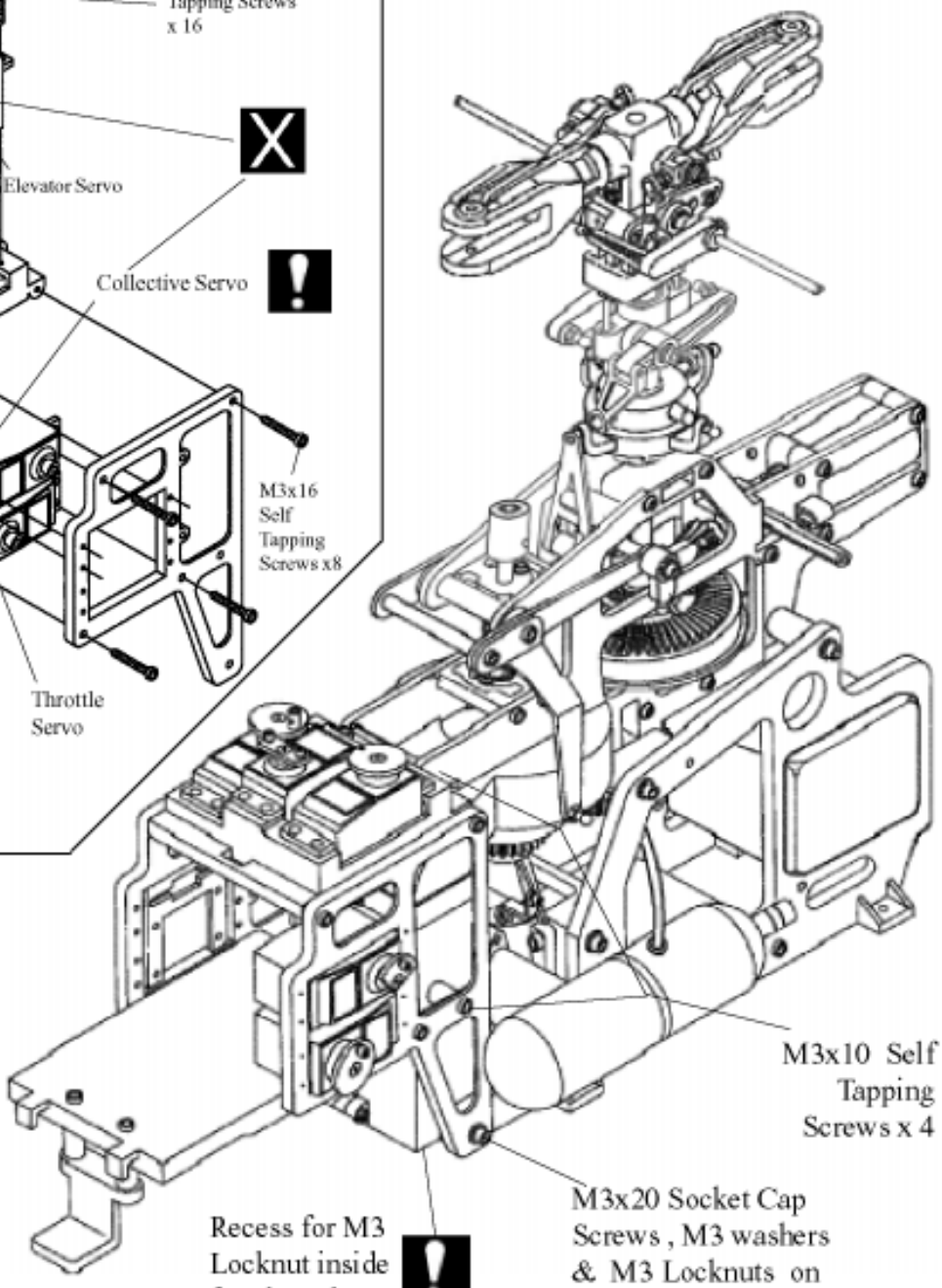
STEP 25 Servo Tray (**Heli-Radio**)

Helicopter Radio 6 Channel Setup

STEP 25

From parts bag 5: Install the collective and throttle servos (note orientation) from the ***inside*** of the left 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**). Assemble the servo tray using the eight 3x16mm Phillips Machine Screws. Attach the rudder (yaw), aileron (roll cyclic) and elevator (fore/aft cyclic) servos insuring proper orientation, to the top servo tray. Attach the canopy mount using two 3x30 Phillips Machine Screws through the top of the lower servo tray, through the plastic spacer and into the canopy mount.



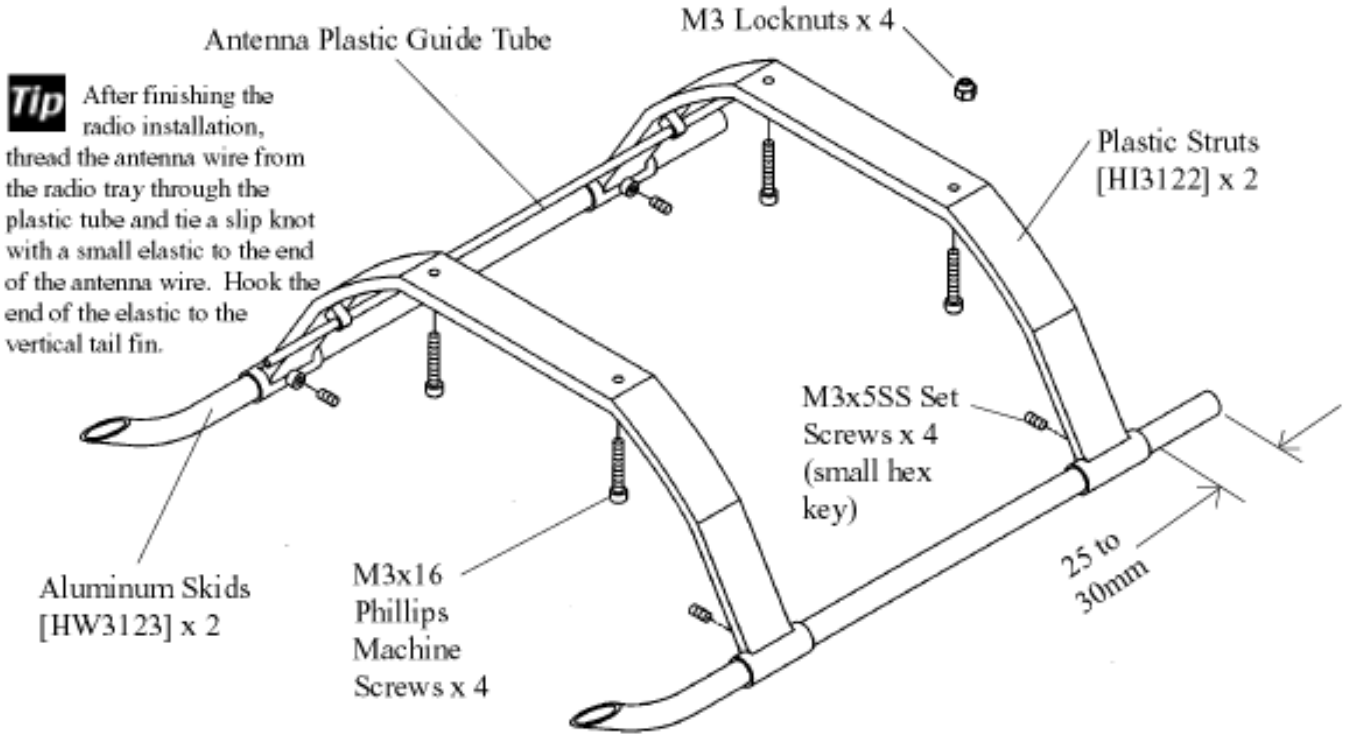


Attach the servo tray assembly to the mechanics using four 3x10mm Self Tapping Screws, two 3x20mm Socket Cap Screws and two M3 Washers. The two Locknuts for the cap screws are unserted into the recess inside the bottom of the fan shroud .

STEP 26-27 Landing Gear & Tail Drive Shaft

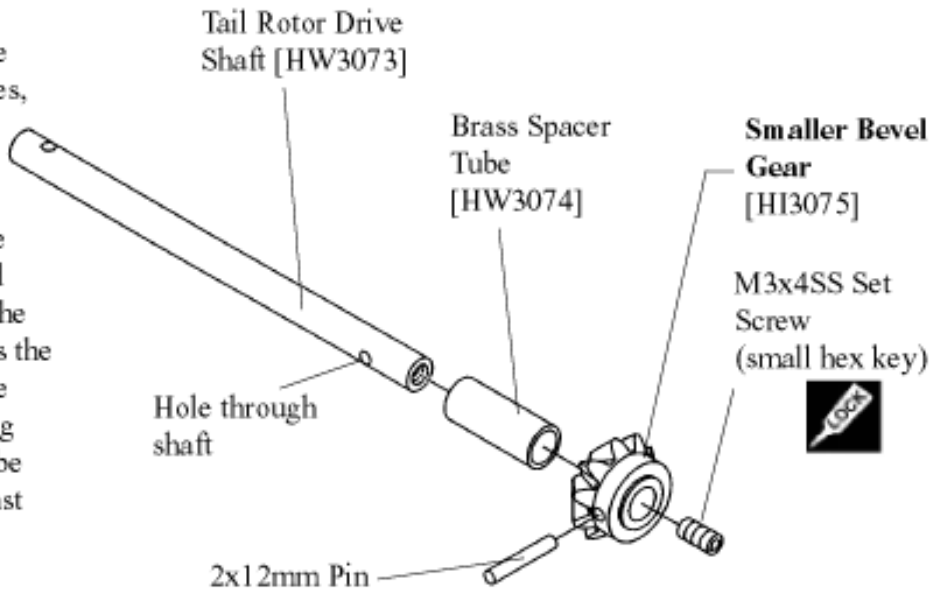
STEP 26

From parts bag 6: Assemble the landing gear by sliding the Aluminum Skids through the Struts, start the four M 3x5mm Set Screws into the struts now but do not tighten at this time. (Do not use any threadlock). Set the distance from the rear of the skid to the strut at 25 to 30mm. Attach the landing gear to the main mechanics using four 3x16mm Phillips Machine Screws and locknuts. **Now set the skids into their desired position and tighten the 4 set screws. Be careful not to strip the sideframes.**



STEP 27

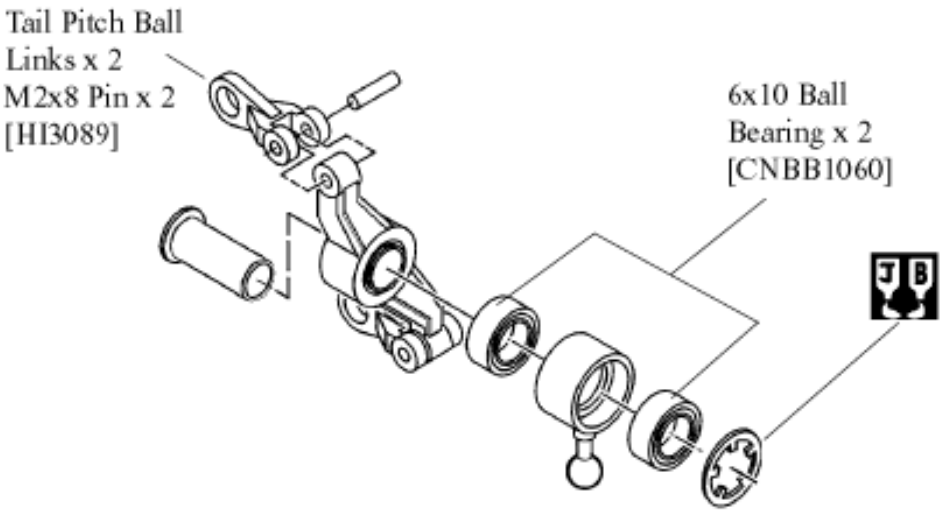
From parts bag 7: Notice that the Tail Rotor Drive Shaft has 2 holes, one through the shaft and one drilled partially into the shaft. Slide the **SMALLER** Bevel Gear with the teeth facing inward from the end with the through hole. Position the gear by aligning the holes. Press the 2x12mm Pin through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



STEP 28-30 Tail Rotor Output Assembly

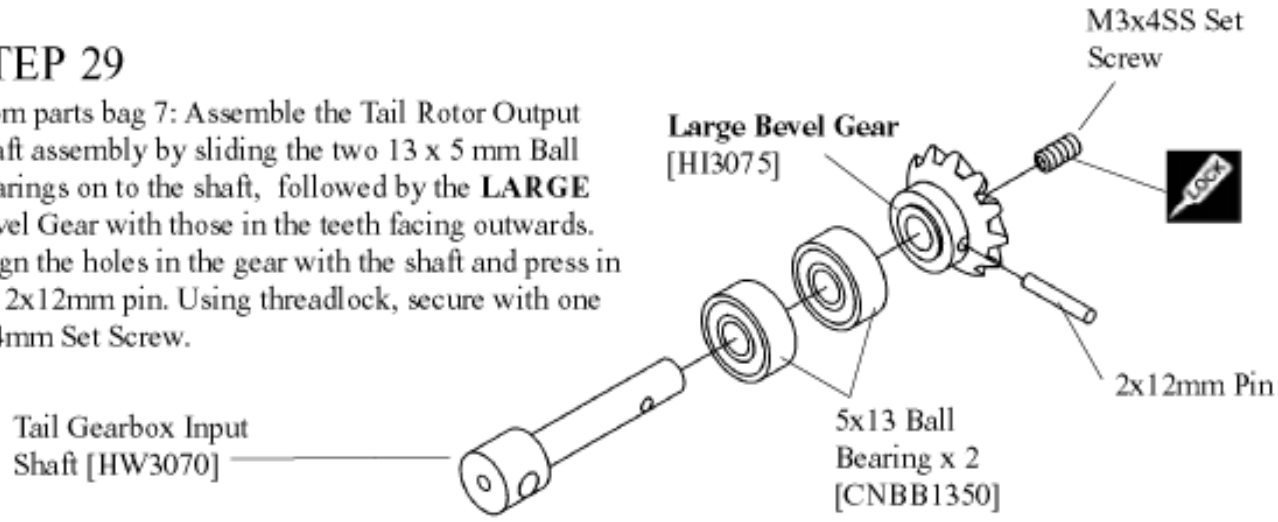
STEP 28

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 later.



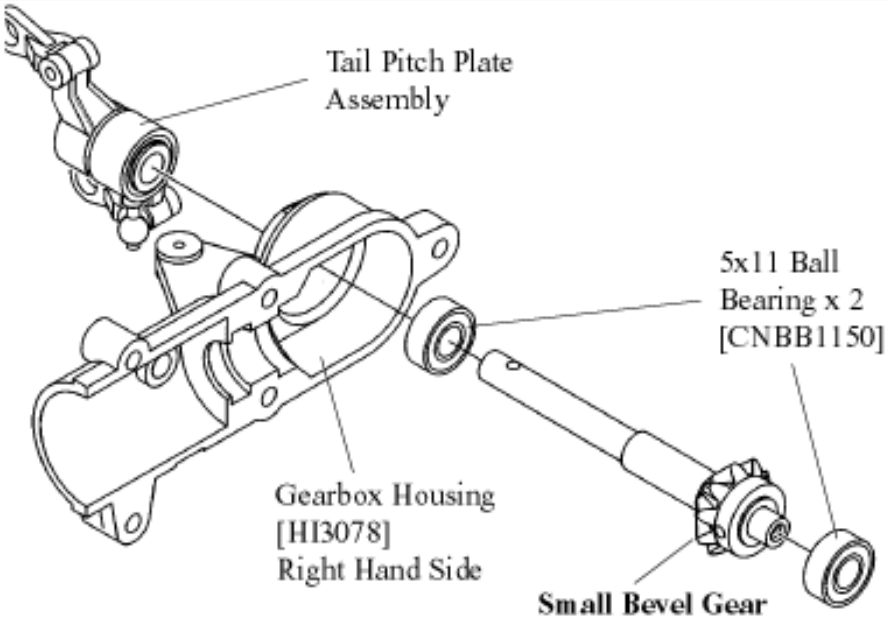
STEP 29

From parts bag 7: Assemble the Tail Rotor Output Shaft assembly by sliding the two 13 x 5 mm Ball Bearings on to the shaft, followed by the **LARGE** Bevel Gear with those in the teeth facing outwards. Align the holes in the gear with the shaft and press in the 2x12mm pin. Using threadlock, secure with one 3x4mm Set Screw.



STEP 30

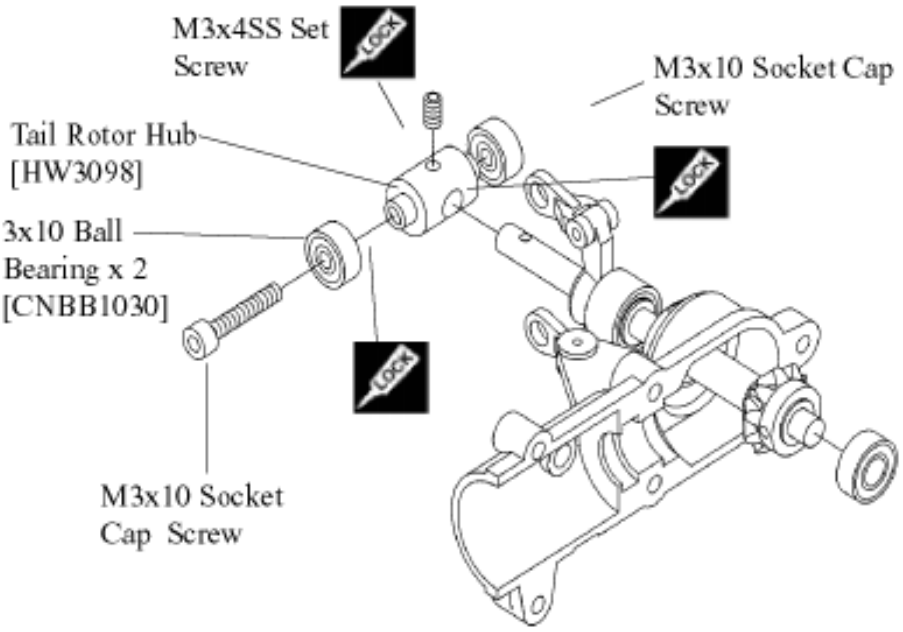
Slide one of the two 11 x 5mm Ball Bearings onto each end of the Tail Rotor Drive Shaft assembly and insert through the inside of the right side of the Tail Rotor Gearbox Housing. Make sure the bearing is fully seated into the recess. Slide the tail rotor pitch plate assembly onto the shaft.



STEP 31-32 Tail Rotor Hub & Tail Rotor Grips

STEP 31

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

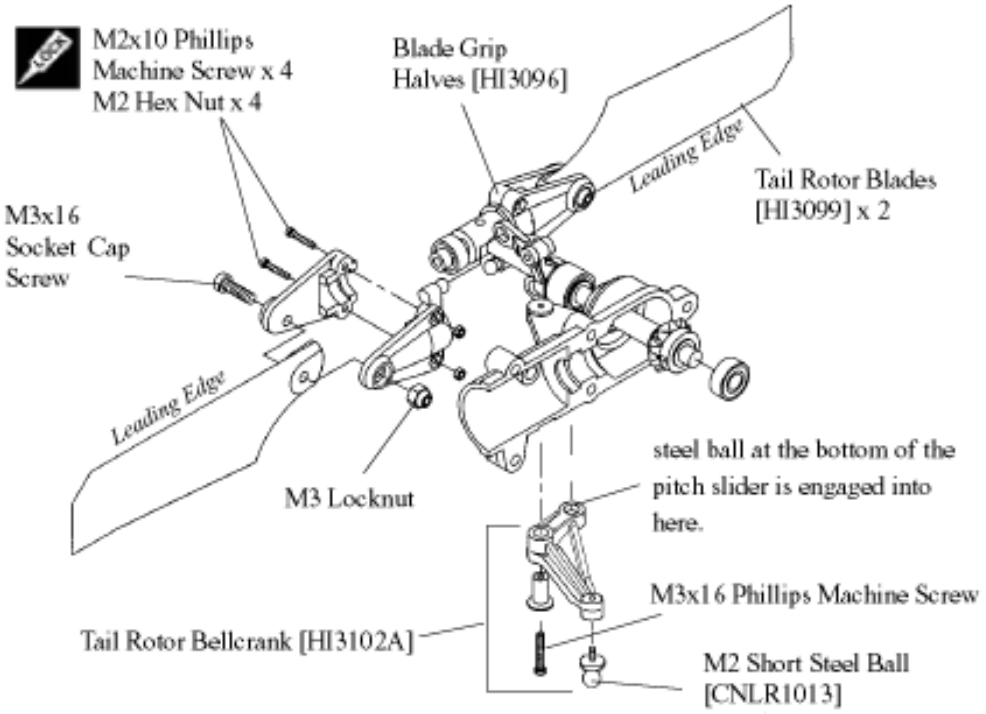


STEP 32

From parts bag 7: Using threadlock on the two 2x10mm Phillips Machine Screws and 2mm Nuts, assemble both Blade Grip Halves over the bearings with the nuts facing to the gearbox, Snap the two balls from the tail rotor grip into the adjoining pitch slider links.

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

Install the M2 Short Steel Ball, threaded from the bottom of the bellcrank. Install the tail rotor bellcrank onto the tail rotor gear box with one 3x16mm socket cap machine screw, inserted through the brass bushing with the washer side on the bottom (**make sure the steel ball at the bottom of the pitch slider is engaged into the end of the t/r bellcrank**).

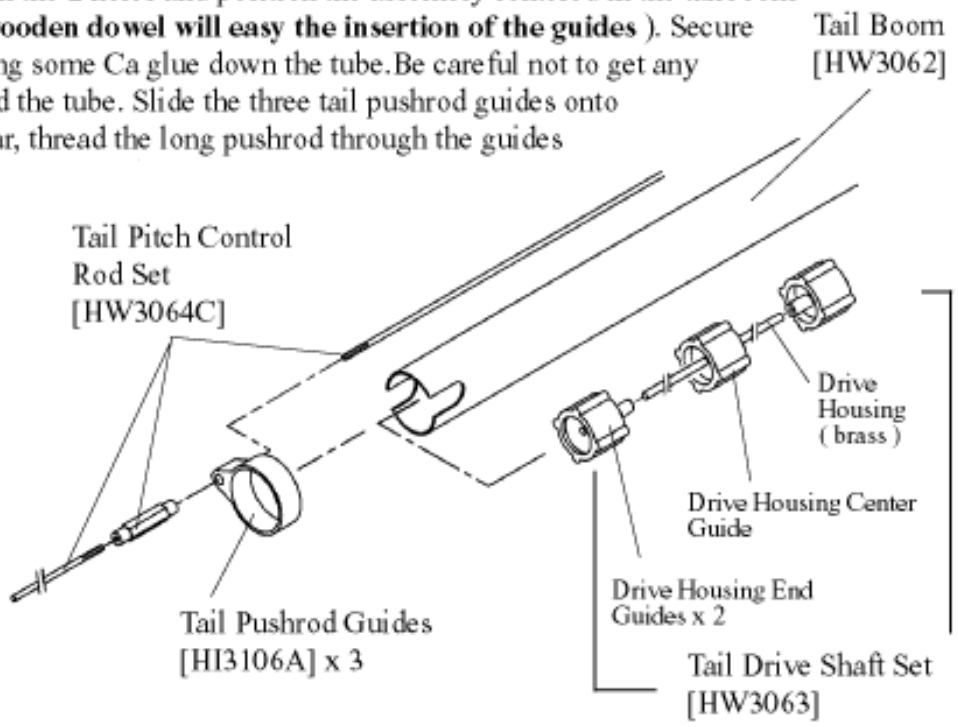


Tip After flying the model, if a buzzing vibration is noticed on the ends of the vertical or horizontal fin, you can remove the complete tail rotor assembly with the hub and further balance it using a High Point balancer. Careful sanding of the rotor blades is all that would be needed.

STEP 33-34 Tail Guide & Tail Gearbox

STEP 33

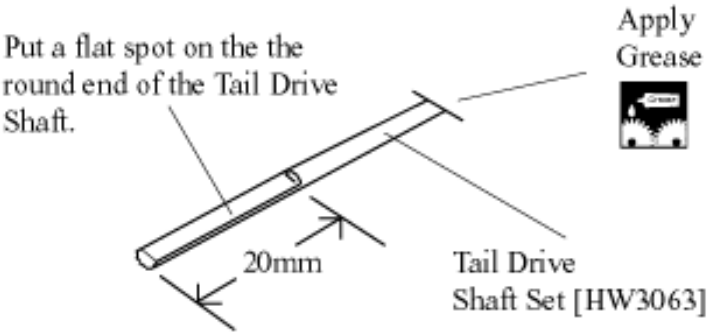
From Bag 7: Insert three tail drive shaft Guides on to the Brass Tail Drive Housing, found in the bottom of the box (**Note that one guide has a larger center hole than the others, slide this one to the center of the brass tube**), add the remaining two onto the ends. Glue the guides into position using 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**). Secure inside the boom by dripping some Ca glue down the tube.Be careful not to get any between the wire drive and the tube. Slide the three tail pushrod guides onto the tailboom. From the rear, thread the long pushrod through the guides with the bent section at back. Screw the pushrod connector found in bag #4 onto the front of the long pushrod, the short pushrod will be attached to this later 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 34

The Tail Drive Shaft has one end flattened to engage into the front of the boom, the other end needs to have a 20mm long flat spot filed on the round end of the shaft to provide a more solid seating for one of the two 4x4mm Set Screws from the tail rotor input shaft. Thoroughly grease the tail drive shaft and insert the newly filed end into the end of the tailboom with the slots. Align with the center of the drive shaft housing assembly and insert. Insert and degrease both ends of the shaft.



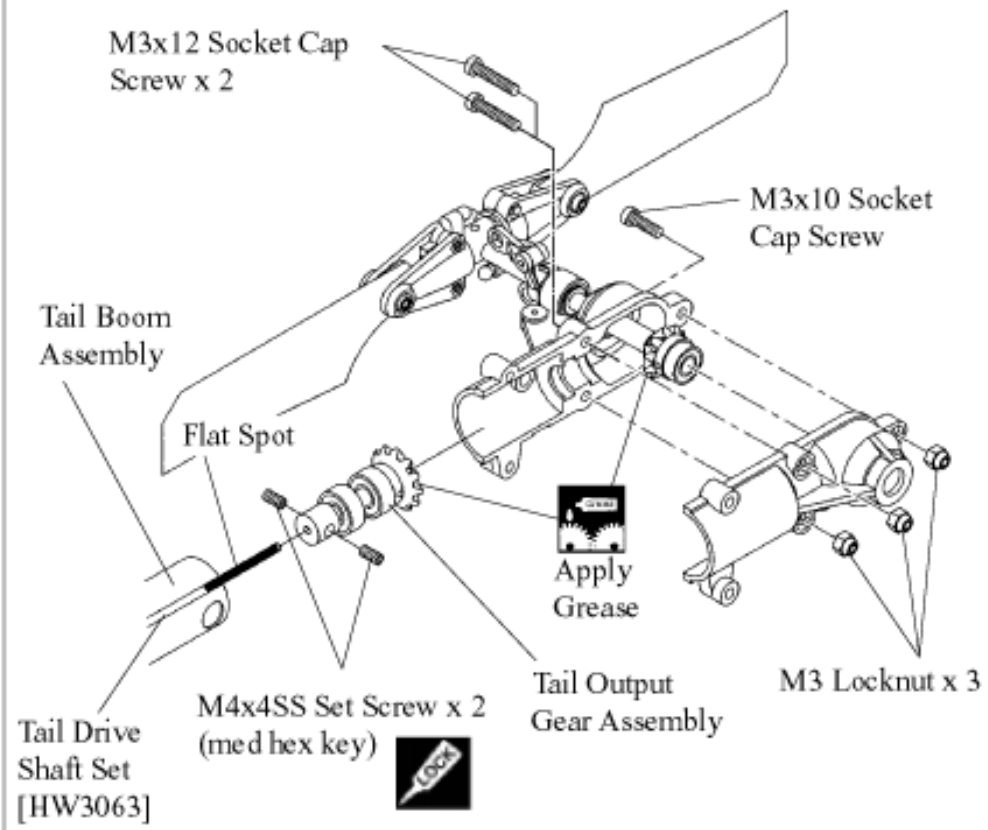
Tip

A flat file is the ideal tool for the job, alternately careful use of a Dremel Moto Tool will work. It is important that the flat be at least 1/4 of the diameter but no more than 1/3 to avoid weakening the material.

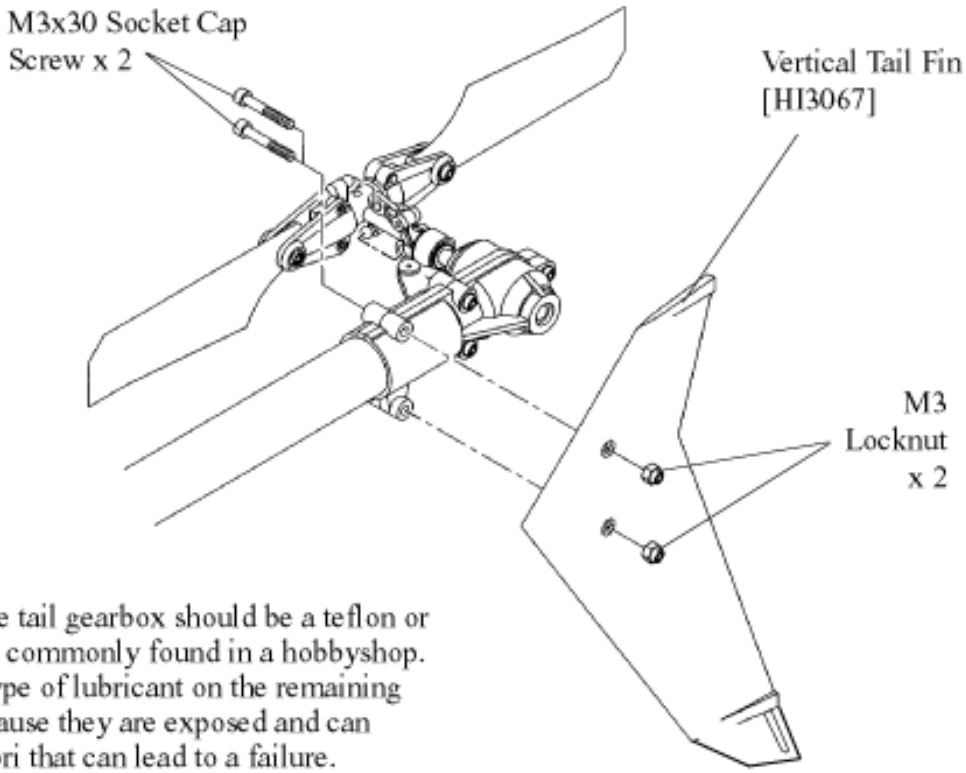
STEP 35 Tail Gearbox

STEP 35

Attach the tail output gear assembly onto the rear of the drive wire shaft using a threadlock on the two 4x4mm Set Screws (**insure the filed flat spot is aligned with one of the set screws**). 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 attaching the left side. **Position the gear box halves such that the molded key pins are fit into the key holes in the end of the tail boom.** Secure with one 3x10mm Socket Cap Screw and M3 locknut at the back of the gearbox and two 3x12mm Socket Cap Screws with M3 locknuts at the center top and bottom of the gearbox. Install the Vertical Fin with two 3x30mm Socket Cap Screws and M3 locknuts through the molded mounts in the front end of the tail rotor gearbox.



Tip Apply red locktite to the drive shaft end and insert into the gearbox input shaft. Do not use on set screws, only locking the wire shaft to the input shaft.



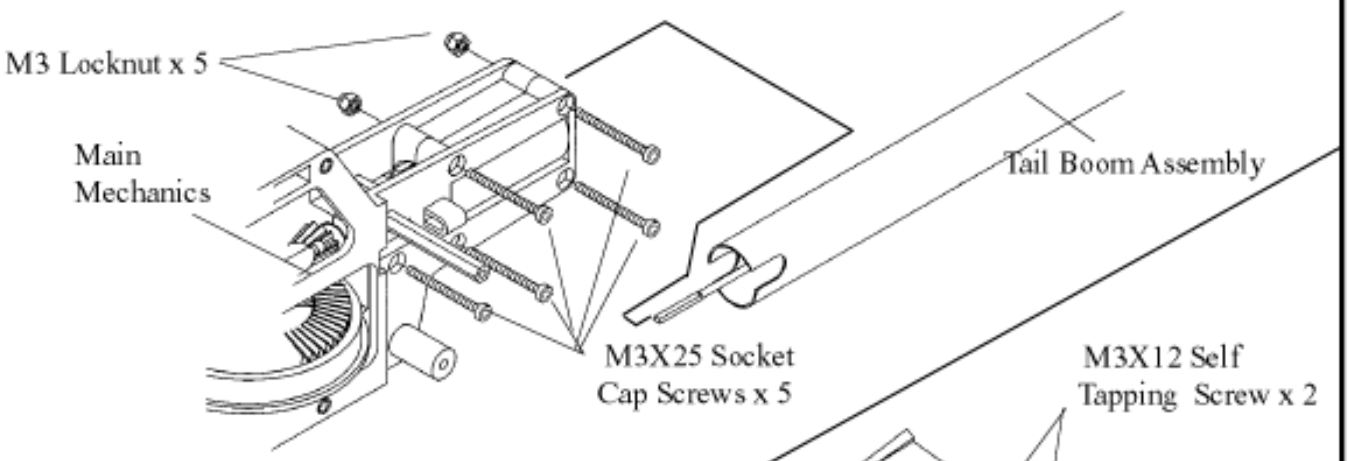
Tip

Grease to be used inside the tail gearbox should be a teflon or light lithium type of grease commonly found in a hobbyshop. Do not use grease or any type of lubricant on the remaining gears on the helicopter because they are exposed and can actually attract dirt and debri that can lead to a failure.

STEP 36-37 Tailboom & Horizontal Fin

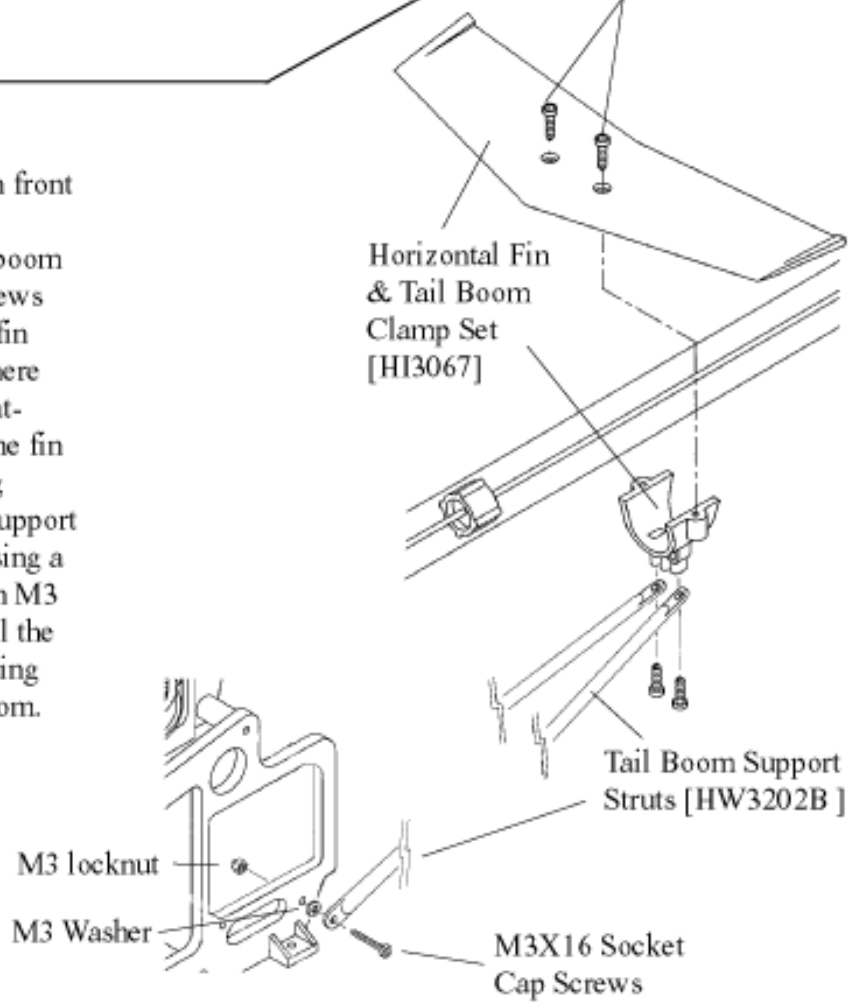
STEP 36

Attach the tail boom assembly to the main mechanics by sliding the tailboom tube into the mounting hole at the rear of the upper frame using five 3x25mm Socket Cap Screws and M3 Locknuts. Slowly press the tailboom in, being careful to engage the flattened end of the drive wire into the slotted tail rotor output gear shaft. The slots on the end of the tailboom will self align with molded pins inside the upper side frame. Take your time and the wire will slide in. Once engaged, press the tail boom in completely until it is fully seated. Hold the maingear from moving and try to turn the tail rotor to insure proper engagement, you should not be able to turn the tail rotor. If you can rotate it, the drive wire is probably not properly seated into the slot of the front output shaft. Connect the short rudder pushrod to the coupler at this time.



STEP 37

Position two of the pushrod guides in front of the horizontal fin and one behind. Attach the Horizontal Fin on the tailboom using two 3x12mm Self Tapping Screws into the Tailboom Clamp. Space the fin along the tailboom at the position where the Tail Boom support struts can be attached. Secure the support struts to the fin mount with a M3 x 8mm self tapping screws. Attach the front of the two support struts to the lower frame assembly using a M3 x 16mm hex bolts, washer and an M3 locknut. Referring to Step 38, install the long tail rotor control pushrod, inserting into the three guides along the tailboom.



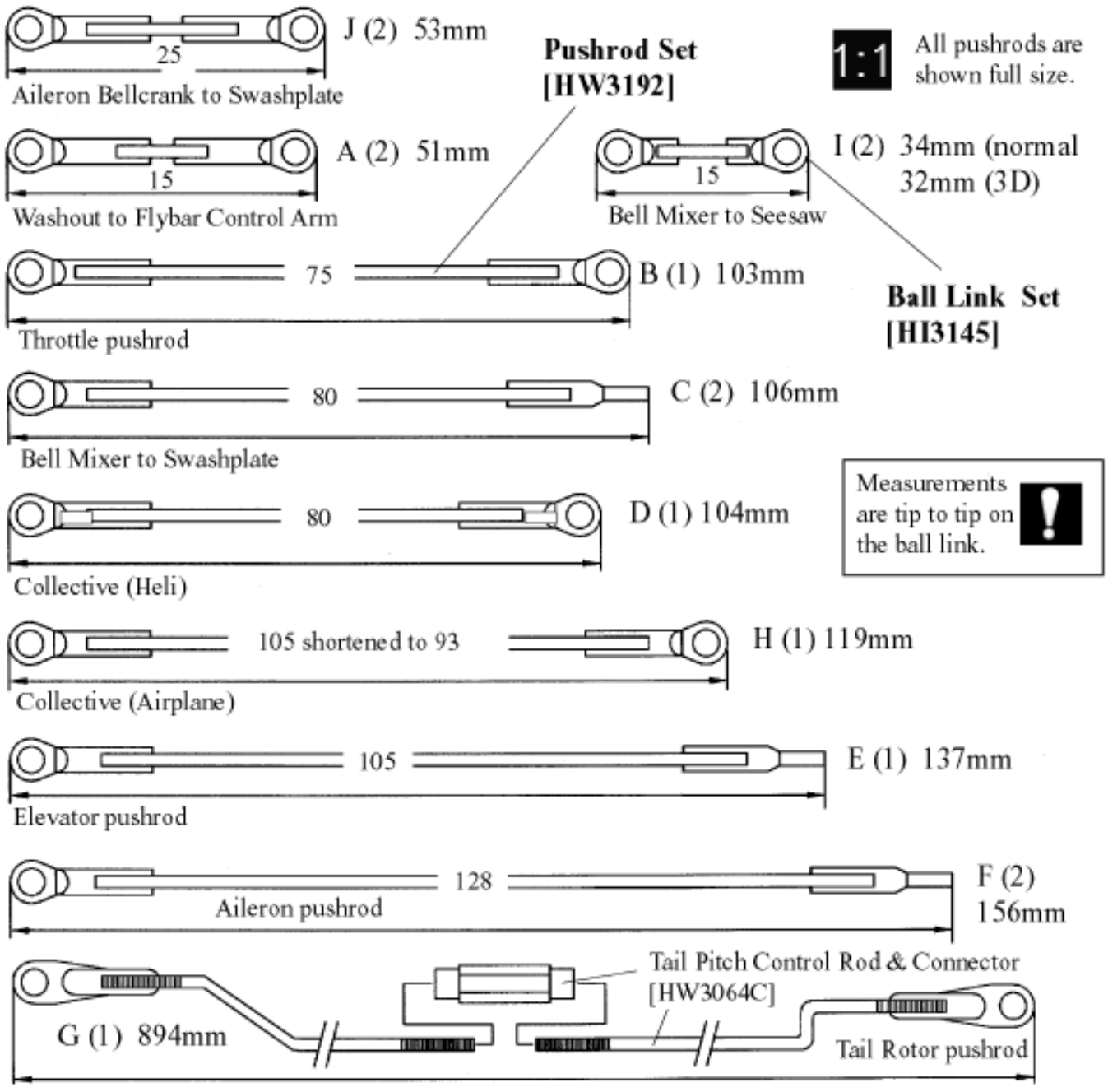
STEP 38 Pushrod Setup and Adjustments

STEP 38 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 listed from end to end of the plastic rod-ends are to be taken as correct. Fine tuning may be required as the picture size may change when printed. Also some servos offer different horn placements for fine tuning. 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 Multi Channel Helicopter radio, there will be one extra 105mm.

Setup for the 4 Channel Airplane radio, requires one of the 105mm pushrods to be shorten by 12mm, 6mm per end for use as the Collective Arm Pushrod.

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. The overall lengths of the pushrods are shown to the right of each pushrod drawing.



CENTURY Hawk IV - Addendum to instructions

Page 26 - control rod lengths (beginners-intermediate)

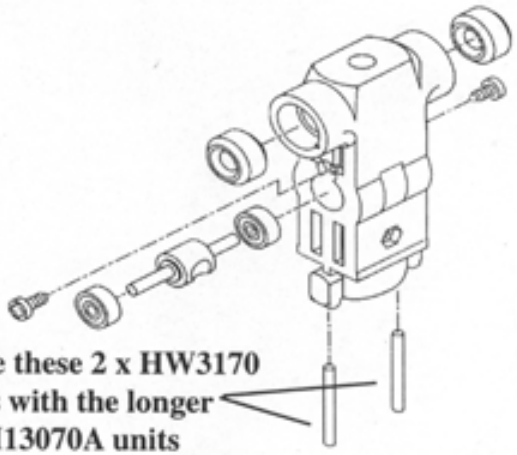
(Note: these lengths are measurements from the outside to the outside of the ball links)

Control Rod I (2 each): Bell mixer to seesaw - 35mm
Control Rod A (2 each): Washout to flybar control - 51mm
Control Rod J (2 each): Aileron bellcranks to swashplate - 61mm
Control Rod C (2 each): Bell mixer to swashplate - 104mm
Control Rod D (1 only): Collective servo to Collective arm - 102mm
Control Rod E (1 only): Elevator servo to elevator bellcrank - 135mm
Control Rod F (2 each): Aileron servo to aileron bellcranks - 158mm

CENTURY Hawk IV - 3D set-up modifications

From Page 5 / Step 1: replace the two short HW3170 (2.6mm x 24mm) washout guide pins with the longer HW3170A (2.6mm x 30mm) guide pins. (see diagram)

From Page 6 / Step 4: Change the length of pushrod " I" from 34mm to 33mm.



3D Control Rod Lengths

(Note: these lengths are measurements from the outside to the outside of the ball links)

Control Rod I (2 each): Bell mixer to seesaw - 33mm
Control Rod A (2 each): Washout to flybar control - 54mm
Control Rod J (2 each): Aileron bellcranks to swashplate - 61mm
Control Rod C (2 each): Bell mixer to swashplate - 106mm
Control Rod D (1 only): Collective servo to Collective arm - 100mm
Control Rod E (1 only): Elevator servo to elevator bellcrank - 135mm
Control Rod F (2 each): Aileron servo to aileron bellcranks - 158mm

STEP 39 Aileron & Collective Linkage (Helicopter Radio)

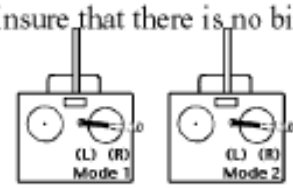
Helicopter Radio Setup

STEP 39

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

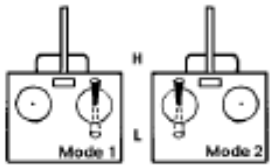
Using threatlock, attach two steel balls with two 2mm nuts to a round servo arm at a distance of 10 to 11mm from the center of the servo (this range may vary depending on your particular radio) and 10 -12 degrees ahead of the center of the servo. You are trying to get a 90 degree angle between the line described by the pushrods and the line described between the center of the servo and the ball joint on the servo wheel. This will eliminate any stress (wear) on the servo and any undesired collective/cyclic mix. With the radio turned on and the trim centered, attach the servo horn and the Aileron Bellcrank Pushrods (**F**). Some slight adjustment may be necessary to have the swashplate sit level or 90 degrees to the main shaft when viewed from the the front or back. Move the Aileron stick completely in both directions to insure that there is no binding in the linkages.

For the Collective Servo, use threadlock to attach one steel ball with one 2mm nut to the servo horn at a distance of 10-12mm from the center of the servo. With the Collective/Throttle stick on the radio in the center press the servo horn onto the collective servo so the ball is at 75-80 degrees to the servo as shown. 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.

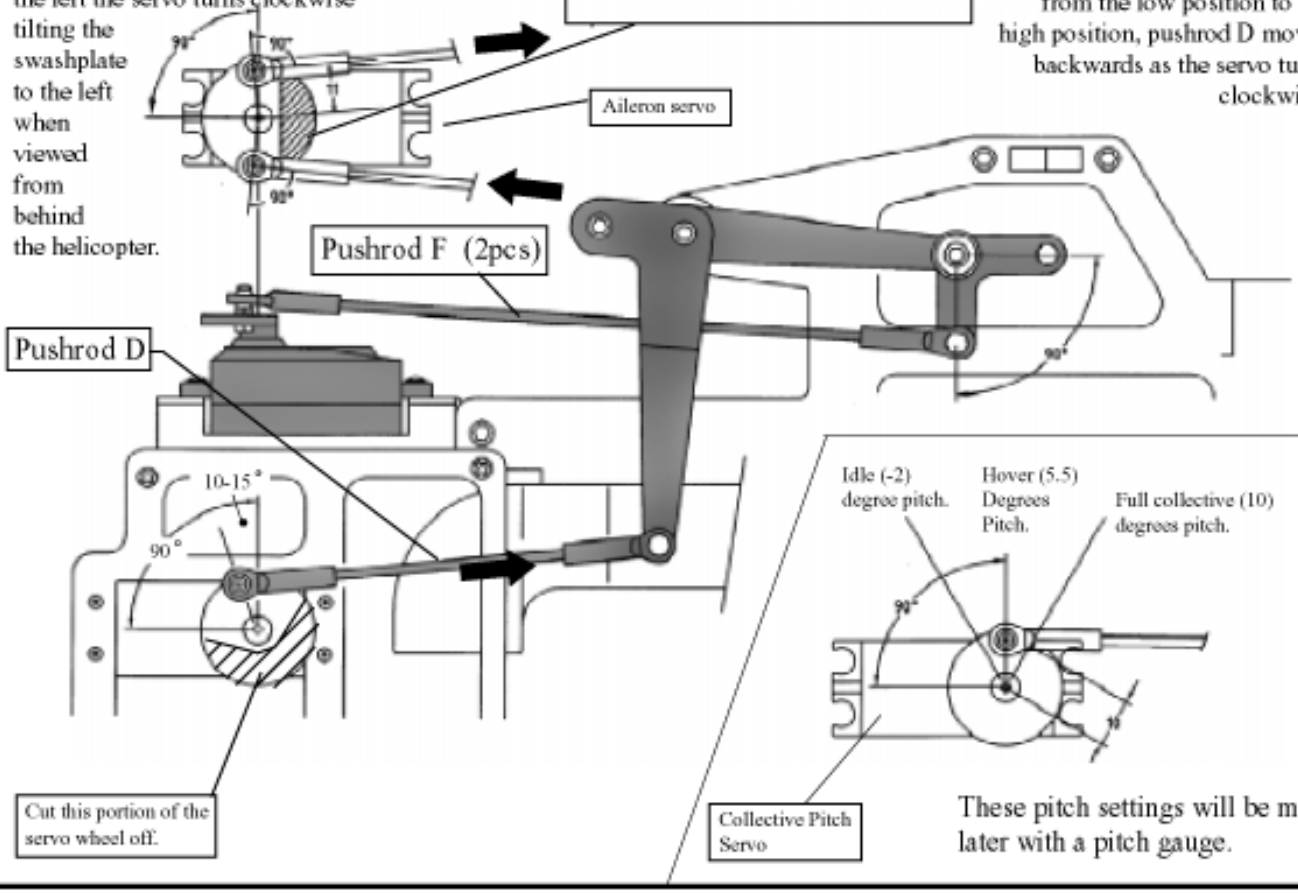


At the aileron stick is moved to the left the servo turns clockwise tilting the swashplate to the left when viewed from behind the helicopter.

1. Remove this section of the servo wheel to avoid the rod end binding against the servo wheel.
2. Optionally, the straight arm can be used however this tends to bind, for free movement use first method



As the collective stick is moved from the low position to the high position, pushrod D moves backwards as the servo turns clockwise.



These pitch settings will be made later with a pitch gauge.

STEP 40 Aileron & Collective/Throttle Linkage (Airplane Radio)

Airplane Radio Setup

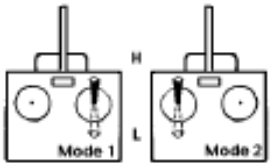
STEP 40

The Airplane setup for the Aileron servo is exactly the same as the Helicopter setup, use the same settings as in Step 34.

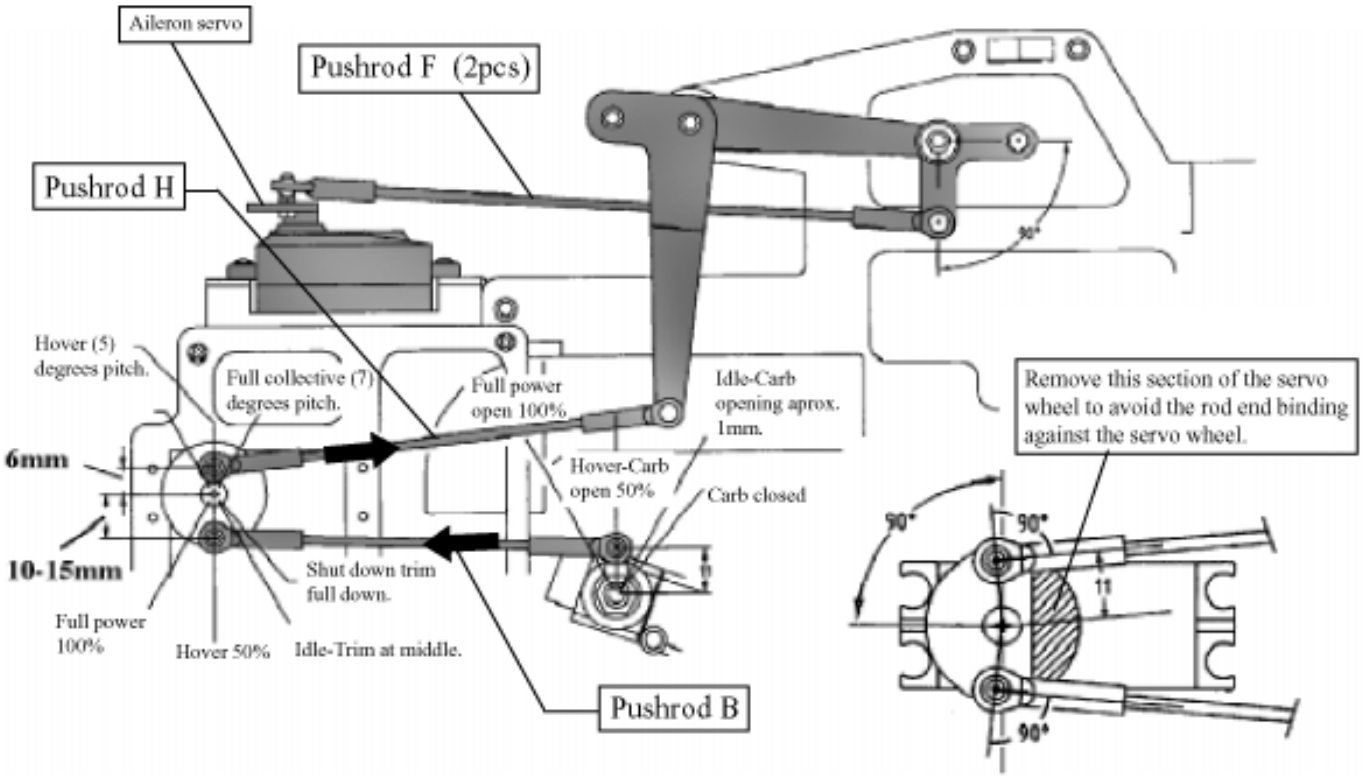
The Collective linkage slides the swashplate up and down causing the blades to increase or decrease in pitch causing the helicopter to go up or down.

For the Collective/Throttle using an Airplane radio, the two controls are made by the same servo. Install two steel balls and two 2mm nuts using threadlock at the locations shown below. The steel ball for the Collective Pushrod should be installed between 5-6 mm from the center of the servo whereas the ball for the Throttle Pushrod should be 10-15 mm. Install one steel ball and one 2mm nut on the Throttle Extension on the engine (**check to see that the carburetor is at half throttle or half way open when the arm is pointed straight up, the nut holding the arm may need to be loosened and the arm repositioned**) in the outermost hole using threadlock.

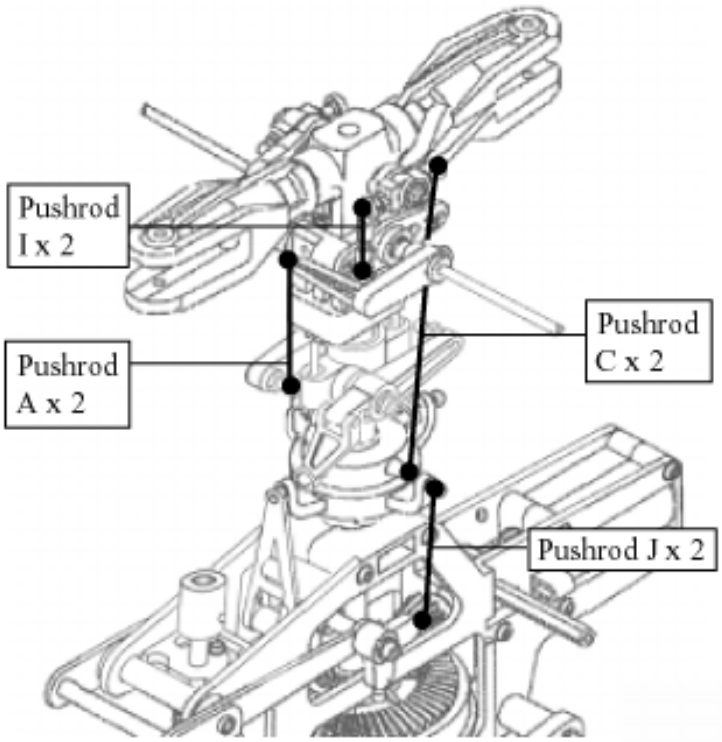
Assemble the Collective Pushrod by threading the two ball-ends onto the previously shortened pushrod (105mm shortened to 93mm) to a total length of 119mm tip to tip. Move the collective/throttle stick on the radio to the center and center the trim on the radio, attach the collective/throttle servo horn to the servo so the balls are at 90 degrees to the servo and then snap on the Collective Pushrod (**H**) and Throttle Pushrod. Move the stick completely in both directions to insure there is no binding in the linkages.



As the collective/ throttle stick is moved from the low position to the high position, the collective pushrod (H) moves backwards and the throttle pushrod (b) moves forwards as the servo turns clockwise.



STEP 41-43 Rotor Head Linkages & Elevator Linkage



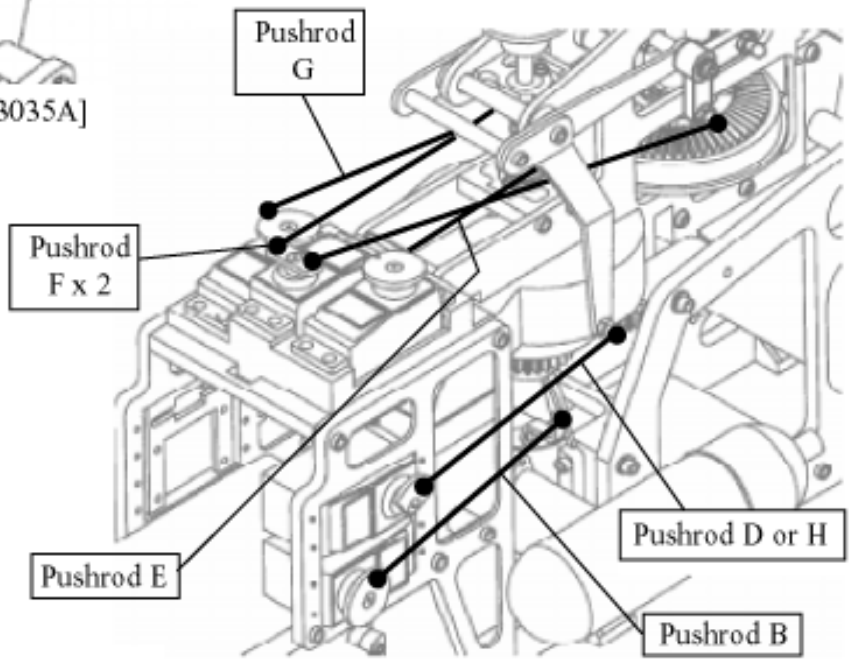
Replacement Linkage Set #[HI3035A]

Step 41

When attaching all pushrods, make sure that any two pushrods that should be the same length actually are the same length at this time. Otherwise it will be difficult later to figure out where any linkage problems are coming from. The entire rotor head is set up the same way for both types of radios. Attach the two Flybar Arm to Washout pushrods (**A**), the two Bell Mixer to Inner Swashplate pushrods (**C**) and the Aileron Bellcrank Swashplate pushrods (**J**). Pushrod (I) was previously installed in Step 4.

Step 42

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



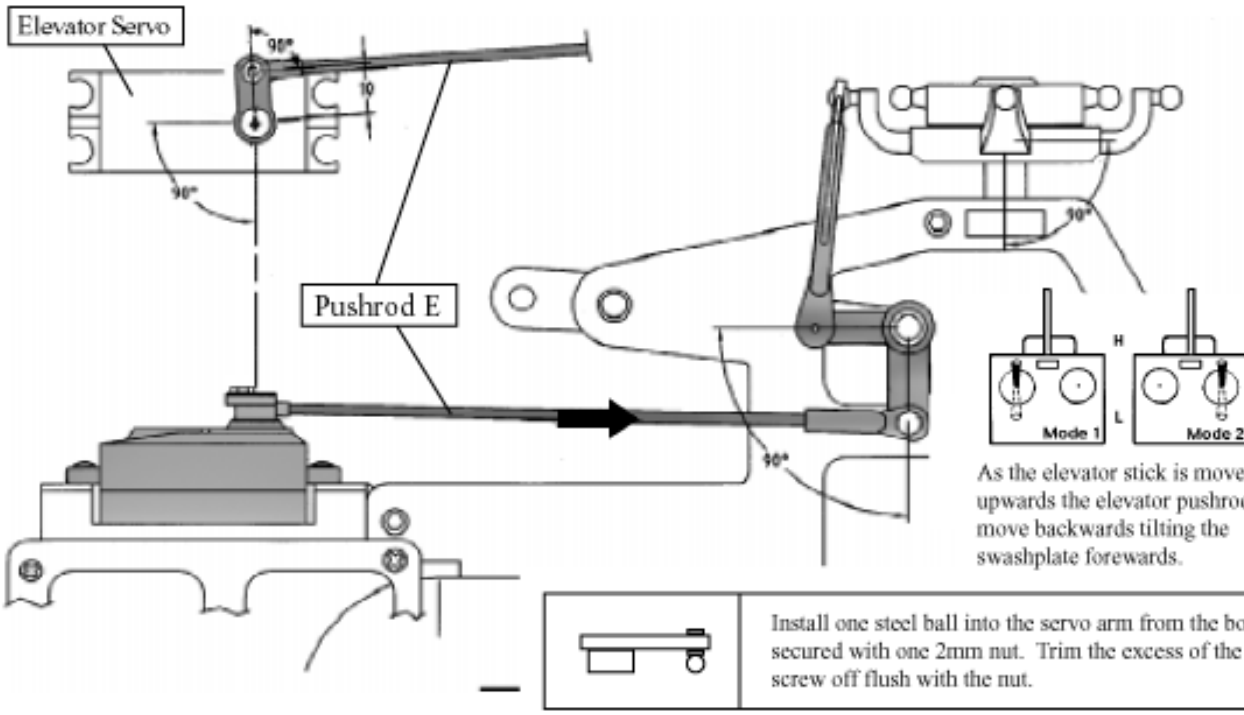
Step 43

The Elevator linkage is set up the same for both Helicopter and Airplane radios, 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).

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 10mm 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 behind center of the servo (towards the front) The offset enables an equal throw of the swashplate. **It is important that the swashplate sit at 90 degrees to the main shaft when viewed from the side.**

Note, for Airtronics servos, the ball needs to be installed on the top of the servo horn requiring the aileron servo to be moved up. This can simply be done with 1/4" thick (6mm) spacer made from wood or plastic with the appropriate holes drilled.

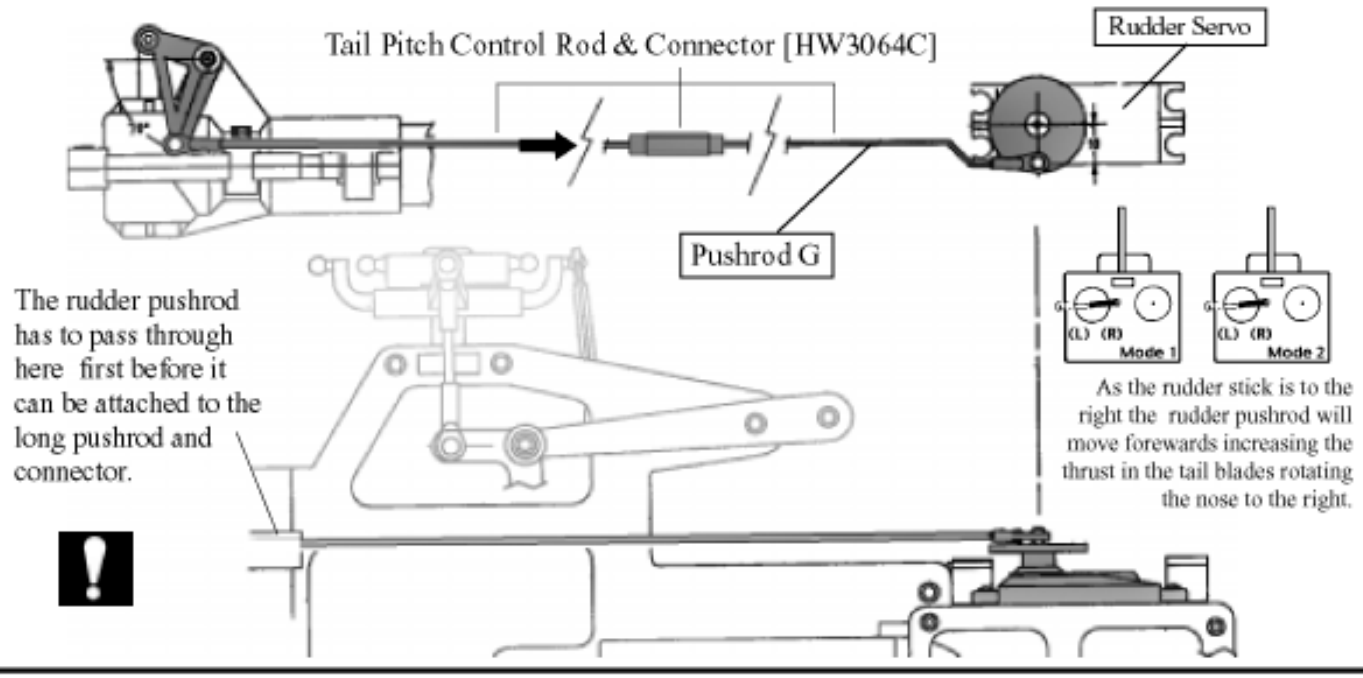
STEP 44 Elevator & Rudder Linkage (Helicopter & Airplane radio)



Step 44

The 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 and to rotate the nose of the helicopter about the main shaft.

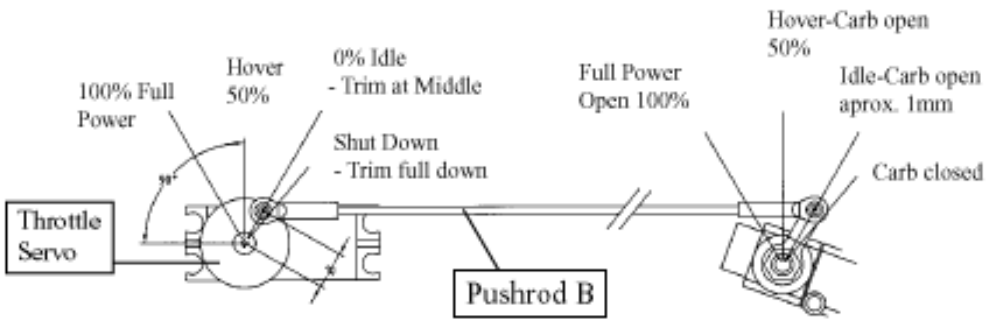
Use a servo horn in the shape of a cross and trim 3 of the 4 arms off. Using threadlock, install one steel ball and one 2mm nut at a distance of 10mm from the center of the servo. Thread the front part of the tail rotor control pushrod (the short part) (**G**) through the guide in the upper frames. Thread the rear end of it into the hex connector and attach the ball link to the servo end. Having the radio on and the rudder trim centered, press 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 45-46 Throttle Linkage & Main Blades

Step 45

From Bag 4, Using threadlock, attach one steel ball with one 2mm nut, to both the Throttle servo horn and the Throttle Extension from Step 17. Position the ball at 10mm from the center of the servo and in the outermost hole on the metal throttle arm. With the radio on, the throttle stick centered and the trim in the center, press the servo horn onto the servo so the ball is at 90 degrees to the servo (the hovering position). Move the throttle stick to the low/idle position and press the Throttle Pushrod (**B**) onto the steel balls. 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 extension nut may have to be loosened and the lever repositioned to operate as recommended without any binding.

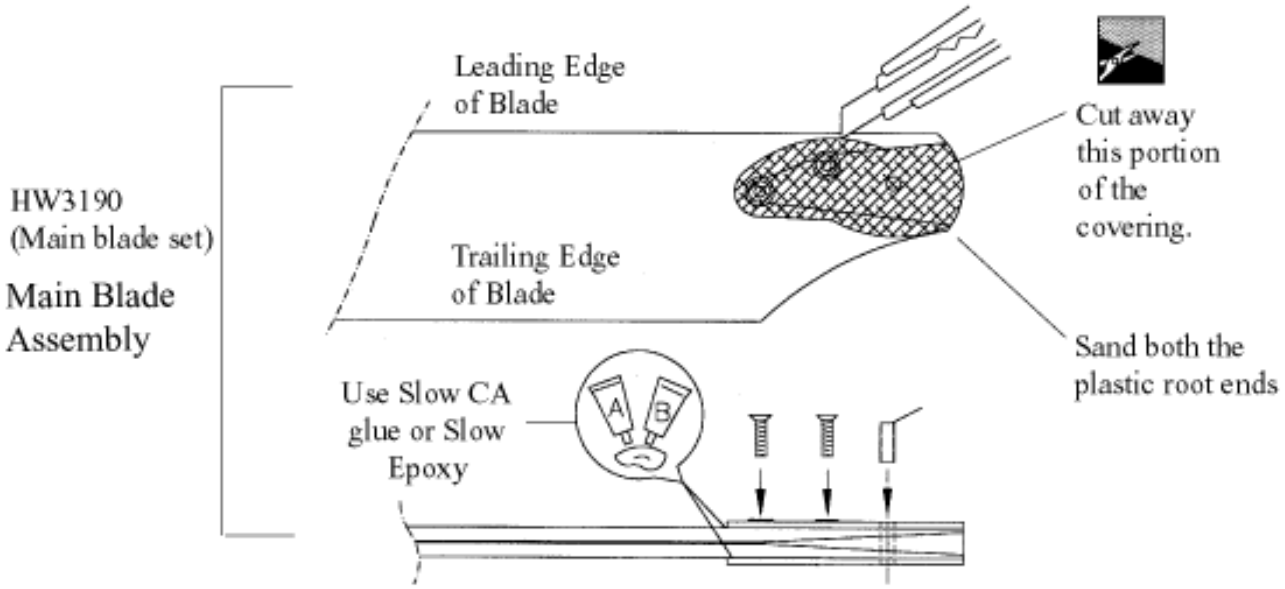


Airplane Radio Setup

The only change is to install the steel ball on the servo horn at a distance of 11-15mm from the center of the servo. See Step 40.

Step 46

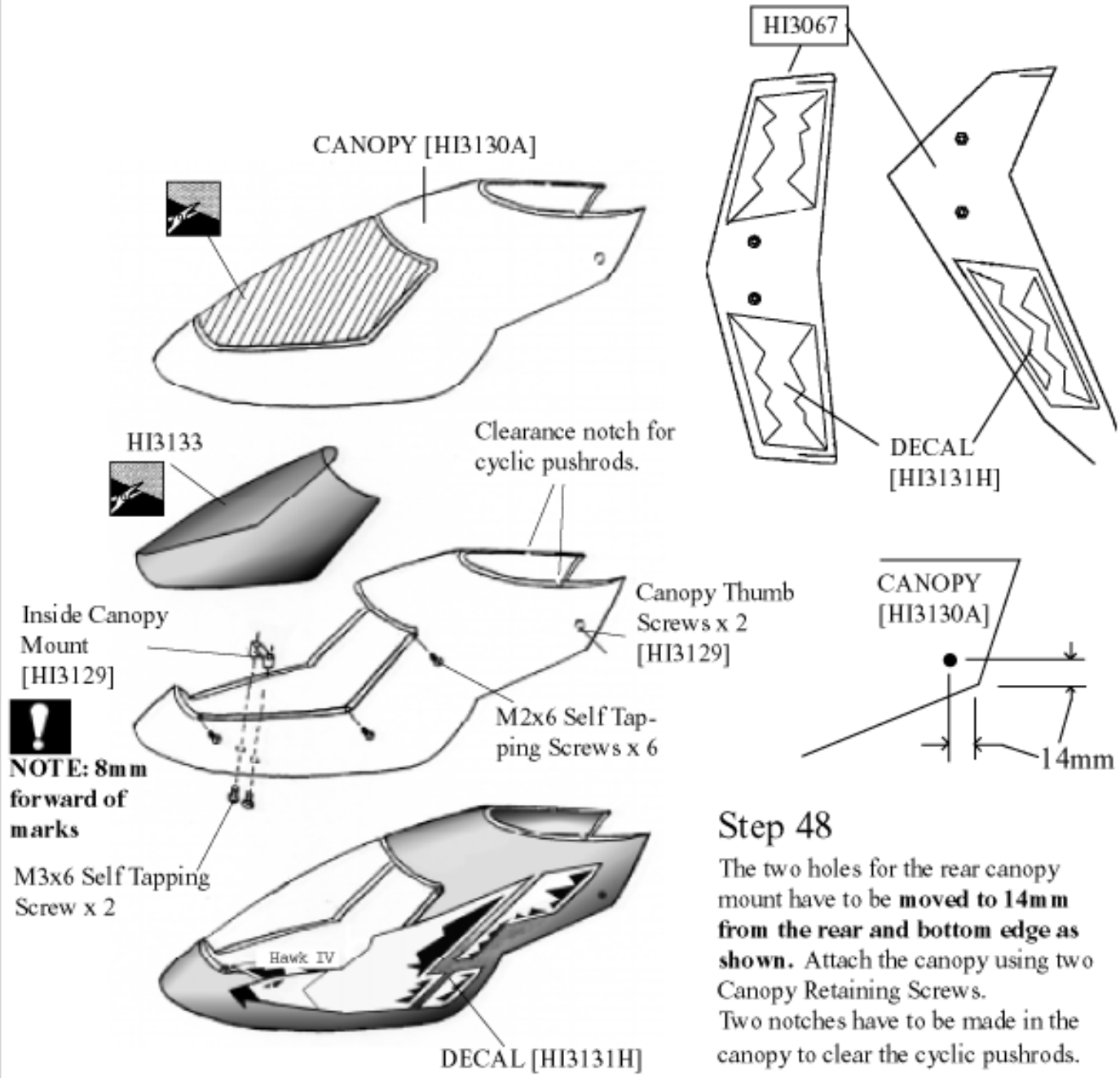
The Main Rotor Blades in the Hawk kit are pre-built and balanced, the only work required is to glue the blade grip root ends to the blades (**Please note that this step is necessary to insure the blades will not separate from the helicopter during flight!!**). Temporarily install the root ends (see note) onto the blades by cutting the covering over the holes and using a pencil, mark 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 sharp hobby knife. Using some sandpaper roughen the plastic root ends and glue them in place with Slo CA or slow epoxy glue. Install the blades onto the rotor head to dry. This will insure the thickness is correct when finished.



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 47-45 Canopy & Decals

Step 47 The Canopy has a line molded into the plastic to follow when trimming out the windshield area. **Note: 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 may be 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.



Step 48

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.
Two notches have to be made in the canopy to clear the cyclic pushrods.

ARF Supplemental Instructions

These instructions are to supplement the regular Hawk IV instruction manual and to assist as some disassembly is required to install all necessary components. Open the large box containing the tail components & servo linkages. Lay out these components for easy identification. Follow the numbered steps, for those who purchased the CN1007A ARF with O.S. 32 Engine and Muffler, skip over steps 16, 17, 21, 23.

CN1006 ARF w/o engine

Step 16, follow the instructions for installing and assembling the clutch, fan and cooling fan onto the engine.

Step 17, follow the instructions for installing the engine mount and set up the carburator as specified.

Step 21, before installing the engine into the mechanics, remove the following screws (from both side of the helicopter): forwardmost top 3x16mm Cap Screw, the lower 3x20mm Cap Screw from the locknut inside the fan shroud and the 3x10 Self Tapping screw for the fan shroud. Drop the cooling fan shroud out and transfer to the engine, remove the engine needle valve and retainer clip and rotate the complete servo tray assembly forward to install the engine assembly. Skip to Step 24-25 and install the collective and throttle servos. The engine needs to be tilted as it is installed and make sure the drive gear meshes with the counter gear. Align with the counter gear and replace all screws, remember to locktite the upper frame screws. Replace the main needle valve and retainer, close the needle down and open to 1 1/4 turns.

Continue with Steps 23-45

CN1007 ARF with OS 32SX-H & Muffler

Step 23, attach the muffler to the engine, using screws provided with the muffler. Simply tighten the bolts using high temp threadlock but retighten after running the engine for several minutes on the first flight.

Step 24-25, Install the collective and or throttle servo from the inside as noted.

Step 28, Using JB Weld or equivalent epoxy, **bond** the lock ring to the brass slider tube. Bypassing this step can result in a failure.

Step 33, Follow regular instructions for the tail rotor pushrod.

Step 35-45, Follow each step as indicated to complete assembly.

Pushrod Bag

Fuel Line	1
Rod - Aileron M2x128	2
Rod - Elevator M2x105	2
Rod - Coll/Swash M2x80	3
Rod - Throttle M2x75	1
M4x30 Socket Cap Screw	2
M4 Locknut	2
M2.3x10 Servo Screw	20
M3x25 Socket Cap 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	8
Throttle Extension	1
Steel Ball w/ 2mm Thread	7
M2 Hex Nut	14
Tail Pushrod Connector	1
Horizontal Fin	1
Vertical Fin	1

Clutch Bag (1006 only)

Clutch Shoe	1
Clutch Bell w/Gear	1
Oilite Bearing M12x18x3	2
Cooling Fan	1
Engine Mount	1
M3x16 Socket Cap Screw	8
M3x11 Flat Washer	4
M5x13 Flat Washer	1
M9x14 Flat Washer	1

Tail Fittings Bag

Horizontal Fin Mount	1
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
Canopy Thumb Screw	2
Inside Canopy Mount	1
M3x6 Self Tapping Screw	2

Packing List #1006A & #1007A

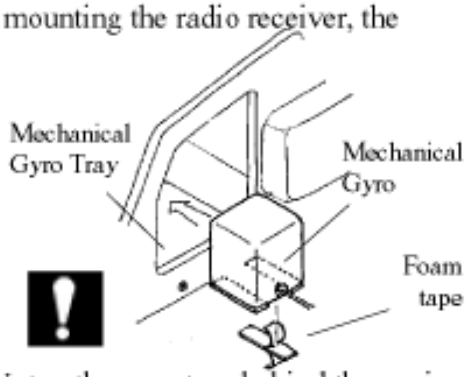
In Box

Main Mechanics Ass.	1
Tail Boom Assembly	1
Instruction Manual	1
Registration Card	1
Canopy	1
Windshield	1
Decal Sheet	1
Main Rotor Blades	1
Antenna Plastic Tube	1
Short Rudder Pushrod	1
Long Rudder Pushrod	1
Tailboom Strut	1

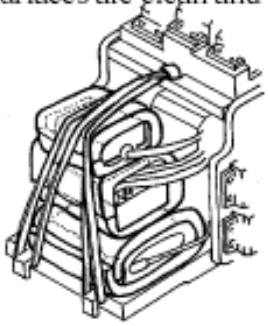
Radio Components & Balancing

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

Gyro: Mount the gyro on the radio tray. A different arrangement from the picture may be required to mount everything. **If using the PG2000 II, the gyro can be mounted between the collective & throttle servos and the right servo frame sideplate.** 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 at least a 1/8" 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.



Note: the gyro tray behind the engine is for mounting the **mechanical style gyro only, not for the PG2000 II piezo type gyro.**

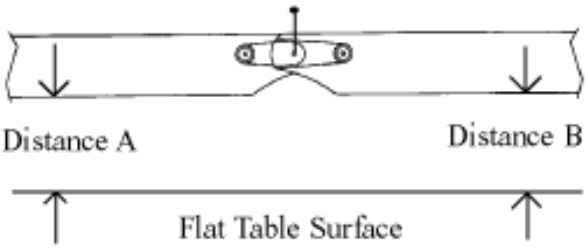


Receiver & Battery Pack

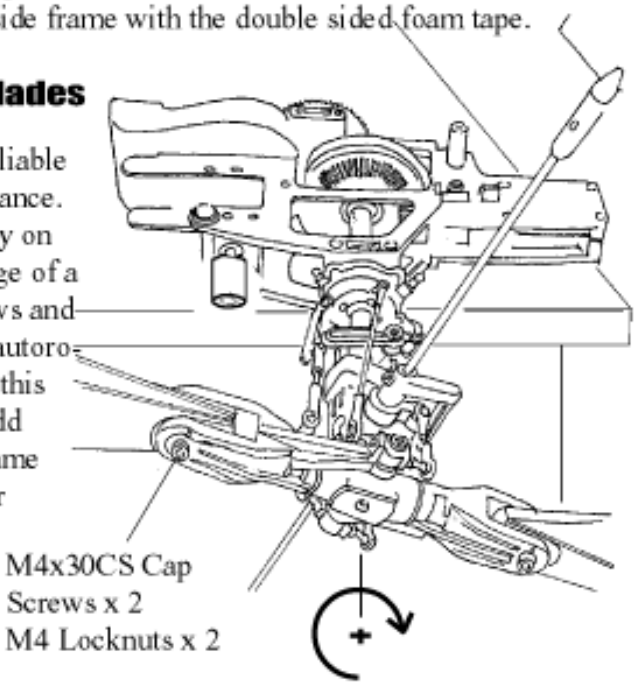
Using foam rubber, wrap the battery pack & receiver. Using two #64 elastic bands, looped through the front of the top servo tray, secure the components to the two hooks on the lower servo tray. Collect the servo and gyro wires and plug them neatly into the receiver. Tie these wires neatly together using small tie wraps. Depending on your equipment, the switch can be mounted on the provided bracket or on the lower side frame with the double sided foam tape.

Balancing the Rotor Head & Attaching Main Blades

Balance is the most important part in maintaining a safe, reliable and vibration free helicopter. First check the blades for balance. This can be done on a balancer but can also 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 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 a spot lower then the other, add some tape to the lighter (higher) until they balance at the same level. 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.



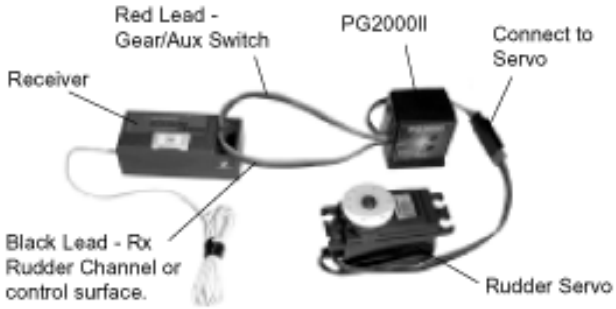
When attaching the main blades, the direction of rotation is clockwise, when looking from the top of the helicopter.

**Blade Bolt tension on the main blades should be set by tightening the bolts a little at a time until the blades will hold straight out as the helicopter is tipped on its side and a light shake will cause them to move. Too tight and a vibration may occur, too loose and a boom strike can happen. Tail blades can be set much looser.

Setup and Installation of PG2000 II Gyro (purchased separately)

Connections:

The connectors on the gyro have been selected to be universal for the range of radios and servos on the market.
Warning, if any radio system is used other than those listed make sure same polarity is maintained and double check your connections, otherwise you risk damaging the PG2000 II gyro.



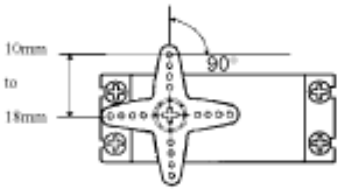
Transmitter Settings:

The PG2000 II is truly "plug and play" with your radio, the following chart shows the basic settings for your transmitter.

		Rudd	Gear/Aux
Servo Reverse		N	N
Travel* (ATV or	H	100%	100%
EPA)	L	100%	100%
Revo Mix	Up	30%	
	Down	20%	

Helicopter Servo Setup:

1. Disconnect the tail pushrod from the rudder servo and check that the pushrod moves smoothly, requiring only a gentle force to move through the entire range of movement. Make necessary changes if needed.
2. Following the tail rotor instructions provided with the helicopter, set the pushrod length so the pitch slider is centered within it's movement range and has the proper 5° of tail pitch to hold the helicopter straight in a hover while the collective/throttle stick is at the hovering position.
3. Position the control ball or "z" bend on the servo arm to achieve maximum mechanical throw (10-18mm from center). For beginners getting started use 10-14mm.

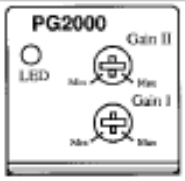


Final Connections:

1. Connect the tail rotor servo (or any function you expect to be assisted by PG2000 II Piezo Gyro) directly to your receiver. Turn on the transmitter and receiver. Your helicopter (or aircraft/surface models) should be set up as per the manufacturer's instructions. Set all transmitter subtrims, trim offsets and mechanical trims to zero (neutral). Move the collective stick to the hover position (usually 50%) and install the servo horn in the mid position (such that there is equal pushrod movement in each direction.
2. Turn off power to the transmitter and receiver. Disconnect the rudder servo from the receiver and connect to the gyro wiring harness. Connect the black lead from the gyro to the rudder channel on the receiver, the red lead to the Gear/Aux channel.
3. **Insure your throttle/collective stick is at the bottom** and turn on the power of the TX and then the RX. The green LED on the top left corner of the gyro will flash rapidly for 5 seconds. **During this time do not move the helicopter or the rudder stick.** The green LED will become solid when the gyro has initialized. Later, when hovering, trim the rudder channel using your trims or sub-trims and revo-mixing for no drift at all collective settings.

Adjustments:

Only use a plastic screw driver to make changes on the gyro switches and pots.



Gyro Configuration & Setup:

This chart lists the gyro settings by radio manufacturer. Gain I and Gain II correspond to the switch position on the radio however the PG2000 II is unique in that Gain I is for hovering maneuvers and Gain II is for forward flight. The difference being the percentage gain available in each switch position.

Futaba / Hitec	Switch
Gain I	Back
Gain II	Front
Gyro Direction	R
JR / Airtronics Z	**Switch**
Gain I	Front
Gain II	Back
Gyro Direction	N

Gain Settings:

Gain I	Hovering	Range 35% - 100%
Gain II	Forward Flight	Range 20% - 85%

Start with the switch in **Gain I** (hovering) set at 50%. Bring the helicopter to a hover and keep increasing **Gain I** until the tail starts to oscillate (hunt). At this point reduce **Gain I** setting slightly (5-10%). To set ***Gain II*** (forward flight), start at 50%, and bring the helicopter into forward flight and continue to increase ***Gain II*** until the tail oscillates (hunts), again at this point reduce slightly (5-10%). Due to the range differential, the setting on the pot may make ***Gain II*** appear to be the same as **Gain I**, but it is a lower setting to accomodate the forward speed & higher rotor speed.

Mechanical Gain:

A. If hunting occurs at less than 65% in Gain II while hovering - then move the rudder pushrod connection one hole inwards on the servo arm.
B. If no hunting occurs at 100% in Gain I in hover - move the rudder pushrod connection one hole outward on the servo arm.

Revolution Mixing:

Due to the high sensitivity of the piezo gyro, the revo mix settings will be lower than the default setting in most radios. To correctly set for the UP direction, hover the helicopter and apply full throttle/collective and watch the tail rotation. Again for the DOWN direction, hover at a higher altitude lower the power/collective stick and watch the rotation.

Nose turns left	increase revo value to increase tail pitch
Nose turns right	decrease revo value to decrease tail pitch

Pirouette Rate Adjustment

You may wish to have a faster or slower yaw (pirouette/rudder) rate then provide with these initial settings. As this is a "yaw rate" and not a "heading hold" gyro. One can set the servo to "over-drive" its' throw in order to increase yaw rate. In the air, a yaw rate gyro, will have continual feedback from the piezo element working through the gain circuit to limit the throw of the servo. First increase (for faster) or decrease (for slower) the rudder ATV settings to achieve the desired rate. If you require a greater setting then move the rudder control pushrod attachment point farther from the center of the servo arm (faster) or closer to the center of the servo arm (slower).

Initial Radio Setup

There are various different radios on the market, each having it's own special setup requirements, we have picked the top three brands to give you the basic setup parameters for the computer class radios. Not all features are available on all radios, use values for functions that do apply. For those that are using either the airplane version or an analog radio some of the following information will still apply. **NOTE: These are assuming that your mechanical set up is as per the instructions.**

JR

	THR	AILE	ELEV	RUDD	GEAR	PITCH	AUX2	AUX3
Channel #	1	2	3	4	5	6	7	8
Servo Reverse	R	N	N	N	N	N	N	N
Travel (ATV) H	95%	95%	115%	100%	100%	100%		
L	95%	95%	115%	100%	100%	100%		

Trim (sub trim) (after test flying, adjust the individual pushrods to bring the mechanical trims back to center)

D/R & Exp	Pos 0	90%	90%
		20%	20%
	Pos 1	100%	100%
		0%	0%

Trim Offset (store trim positions after test flying)

Throttle Curve	L	2	H
Pos N	0%	50%	100%
Pos S[2]	40%	50%	100%

Throttle Hold (set 5% above idle position)

Revo Mix[1] Up 30% Down 20%

Pitch Curve	L	2	H
Pos N	-2°	5.5°	10°
Pos S	-5°	5.5°	10°
Pos H	-5°	5.5°	12°

PG2000 II Piezo Gyro
Direction: R
Gain I: (advence) 20 - 85%
Gain II: (hover) 30 -100%

General
The parameters here are based on JR servos and to be used as a guide in programming your JR radio.

Note 1, revolution mixing values based on PG2000 gyro, actual values may varies depending on gyro used.

Note 2, Throttle position "S" is for stunt setup & 3D flying only. Strongly not recommended for beginners.

Futaba

	THR	AILE	ELEV	RUDD	GEAR	PITCH	SPARE	SPARE
Channel #	3	1	2	4	5	6	7	8
Servo Reverse	R	N	N	N	N	N	N	N
Travel (ATV) H	95%	95%	95%	100%	100%	90%		
L	95%	95%	95%	100%	100%	90%		

Trim (Sub trim) (after test flying, adjust the individual pushrods to bring the mechanical trims back to center)

D/R & Exp	Pos 0	90%	90%
		-20%	-20%
	IDLE-UP	100%	100%
		0%	0%

Trim Offset (store trim positions after test flying)

HV-T~TH-CRV		1	3	5
(Throttle Curve)	Pos N	0%	50%	100%
	IDLE-UP[2]	40%	50%	100%

TH-HLD (set 5% above idle position)

REVO[1] Up 30% Down 20%

TH-CUT (Throttle Cut) -20%

P-AT~PI-CRV (Pitch Curve)		1	3	5
	Pos N	-2°	5.5°	10°
	Pos S	-5°	5.5°	10°
	Pos H	-5°	5.5°	12°

PG2000 II Piezo Gyro
Direction: R
Gain I: (advence) 20 - 85%
Gain II: (hover) 30 -100%

General
The parameters here are based on Futaba servos and to be used as a guide in programming your Futaba radio.

Note 1, revolution mixing values based on PG2000 gyro, actual values may varies depending on gyro used.

Note 2, Throttle position "IDLE- UP" is for stunt setup & 3D flying only. Strongly not recommended for beginners.

Airtronics

	THR	AILE	ELEV	RUDD	GEAR	PITCH	7/B
Channel #	3	2	1	4	5	6	7
Reverse (SW-R)	R	N	N	N	N	N	N
Travel (EPA) H	95%	95%	100%	100%	100%	95%	
L	95%	95%	100%	100%	100%	95%	

TRIM (Sub Trim) (after test flying, adjust the individual pushrods to bring the mechanical trims back to center)

D/R & Exp	Pos 0	90%	90%
		20%	20%
	Pos 1	100%	100%
		0%	0%

Trim Offset (store trim positions after test flying)

TH~CU-PL,2,PH		PL	P2	PH
(Throttle Curve)	Pos N	0%	50%	100%
	Pos 1[2]	40%	50%	100%

Throttle HOLD (set 5% above idle position)

RVH[1] (Revo Mixing) Up 30% Down 20%

T-CUT (Throttle Cut) -20%

P-F~CU-PL,2,PH (Pitch Curve)		PL	P2	PH
	Pos N	-2°	5.5°	10°
	Pos 1	-5°	5.5°	10°
	Pos 2	-5°	5.5°	12°

PG2000 II Piezo Gyro
Direction: R
Gain I: (advence) 20 - 85%
Gain II: (hover) 30 -100%

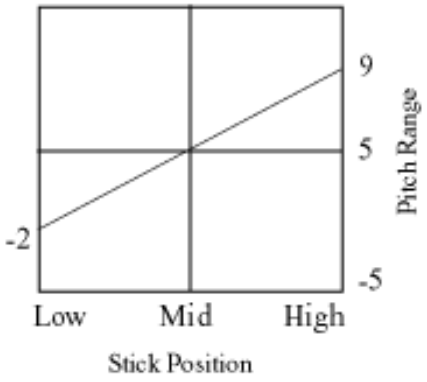
General
The parameters here are based on Airtronics servos and to be used as a guide in programming your Airtronics radio.

Note 1, revolution mixing values based on PG2000 gyro, actual values may varies depending on gyro used.

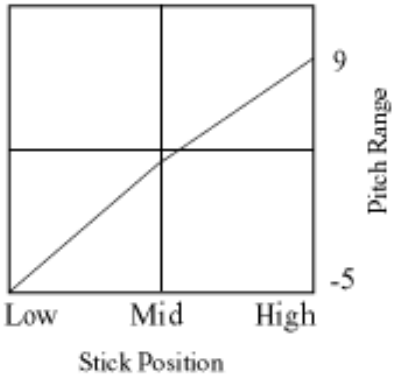
Note 2, Throttle position "1" is for stunt setup & 3D flyingonly. Strongly not recommended for beginners.

Pitch Curve

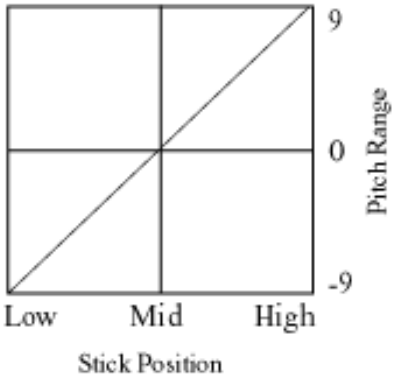
Hovering - (linear) Normal Flight Mode



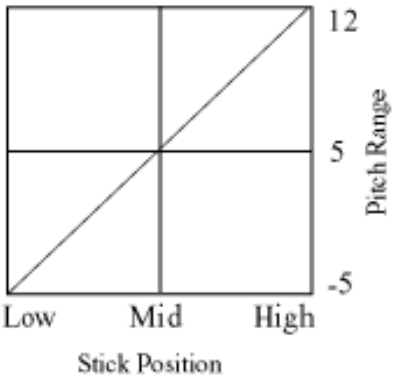
Aerobatic Flying - Flight Mode 1



3D Flying - Flight Mode 2



Autorotation - Throttle Hold



Using Pitch & Flybar Paddle Gauge CN2026 (Purchased Separately)

Before making accurate pitch readings or aligning paddles, the helicopter should have all linkages attached at the factory normal settings with the servos connected, working and moveable to the endpoints of the servo without binding. Also have the swashplate set level in the fore/aft and left/right directions. Turn the radio on and take different readings at the different throttle/collective stick positions.

Pitch Gauge

1. Loosen the thumb screw on the back side of the gauge, open the jaws and position the gauge on the blade near the rotor head, see photo#2.
2. Position the flybar perpendicular (90°) to the main shaft.
3. Take 3 readings: at low pitch, at hover pitch and high pitch.
4. To read the blade pitch, while looking at the gauge in photo#2, align the bottom or top by sighting the edge of the gauge parallel to the flybar. When these are parallel, read the value at the pointer on the scale.
5. Repeat this process for the opposite blade, make changes in the radio or in the length of pushrod C if necessary.

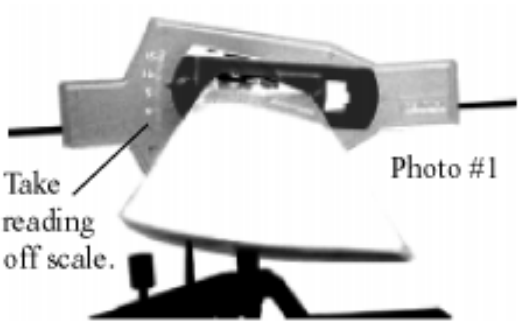


Photo #1

Sighting Edges A or B

Photo #2

Flybar Paddle Alignment Gauge

1. Make sure the flybar is centered in the rotor head using a ruler. Install the flybar control arms and paddles on each side. Leave the set screws on the control arms slightly loose so they rotate but do not slide.
2. Disassemble the center part of the pitch gauge and slide one paddle gauge on each flybar paddle. Adjust the paddles until both gauges are parallel to each other, as in photo#3.
3. Make sure the swashplate is level, align the paddles to the flybar control arms and tighten the set screws.

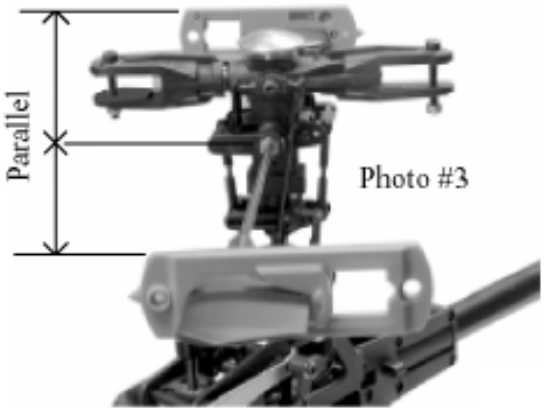
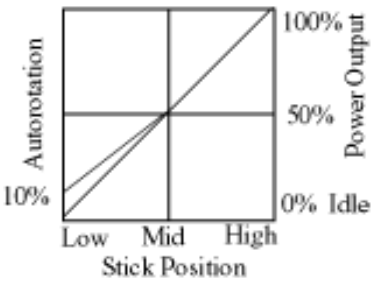


Photo #3

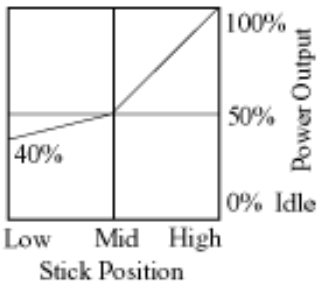
Throttle Curve Adjustments

After several tanks of fuel the engine will be run-in, at this time you can modify throttle settings. 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.

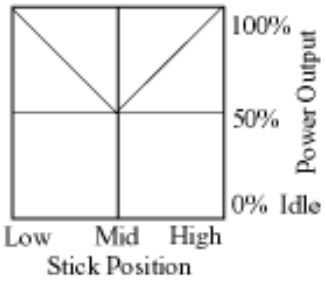
Hovering - (linear)
Normal Flight Mode



Aerobatic Flying -
Flight Mode 1

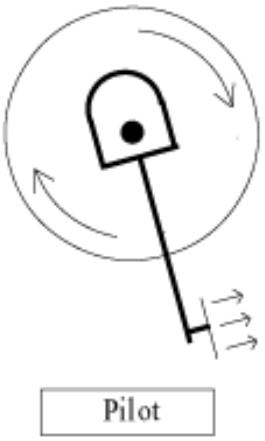


3D Flying - Flight Mode 2



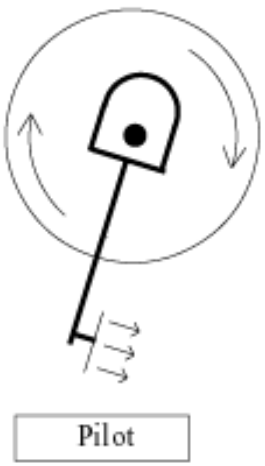
Tail Rotor Setup

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 hovering in front of you - tail in.



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. If the yawing is minimal, then one can apply some right rudder trim at the Transmitter.



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. If the yawing is minimal, one can apply some left rudder trim at the transmitter.

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 is 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/collective to maximum so the helicopter climbs steadily. Notice the direction the nose rotates:

Nose rotates	
High & Low	left increase revo value to increase tail pitch. ight 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 stick 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 as it does when given a right stick command. 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 wag back and forth, then reduce the setting slightly.
Problem: Tail rotor makes sudden uncontrolled rotation.
Solution: Reverse gyro direction switch.

Before Flying your Hawk IV Helicopter

Before each flight, check that all bolts and screws are tight. Simply flying your helicopter, may loosen any screws which were 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 the training capability to allow pilots to become familiar with the helicopter controls and how they relate to the behavior of the helicopter before actually leaving the ground.

Starting Your Engine

Fuel 15-30% Helicopter fuel is recommended as it contains 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.

Needle Valve Following the engine manufacturers instructions, turn the main needle valve until closed and open to the setting the instructions call for. Different engines will have different settings.

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

Glow Plugs Remove the canopy (or use the optional remote glow plug connector) and connect the 1.5V glow driver to heat the glow plug. Warning!! glow plugs operate at 1.5V not 12V.

Engine Before starting the engine, check that the carb barrel is rotated to the idle setting and make sure the electric starter is turning in the counter-clockwise direction.

Starting If you do not already have a 6mm hex start wand, you will need the optional CN0426. Set the TX for low throttle with the trim centered. Holding the rotor head in one hand, insert the hex shaft into the coupler and press down slightly to engage the starting shaft into the fan. Engage the starter until the engine starts. If the engine does not start recheck all previous points. Remove the start wand using the two step system described on page 8. NOTE: The main blades should 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.

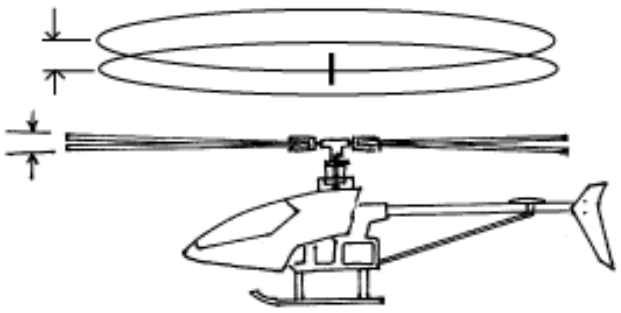
Q. The engine rotates and tries to start but doesn't.
A. The glow plug may be getting old. The glow plug batteries are weak. The engine may not be getting enough fuel or too much fuel. The starter may be turning the wrong direction.

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 barrel is not open enough at idle. Open the throttle trim by 1-2 clicks as the main needle is set too lean Helicopter engines have a low speed needle which is factury set, beginners should not adjust it!!

Adjusting the Blade Tracking

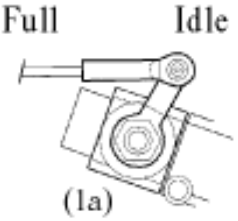
Pitch In steps 34-35 you set the pitch range using a pitch gauge and adjusting the radio and the pushrods on the servo horns to specific lengths. Once the helicopter is flying the pitch setting have to be fine tuned. Using appropriate training gear, increase the throttle until just before the helicopter lifts off. Sight the rotor disk from 15' back. If there appears to be 2 rotor disks then adjust Pushrod C until only one disk appears. Using colored tape mark one blade so you can adjust the correct blade.



Starting the engine for the first time.

The model engine is the single most difficult part of model helicopters to the beginner, second only to learning to fly. For this reason we have taken the time to go through starting the engine the first time for you This should help you to understand the basic operation and tuning of the engine.

Items to recheck:



(1a)

1) Servo direction for the throttle channel - Turn on the transmitter switch, then the switch on the helicopter, move the throttle/collective stick to the low position, the carburetor arm should look exactly like the diagram (1a). Watch the throttle servo. As you raise (increase) the left stick the throttle pushrod will move towards the front of the helicopter. All carburetors work the same, the barrel of the carburetor rotates counter-clockwise as it opens. If this does not happen you need to reverse the servo direction and reset the throttle arm in Step 17. Starting the engine at full power will possibly damage the engine and can damaged clutch components on the helicopter.

2) Fueling the engine - Open the gallon of fuel and insert draw line from the fuel pump into the fuel, remove the fuel line at the carburetor inlet and connect to the fueling line of the fuel pump. Remove the pressure line from the muffler. Fill the tank until you start to see fuel in the pressure line. Reverse the pump for 1 second and reattach the pressure line to the muffler. Disconnect the lines starting with the fueling line and reconnect to the line to the carburetor. Recap the fuel to keep moisture out. Only fuel the model when you are setup and actually ready to start the engine, it is common for the carburetor to fill with fuel while sitting on the bench over a brief period of time. More common is the engine flooding while trying to start. In this case, as you are starting with an electric starter the engine initially turns easily but soon slows down.

3) Last pre-flight checks. Make sure that both the radio Tx and Rx have been charged overnight and the glow starter (if rechargeable). Do a range check, walk away from your helicopter with the antenna fully collapsed to 30 paces and have someone verify that all control surfaces are operating. If you do not make this distance have an experienced modeler check over your setup, do not fly until then. Be sure the throttle control stick is set to the idle position.

4) Cranking the engine over.

- Prime the engine by moving throttle stick to half **(insure the glow plug driver is not connected to the engine)** and crank the engine over for 10 to 15 seconds until you can see fuel come up the fuel line and into your carburator. Then keep it turning over for another few seconds to insure the fuel has entered the cumbustion chamber. If fuel does not rise into the carb then check for blockage, proper needle valve opening and proper carburator barrel opening (approximately 1/16 of an inch).
- Move the throttle stick to the low position with the trim in the center.
- **NOW** connect the glow plug to the 1.5V glow driver battery
- Place one hand firmly on the rotor head. **You must always hold onto the rotor head during start up.** Should the engine start anywhere above idle you will only have a few seconds to put the starter down and pull the fuel line off the carburetor line going to the engine. It is important to make sure you are standing/kneeling on the fuel line side to facilitate this.
- Place the start wand into the hex coupler and push down. Before you start, rotate the coupler counter clockwise until you feel the compression increase. Rotate the shaft past that point to insure the engine isn't flooded.
- Press the button on the electric starter to turn the engine over. There will be an initial popping sound as the engine turns over and within a few seconds the engine should start. When it does, continue to hold the rotor head, disengage the start wand as in structed on page 8 and put down the electric starter. Disconect the glow driver and move the throttle trim down or up until the engine continues to run at the lowest speed without quitting. If the engine starts to die simply move the trim up one or two clicks. Do not move the throttle stick from the low position at this time.

5) If the engine does not start. Do not continue to crank the engine over if it does not start after a few attemps. When a brand new engine does not start there are only three major possibilities: a) the glow plug is not hot enough or already burned out b) not enough fuel is getting to the carburetor c) too much fuel is entering the carburetor. Assuming you have gone through step 1 on this page. Connect the starter to a 12Volt source and verify that the starter will turn the starting hex coupler counter-clockwise.

a) Remove and check the glow plug, is the glow plug dry or wet? Connect the glow driver to the glow plug and verify that the element glows a bright orange color, If you get a dull orange glow then your glow starter is not supplying enough power to the glow plug or your plug is no good.

b) If the glow plug is wet, then the engine is receiving fuel. If the glow plug is dry, no fuel is reaching the engine. Try re-priming the engine, point #1 step 4. Again verify that the engine is receiving fuel.

c) Is the engine is very difficult to turn over, to the point that the electric starter has difficulty to turn the engine? If yes, you have filled the engine and carburetor with too much fuel. Do not force the starter as you can damage the starter or engine. This will lead to the stripping of the hex coupler on the start shaft. First, disconnect the glow starter, and pickup the helicopter. Pinch off the muffler pressure line and tip forwards and backwards with the muffler side down. This will drain the muffler of any raw fuel that may have collected there. Next turn the coupler to 90 degrees past the highest compression point. This will open the exhaust port and drain any excess raw fuel from the crankcase into the muffler. Clear the muffler and try to start again. If you have the same problem, remove the glow plug and spin the engine (without) plug and any excess fuel will be expelled, replace glow plug and try again.

If the engine still doesn't start, contact an experience modeler to help you with starting the engine, the problem may be very simple.

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 - tail pointing to you.
(2) Always watch the nose of the helicopter, move the rudder left and the nose should 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 holding the model in the same spot for a few seconds. Then land and take a deep breath.

When you become more comfortable, you can gradually increase altitude (be very careful not to get too high) as you are now just practising taking off and landing. This is the most basic but required skill 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 practice hovering until you are completely comfortable in holding the helicopter in any position or altitude. Perfecting hovering enables you to more easily and safely move on to all the other types and styles of flying, from fast forward flight to loops and rolls to 3D aerobatics and anything you want to do with your HAWK IV helicopter. The HAWK IV can be set up for all of these various disciplines. Have fun!!

Pre-Flight Checklist

1. After turning the radio on, move each servo separately, looking for unusual or excessive movement.
2. Clean & lubricate the main shaft above the swashplate & the tail output shaft area of the pitch slider.
3. Inspect the main and tail rotor grips for play or binding.
4. Turn the main gear in both directions to feel if a problem is developing in the drive train.
5. Check the glow plug and fuel lines for signs of wear.

PRE-FLIGHT CHECK UP & TRIM ADJUSTMENTS

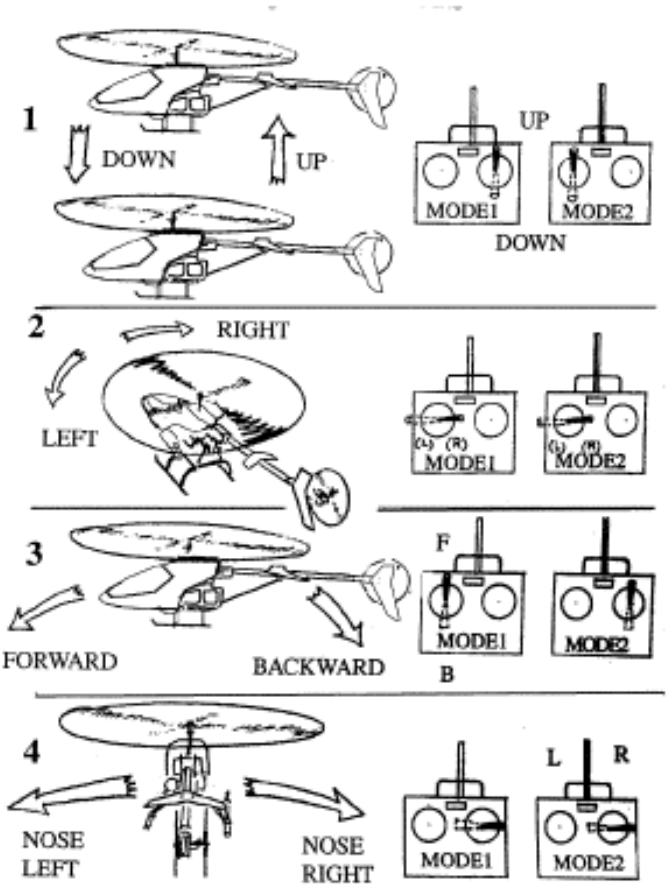
All trim adjustments are to allow you to lift the helicopter straight up and can be made one click or detent at a time on the radio.

(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 and/or hover throttle settings on the radio. If the helicopter lifts off before mid stick decrease these settings.

(2) **Rudder:** When the helicopter is ready to take off, trim first for no yaw, then use the rudder stick to control the Left & Right Yaw axis. Note, now is a good time to make the final adjustments 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 this fore-aft axis.

(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 helicopter Right-Left movement.



Hawk IV Bag Parts List

Bag 1

Rotorhead Block	1
Offset Plate	2
Tie Bar	2
Center Hub	1
Bearing Holder	2
Spacer M3x6x1.5	2
Ball Bearing M3x7x3	2
Oilite Bearing M3x10x4	2
M3x6 Self Tapping Screw	2
M3x6 Phillips Mach Screw	2
Special Ball M3x6	2
Main Blade Grip	2
Bell Mixer	2
Slide Tube	2
Short Ball	2
Long Ball	2
M3x16 Socket Cap 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 Socket Cap Screw	2
M3x7 Flat Washer	2
Swashplate	1
Short Silver Ball	2
Medium Silver Ball	5
Feathering Shaft	1
Damper	2
Bearing M5x13x4	4
M4 Locknut	2
M2.5x25 Pin	2
M5x10 Flat Washer	2
M4x10 Flat Washer	2
M4x12 Flat Washer	2
Flybar Control Arms	2
Short Steel Ball	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
Ball Links	4
M2.3x25 Pushrod	2
Short Steel Ball	5
Roll Cyclic Bellcrank	2
Slide Tube	2
Collective Shaft 6mm ø	1
Collective Hex Spacer	1
Collective Lever	1
Collective Arm	2
Ball Bearing M6x10x3	2
Short Ball	1
M3x10 Socket Cap Screw	4
Mast Stopper	1
Bearing M8x19x6	2
M3x16 Socket Cap Screw	5
M3x20 Socket Cap Screw	1
M3 Locknut	6
M4x4 Set Screw	2
Long Hex Spacer	2
Short Hex Spacer	2
Canopy Thumb Screws	2
M3x40 Threaded Stud	1
M3x35 Socket Cap Screw	4
M3x7 Flat Washer	4
Hex Start Coupler	1
Start Shaft	1
Collar M5x10x5	1
M3x4 Set Screw	1
Start Shaft Block Assembly	2
Spring	1
M2x16 Pin	1
M5x10 Flat Washer	1
M3x12 Self Tapping Screw	8
M3x6 Washer Head Screw	1
Fore Aft Cyclic Lever Ass.	1
Short Spacer	2
M3x7 Flat Washer	2
Long Threaded Axle	1
M3x30 Socket Cap Screw	2

Bag 3

Gyro Tray	1
M3x15 Self Tapping Screw	4
Clutch Shoe	1
Clutch Bell w/Gear	1
Ball Bearing M12x18x3	2
Cooling Fan	1
Engine Mount	1
M3x16 Socket Cap Screw	8
M3x11 Flat Washer	4
M5x13 Flat Washer	1
M9x14 Flat Washer	1
Lower Sideframe	2
Left Fan Shroud	1
Right Fan Shroud	1
M2.5x10 Self Tapping Screw	5
M3x12 Self Tapping Screw	2
M3x7 Flat Washer	2
M3x20 Socket Cap Screw	2
M3 Locknut	2
Fuel Tank	1
Fuel Line 56mm	1
Long Vent Tube	1
Short Pickup Tube	1
Rubber Stopper	1
Large Cap	1
Small Cap	1
Clunk	1
M2.5x18 Self Tapping Screw	1
Cable Tie Wrap	1

Bag 4

Fuel Line	1
Rod - Aileron M2.3x128	2
Rod - Elevator M2.3x105	2
Rod - Coll/Swash M2.3x80	3
Rod - Throttle M2.3x75	1
M4x30 Socket Cap Screw	2
M4 Locknut	2
M2.3x10 Servo Screw	20
M3x25 Socket Cap 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
Throttle Extension	1
Steel Ball w/2mm Thread	7
M2 Hex Nut	14

Bag 5

Servo Tray Top	1
Servo Tray Left	1
Servo Tray Right	1
Battery Tray	1
Inside Canopy Mount	1
Canopy Mount Hook	1
Canopy Mount Spacer	1
M3x30 Phillips Mach Screw	2
M3x6 Self Tapping Screw	2
M3x15 Self Tapping Screw	8
M3x12 Self Tapping Screw	2
M3x7 Flat Washer	2

Bag 6

Landing Struts - Plastic	2
Landing Skids - Metal	2
M3x4 Set Screws	4
M3x16 Phillips Mach Screw	4

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	2
Pitch Slider Assembly	1
M2x8 Pin	2
Tail Pitch Ball Link	2
Tail Pitch Bellcrank	1
M2.5x16 Phillips Mach Screw	1
M5x2 Steel Ball	1
Short Steel Ball	1
Tube M3x8	1
M3x16 Socket Cap Screw	2
M3x16 Socket Cap Screw	2
M3x10 Socket Cap 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 Shaft	1
Tail Drive Housing	1
Antenna Plastic Tube	1
Short Rudder Pushrod	1
Long Rudder Pushrod	1
Tailboom Strut	2

In Box

Instruction Manual	1
Registration Card	1
Canopy	1
Windshield	1
Decal Sheet	1
Main Rotor Blade	2

Hawk IV Replacement Parts

CN2230HS	CRASH KIT -(Main Blades, Main Shaft, Tail Boom, Feathering Shaft and Flybar)	1
HW3000	HARDWARE PACK	1
CN0402	HEX START COUPLER	1
HW3005A	STARTER SHAFT SET	1
HI3007	STARTER SHAFT BEARING BLOCKS	1
HI3009	COOLING FAN	1
HI3010	CLUTCH BELL & LINING	1
HW3011	CLUTCH SHOES	1
HW3017	ENGINE MOUNT	1
HI3020	COOLING FAN SHROUD	1
HW3024	COLLECTIVE PITCH LEVER SET	1
HI3031B	AILERON BELLCRANKS (L&R CYCLIC)	2
HI3032B	ELEVATOR LEVER SET	1
HI3035A	ADJUSTABLE CYCLIC PUSHROD LINKS	2
HI3040	COUNTER DRIVE GEAR	1
HW3042	PRIMARY DRIVE SHAFT	1
HW3045	ALLOY DRIVE GEAR	1
HW3050	AUTOROTATION BEARING SET	1
HW3053A	10mm 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	1
HW3063	TAIL DRIVE SHAFT SET	1
HW3064C	TAIL PITCH CONTROL ROD & CONNECTOR	1
HI3067	TAIL FIN SET	1
HW3070	TAIL GEARBOX INPUT SHAFT	1
HW3073	TAIL GEARBOX OUTPUT SHAFT	1
HI3074	BRASS 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
HI3099	TAIL ROTOR BLADES (PAIR)	1
HI3102A	TAIL PITCH LEVER SET	1
HI3106A	TAIL CONTROL ROD CLAMPS	3
HI3107	UPPER SIDE FRAMES	2
HI3112	LOWER SIDE FRAMES	2
HI3115	SERVO MOUNT FRAME SET	2
HI3122	LANDING STRUTS (PLASTIC)	1
HW3123	LANDING SKIDS (PAIR)	1
HW3127	HEX FRAME SPACER SET	1
HI3129	CANOPY MOUNT & HARDWARE	1
HI3130A	CANOPY	1
HI3131H	HAWK IV DECAL SET	1
HI3132D	HAWK IV INSTRUCTION MANUAL	1
HI3133	CLEAR WINSHIELD (for HI3130A)	1
HI3138A	FUEL TANK	1
HI3145	BALL LINKS (16 LONG & 6 SHORT)	1
HI3146A	SWASHPLATE WITH STEEL BALL END	1
HI3152B	WASHOUT SET	1
HI3152A	RADIUS LINK WITH PIN	1
HI3160B	ROTOR HEAD BLOCK	1
HW3161A	FLYBAR SEESAW SHAFT SET	1
HI3167A	FLYBAR SEESAW COMPLETE SET	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	1
HI3181	DAMPING RUBBERS	2
HI3184	ROTOR BLADE GRIP	1
HI3189	MIXING ARM SET	1
CN2322	MAIN ROTOR BLADES(PAIR)	1
HW3192	LINKAGE SET (11 RODS)	1
HW3202B	T/B SUPPORT STRUTS (PAIR)	1
HW3203	BRASS BEARING SET	1
HW3204	THROTTLE EXTENSION	1
CNBB0730	Bearings 3X7X3 (Flybar,Elevator Lever)	2
CNBB1019	Bearings 10X19X6 (Top Main Shaft)	2
CNBB1030	Bearings 3X10X4 (Seesaw,Tail Grips)	2
CNBB1060	Bearings 6X10X3 (Collective Axle)	2
CNBB1150	Bearings 5X11X4 (Start Shaft,Tail Shaft)	2
CNBB1350	Bearings 5X13X4 (Counter shaft,Blade grips,Tail Shaft)	2
CNBB1150	Bearings 5X11X4 (Start Shaft, Tail Shaft)	2
CNBB1980	Bearings 8X19X6 (BottomMain Shaft)	2
HW3050	Autorotation Bearing 12X18X16	1
CNLR1010	M3 Ball joint with short standoff	2
CNLR1011	M3 Ball joint with medium length standoff	2
CNLR1012	M3 Ball joint with long standoff	2
CNLR1013	M2 Ball joint	2

Hawk IV Upgrade Parts & Accessories

CN0427	Hex start wand with one-way bearing
CN0520	Twin bearing supported Carbon torque tube tail drive
CN2005	Main Blade Transport Supports
CN2007	Trainer Pod 30-46 w/4 Legs
CN2015	Hardened Tip Hex Wrench Set (1.5mm/2.0mm/2.5mm/3.0mm tips)
CN2016A	4.8V Battery Monitor/Alarm
CN2018	PG-2000 dual rate piezo gyro
CN2022	Single rate micro piezo gyro
CN2046	Basic Heli Setup Tool Kit (pitch gauge, blade balancer & pliers)
CN2052	Accuratech Blade Balancer **-blue**
CN2056	CNC Machined Aluminum Swashplate
CN2079	Fast 3-D Hot dog fly bar paddles (R red, O orange, Y yellow)
CN2122	Carbon fiber flybar stiffeners 30
CN2137	2 oz Header Tank w/ Universal Bracket **-purple**
CN2155	Piston Locking Tool - **purple**
CN2153	Machined Throttle Extension - OS32SX,46FX, TT36H **-purple**
CN2176	CNC machined servo arm pack (5 pcs. Futaba **purple**)
CN2177	CNC machined servo arm pack (5 pcs. JR **purple**)
CN2179H	CNC machined servo arm pack (5 pcs. Hitec **purple**)
CN2202	Aluminum Turbo cooling fan - **purple**
CNBB1001	Ball Bearing Upgrade Set
CN2206	CNCMachined Flybar Control Arms (2)
CN2207	CNC Machined Washout Mixing Arms (2)
CN2208B	Metal Swashplate Anti-rotation Bracket - **black**
CN2208P	Metal Swashplate Anti-rotation Bracket - **purple**
CN2210	Canopy Quick Mount(2) - **purple**
CN2212P	Aluminum Tail Rotor Grips(2) - **purple**
CN2212G	Aluminum Tail Rotor Grips(2) - **Gold**
CN2212B	Aluminum Tail Rotor Grips(2) - **black**
CN2213	2oz Header Tank w/ Machined Mount Bracket - **purple**
CN2214B	Air Filter (OS32-46, TT36-46)
CN2215B	Machined Head Button (TM) - **black**
CN2215P	Machined Head Button (TM) - **purple**
CN2216	Rear Tail Rotor Servo Mount Set
CN2217P	Machined Color Caps - **purple**
CN2218P	Machined Color Washers - **purple**
CN2221	6mm Feathering Spindle system w/ Thrust Bearings
CN2126H	Ultra Light Carbon Graphite Tail Boom
CN2239C	DLX boom mount for T/R servo
CN2240H	Carbon Graphite 3D Tail Fin Set
CN2128H	Ultra Light Carbon Graphite Tail Boom Supports
CN2400	Hurricane Carbon fiber Blades - 550mm Fully Sym
CN2501	Vortex Carbon fiber Blades - 550mm Fully Sym 3D Pro
CN3033	Speed torpedo 30 HV Muffler - **Polished Aluminum**
CN3055H	Millennium Pipe System - **Polished Aluminum**

Hawk IV Replacement Parts


HW3000


CN0402


CN2226


HI3007

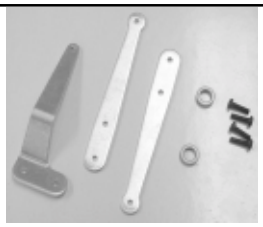

HI3009


HI3010


HW3011


HW3017


HI3020


HW3024

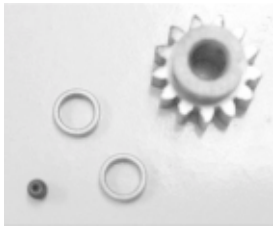

HI3031A


HI3032B


HI3035A


HI3040


HW3042


HW3045


HW3050


HW3053A

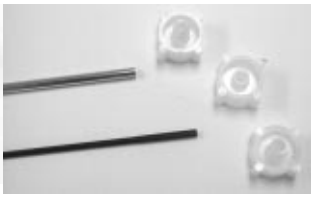

HW3054A

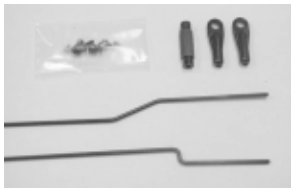

HI3056

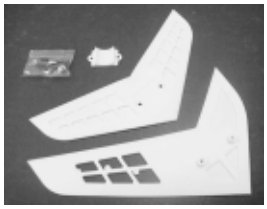

HW3057

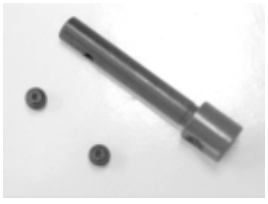

HW3059


HW3062

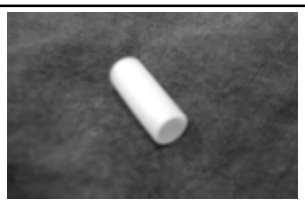

HW3063


HW3064C


HI3067A


HW3070


HW3073


HW3074


HI3075


HI3078


HI3087A


HI3089


HI3096


HW3098


HI3099


HI3102A


HI3106A

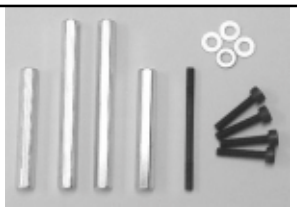

HI3107


HI3112


HI3115


HI3122

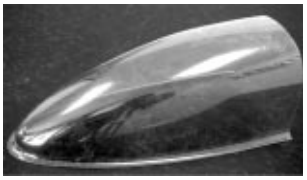

HW3123


HW3127


HI3129


HI3130A

HI3131D


HI3133


HI3138A

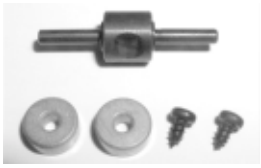

HI3145


HI3146B


HI3152C


HI3152A


HI3160B


HW3161A


HI3167A


HI3167B


HI3167C

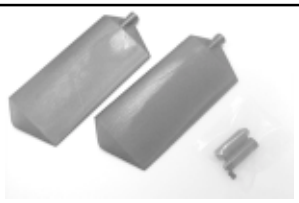

HI3167D

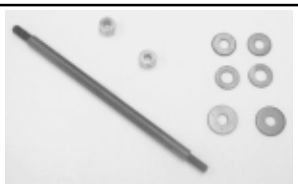

HI3167E


HW3170A


HW3173


HI3176


HI3179


HW3180


HI3181


HI3184


HI3189


HW3192


HW3202B


HW3203


HW3204


CN2322


HI3032C


HI3107A