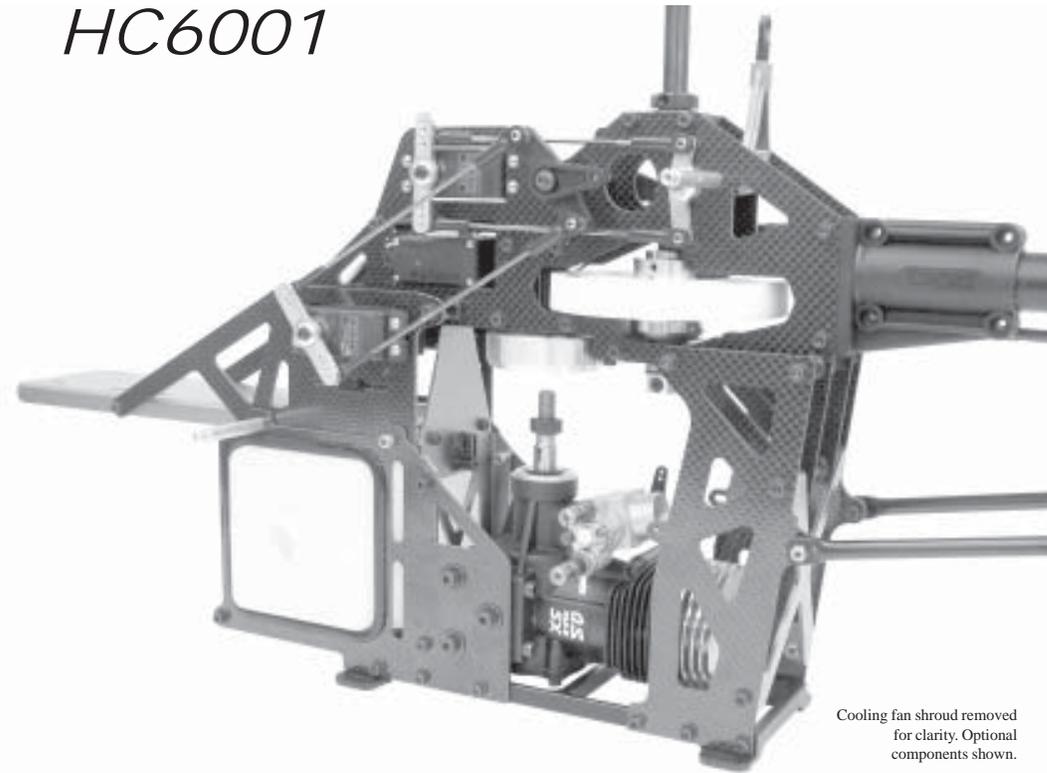


Predator Carbon Conversion Kit

HC6001



Cooling fan shroud removed for clarity. Optional components shown.

SPECIFICATIONS

The carbon side frame conversion kit is an upgrade for the glow series Predator helicopter kits. The conversion as shown consists of the main side frames and the front rudder servo mount conversion. Aerobatic performance is enhanced further by incorporating the elevator push pull kit, moving the c.g. forward with the optional front rudder servo and bracing of the battery tray. Combine these features with a new machined bottom frame, 2mm carbon frames and the inherently rigid Predator design and you have a helicopter that can compete on par with champions.

Century Helicopter Products

Designed and Developed in USA

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Building Instructions for the Predator carbon conversion kit.

Introduction

This manual has been written for both the Predator Carbon Conversion Kit, #HC6001 & the Front Rudder Servo Mount Kit #HC6002. The complete assembly will mount directly to the Predator with a few slight modifications. Only the key steps are included in this manual and the original Predator manual is needed to complete the setup. Ultimately, it is your responsibility to check and verify that all components are installed and setup to operate properly. Your Predator should be disassembled to point that the side frames are ready to be changed.

Warning

This radio controlled model is not a toy! It is a precision machine requiring proper assembly and setup to avoid accidents. It is the responsibility of the owner to operate this product in a safe manner as it can inflict serious injury otherwise. It is recommended that if you are in doubt of your abilities, seek assistance from experienced radio control modelers and associations. As manufacturer, we assume no liability for the use of this product.

Symbols used to help assist you in building the kit:

 Special Attention	 Repeat Steps as specified	 Partially tighten	 Helpful Tip
 Apply JB Weld	 Apply threadlock	 Purchased Separately	 Apply CA glue
Tip 1 Remove oil residue from fasteners before applying any threadlock agent.	Tip 2 Tap holes with machine screws before installing steel balls in plastic.	Tip 3 Tap holes with machine screws before installing self tap screws in plastic.	Tip 4 Tap holes with machine screws carefully in plastic holes with bottoms.

Recommended Tools & Accessories

The tools and materials listed below are the minimum needed to assemble the parts:

Small Press (vice ok) & 12mm OD socket.
240 Grit Wet/Dry Sandpaper
10mm wooden dowel (old main shaft ok)
Screwdrivers - Slotted and Phillips head.
Long-Nosed Pliers.
Allen Wrenches - 1.5 to 5.0mm
Locktight 260 Green, 242 Removeable & 262 Permanent

Optional Upgrades

HI6032A Metal Elevator Set
HI6099-O Tail Rotor Blades - Orange
HI6130A Canopy (no windshield type)
HI6189A Metal Bell Mixers Arm Set (1:1 ratio)

In addition, the following will make assembly and setup easier, and prove useful later in your model toolbox:

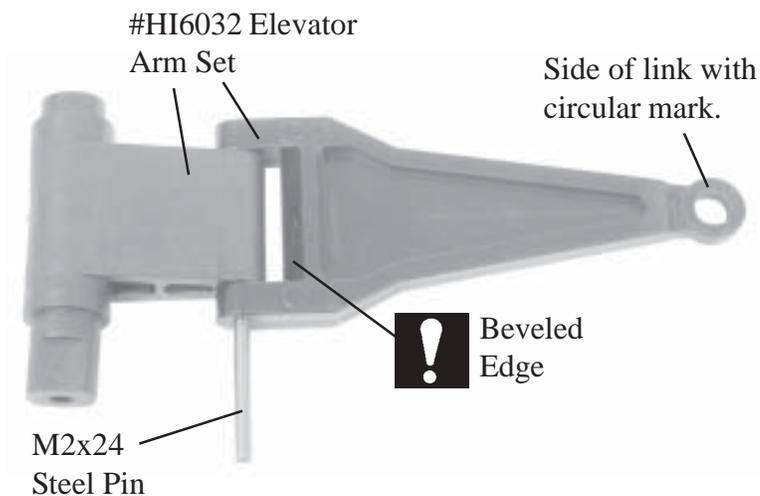
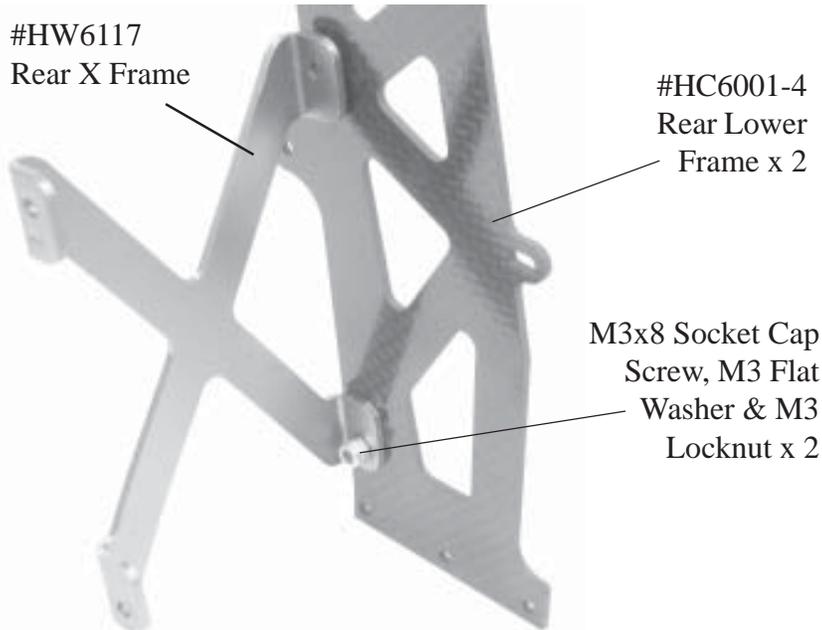
Part#CN2015 Hardened Tip Hex Screw Driver Set
Part#CN2026 Pitch Gauge with Paddle Gauge
Part#CN2034A 15° Curve Tip Ball link Pliers
Part#CN2293 Fan Hub Puller
Part#CN2055 Ball Link Sizing Tool
Part#CN2219 Ball Link Easy Driver
Part#CNWI26555 5.5mm Nut Driver
Strap Wrenches

HW6042A Main Shaft Double Bearing Block
HW6176D Metal Flybar Control Arm
HW6176P Metal Flybar Control Arm - Purple
CN2217 Anodized Color Caps (R,G,S,B,I,P,G,Bk)
CN2295 Servo Mount Reinforcement Kit
CN3148 Pre-Painted Canopy with Fin Set

Step 1 Rear & X Frame Assembly

Align the rear X frame with the one of the rear lower frames. Insert one M3x8 socket cap screw with M3 flat washer from the outside of the lower frame, through the lower hole in the X frame and secure with an M3 locknut on the inside. Attach the right side lower frame in exactly the same way.

Assemble these bolts only to position the frames at this time, they will be tightened when the upper frames are installed. Note that the upper hole remains empty until then.



Step 2 Reverse Elevator Arm

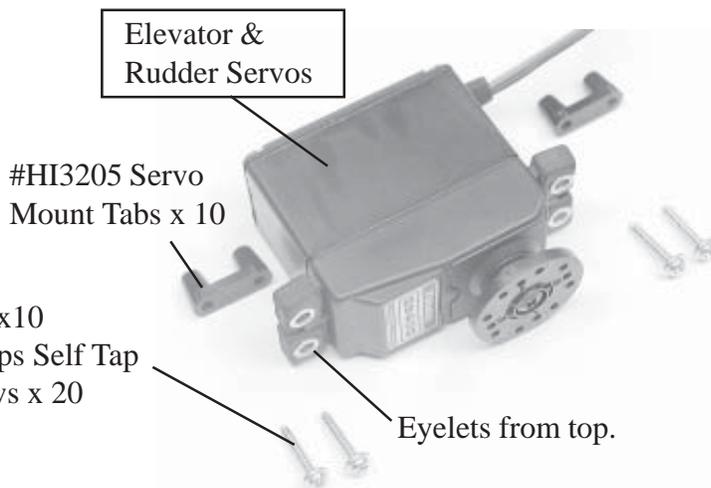
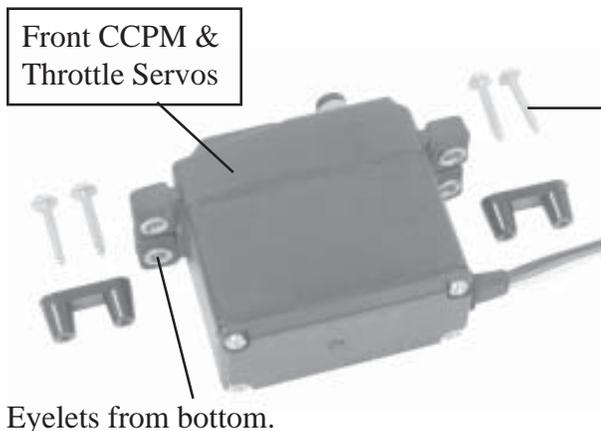
If you have not noticed yet, the carbon conversion places the elevator linkages on the left side of the mechanics which is opposite to the regular Predator. The M2x24 pin needs to be pressed out, the elevator arm needs to be flipped over (notice that one side of the A arm has a beveled surface that must face the swashplate) and installed on the other side according to the photo.

Customers using the HI6032A metal elevator upgrade can skip this step.

Step 3 Elevator & Rudder Servo Eyelets

If not already completed, the five servos need to have the eyelets installed in the correct directions.

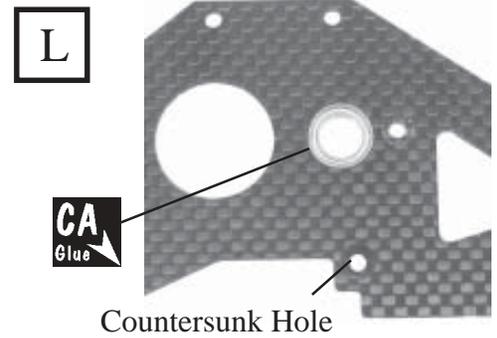
The front CCPM servos and the throttle servos need to have the eyelets installed from the bottom of the servo.



The elevator and rudder servos will be mounted from inside the side frames and will need to have brass eyelets installed from the top surface of the servo.

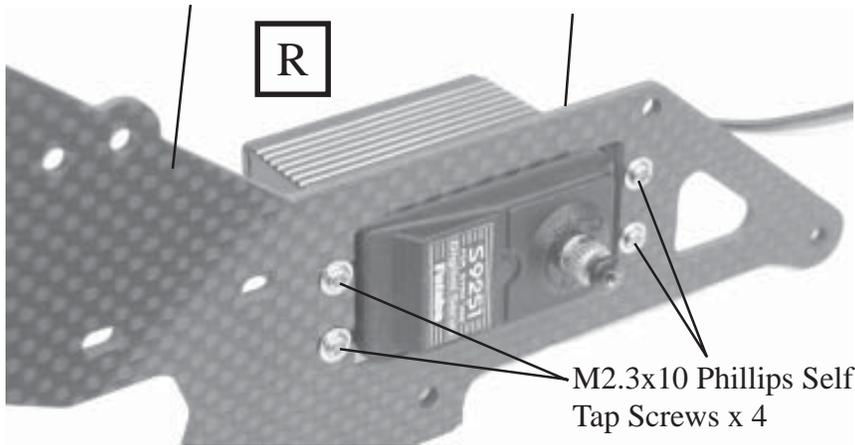
Step 4 Elevator Ball Bearings

The two M8x12 flanged ball bearings need to be moved to the upper carbon side frames being careful to observe the correct direction. The bearings are installed from the inside of the frames. The outside of the frames have the countersunk holes. If the bearing fit is tight, wrap a small piece of 240 grit wet/dry sandpaper around the main shaft or a 3/8" wooden dowel and very carefully remove a small amount of material at a time from the inside of the bearing hole. Carefully apply a small amount of thick cyanoacrylate glue to bond the bearing in place.



#HC6001-2 Right Upper Carbon Side Frame

#HI3205 Servo Mount Tabs x 2



Step 5 Rudder Servo & Right Upper Frame

If using the optional front rudder mount kit, install the rudder servo in the right carbon upper frame using four M2.3x10 Phillips self tapping screws and secured using two servo mount tabs. Position the servo output towards the front of the helicopter. Notice that the servo is positioned from the inside the frame with the screws inserted from the face of the carbon frame.

The right side frame contains only the lower rudder servo opening and can be identified by the counter sunk hole above the main gear.

Step 6 Elevator Servo & Left Upper Frame

Install the main shaft bearing block or the double bearing block (depending on your helicopter) using two M3x8 socket cap screws with M3 flat washers. Install the clutchbell assembly and lower bearing blocks with five M3x8 socket cap screws and M3 flat washers. Temporarily install one M3x8 socket cap screw into the rearmost hole for positioning only. Install the 26mm threaded hex spacer as shown using one M3x8 socket cap screw and M3 flat washer. Do not use any threadlock until the main shaft has been installed and the gear mesh has been set.

Position the elevator assembly with the axle pressed through the left side frame.

26mm Threaded Hex Spacer

HC6001-1 Left Upper Carbon Side Frame

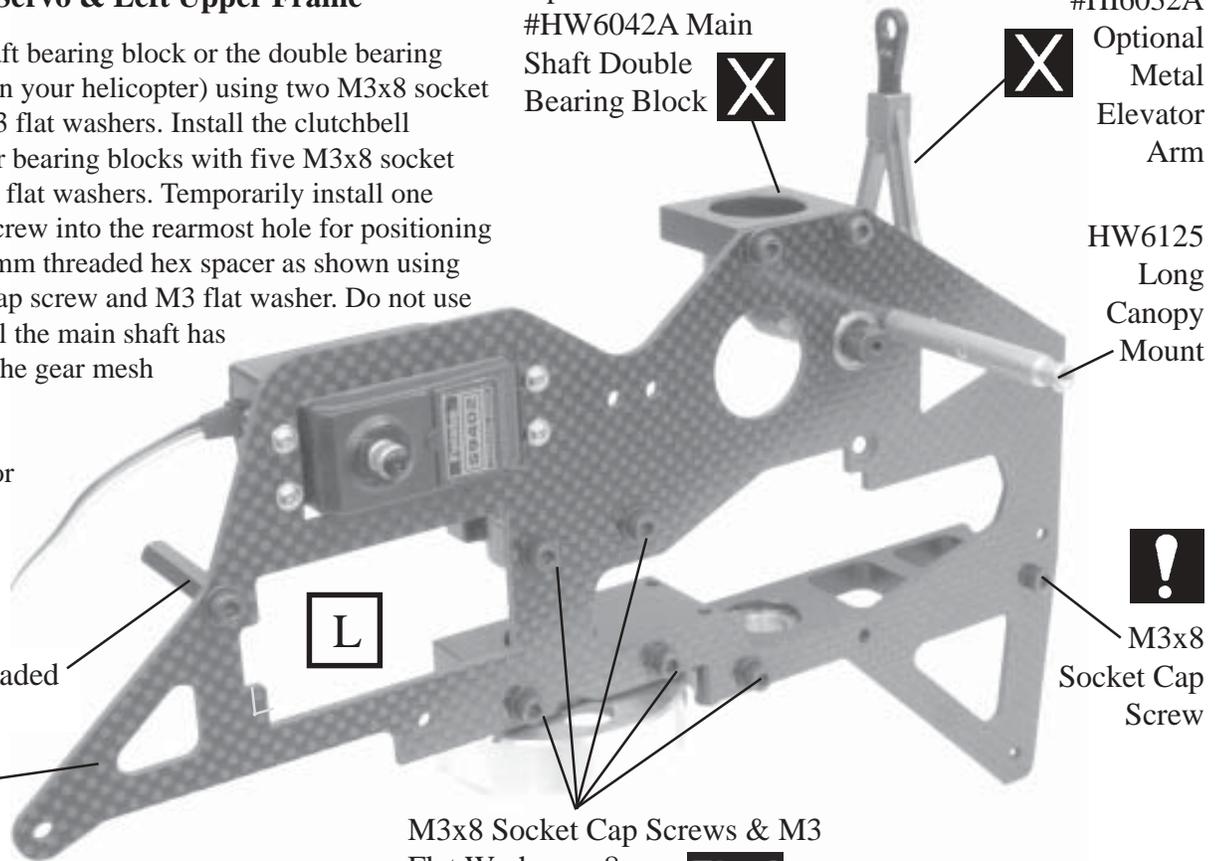
Optional #HW6042A Main Shaft Double Bearing Block

#HI6032A Optional Metal Elevator Arm

HW6125 Long Canopy Mount

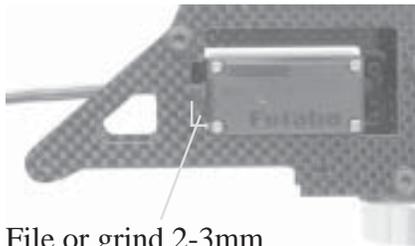
M3x8 Socket Cap Screw

M3x8 Socket Cap Screws & M3 Flat Washers x 8
Tip 1
(no threadlock now!)



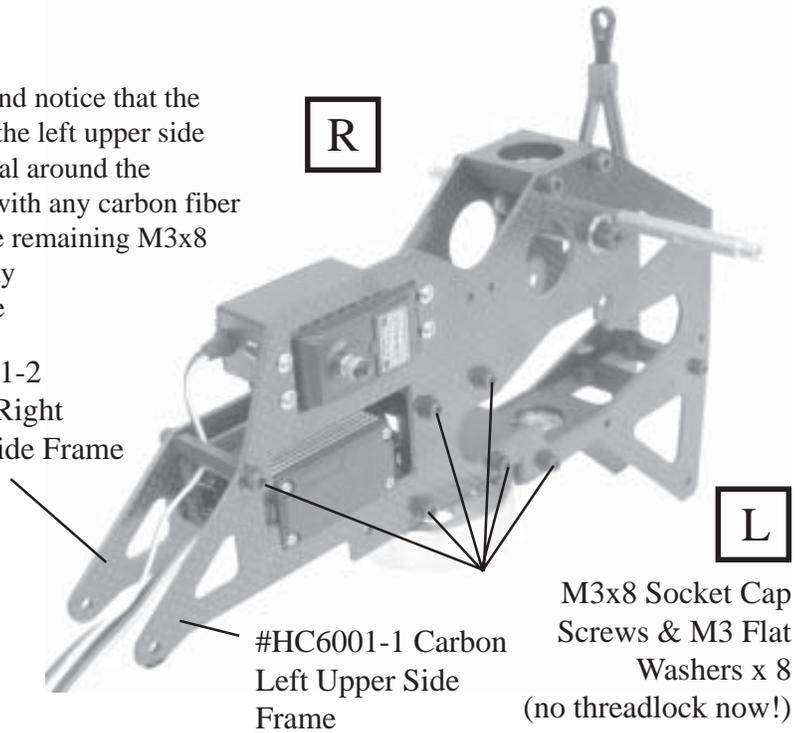
Step 7 Upper Frame Assembly

Align the right upper side frame to match the left and notice that the bottom of the rudder servo lead insulator may contact the left upper side frame. If this is the case, file or grind 2-3mm of material around the interference. Remember to use a mask when working with any carbon fiber material. Match the side frames together and install the remaining M3x8 socket cap screws with M3 flat washers. Do not use any threadlock until after the main shaft is installed and the gear mesh has been set.



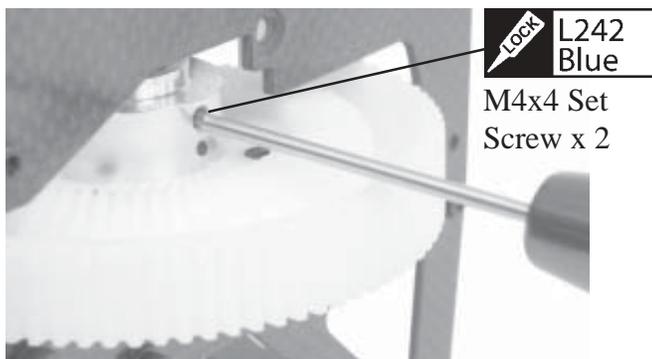
File or grind 2-3mm of material here.

#HC6001-2
Carbon Right
Upper Side Frame



#HC6001-1 Carbon
Left Upper Side
Frame

M3x8 Socket Cap
Screws & M3 Flat
Washers x 8
(no threadlock now!)



Lock L242
Blue

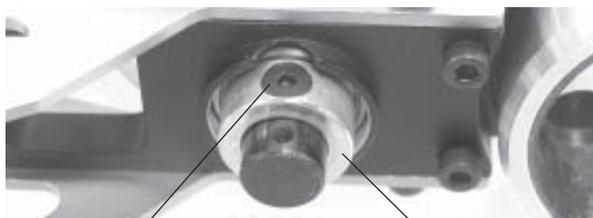
M4x4 Set
Screw x 2

Step 8 Main Shaft & Gear Assembly

Slide the main shaft through the upper bearing block, the main gear assembly, the spacer and finally through the lower bearing block assembly. Look carefully through the two open M4 threaded holes in the top hub and align with the hole in the main shaft. Insert and press the M3x15 steel pin through the hub and roughly center it in the main shaft. Using a permanent marker, mark both holes that will lock the pin in place. Insert the M4x4 set screws in each side and tighten them equally, using L242 Blue threadlock. These do not need to be torqued down.

Step 9 Bottom Main Shaft Collar

Depending on if you have a regular Predator or SE or Max kit, then assemble the bottom collar with your particular parts. For regular kits, install the bottom collar with the step towards the bearing and install two M3x6 flat head socket screws using L242 threadlock.



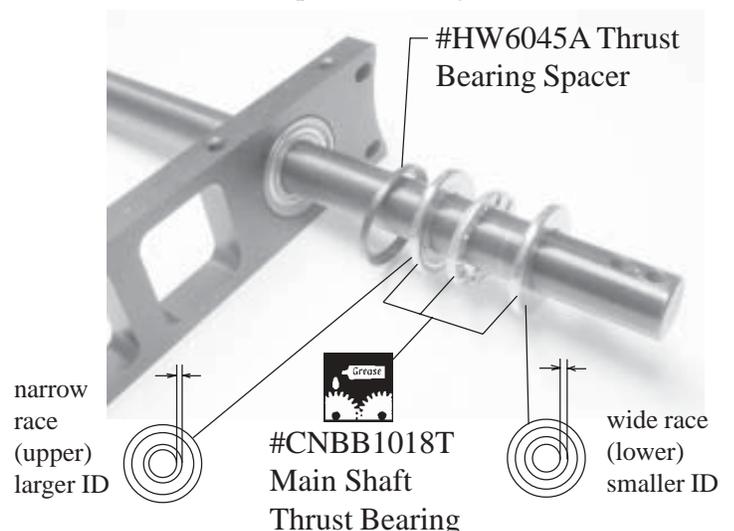
Lock L242
Blue

#HW6054 Bottom Collar &
M3x6 Flat Head Screws x 2



Offset step
towards
bearing.

Customers with the SE or Max kits, install the lower thrust bearing, slide the flat side of the thrust bearing spacer against the bearing, followed by the larger ID race, apply grease to the ball race and and finally the smaller ID race. Slide the bottom collar with the flat side towards the thrust bearing and insert two M3x6 flat head cap screws using L242 Blue threadlock.



#HW6045A Thrust
Bearing Spacer

narrow
race
(upper)
larger ID

Grease
#CNBB1018T
Main Shaft
Thrust Bearing

wide race
(lower)
smaller ID

Step 10 Mast Stopper

If not already done, remove and apply L242 Blue threadlock to the upper main shaft bearing block screws and the forwardmost screw on the lower bearing block and tighten in place.

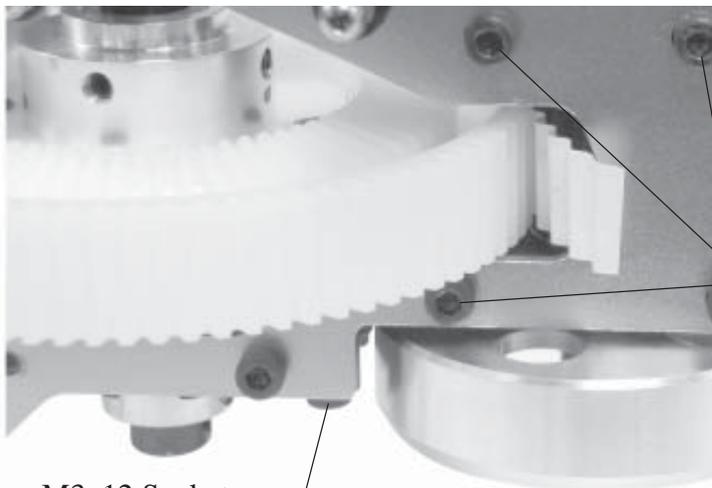
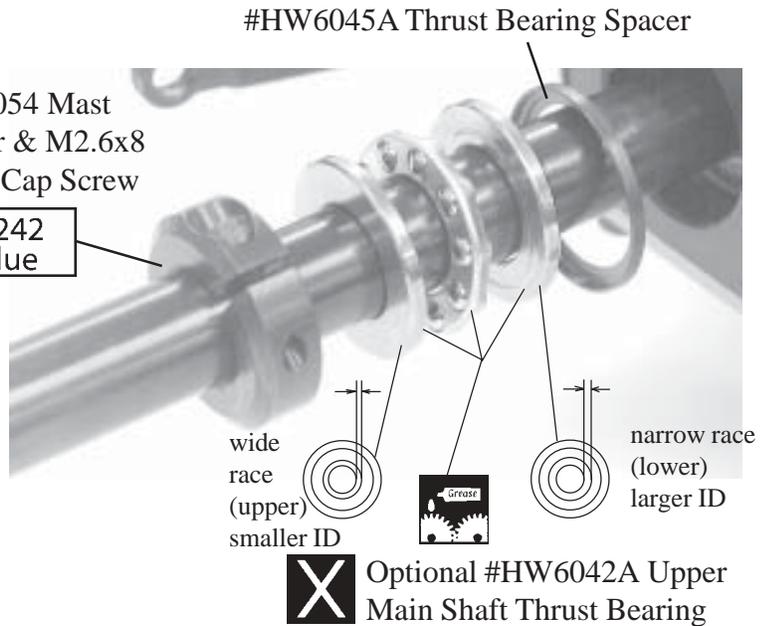
Customers using the optional upper thrust bearing kit, slide the flat side of the thrust bearing spacer against the bearing, followed by the larger ID race, apply grease to the ball race and and finally the smaller ID race. Start the M2.6x8 socket cap screw into the mast stopper.

Slide the mast stopper onto the main shaft, ensure the raised lip is towards the bearing. Pull up on the main shaft to remove any vertical play, press the mast stopper down and tighten in place using L242 Blue threadlock.

#HW6054 Mast Stopper & M2.6x8 Socket Cap Screw

 L242 Blue

Tip 1



M3x12 Socket Cap Screws x 2

 L242 Blue **Tip 1**

Step 11 Main Gear & Clutchbell Gear Mesh

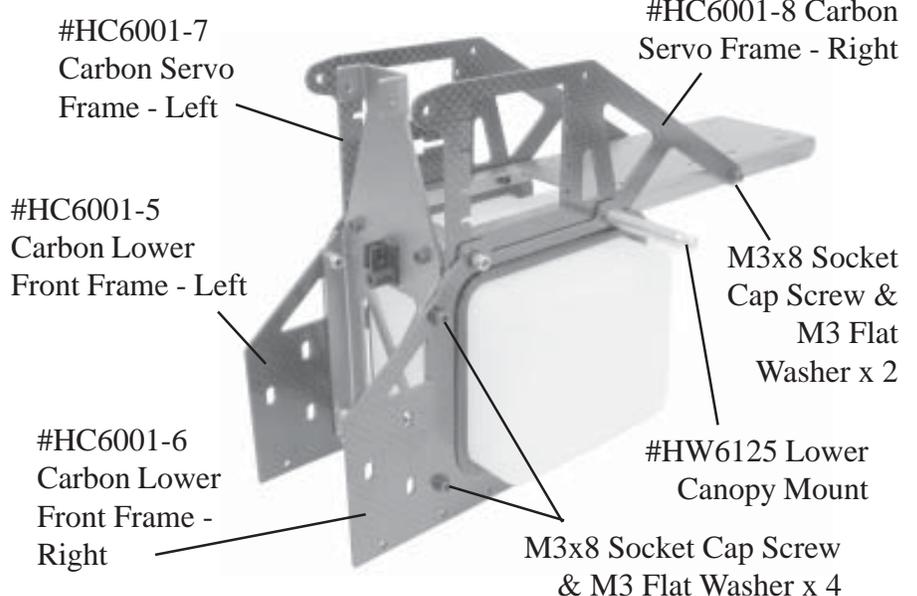
Loosen the eight M3x8 socket cap screws and the two M3x12 socket cap screws between the upper and lower bearing block assemblies. Cut a strip of regular copy paper 12mm x 50mm and thread between the main gear and the clutchbell gear. Press the clutch bell towards the main gear and tighten up the eight bolts. Proper gear mesh is achieved when the paper strip will pass between the gears without ripping or damaging the paper strip, but no looser.

One at a time, remove each of the M3x8 and M3x12 socket cap screws, apply L242 Blue threadlock and tighten in place. After completion, you should still be able to thread the paper strip through the gears. If not, repeat this procedure.

Step 12 Lower Front Frame Assembly

Following the instructions in your regular manual, assemble the front lower frames essentially identical to how the aluminum frames are built.

Transfer the fuel tank insulators and notice that the right front lower frame has the larger hole for the fuel tank. Insert two M3x8 socket cap screws into the forward holes in the servo frames and secure using two M3 locknuts from the underside of the battery tray.

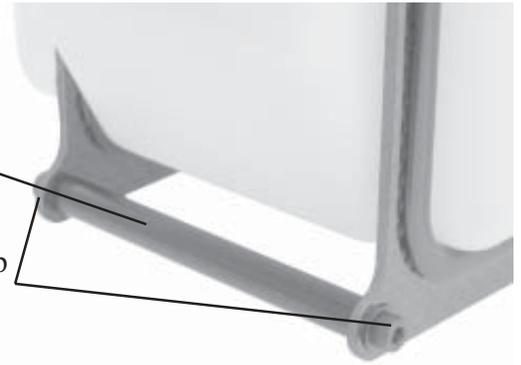


Step 13 Front Frame Spacer

Install the 64mm fuel tank spacer at the front lower corner of the front lower frames using two M3x8 socket cap screws and M3 flat washers. Do not use any threadlock until after the upper frames are installed.

#HC6001-11
Machined Fuel
Tank Spacer
64mm long

M3x8 Socket Cap
Screw & M3 Flat
Washer x 2

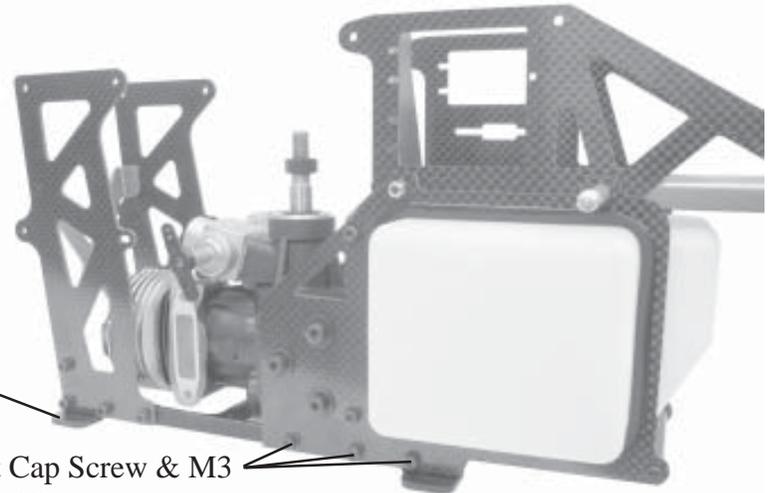


Step 14 Lower Frame Assembly

Install the engine with the motor mount into the front lower side frames using the original M4x10 socket cap screws and M4 flat washers. Leave these loose for now. Install the front and rear frame assemblies onto the machined bottom plate using M3x8 socket cap screws and M3 flat washers. Do not use any threadlock at this time until after the upper frames are installed.

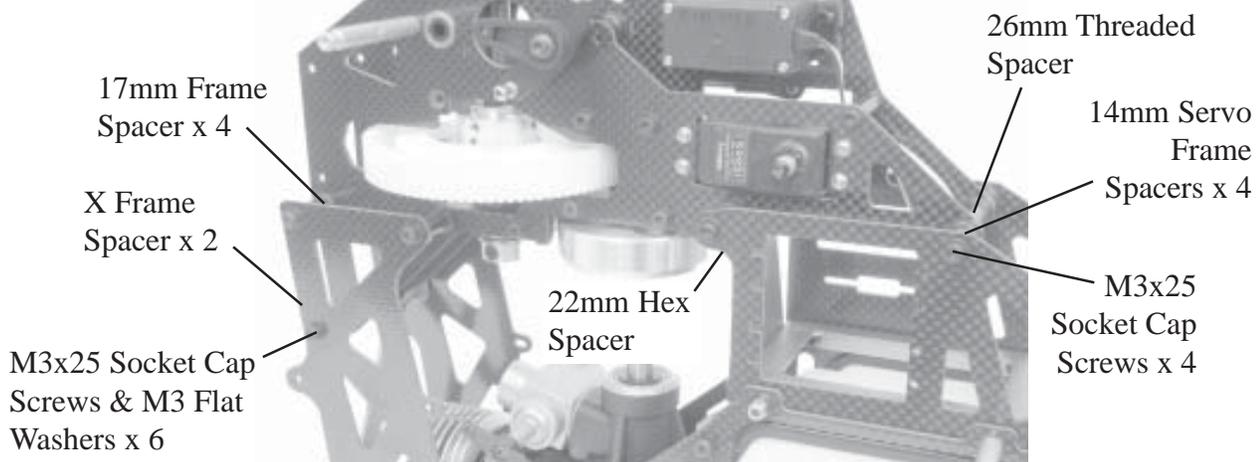
#HC6001-3
Machined Bottom
Frame

M3x8 Socket Cap Screw & M3
Flat Washer x 12



Step 15 Upper and Lower Frame Assembly

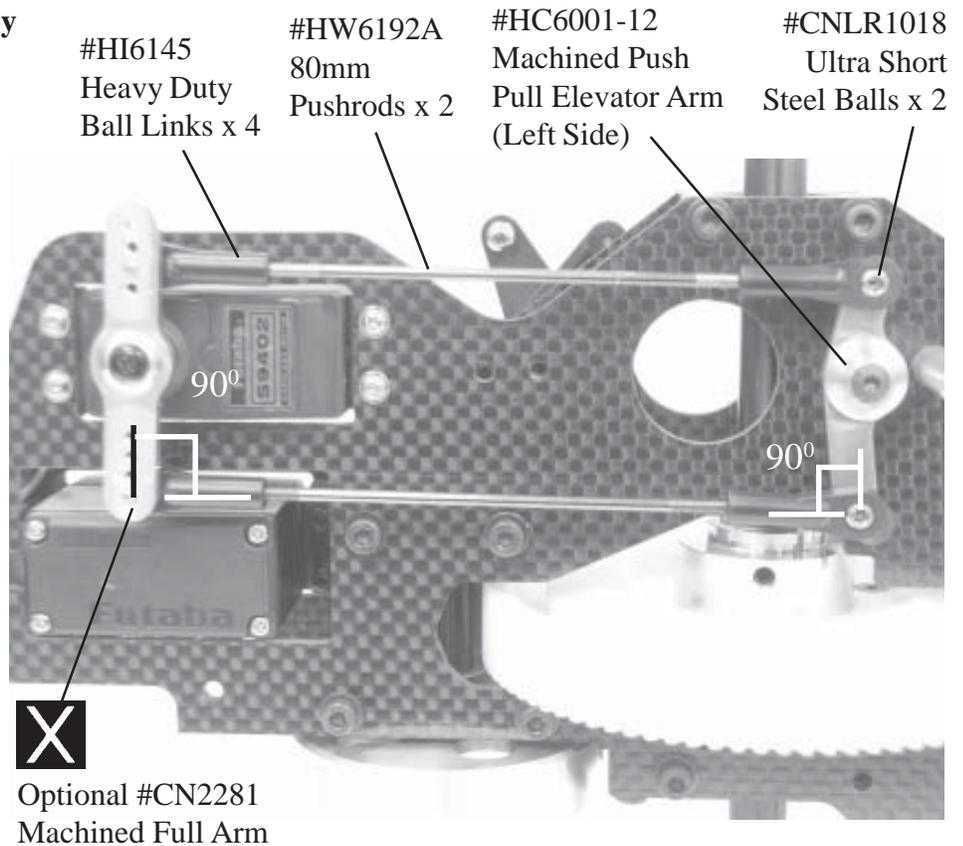
Position the upper and lower frame assemblies, aligning the starter shaft in the clutch bell to the torrington bearing in the clutch. While holding this in place, insert the M3x25 socket cap screws on both sides through the servo frames, the lower rear frames and position the appropriate standoffs and thread in place. Do not use any threadlock yet.



Up to this point we have not used threadlock on any of the fasteners. Take the time now to align the clutch to the clutchbell as accurately as possible. Once the clutch is parallel to the clutchbell both fore-aft and left-right, test by slowly turning the cooling fan. Watch as the clutch turns to make sure that it does not turn the clutchbell at any point. All the fasteners should be tightened by this point, both the frame spacers and the M3x8 socket cap screws to attach the lower frames to the landing gear frame. Start and remove each of the frame spacer bolts one at a time, apply L242 Blue threadlock and tighten in place. After completion, repeat the test to verify that the clutch is still in perfect alignment. Remember to threadlock the M4 engine bolts also.

Step 16 Elevator Push Pull Assembly

Press the machined elevator arm (this is different from upgrade #CN2294) onto the elevator axle. Using a 'C' clamp, gently press the arm in place and secure using one M3x10 button head screw. Make sure the longer arm is positioned downwards. Install two ultra short steel balls onto the elevator arm using L242 Blue threadlock. Assemble two pushrods measuring ~107mm center to center. Rotate one ball link to match the steel ball as the links only install in one direction. Install two more ultra short steel balls on to the servo horn using two M2 hex nuts to secure in place using L242 Blue threadlock. The steel balls should be positioned 14mm on top and 20mm on the bottom from the center of the servo. Install the elevator servo horn when all the elevator trims and sub-trims are centered.

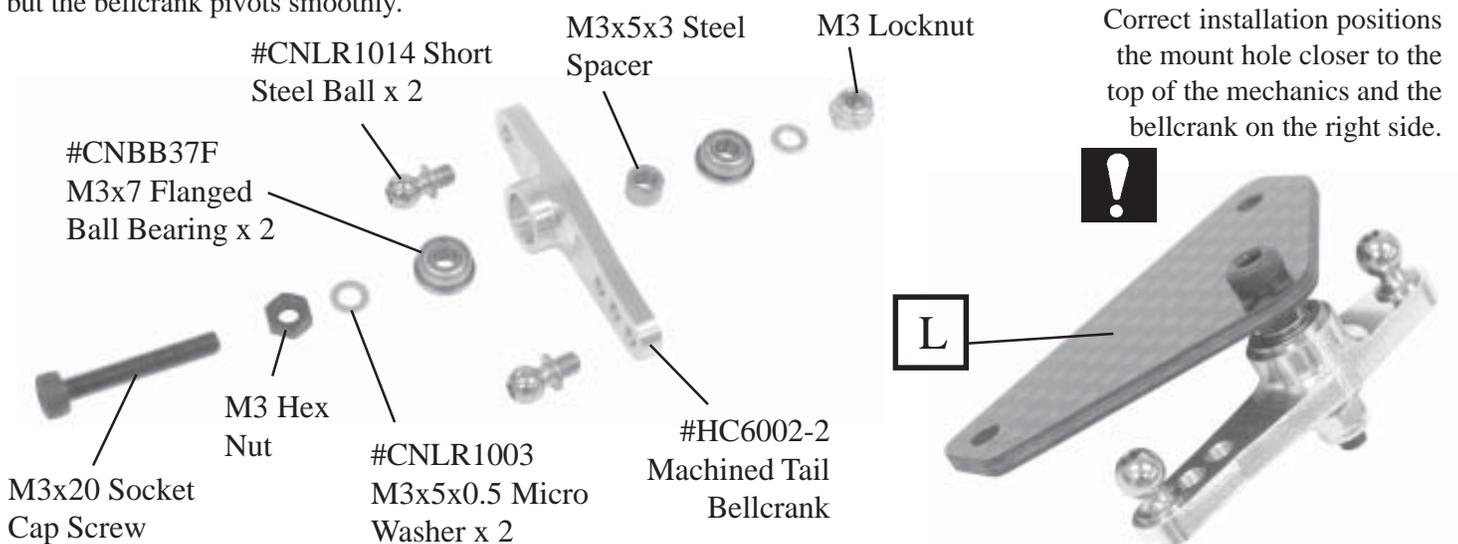


Step 17 Remaining Assembly

The remainder of the Predator assembly can be completed using the original helicopter instruction manual. If you have purchased the #HC6002 Front Rudder Servo Mount Kit then follow along with the next steps to install the new carbon tail pushrods and the mixing bellcrank.

Step 18 Front Rudder Bellcrank Assembly

The tail bellcrank needs a M3x7 flanged bearing pressed into both sides. This is a tight and should be installed using a small press. Insert one bearing from one side then insert the M3x5x3 steel spacer, followed by the second ball bearing. Insert two short steel balls into both ends of the bellcrank (on the side with the boss), using L242 Blue threadlock. Looking at the carbon rudder mount, insert one M3x20 socket cap screw through the left side (as shown) and thread the M3 hex nut and tighten against the mount using L242 Blue threadlock. Slide one M3x5x0.5 micro washer, the bellcrank assembly, one more M3x5x0.5 micro washer and secure using one M3 locknut. Tighten the locknut until there is no axial movement but the bellcrank pivots smoothly.



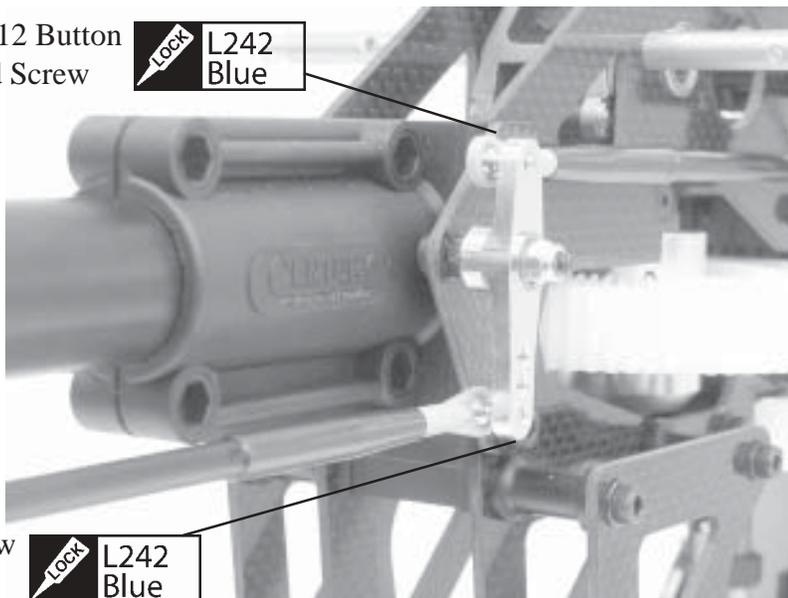
Step 19 Tail Bellcrank Mount

Align the tail bellcrank mount overlapping the holes for the tail transmission and notice that the M3x20 socket cap screw does touch the tail transmission. Some slight grinding is necessary on the transmission or the screw head to avoid stressing the mount.

Install the mount using one M3x12 button head cap screw inserted into the top hole and one M3x10 socket cap screw with M3 flat washer into the bottom hole using L242 Blue threadlock.

M3x12 Button
Head Screw

 L242
Blue



M3x10 Socket Cap Screw
& M3 Flat Washer

 L242
Blue

Step 20 Rudder Pushrod Setup

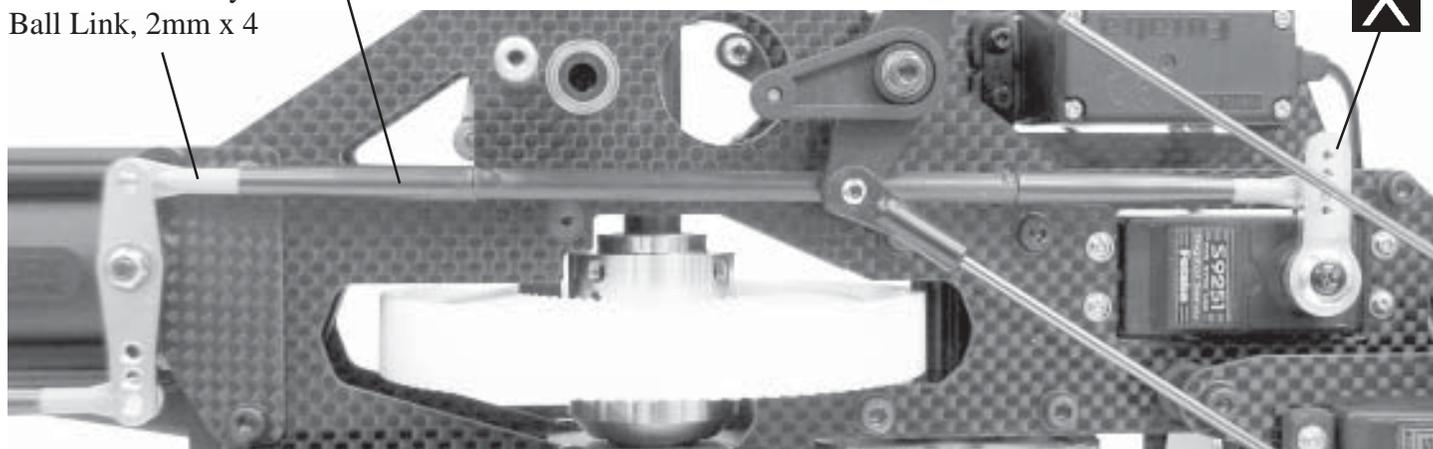
Reposition if necessary the steel ball on the rudder servo horn at a position of 13mm from the center of the servo. This will create a 1 to 1 relationship between the rudder servo and the input on the tail bellcrank. Center the sub and regular trims for the rudder and press the servo horn onto the servo, securing with the servo screw. The final distance for the front carbon pushrod is ~188mm center to center. Measure, cut and bond the machined pushrod ends to achieve this distance.

Similarly, bond one machined end of the rear carbon pushrod and attach to the tail bellcrank. Slide on one or two of the tail pushrod support guides and position them on the tail boom. Align the carbon pushrod to the tail bellcrank, measure, cut and bond the machined pushrod end with ball link to achieve the 5° degrees (roughly center the pitch plate between the tail gear box and the tail rotor hub) of tail rotor blade pitch.

#HW6065 Machined
Pushrod End x 4

Optional #CN2278
Machined Servo Arm

CNLR1000S Grey
Ball Link, 2mm x 4



Predator Carbon Replacement Parts

HC6001-1	Carbon Upper Side Frame Left
HC6001-2	Carbon Upper Side Frame Right
HC6001-3	Machined Bottom Plate
HC6001-4	Carbon Lower Rear Side Frame
HC6001-5	Carbon Lower Front Side Frame Left
HC6001-6	Carbon Lower Front Side Frame Right
HC6001-7	Carbon Servo Frame Left
HC6001-8	Carbon Servo Frame Right
HC6001-11	Machined Fuel Tank Spacer
HC6001-12	Machined Push Pull Elevator Arm (Left Side)

HC6002-1
HC6002-2

Carbon Rudder Bellcrank Mount
Machined Tail Bellcrank - Purple

HI3205
HI6106
HI6145
HI6192A
HW6045A
HW6065
CNBB1018T
CNLR1000S
CNLR1014
CNLR1018

Servo Mount Tabs (10)
Tail Pushrod Guides (2)
Heavy Duty Ball Links
Lower Linkage Set (80mm Pushrods)
Main Shaft Bearing Block w/Thrust Bearing
Carbon Pushrod w/ End Fittings
Main Shaft Thrust Bearing
2mm Ball Links - Grey (10)
Short Steel Balls M3
Ultra Short Steel Balls M2 (2)

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