Vigor

Designed by Curtis Youngblood in conjunction with JR Engineers

ASSEMBLY INSTRUCTIONS
STANDARD MIXING/BELT DRIVE

www.vigorpilot.com

"... My finest effort to date."
– Curtis Youngblood –
2-Time World Champion
11-Time U.S. Nationals Champion

VIGOR SPECIFICATIONS

Overall Length	55.25"	Tail Rotor Diameter	10.34"
Overall Height	18."	Gear Ratio	9.33:1:5.18
Main Rotor Blade Length (Main rotor blades not included)	680 – 710mm"	Gross Weight	10.5 lbs.

JR
HELI DIVISION

Vigor

INTRODUCTION

The Wait is over!

Congratulations on your purchase of the new JR Vigor helicopter kit. The Vigor, designed by 2-time World Champion, and 11-time US Nationals Champion Curtis Youngblood, in conjunction with JR engineers, has been in development for nearly 3 years and thousands of test flights, to bring you a model that sets the new standard for others to be judged.

Designed By a Champion To Be a Champion

The Vigor was designed by Curtis with rigidity, durability, and simplicity in mind. The Vigor's unique main frame design utilizes two straight frame plates and achieves its unmatched strength and rigidity through the use of internal "T" beam supports, rather than the engine. This results in a very simple, yet highly rigid, frame that eliminates any unwanted loads from being applied to the engine during flight.

In addition to the Vigor's unique frame, the cooling system has also been completely redesigned from the ground up by Curtis through countless hours of engine cooling fan efficiency testing. The end result is a cooling system that provides double the airflow of a conventional cooling system, with no increase in power consumption. This system will allow the engine to run more consistently, and at a more consistent temperature.

Building From a Proven Performer

As you will see when you begin to assemble your Vigor, many of the rotor head and tail rotor components are similar to the JR Ergo 60 components, but with many enhancements.

The Vigor's pre-assembled main rotor head has been completely redesigned from the ground up to provide increased stability and improved flight characteristics, while retaining a reliable and easy-to-maintain system.

Low Parts Count Means Quick Assembly

You will find that your Vigor will assemble very quickly due to its well-thought-out/straight-forward design, low parts count, and pre-assembled main rotor head, washout unit, and tail pitch slider assemblies. The building time for the Vigor usually takes only 10–12 hours from start to finish.

Team Tips

Throughout the sections of this instruction manual, you will find dozens of "Team Tips." These tips have been provided by Team JR's Curtis Youngblood and Len Sabato to guide you through the assembly of your Vigor with helpful tips and suggestions that will help you get the most from your new JR Vigor from the very start.

www.vigorpilot.com

For the latest, up-to-date information on the Vigor, visit the Vigor Web page at www.vigorpilot.com. vigorpilot.com will contain up-to-date information on new upgrade parts and radio programming tips, as well as many helpful tips and suggestions from Team JR's pilots to keep you on the cutting edge of Vigor developments and fine tuning.

WARNING

The radio controlled model helicopter contained in this kit is not a toy, but a sophisticated piece of equipment. This product is not recommended for use by children. Radio controlled models such as this are capable of causing both property damage and/or bodily harm to both the operator/assembler and/or spectator if not properly assembled and operated. Horizon Hobby Distributors assumes no liability for damage that could occur from the assembly and/or use/misuse of this product.

AMA INFORMATION

We strongly encourage all prospective and current R/C aircraft pilots to join the Academy of Model Aeronautics. The AMA is a non-profit organization that provides services to model aircraft pilots. As an AMA member, you will receive a monthly magazine entitled *Model Aviation*, as well as a liability insurance plan to cover against possible accident or injury. All AMA charter aircraft clubs require individuals to hold a current AMA sporting license prior to operation of their models. For further information, you can contact the AMA at:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
(317) 287-1256

PRE-ASSEMBLY INFORMATION

When first opening your Vigor kit, you will notice that all of the parts are packaged and numbered to coordinate with the assembly step numbers of this instruction manual.

All small hardware (nuts, bolts, washers, etc.) for each step are separated and packaged separately within the main parts bags. When beginning a section, you will need to open only the bag with the corresponding number to the section you are going to start. It is suggested that you place all of the hardware in an open container (e.g., coffee can) during assembly so as not to lose any of the small parts. It may also be helpful to familiarize yourself with the various sizes of screws, bolts, nuts, etc., as illustrated in the appropriate assembly section before you begin assembly. At the end of each assembly, in most cases, there should be no parts remaining.

Great care has been taken in filling the bags with the correct quantity of parts and hardware for each section. However, occasionally mistakes do happen. In the event that you find a parts shortage or are in need of technical assistance, please contact your local JR Heli Division parts dealer or contact the Horizon Service Center directly.

Horizon Service Center
4105 Fieldstone Road
Champaign, IL 61822
(217) 355-9511 (9am to 5pm CST)

JR HELI DIVISION

INDEX

VIGOR FEATURES

Frame:
- Unique frame design derives structural integrity without the engine
- Stiffness of frame is double to trip conventional designs — reduces vibration for improved gyro, engine & powertrain performance
- Motor mount acts as a jig for easy, goof-proof powertrain alignment
- Straight frame design with full length I-beams can't scissor like conventional "stacked" frames

Tail Rotor/Boom:
- Improved tail control arm offers more precise control, longer life
- Heavy-duty boom brace ends offer greater rigidity
- Extended sideframe boom mounts provide extremely stiff boom support
- Reliable belt-driven tail rotor

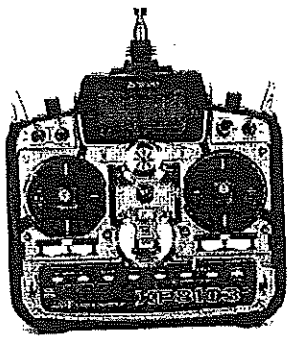
Rotor Head:
- Improved, ultra-true mounting clamp design
- Swashplate timing is pre-positioned at optimum setting
- Revised delta offset positioning offers improved forward flight stability and reduced boom strike potential
- New lightweight 25 gram paddle design is perfect for 3D or fun flying
- Flybar weights included

Drive Train/Cooling:
- High-efficiency cooling system increases airflow to double the normal amount
- Main shaft bearing spacing is 50% wider than conventional designs for superior rigidity
- Additional BB engine drive pinion gear support keeps power loads from being introduced to the engine
- New, larger 20 oz. fuel tank for extended flight times

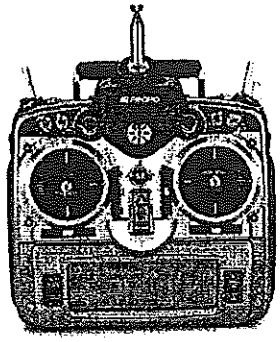
ITEMS REQUIRED TO COMPLETE THE JR VIGOR

1. RADIO SYSTEM REQUIREMENTS (NOT INCLUDED):

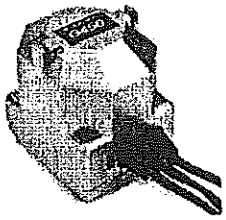
6-channel or greater R/C helicopter system with 5 servos, 1400mAh receiver battery and gyro.



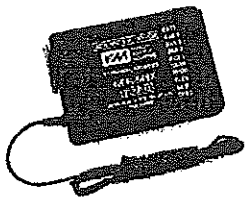
JR XP8103



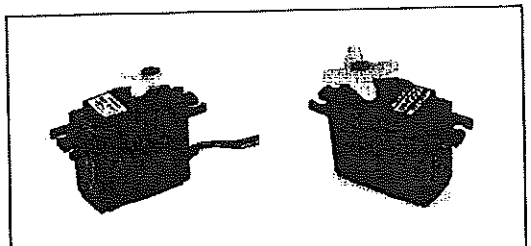
JR PCM10X



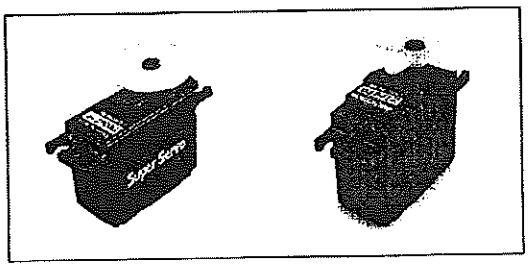
JR G450 Gyro



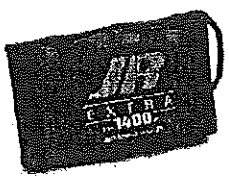
Receiver



JRPS8101 Ultra Precision OR JRPS8231 Ultra Precision Digital
Aileron, elevator, collective, throttle servos



2700G High Speed Super OR 8417 High Speed Digital
Tail rotor servos

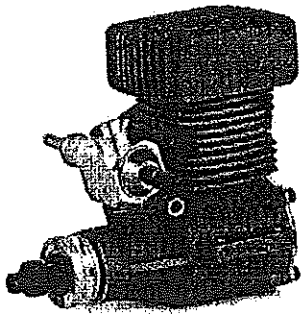


JRPB4340
1400mAh battery pack

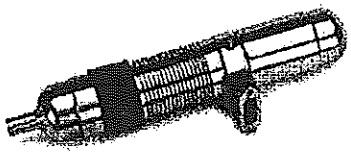
2. ENGINE REQUIREMENTS (NOT INCLUDED):

A .60 – .61 R/C helicopter engine is required.

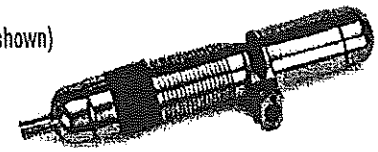
A special helicopter type muffler is also required.



(Webra .61P5 heli engine shown)



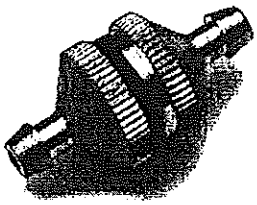
(KSJ520 (O.S.) shown)



(KSJ583 (YS) shown)

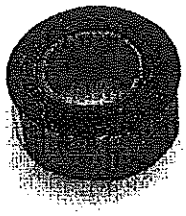
3. BUILDING SUPPLIES (NOT INCLUDED):

The following items are needed to complete the assembly of the JR Vigor:

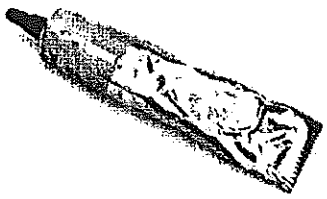


Fuel Filter

Medium Silicone Fuel Tubing (3 ft.)



Double Sided Servo Mounting Tape



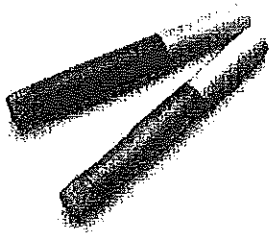
High Speed Grease

Nylon Wire Ties
(to secure radio wires)

Glow Plugs
(HAN3020)

Light Oil

Rubbing Alcohol



Red & Green Threadlock

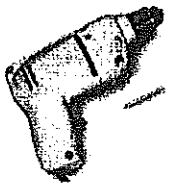
4. TOOLS NEEDED TO ASSEMBLE THE JR VIGOR (NOT INCLUDED):

Phillips Screwdriver

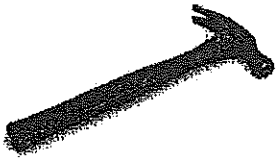
Nut Drivers: 5mm, 7mm

Needle Nose Pliers

Scissors



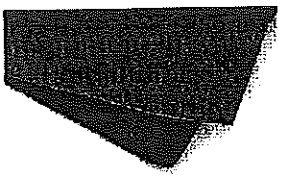
Drill and Drill Bits



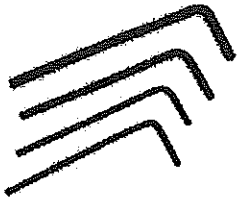
Small Hammer

Hobby Knife

Metric Ruler

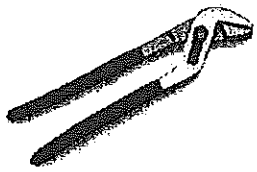


Sandpaper (80–100 Grit)



Allen Wrenches: 1.5, 2.0, 2.5, 3.0mm

JR Ball Link Sizing Tool
JRP60219
(Optional)

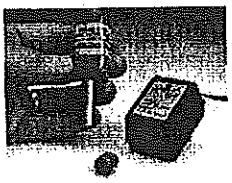


Adjustable Pliers

5. FIELD EQUIPMENT REQUIRED (NOT INCLUDED):

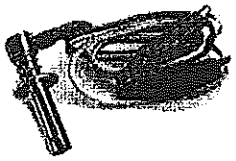
12 Volt Electric Starter

12 Volt Starting Battery



1.5 Volt Glow Plug Battery

OR



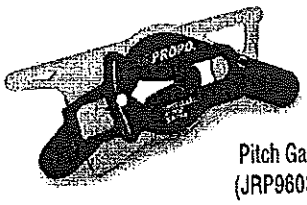
Remote Glow Plug Adaptor

Helicopter Fuel 15% –30%

Fuel Pump

Glow Plugs
(HAN3020)

Hex Starting Shaft
(JRP960090)



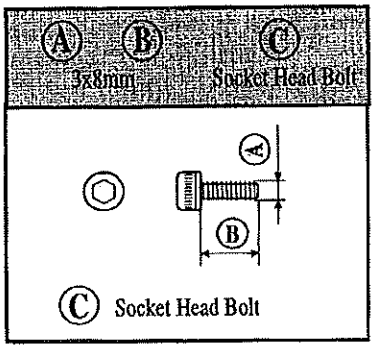
Pitch Gauge
(JRP960326)

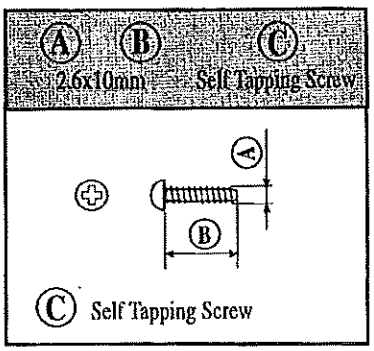
Ball Link Pliers
(RVO1005)

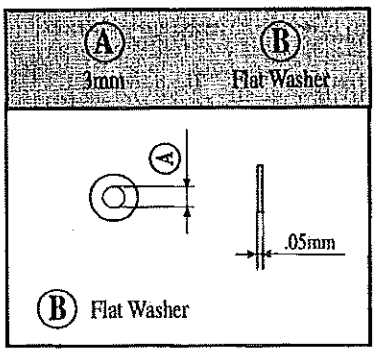
HARDWARE IDENTIFICATION

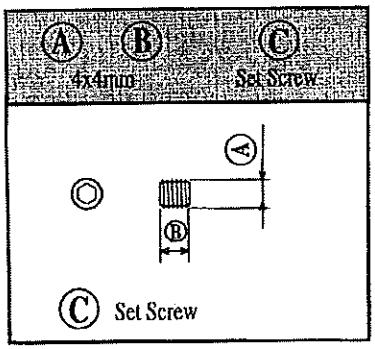
There are a variety of sizes and shapes of hardware included in this kit. Prior to assembly, please be careful to identify each screw by matching it to the full size screw outlines included in each step.

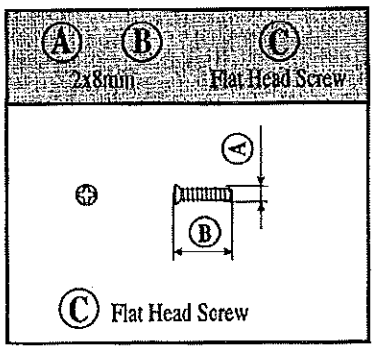
All of the hardware, screws, nuts, etc., contained in the Vigor kit are described in the following A, B, C manner:

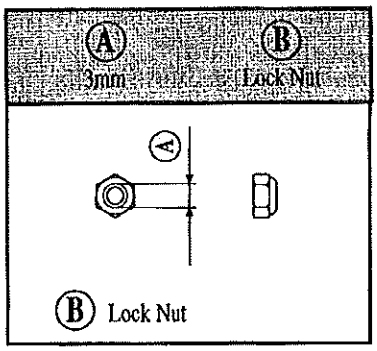


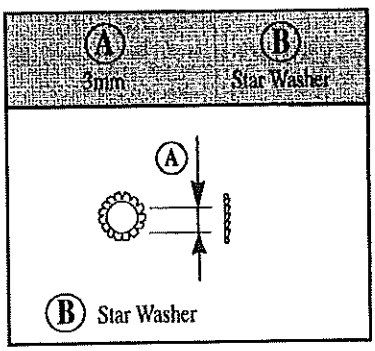


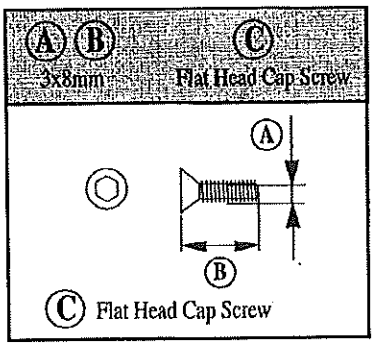


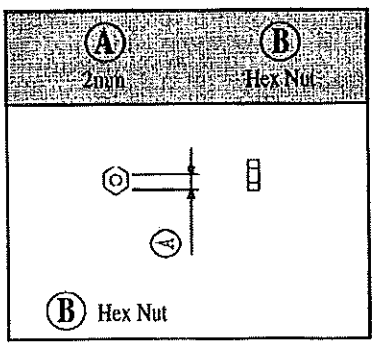












1-1 CLUTCH BELL/START SHAFT ASSEMBLY

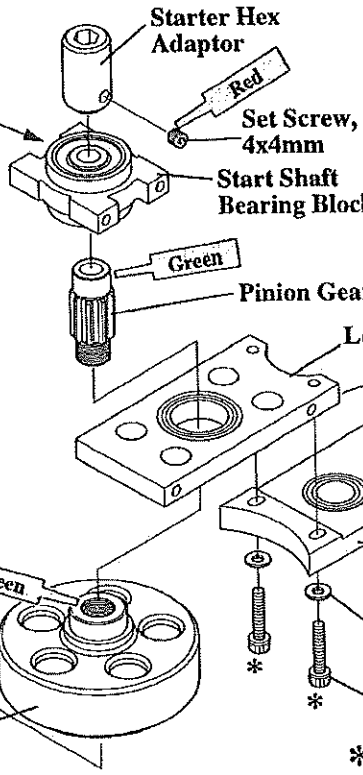
...2pcs
Socket Head Bolt, 3x14mm

.....1pc
Set Screw, 4x4mm

.....2pcs
Flat Washer, 3mm

Use Red & Green Threadlock

Note:
Be sure the bearing with the 5mm ID faces upward.



Assembly Order:
1. Attach ponion to clutch bell
2. Attach clutch bell to bearing block "A"
3. Attach start shaft bearing block to pinion
4. Assemble start shaft assembly
5. Attach bearing block "B"

Note:
Use Green Threadlock

TEAM TIP: Clean areas with rubbing alcohol to remov any residue before applying threadlock.

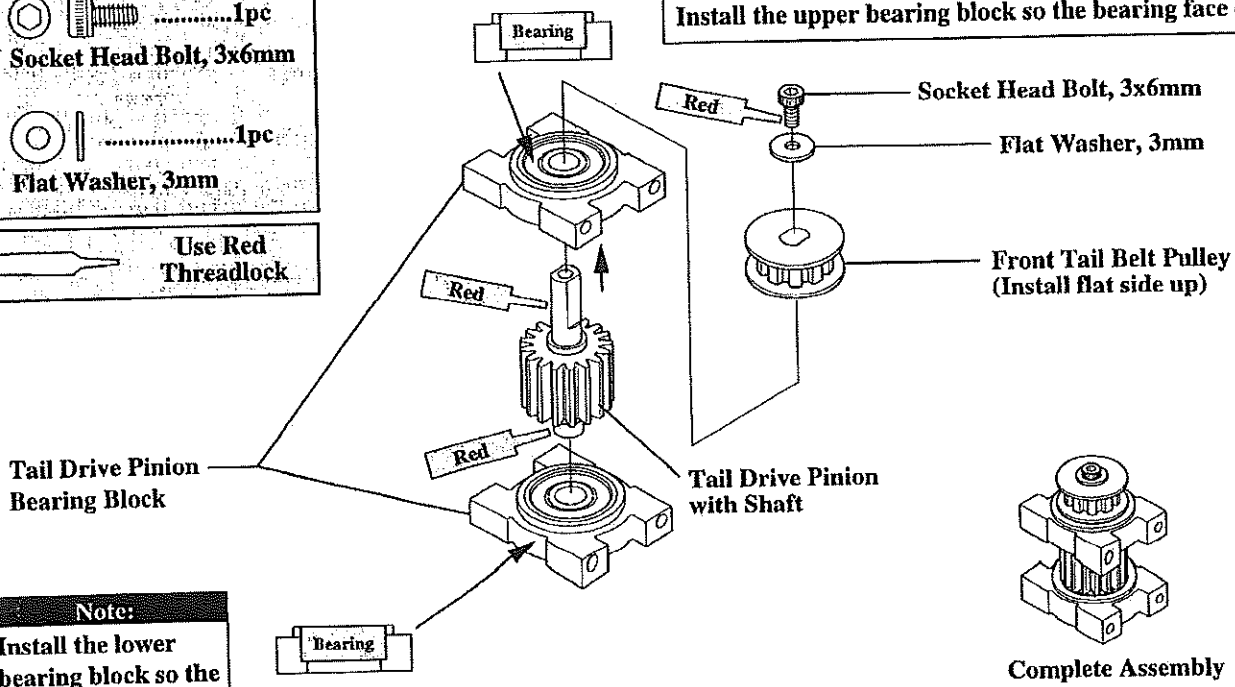
1-2 TAIL DRIVE PINION/ BEARING BLOCK ASSEMBLY

.....1pc
Socket Head Bolt, 3x6mm

.....1pc
Flat Washer, 3mm

Use Red Threadlock

Note:
Install the upper bearing block so the bearing face down.

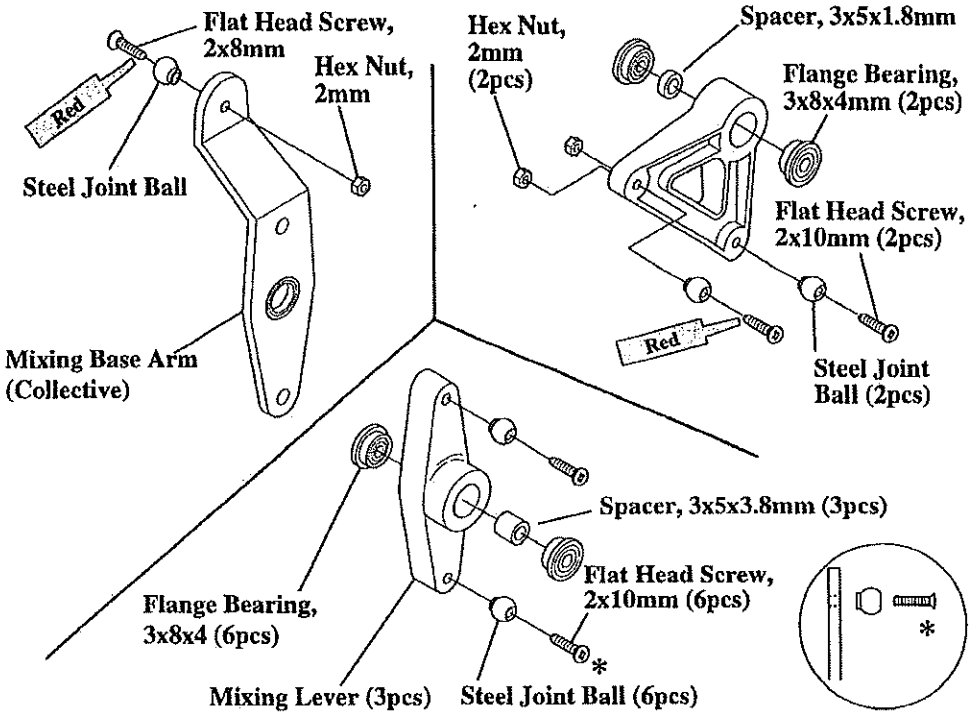


Note:
Install the lower bearing block so the bearing face is up.

1-3 CONTROL BALL INSTALLATION

- Flat Head Screw, 2x8mm 1pc
- Flat Head Screw, 2x10mm 8pcs
- Steel Joint Ball 9pcs
- Hex Nut, 2mm 3pcs
- Flange Bearing, 3x8x4mm 8pcs
- Spacer, 3x5x3.8mm 3pcs
- Spacer, 3x5x1.8mm 1pc

Use Red Threadlock

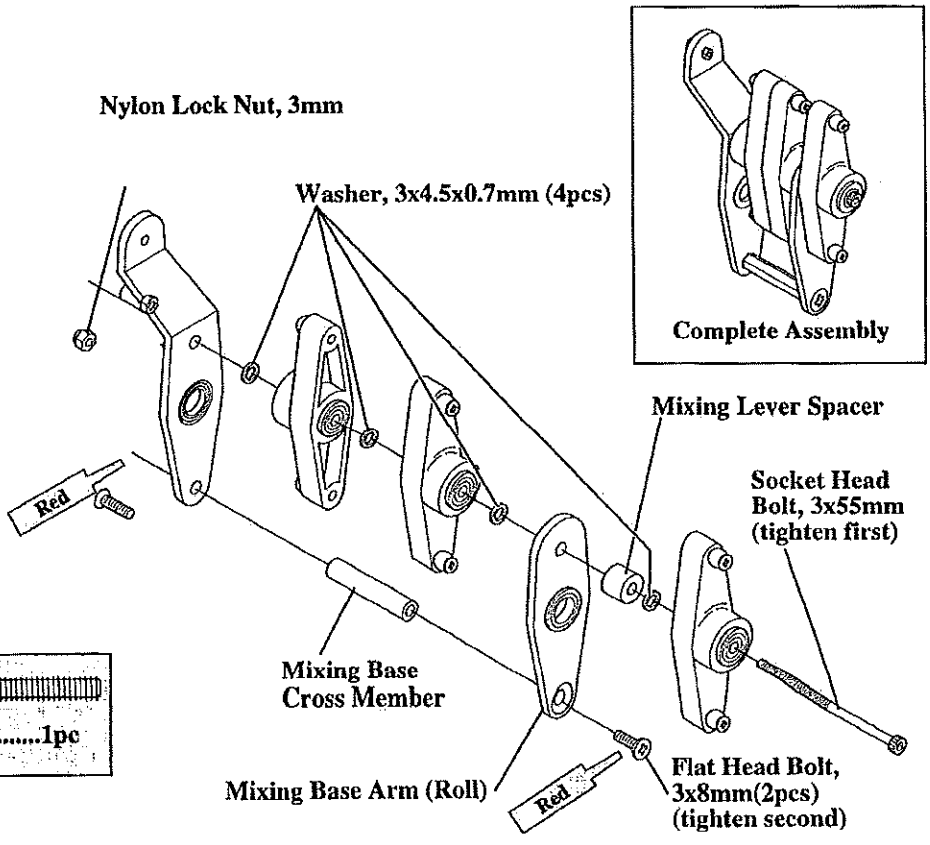


*** TEAM TIP:** *Apply a light drop of oil on the screws. This will allow them to thread into the plastic arms much easier.*

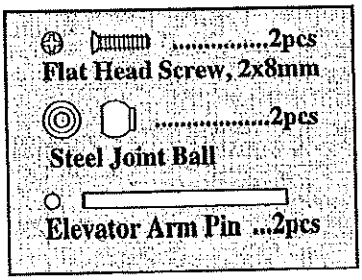
1-4 SERVO MIXING LEVER UNIT ASSEMBLY

- Flat Head Screw, 3x8mm 1pc
- Nylon Lock Nut, 3mm 1pc
- Washer, 3x4.5x0.7mm 1pc
- Mixing Lever Spacer 1pc
- Mixing Base Cross Member ..1pc
- Socket Head Bolt, 3x55mm 1pc

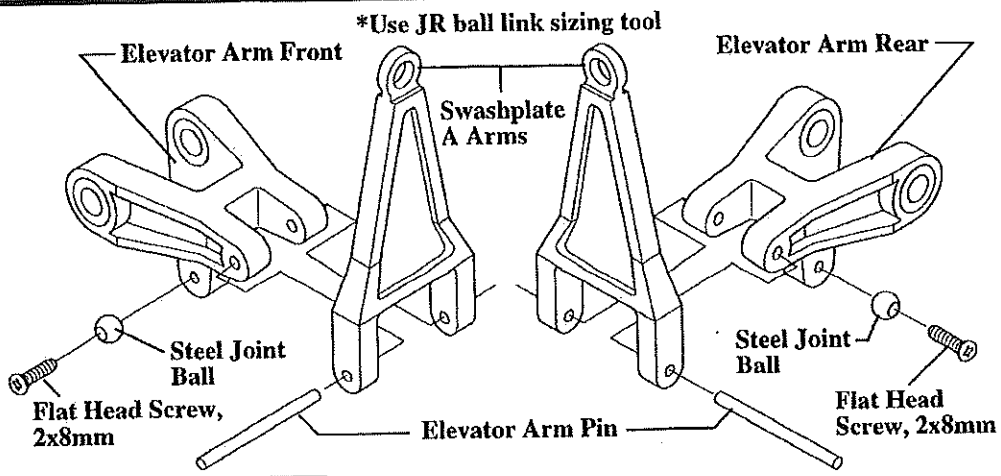
Use Red Threadlock



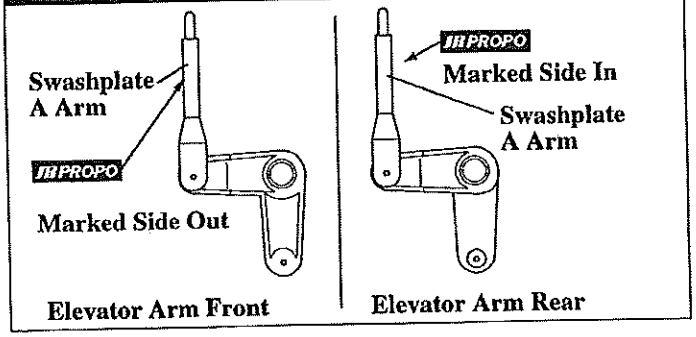
1-5 ELEVATOR ARM ASSEMBLY

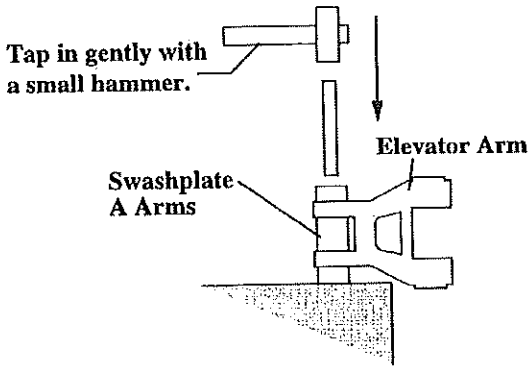


*Option: For smooth operation, pre-size the ball links with the JRball link sizing tool prior to attachment.

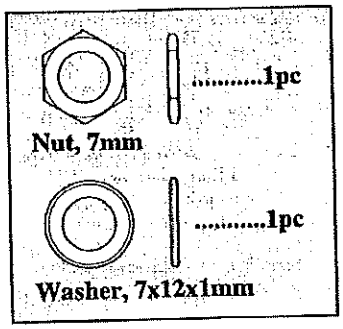


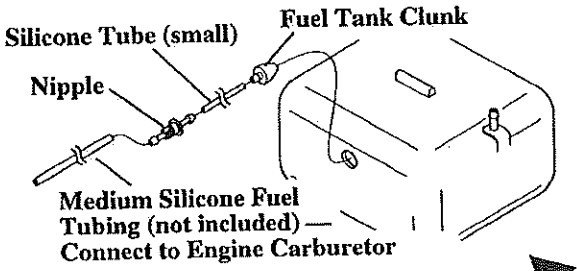
Caution: Be sure to note the correct installation of the Swashplate A Arm.



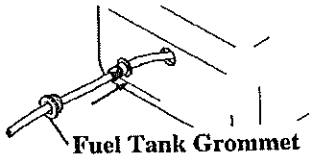


1-6 FUEL TANK ASSEMBLY

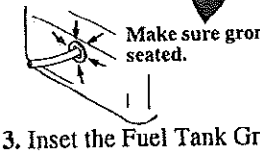




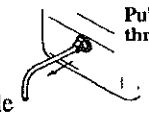
1. Cut the small silicone Fuel Tubing(included) to a length of 77mm. Next, connect the Fuel Tank Clunk, Nipple, and Medium Silicone fuel Tubing (not included) as shown above.



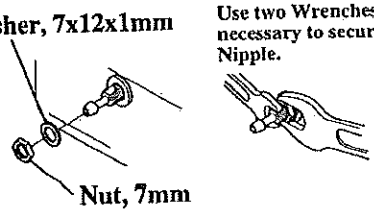
2. Insert the assembly into the Fuel Tank opening so that the Nipple is inside the tank. Next, slide the Fuel Tank Grommet over the medium Fuel Tubing.



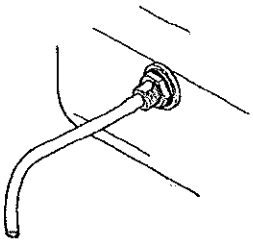
3. Inset the Fuel Tank Grommet into the Fuel Tank opening, making sure that it is fully seated.



4. Pull the medium Fuel Tubing out of the Fuel Tank unit the threads of the Fuel Tank Nipple are exposed.

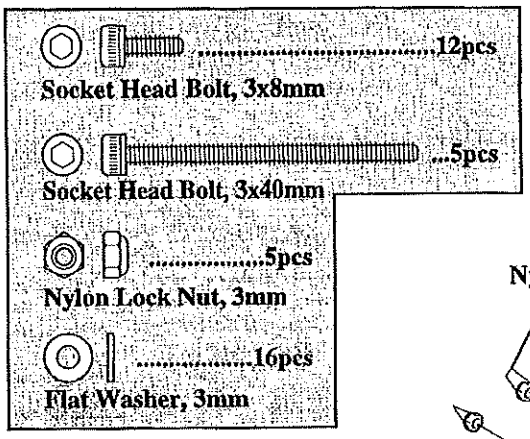


5. Remove the medium Silicone Fuel Tubing from the Nipple and secure the Nipple to the Fuel Tank using the 7x12x1mm Washer and 7mm Nut supplied. Be sure to secure this assembly firmly to avoid leakage.



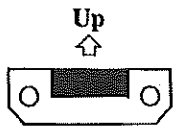
6.Complete Assembly

2-1 MAIN FRAME ASSEMBLY: BEARING BLOCK INSTALLATION

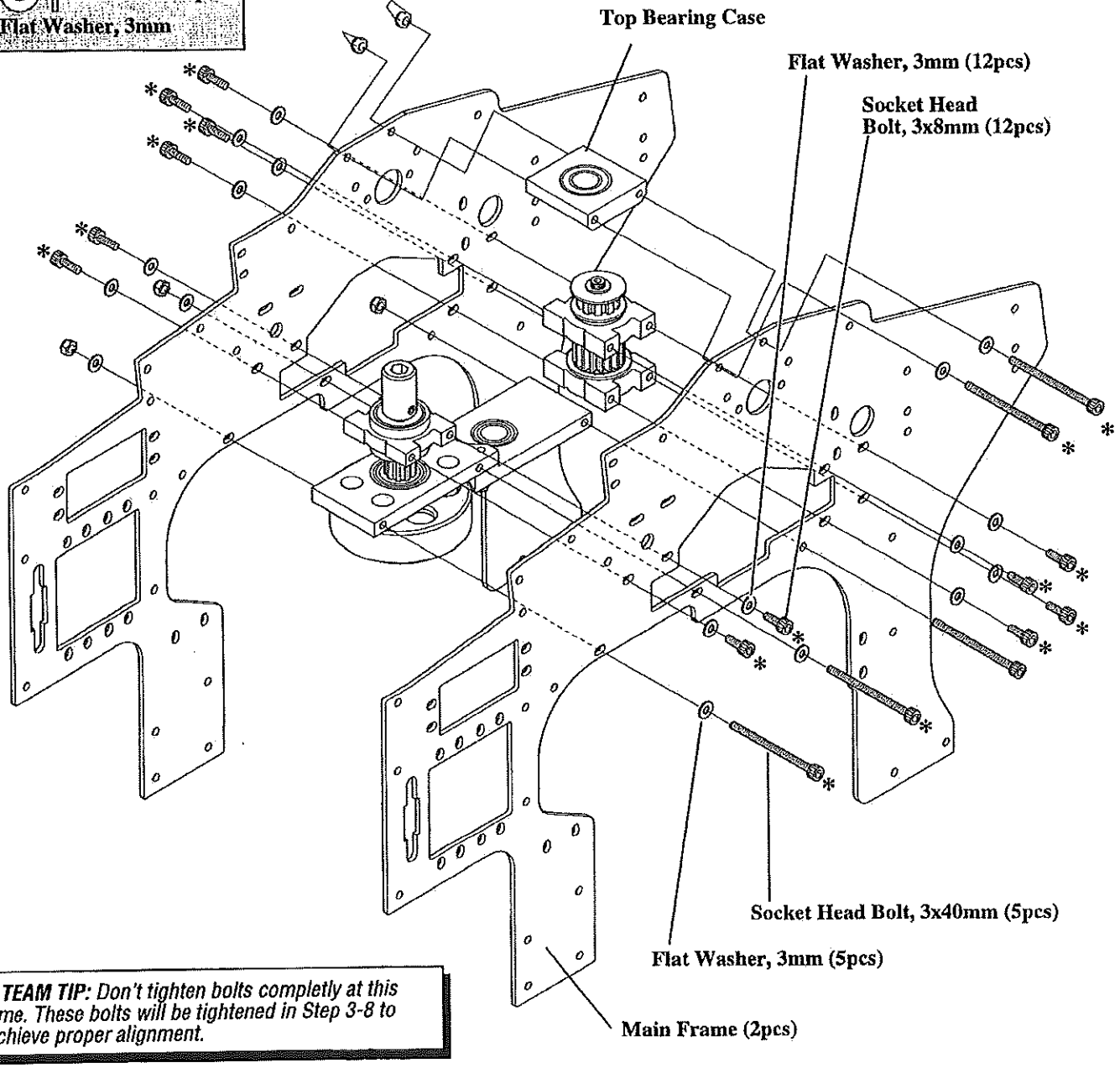


Note:

Positon so that bearing faces upward.



Top Bearing Case Direction

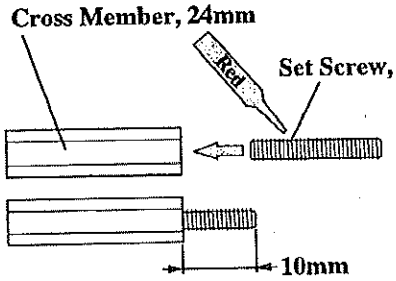


* ***TEAM TIP:*** *Don't tighten bolts completly at this time. These bolts will be tightened in Step 3-8 to achieve proper alignment.*

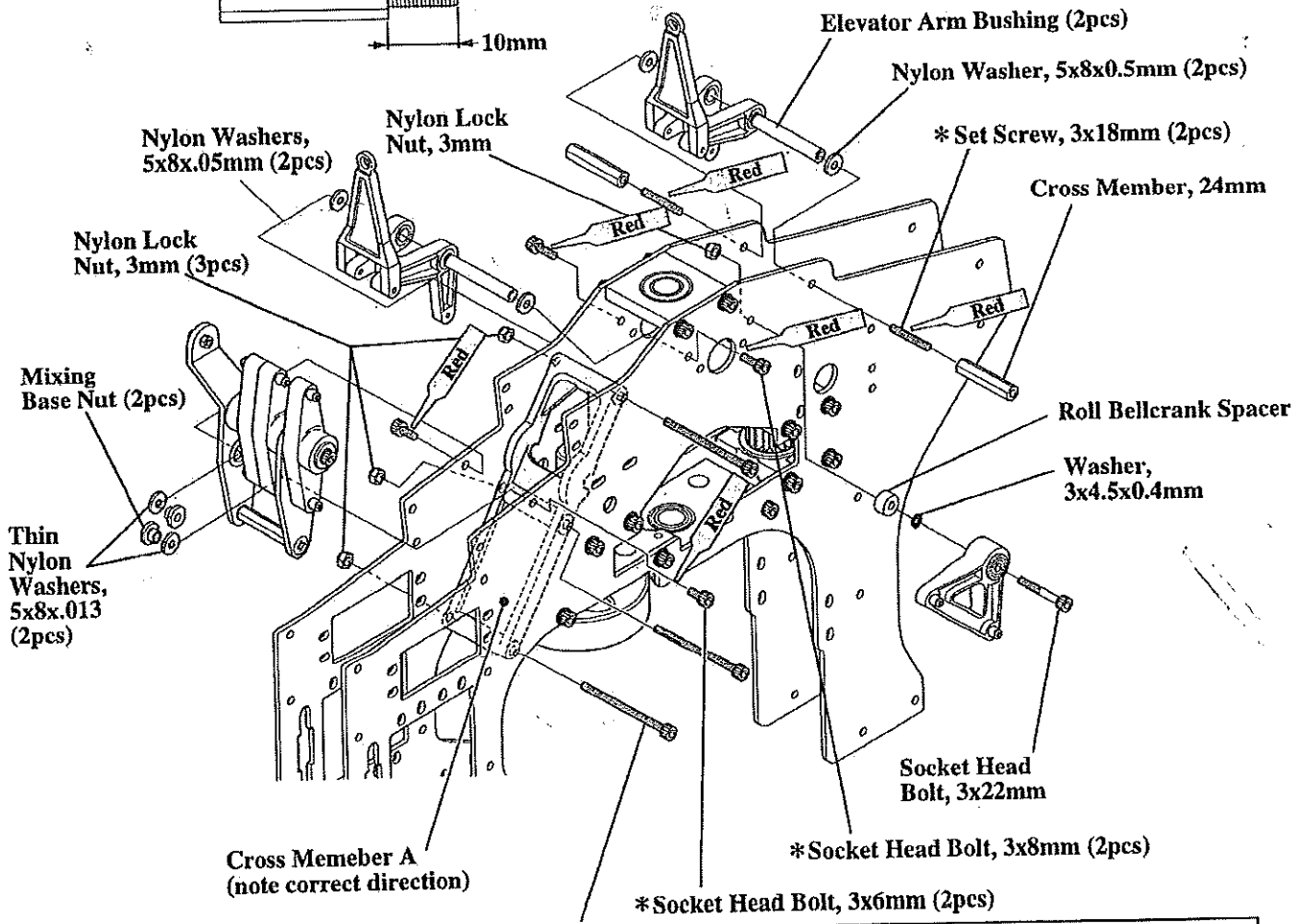
2-2 MAIN FRAME ASSEMBLY: CONTROL LEVER INSTALLATION

- .....2pcs — Socket Head Bolt, 3x6mm
- .....2pcs — Socket Head Bolt, 3x8mm
- .....1pc — Socket Head Bolt, 3x22mm
- Socket Head Bolt, 3x40mm 3pcs
- ....2pcs — Set Screw, 3x18mm
- .....4pcs — Nylon Lock Nut, 3mm
- .....4pcs — Nylon Washer, 5x8x0.5mm
- .....2pcs — Nylon Washer, 5x8x0.013mm
- .....1pc — Washer, 3x4.5x0.4mm
- .....1pc — Roll Bellcrank Spacer
- ....2pcs — Elevator Arm Bushing
- .....2pcs — Mixing Base Nut
- .....2pcs — Cross Member, 24mm

Use Red Threadlock



Note:
When installing the Cross Member A, be careful not to over tighten.



Optional

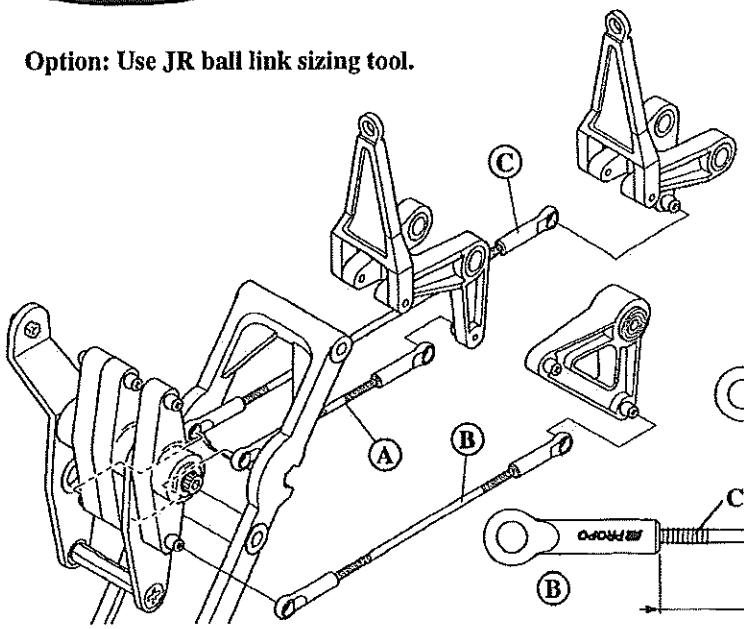
TEAM TIP: *If the side-to-side play is detected in the mixing base, insert two additional 5x8x.013 (thin) nylon washers to correct.*

*** TEAM TIP:** Don't tighten bolts completely at this time. These Bolts will be tightened in Step 3-8. Do not apply threadlock to bolts unless you will procede through Step 3-8 during this building session.*

Kim X3587

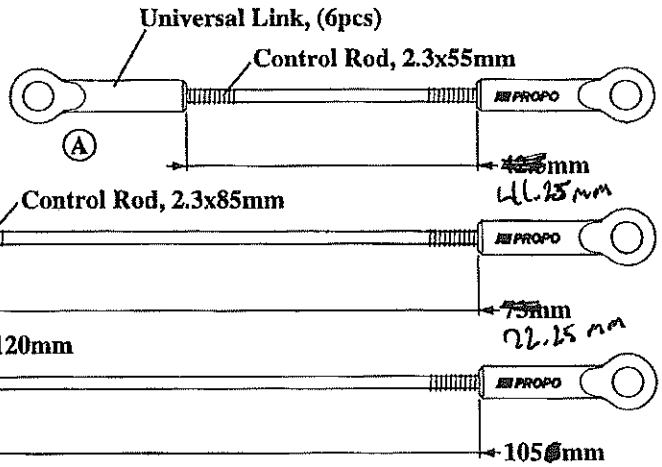
2-3 MAIN FRAME ASSEMBLY: CONTROL ROD ATTACHMENT

Option: Use JR ball link sizing tool.

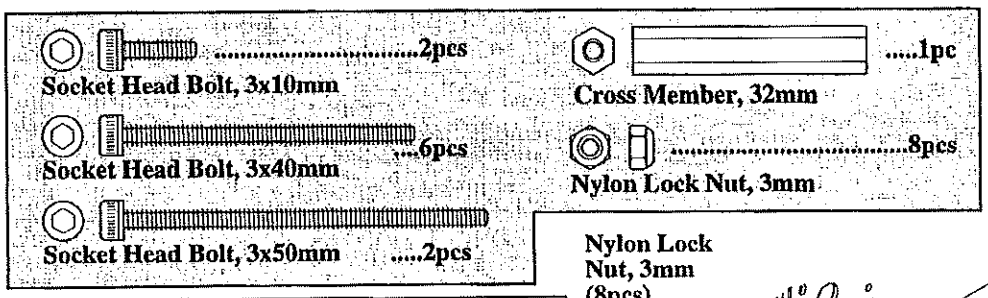


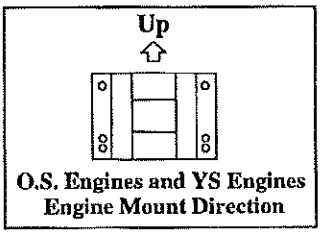
Note:

Please note that all Universal Links should be adjusted so that when attached to the Control Ball, the words "JR PROPO" are to the outside. Assemble and attach the Control Rods to the Mixing Levers/Control Arms as shown below.

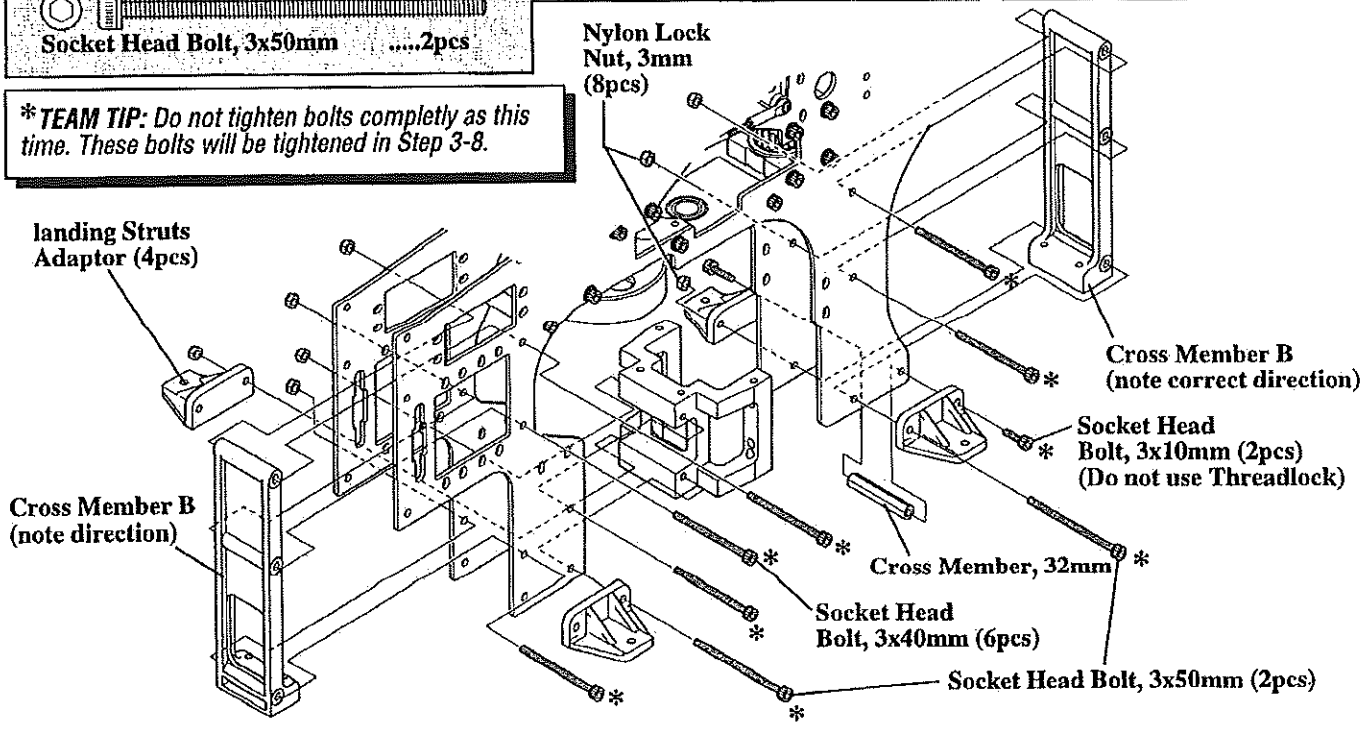


2-4 MAIN FRAME ASSEMBLY: ENGINE MOUNT CROSS MEMBER INSTALLATION

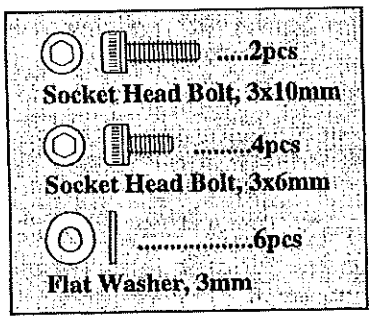




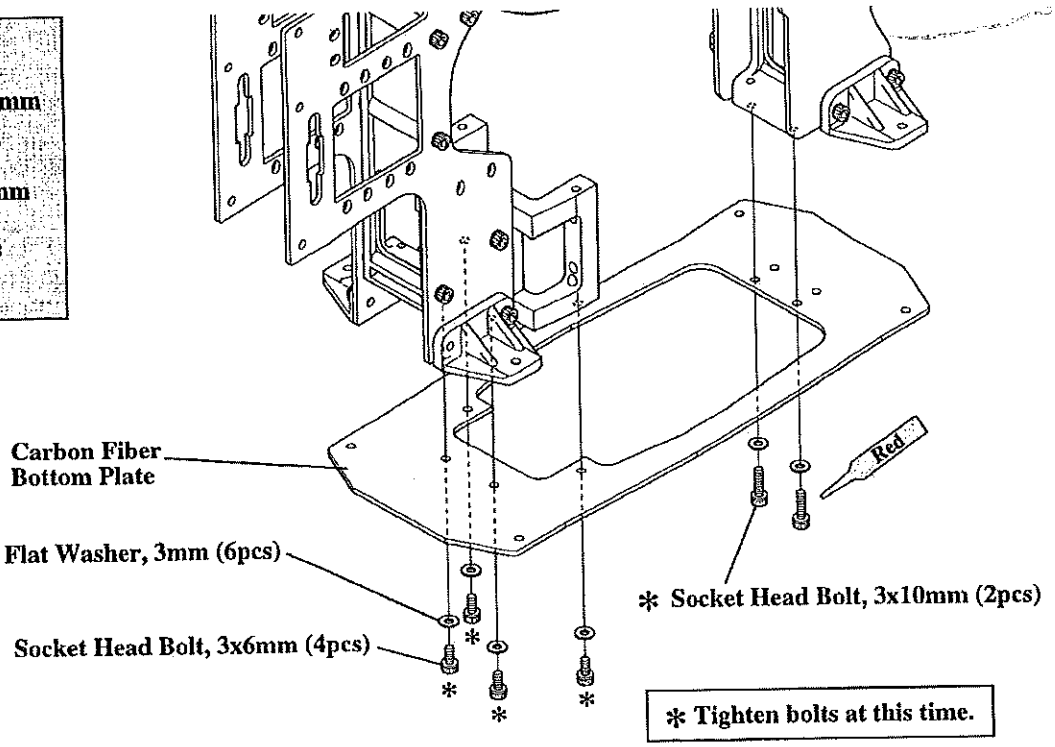
***TEAM TIP:** *Do not tighten bolts completly as this time. These bolts will be tightened in Step 3-8.*



2-5 MAIN FRAME ASSEMBLY: BOTTOM PLATE INSTALLATION

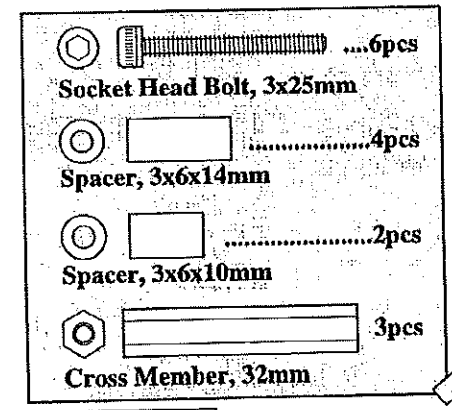


Use Red Threadlock

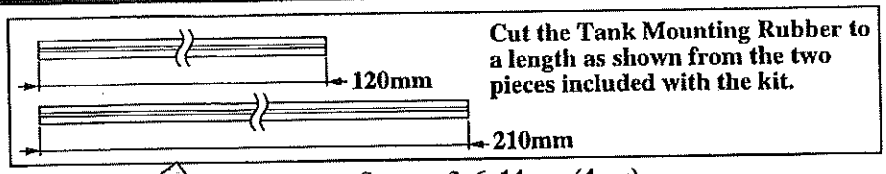


* Tighten bolts at this time.

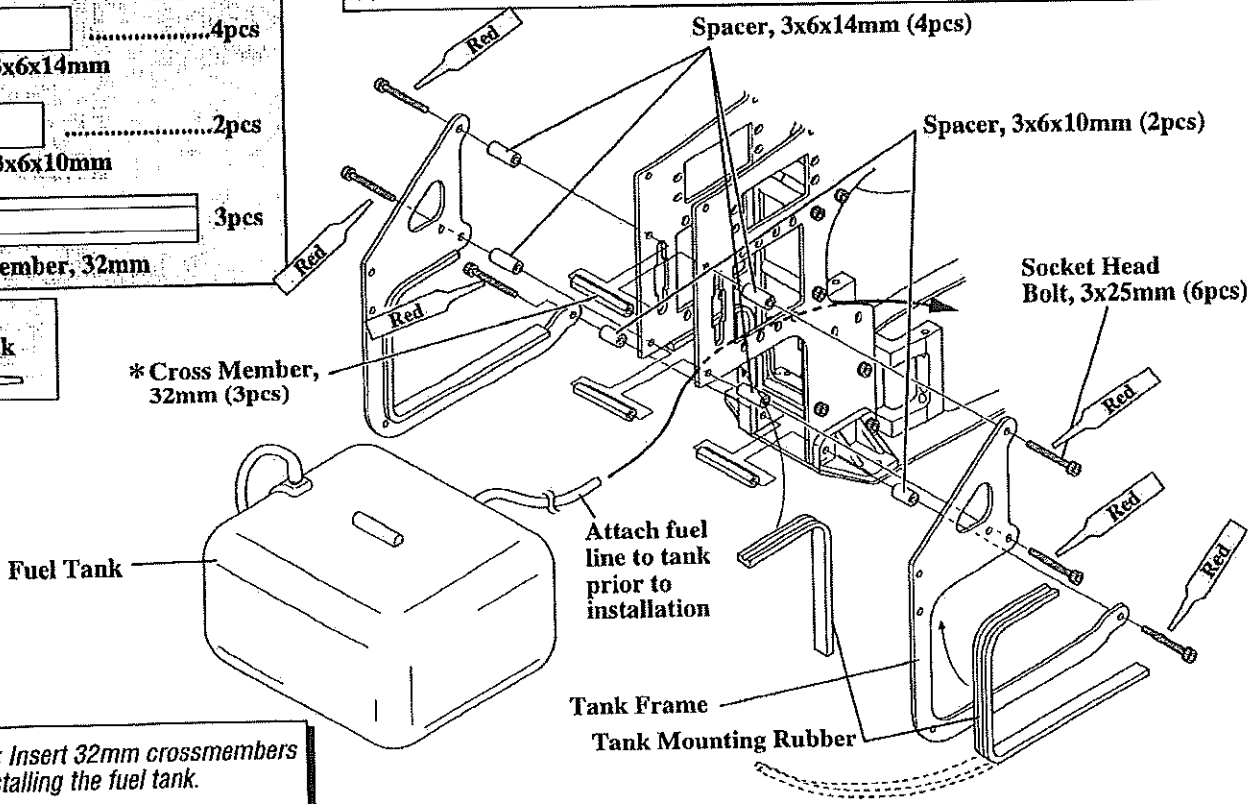
2-6 FUEL TANK INSTALLATION



Use Red Threadlock

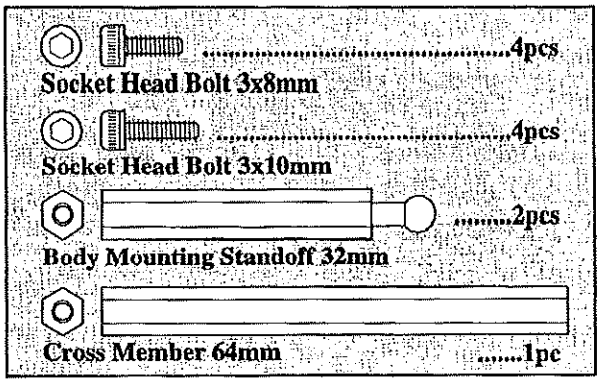


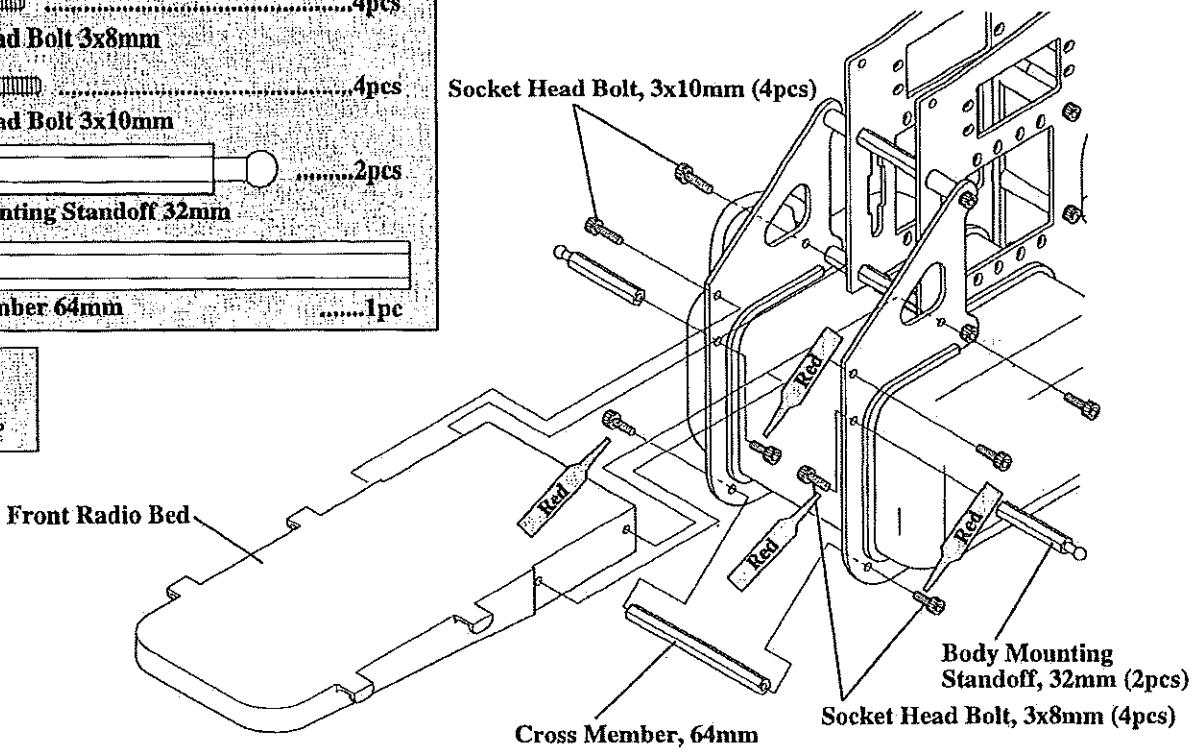
Cut the Tank Mounting Rubber to a length as shown from the two pieces included with the kit.



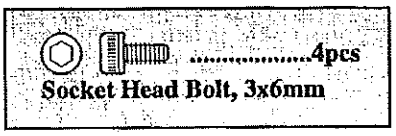
TEAM TIP: Insert 32mm crossmembers before installing the fuel tank.

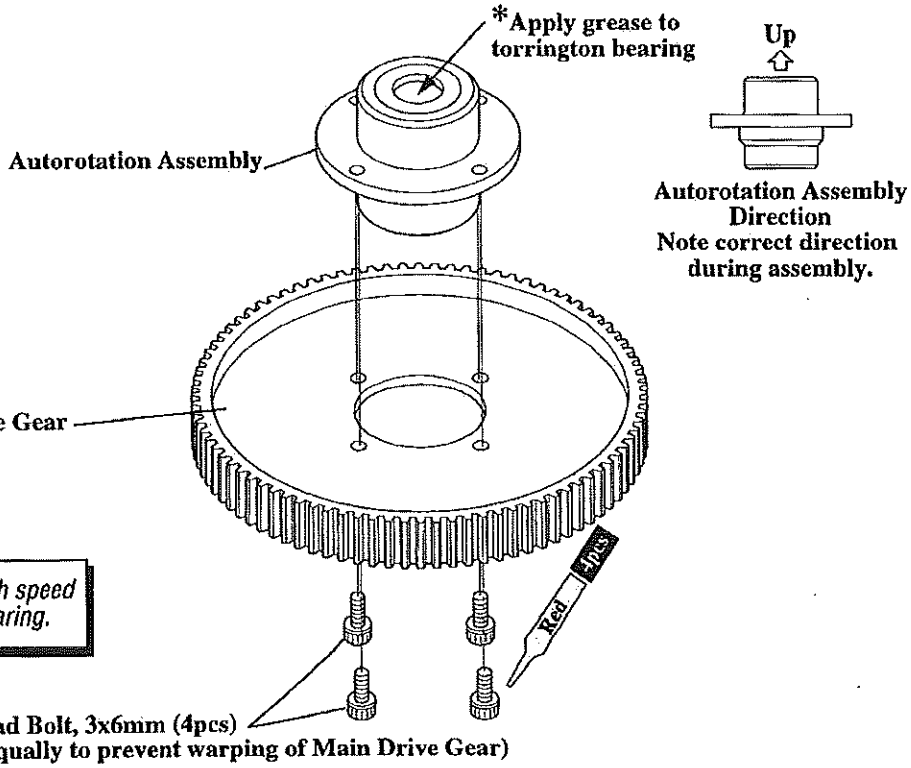
2-7 FRONT RADIO PLATE INSTALLATION





3-1 MAIN DRIVE GEAR/AUTOROTATION ASSEMBLY

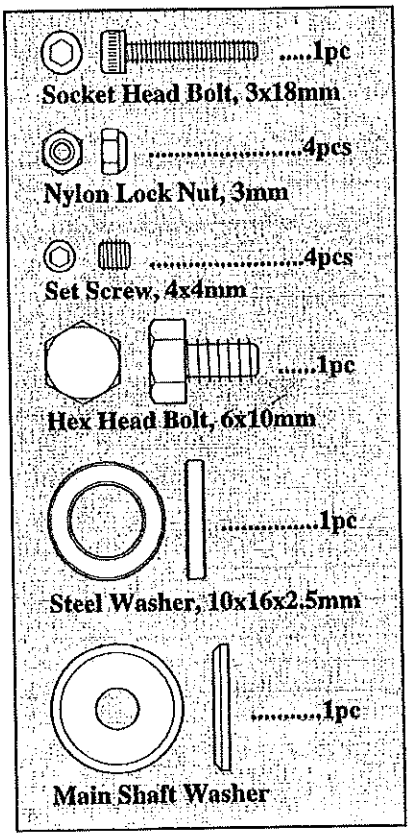




Autorotation Assembly
Direction
Note correct direction
during assembly.

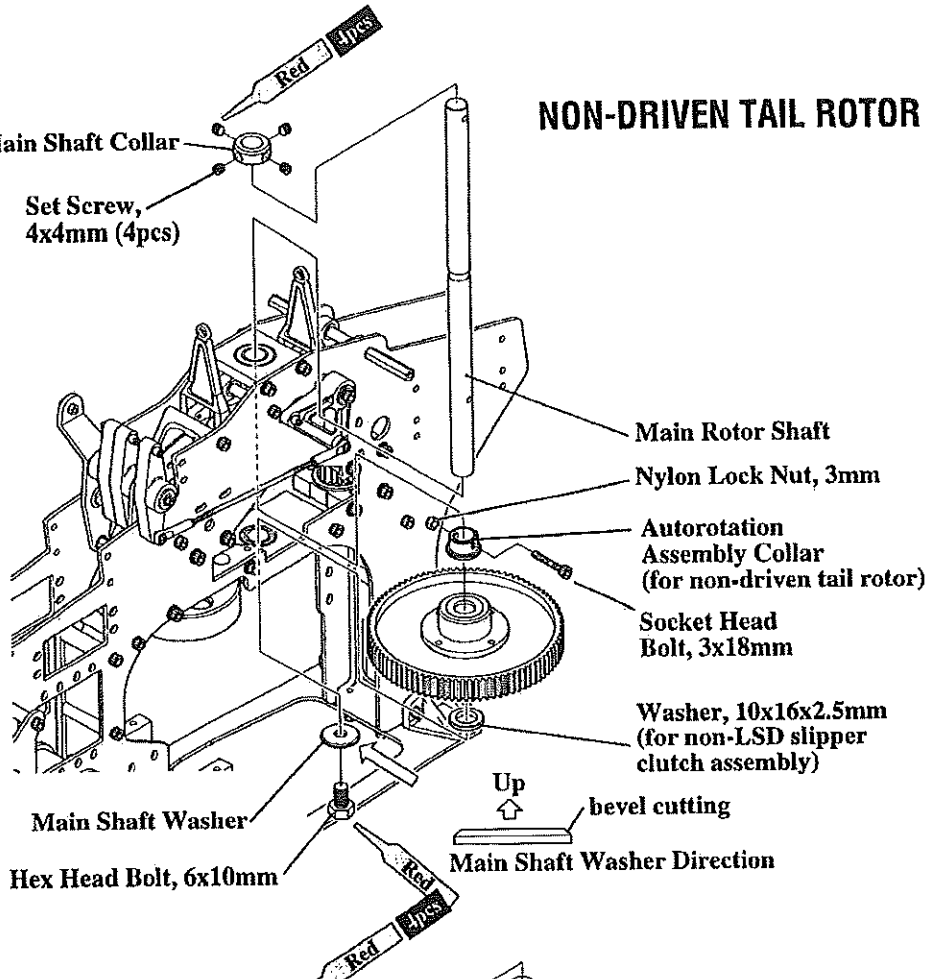
TEAM TIP: Apply a light coating of high speed grease to the inside of the torrington bearing.

3-2 MAIN SHAFT/MAIN DRIVE GEAR INSTALLATION

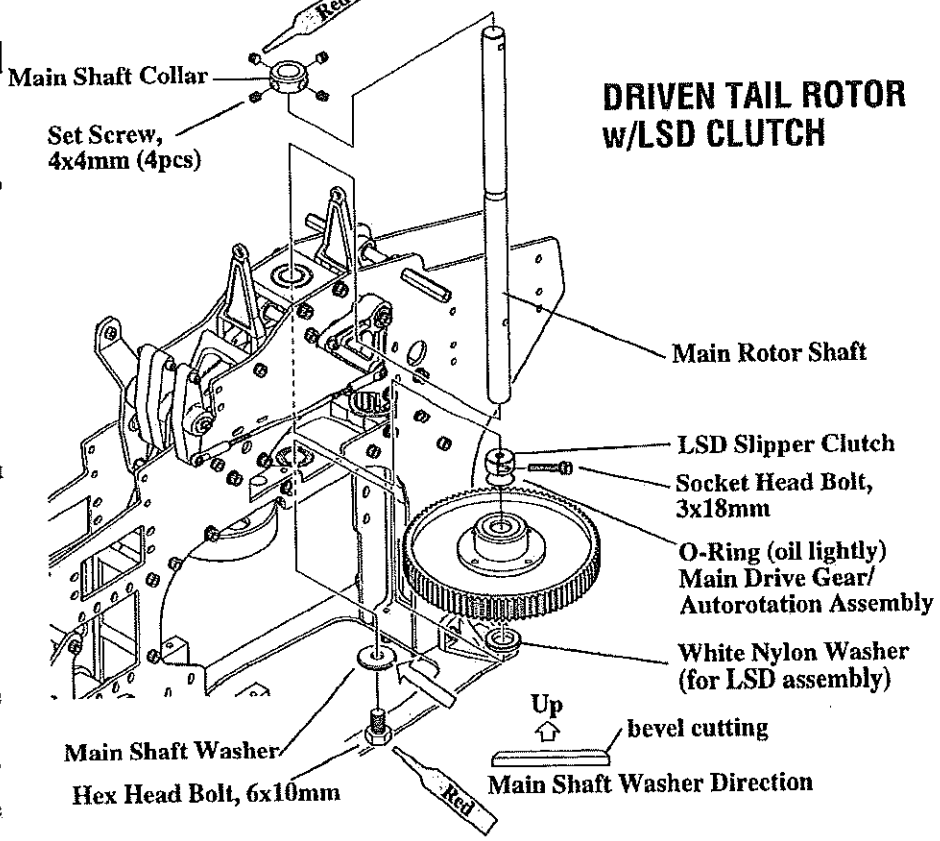


Use Red Threadlock

NON-DRIVEN TAIL ROTOR



DRIVEN TAIL ROTOR w/LSD CLUTCH



LSD Slipper Clutch

Your Vigor kit includes parts that will give you the option to complete this assembly in standard configuration (non-driven tail rotor), or with the LSD (Limited Slip Differential) Slipper clutch. The LSD Slipper Clutch will allow the tail rotor to be partially driven during autorotations. This will allow the pilot to have tail rotor control during autorotations, which is necessary for maneuvers like a 180 degree autorotations, rolling autos, etc. The LSD Slipper Clutch will also prevent the model from rotating at the very end of an autorotations.

When using the LSD clutch, it is important to note that the tail rotor pitch will need to be adjusted due to the fact that the tail rotor is now operational and can cause the model to yaw during an autorotation.

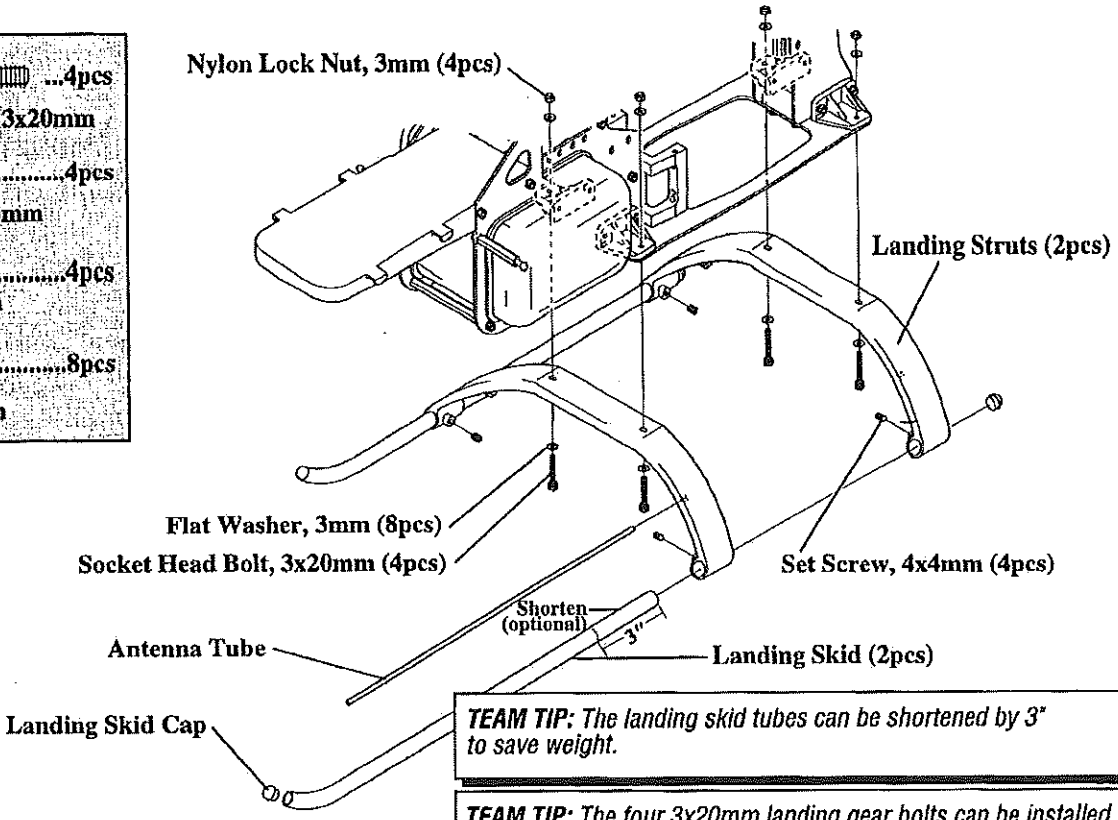
You will find a separate package in your kit that contains the necessary parts to install the LSD Slipper Clutch. When using the LSD unit, the following parts will not be needed:

1- Steel Washer, 10x16x2.5mm
1- Socket Head Bolt, 3x18mm
1- Lock Nut, 3mm
2- Autorotation Assembly Collar

Once the Main Shaft Assembly has been installed per the instructions, the LSD unit can be secured into position with the included 3x18mm Socket Head Bolt. When securing, apply a small amount of downward pressure to the LSD unit so that the o-ring will be slightly compressed. Final adjustment of the LSD unit can be made once the tail rotor assembly has been completed.

3-3 LANDING GEAR ASSEMBLY INSTALLATION

- Socket Head Bolt, 3x20mm 4pcs
- Nylon Lock Nut, 3mm 4pcs
- Set Screw, 4x4mm 4pcs
- Flat Washer, 3mm 8pcs



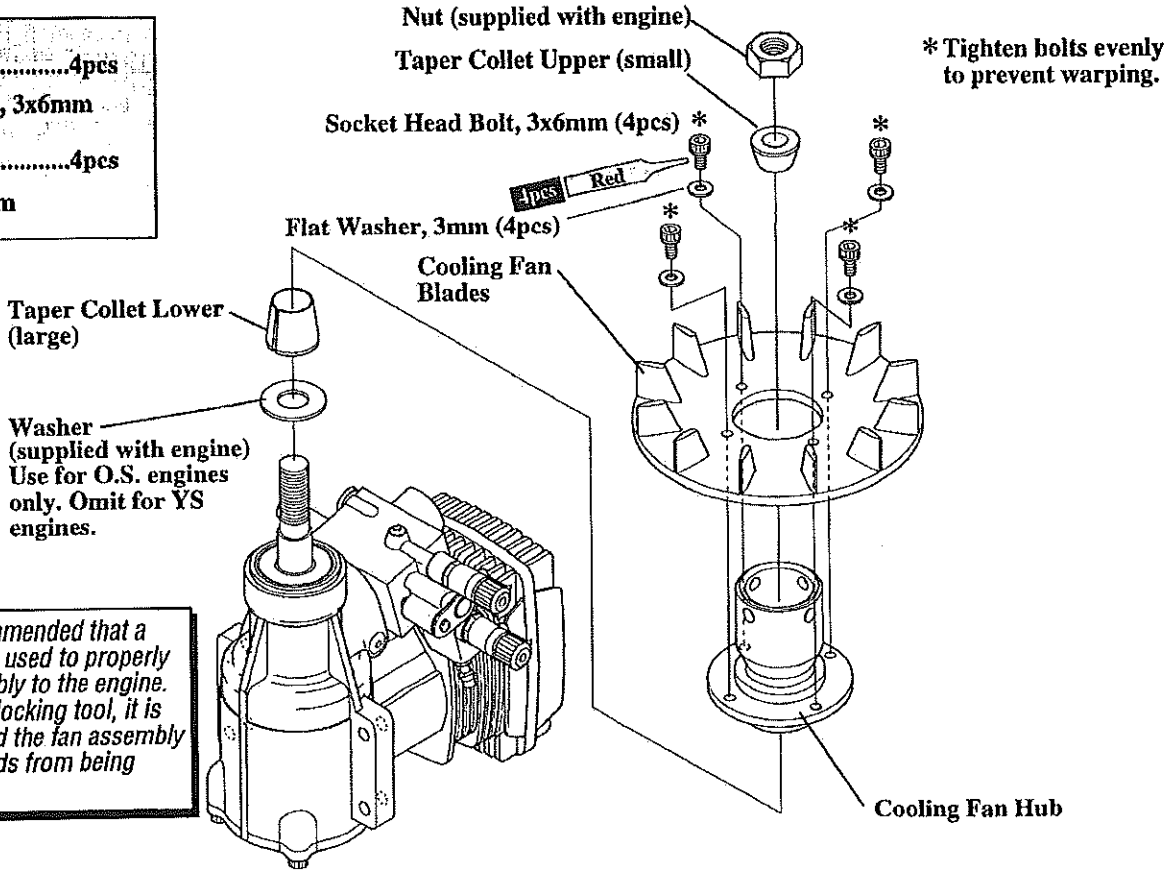
TEAM TIP: *The landing skid tubes can be shortened by 3" to save weight.*

TEAM TIP: *The four 3x20mm landing gear bolts can be installed from the top (opposite diagram) for a cleaner appearance.*

3-4 COOLING FAN/HUB INSTALLATION

- Socket Head Bolt, 3x6mm 4pcs
- Flat Washer, 3mm 4pcs

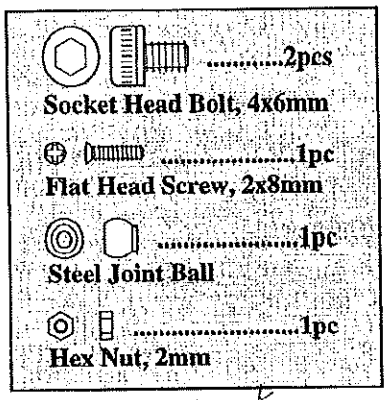
Use Red Threadlock

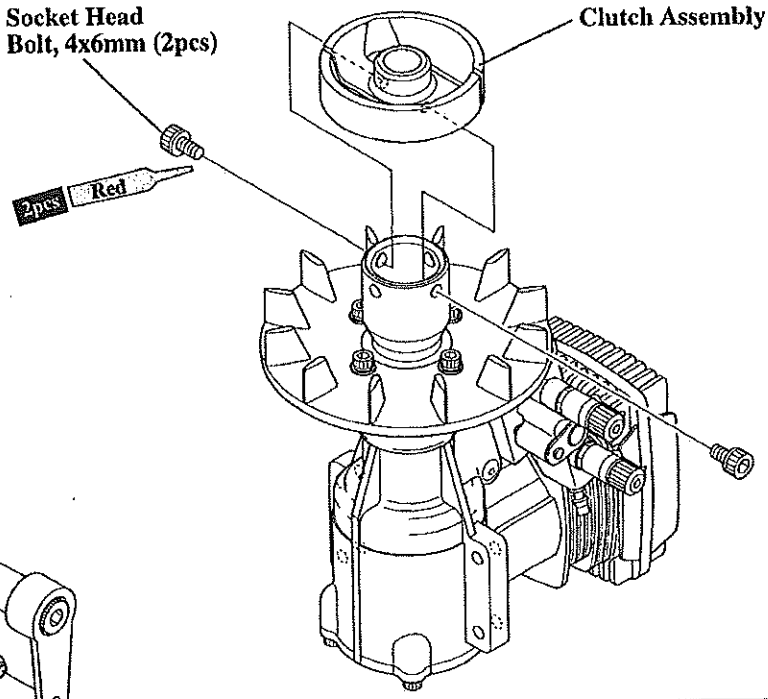


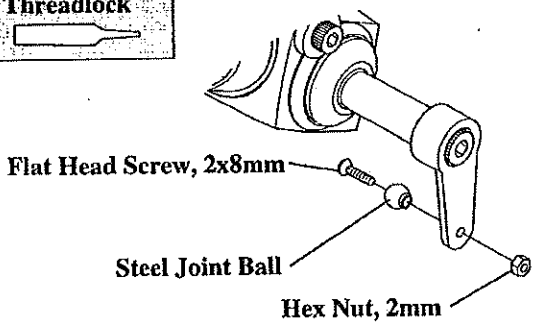
* Tighten bolts evenly to prevent warping.

TEAM TIP: *It is recommended that a piston locking tool be used to properly secure the fan assembly to the engine. When using a piston locking tool, it is necessary to also hold the fan assembly to prevent excess loads from being applied to the piston.*

3-5 CLUTCH ASSEMBLY ATTACHMENT

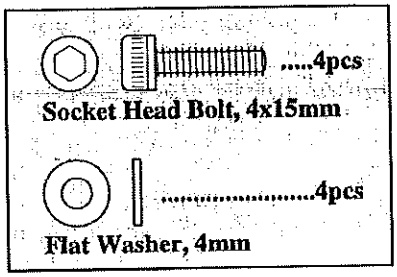




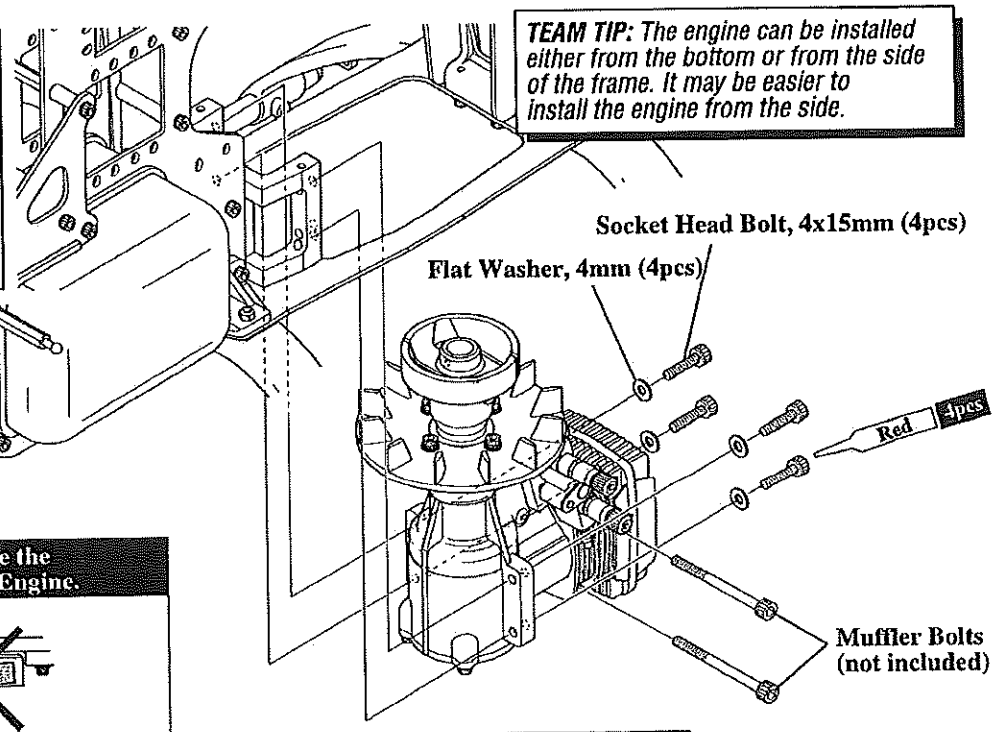


TEAM TIP: *Before the clutch is permanently attached, rotate the clutch/fan assembly to check for trueness. If any clutch runout is detected, reposition the clutch at 90° intervals through the use of the 4 holes in the fan hub until optimum clutch trueness is achieved.*

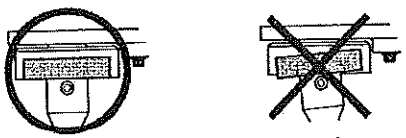
3-6 ENGINE INSTALLATION



TEAM TIP: *The engine can be installed either from the bottom or from the side of the frame. It may be easier to install the engine from the side.*



Caution: Be sure to note the correct installation of the Engine.



1, Adjust the position of the engine as shown so the bottom of the Clutch Assembly is flush with the bottom of the Clutch Bell. Also check to insure that the Engine and Clutch Bell are parallel.

2, It is highly recommended that you insert the Muffler Bolts into the Engine Case prior to installing the engine in the frame.

3-7 COOLING FAN SHROUD BRACKET ATTACHMENT

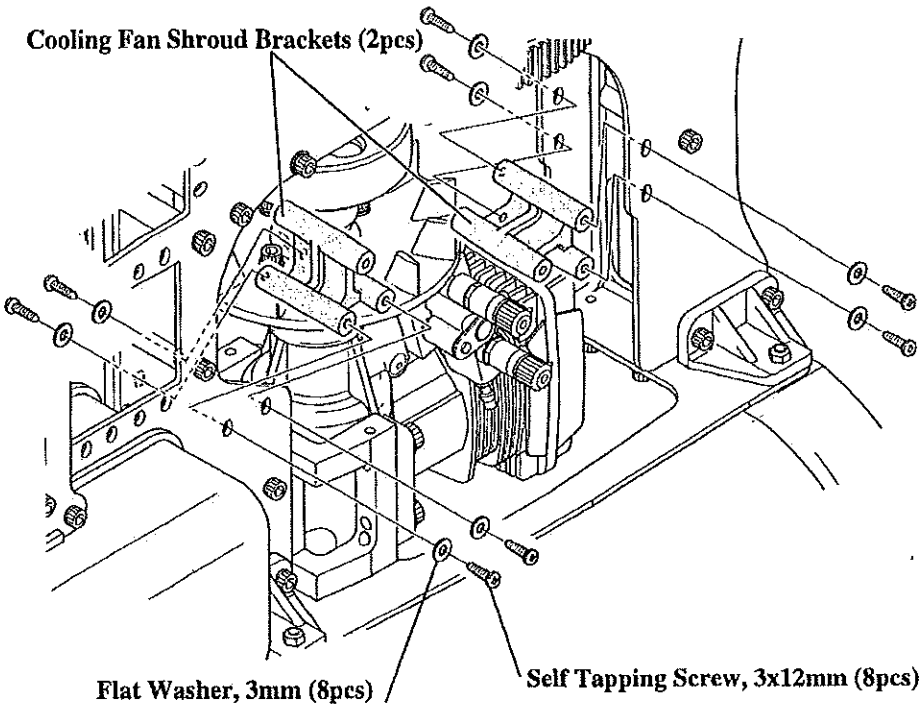
.....8pcs
Self Tapping Screw, 3x12mm

.....8pcs
Flat Washer, 3mm

Do not tighten screws at this time. They will be tightened in Step 3-9.

Note:

Do not tighten screws at this time. They will be tightened in Step 3-9.



3-8 BOLT TIGHTENING ORDER/GEAR MESH ADJUSTMENT

Use Red Threadlock

Bolt Tightening Order:
1. Motor Mount to Main Frame Plates
2. Start Shaft Bearing Block/Bearing Blocks "A" & "B"
3. Crossmember "A", and front Crossmember "B" to Main Frame Plates
4. Upper Main Shaft Bearing Block to Main Frame Plates
5. Rear Pinion Bearing Blocks (2) to Main Frame Plates
6. Rear Crossmember "B" to Main Frame Plates
7. Tighten all remaining bolts on frame left loose from Steps 2-1, 2-2 and 2-4

7 Tighten all remaining bolts

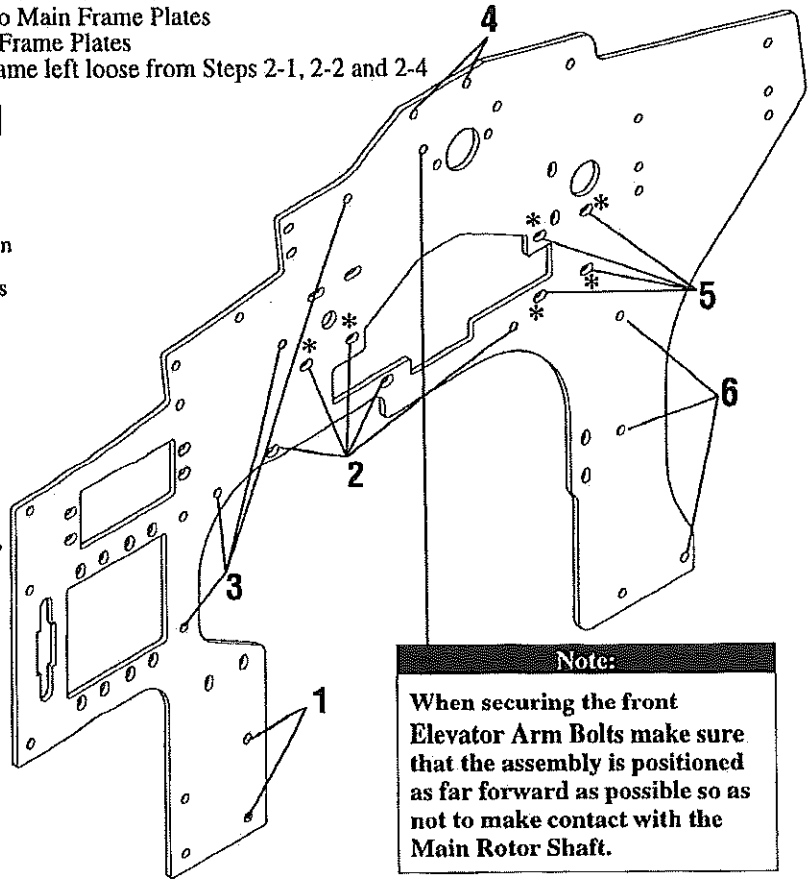
Gear Mesh Adjustment

Once the engine has been installed, adjust the gear mesh of both the main and tail pinions so that a slight amount of "backlash" is achieved. One method for achieving the proper clearance is to insert a folded piece of paper between the two gears, press the gears together, then secure the bearing blocks in place. When setting the gear mesh, make sure that the two pinion gears remain parallel to the main drive gear teeth, as it is possible to alter the pinion gear angle during adjustment.

If you find difficulty achieving proper alignment of the main pinion, it is also possible to loosen the six bolts that attach the engine mount to the main frame. This will allow the engine/mount to be repositioned slightly to achieve the proper gear mesh.

Once the desired gear mesh has been achieved, tighten all bolts left loose from Step 2-1. Please remember to use threadlock on the bolts securing the upper start shaft pinion block, as well as the two tail pinion bearing blocks.

Please also remember to apply threadlock and tighten the two 3x14mm socket head bolts that connect bearing block "A" to bearing block "B." (see Step 1-1 for details).



***TEAM TIP:** Once the gear mesh/engine alignment has been established, rotate the start shaft assembly first counterclockwise, then clockwise. When moved clockwise, the start shaft assembly should move freely with little or no resistance. If resistance is present, this means that the clutch/start shaft assembly are not aligned properly. Readjust as necessary.*

Note:

When securing the front Elevator Arm Bolts make sure that the assembly is positioned as far forward as possible so as not to make contact with the Main Rotor Shaft.

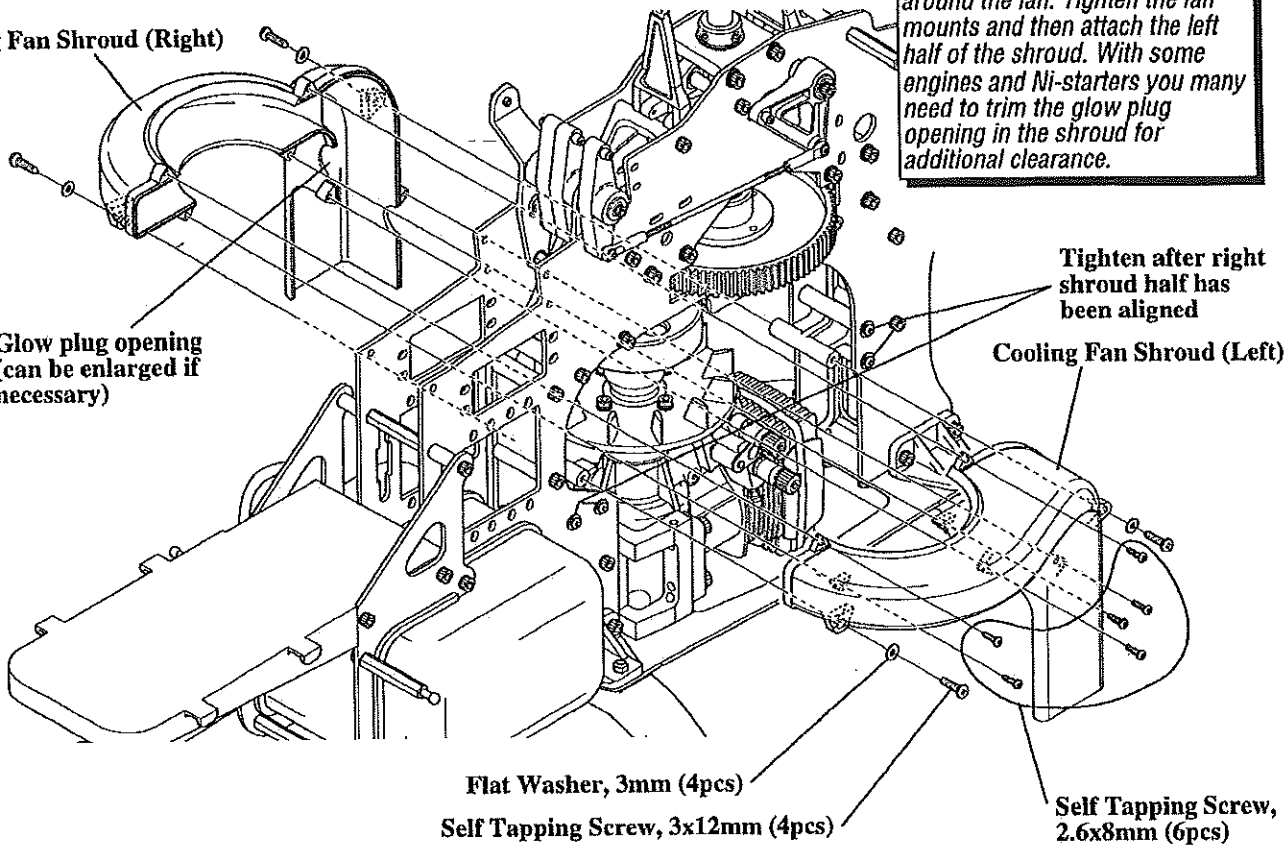
3-9 COOLING FAN SHROUD INSTALLATION

...4pcs Self Tapping Screw, 3x12mm

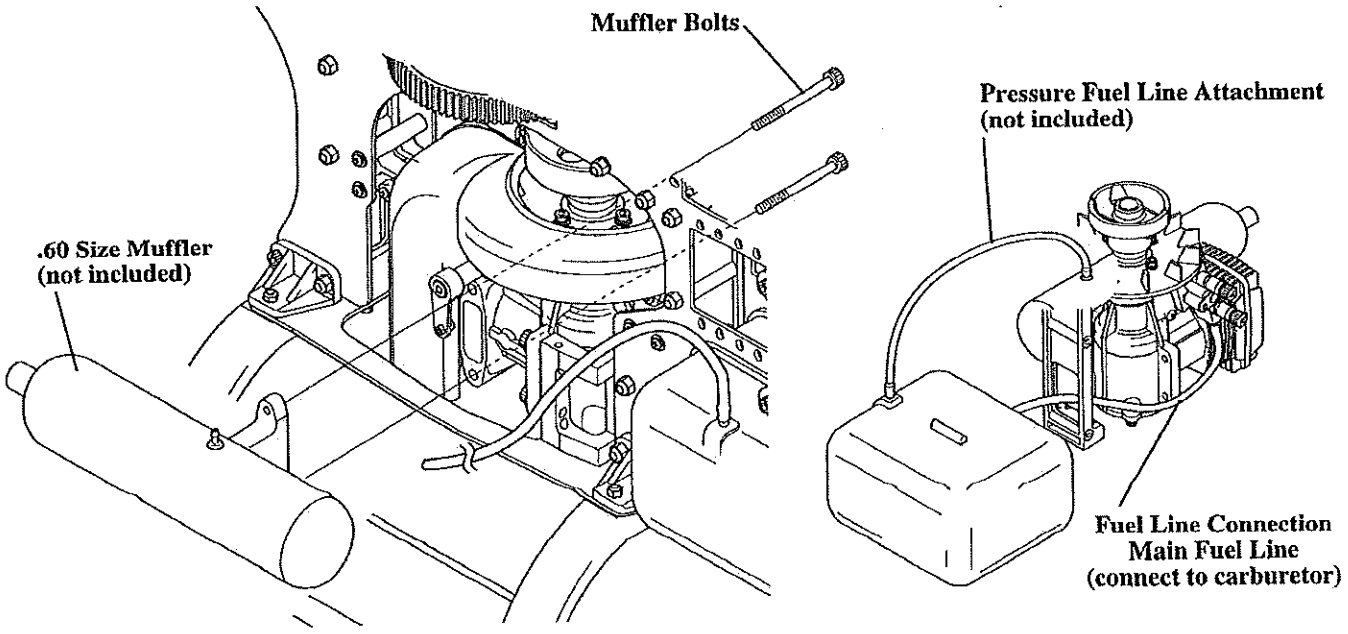
.....6pcs Self Tapping Screw, 2.6x8mm

.....4pcs Flat Washer, 3mm

TEAM TIP: *The best alignment of the fan shroud can be achieved by attaching only the right half of the shroud. Next, align the mounts so the shroud is centered around the fan. Tighten the fan mounts and then attach the left half of the shroud. With some engines and Ni-starters you many need to trim the glow plug opening in the shroud for additional clearance.*



3-10 INSTALLATION OF THE MUFFLER/FUEL LINE CONNECTIONS



4-1 SWASHPLATE ASSEMBLY

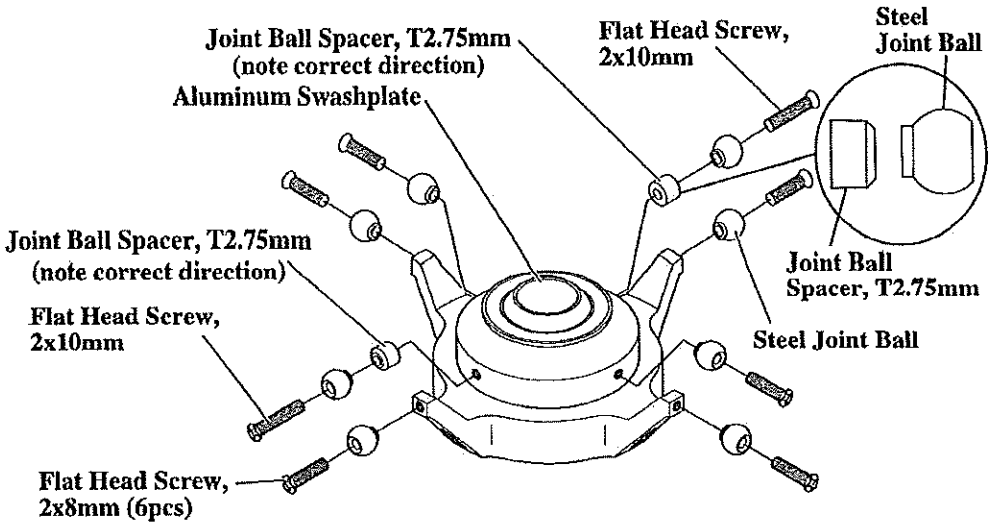
.....6pcs
Flat Head Screw, 2x8mm

.....2pcs
Flat Head Screw, 2x10mm

.....8pcs
Steel Joint Ball

.....2pcs
Joint Ball Spacer, T2.75mm

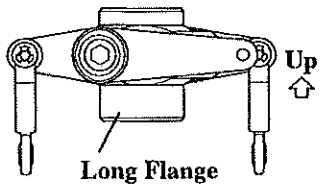
Use Red Threadlock on all Screws



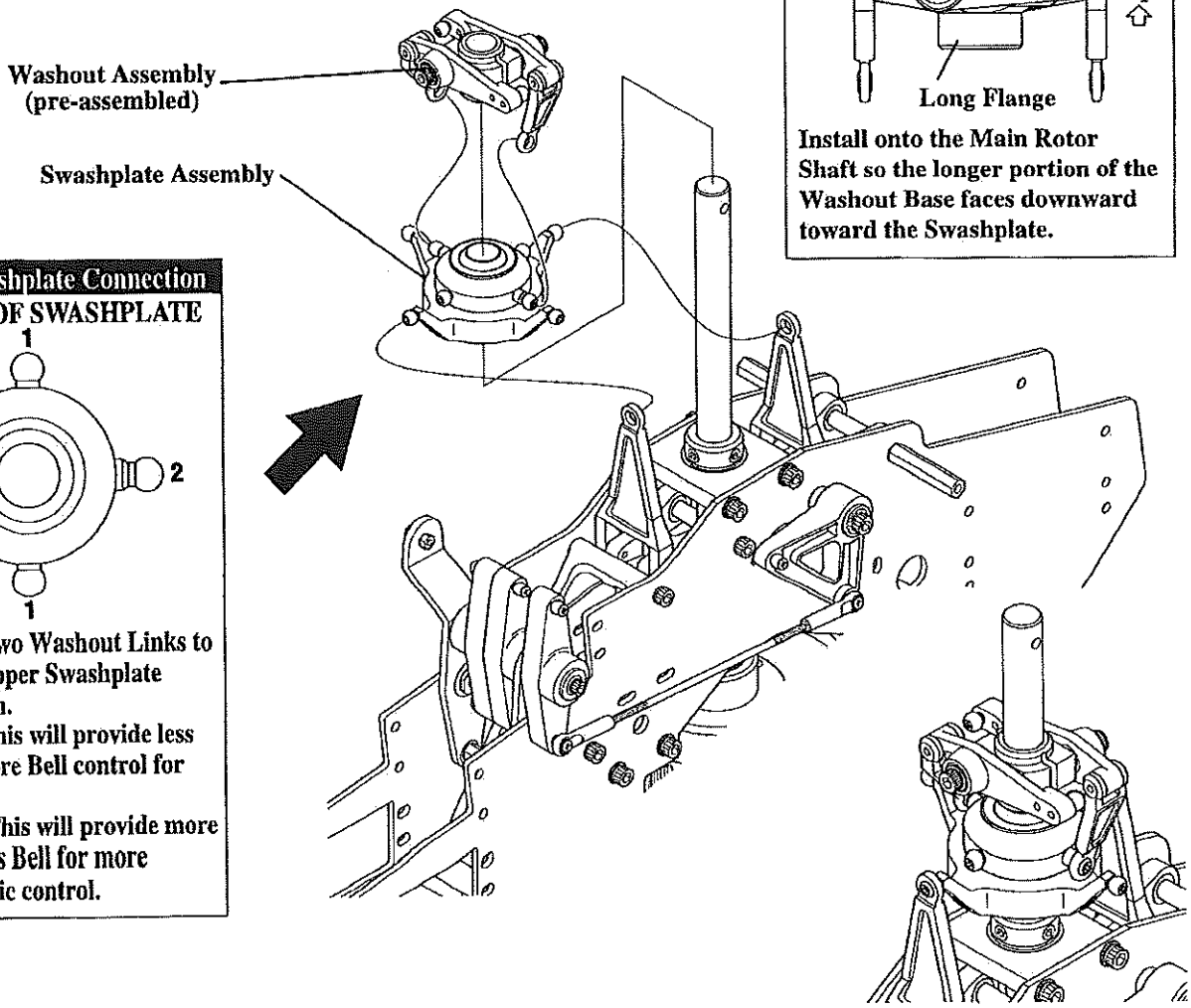
4-2 SWASHPLATE/WASHOUT ASSEMBLY INSTALLATION

TEAM TIP: Flight tune your Vigor for the desired feel by attaching the washout unit to locations #1 or #2 as shown.

WASHOUT ASSEMBLY

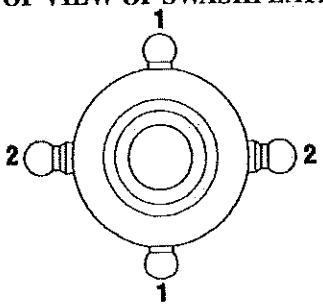


Install onto the Main Rotor Shaft so the longer portion of the Washout Base faces downward toward the Swashplate.



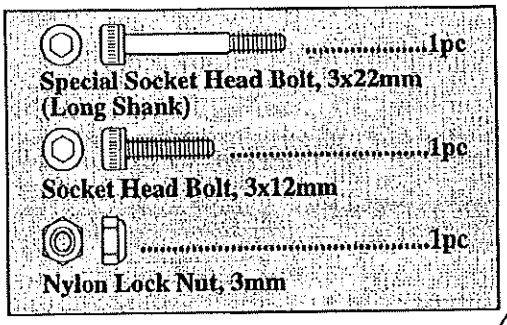
Washout/Swashplate Connection

TOP VIEW OF SWASHPLATE

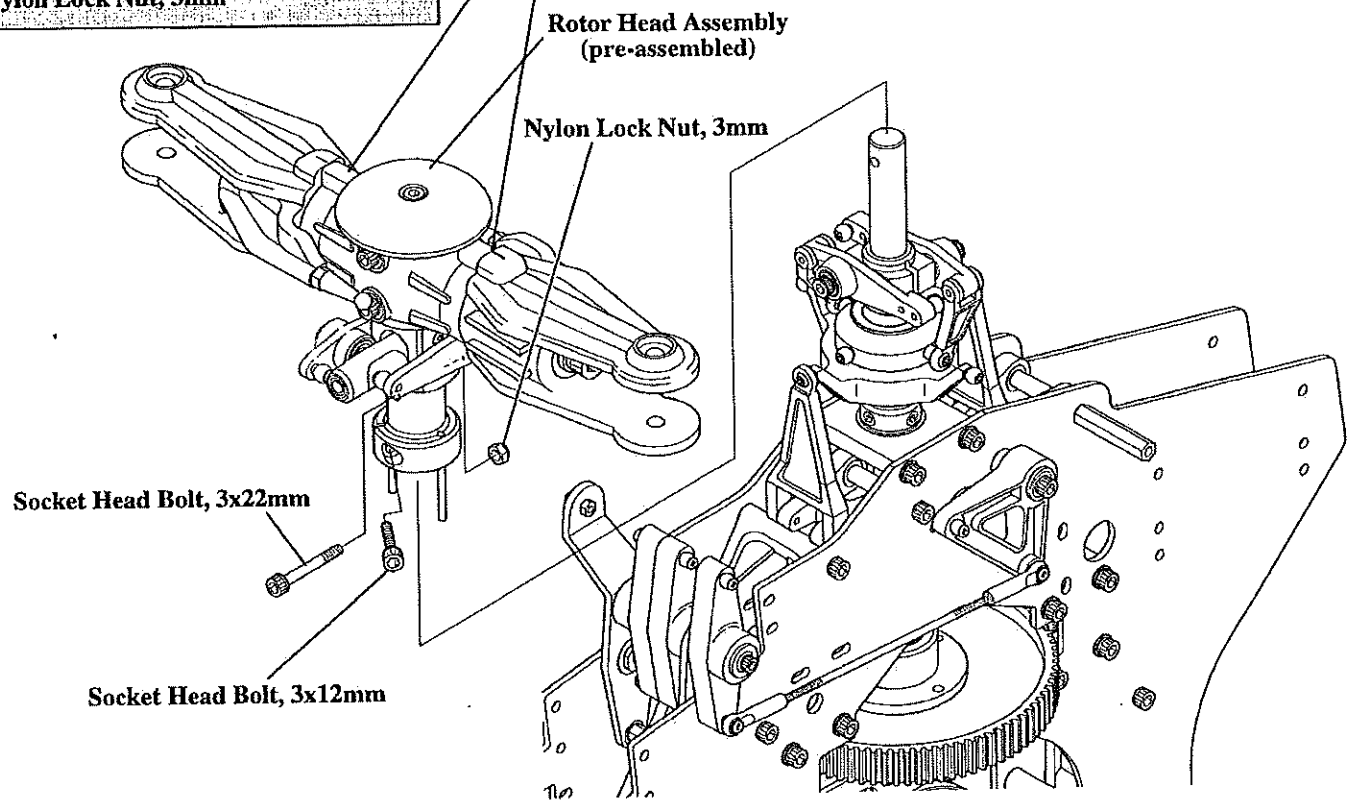


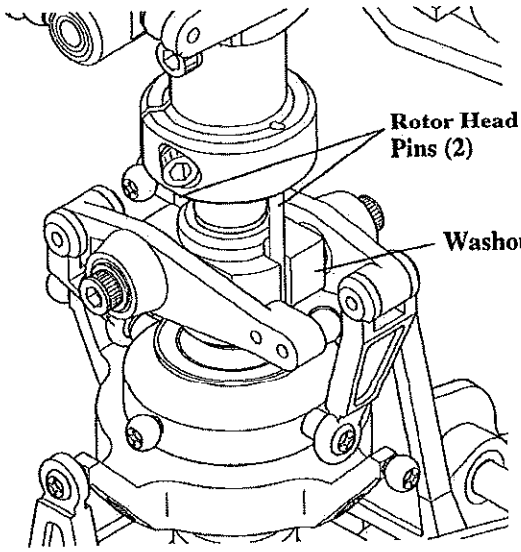
Connect the two Washout Links to the correct Upper Swashplate Balls as shown.
Position #1:This will provide less Hiller and more Bell control for smooth flight.
Position #2: This will provide more Hiller and less Bell for more agressive cyclic control.

4-3 ROTOR HEAD INSTALLATION



Main Rotor head dampeners maintenance. The Main Rotor Head dampeners should be inspected after 30–50 flights and replaced as needed. When replacing the dampeners, it is also suggested that the thrust bearings be greased using a high speed grease to proloing bearing life.

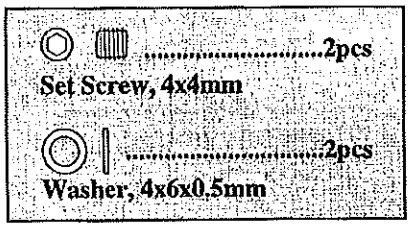




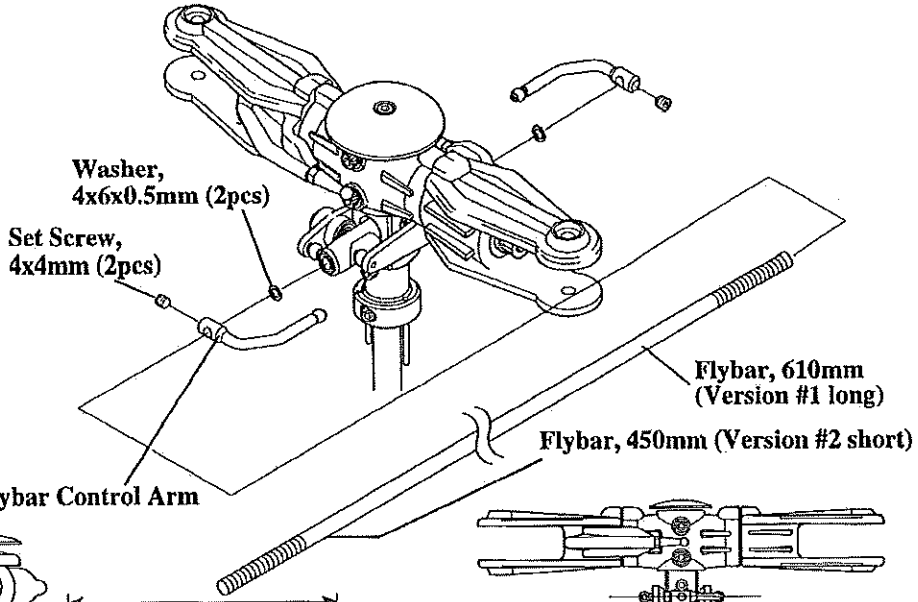
TEAM TIP: *For safety, it's important to note that a hardened bolt with a long shank should be used to attach the rotor head. I have seen many people, over time, replace these with standard bolts. This increases the chances of failures in flight.*

Note:
Be sure to engage the Rotor Head Pins (2) into the Washout Base Driver before securing the Rotor Head Assembly in place.

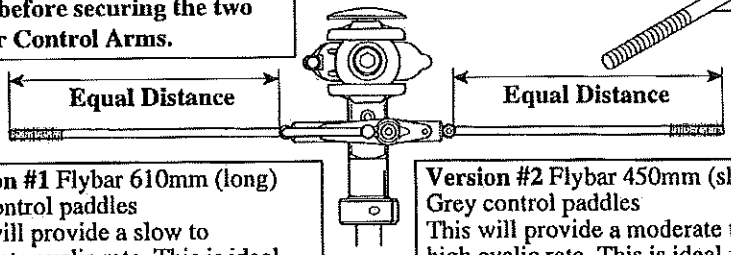
4-4 FLYBAR INSTALLATION



Note:
Your Vigor includes two sets of flybar paddle combinations, so the cyclic rate of the model can be adjusted for the desired "feel" or "rate."

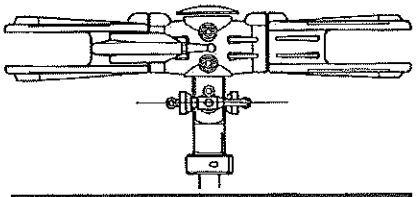


Caution:
Center the Flybar in the Seesaw Shaft before securing the two Flybar Control Arms.



Version #1 Flybar 610mm (long)
Red control paddles
This will provide a slow to moderate cyclic rate. This is ideal for contest or smooth 3D type flying.

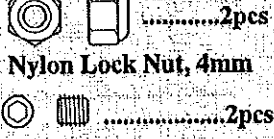
Version #2 Flybar 450mm (short)
Grey control paddles
This will provide a moderate to high cyclic rate. This is ideal for smooth or agressive 3D type flying.



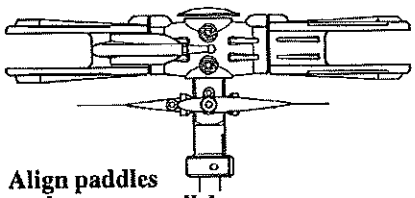
Caution:
Check to insure that the two Flybar Control Arms are parallel to the center line of the Flybar.

4-5 FLYBAR PADDLE ATTACHMENT

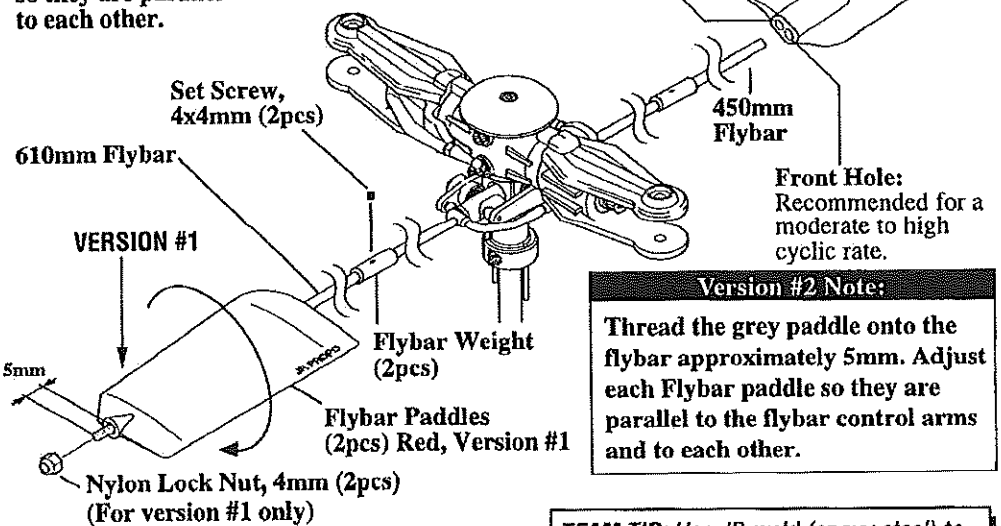
Version #1 only



Version #1 Note:
Thread each flybar paddle onto the flybar until the threaded tip of the flybar protrudes approximately 5mm. Adjust each flybar paddle so they are parallel to the flybar control arms and to each other. Secure to the flybar using two 4mm nylon lock nuts. Note proper direction of each flybar paddle (short portion forward, clockwise rotation).



Align paddles so they are parallel to each other.

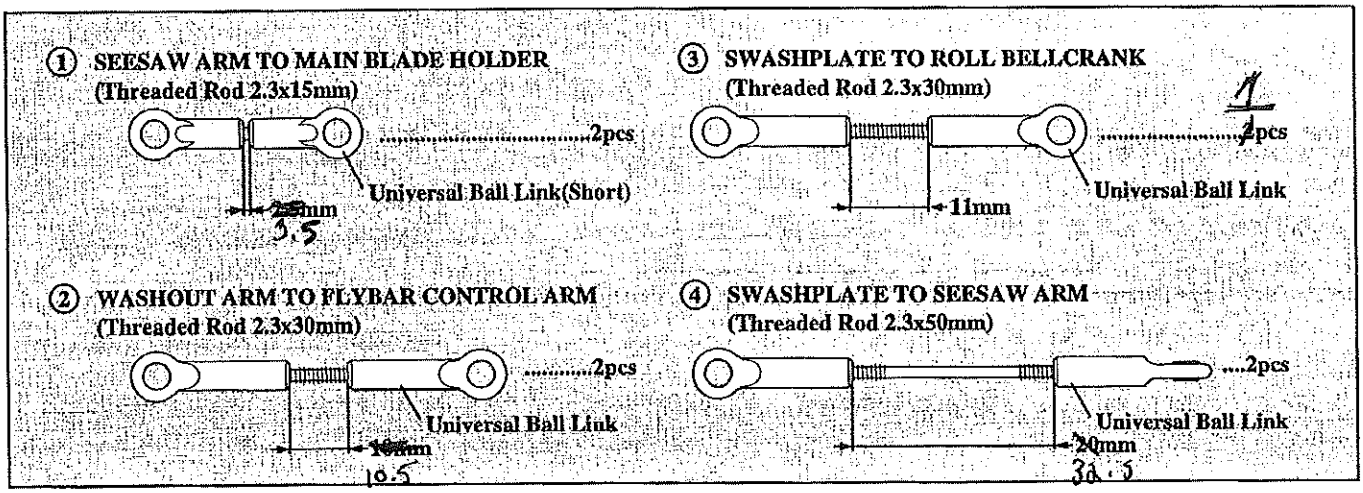


Version #2 Note:
Thread the grey paddle onto the flybar approximately 5mm. Adjust each Flybar paddle so they are parallel to the flybar control arms and to each other.

TEAM TIP: *Flight tune your Vigor to achieve the desired cyclic rate by moving the flybar weights in and out on the flybar (in=more cyclic rate, out=less). Make sure that they are set to the same distance or vibration can occur.*

TEAM TIP: *Use JB-weld (epoxy steel) to glue the flybar paddles to the flybar. Still use the nut as well. The glue prevents the paddles from turning in flight.*

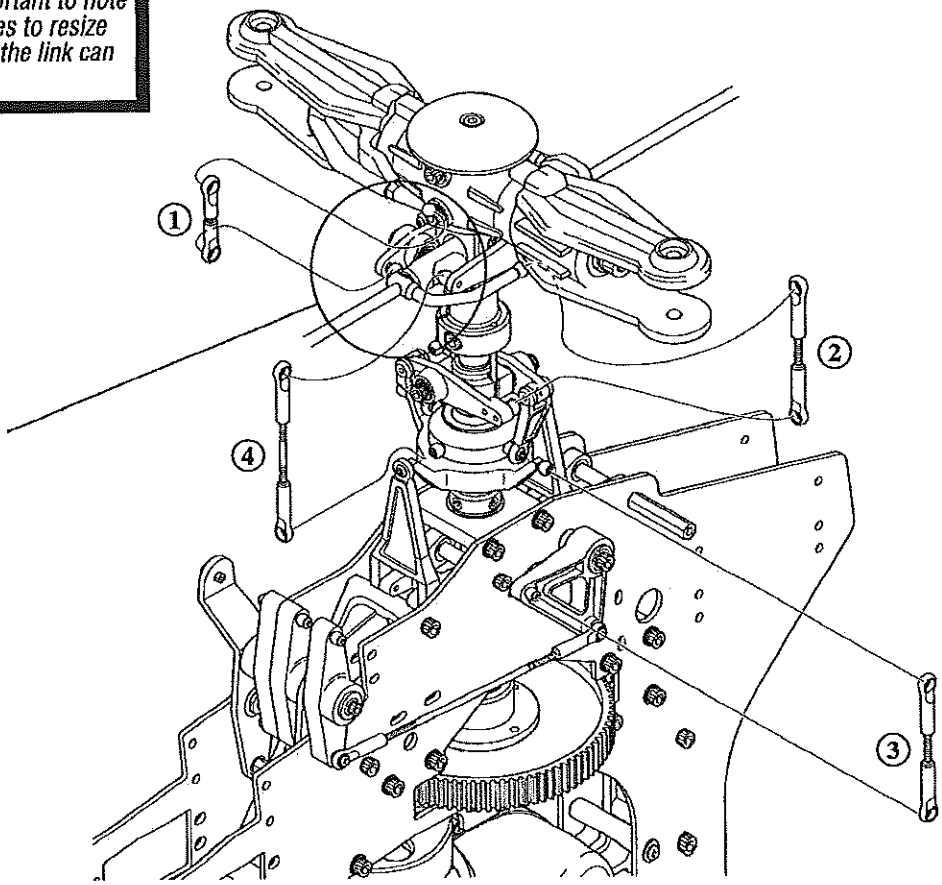
4-6 ROTOR HEAD/SWASHPLATE CONTROL ROD INSTALLATION



TEAM TIP: *The JR ball links are designed with little ridges around the lip of the link. These ridges, in conjunction wtih the JR ball link sizing tool, are there to help you custom fit the link to the ball. If the link fits on the ball too tight you can use the reaming tool to enlarge the link hole size. If the link fits too loose on the ball you can push in on the ridges on the link with a small pair of pliers. This reduces the size of the link hole and makes the link fit tighter. JR links are some of the best links available. It is important to note that very little force is needed on the ridges to resize the link. Using pliers on any other part of the link can cause the links to break.*

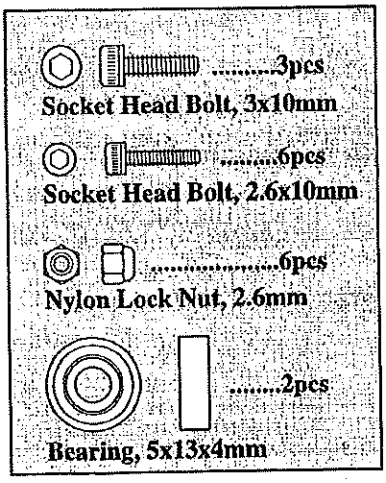
TEAM TIP: *After many flights there can be excess play between the ball and link. It is usually the ball that has actually worn. So when replacing parts, you will actually get the best results by replacing the balls.*

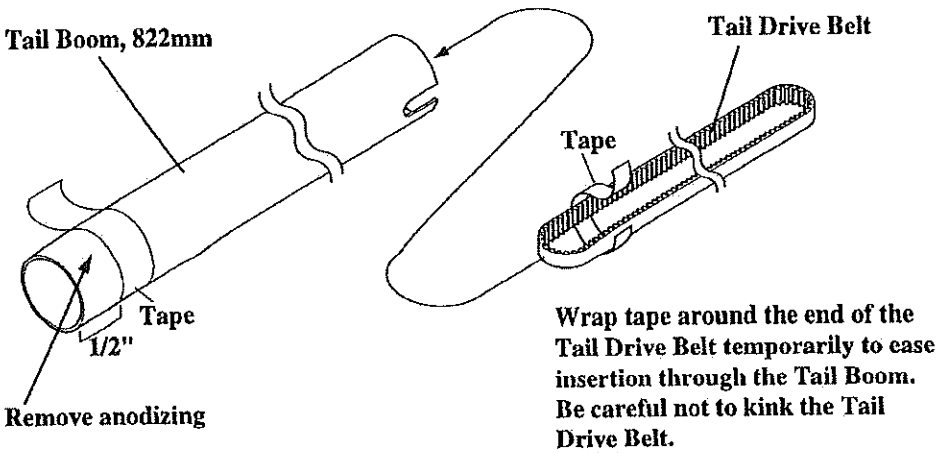
Caution:
Please note that all Universal Links should be adjusted so that when attached to the Control Ball, the words "JR PROPO" are to the outside.



Note: the seesaw mixing arms included with the Vigor are designed to offer a pitch range of approx. 20° (+11°, -9°). If additional pitch range is required, it is possible to replace these arms with part #JRP960178B. These arms will provide a total pitch range of 23° (+13°, -10°). Please note that these optional mixing arms will also increase the "Bell" movement of the Rotor Head, which will alter the flight characteristics slightly. Please refer to Step 8-5 for assembly and installation information of these optional arms. Also note that if these optional arms are used, the overall pitch and travel values may vary from that shown in the data sheets included in this manual (page 53).

5-1 TAIL CASE ASSEMBLY/ATTACHMENT

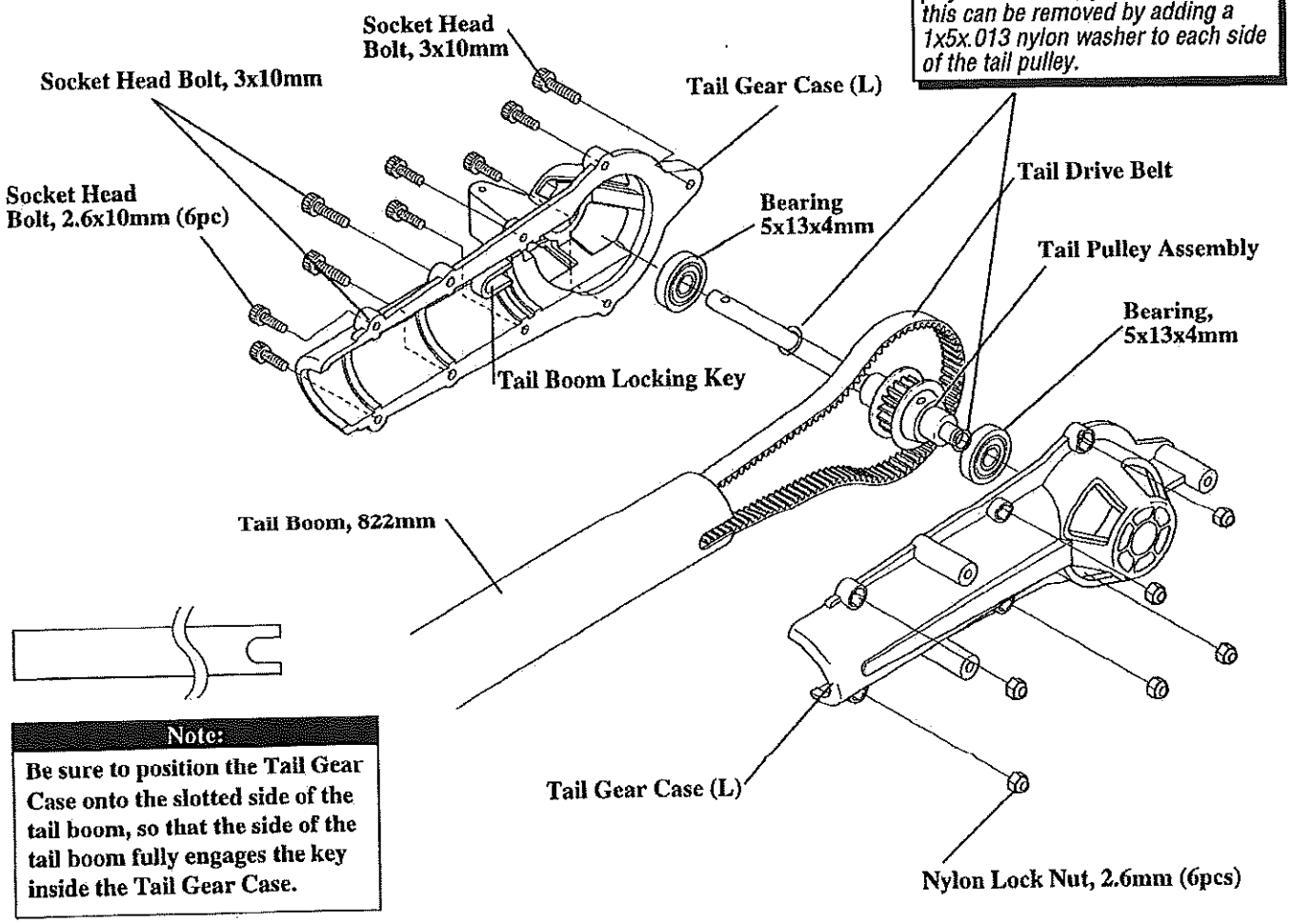




Wrap tape around the end of the Tail Drive Belt temporarily to ease insertion through the Tail Boom. Be careful not to kink the Tail Drive Belt.

IMPORTANT: Removing anodizing from the tail boom for proper grounding
Prior to inserting the Tail Drive Belt, it will first be necessary to remove the anodized coating (black) from the end of the tail boom opposite of the Tail Case. To do this, apply a piece of masking tape to the end of the tail boom so that approximately 1/2" of the tail boom is exposed at the end. Using 80 grit sandpaper, or a Moto-Tool with a sanding drum, remove the black coating from the end of the tail boom. Removal of the anodized coating is **mandatory** to achieve proper grounding of the tail boom assembly to the main frame of the helicopter. This procedure **must** be followed or possible RF radio interference can occur with some systems.This radio, or RF interference can occur during operation as "static" is produced by the tail drive assembly. This "static" can be found in most types of tail rotor systems that incorporate a belt for the tail drive. Testing has shown that by groundingthe tail assembly to the main frame, the possibility of radio interference is eliminated. Please refer to Section 5-6 of this manual for final grounding instructions.

***TEAM TIP: (Optional)** If side-to-side play in the tail output shaft is noted, this can be removed by adding a 1x5x.013 nylon washer to each side of the tail pulley.*

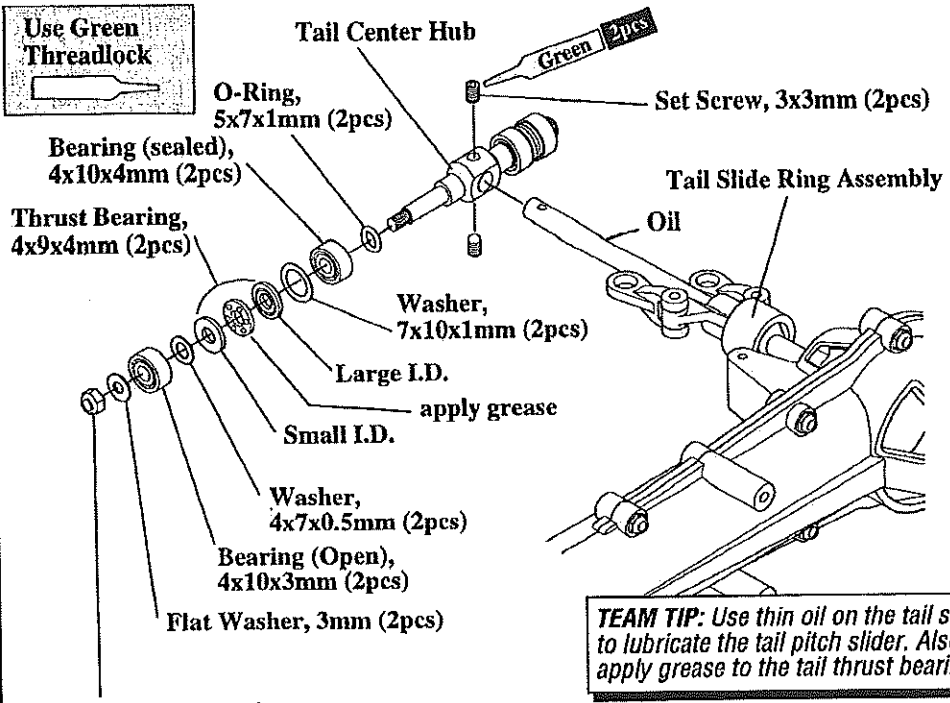


Note:
Be sure to position the Tail Gear Case onto the slotted side of the tail boom, so that the side of the tail boom fully engages the key inside the Tail Gear Case.

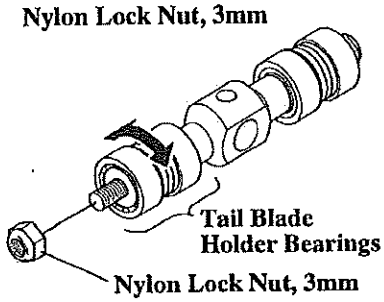
5-2 TAIL CENTER HUB ASSEMBLY

- Set Screw, 3x3mm 2pcs
- Nylon Lock Nut, 3mm 2pcs
- Bearing (sealed), 4x10x4mm 2pcs
- Bearing (open), 4x10x3mm 2pcs
- Washer, 7x10x1mm 2pcs
- Washer, 4x7x0.5mm 2pcs
- Flat Washer, 3mm 2pcs
- Thrust Bearing, 4x9x4mm 2pcs
- O-Ring, 5x7x1mm 2pcs

Use Green Threadlock



TEAM TIP: Use thin oil on the tail shaft to lubricate the tail pitch slider. Also apply grease to the tail thrust bearings.

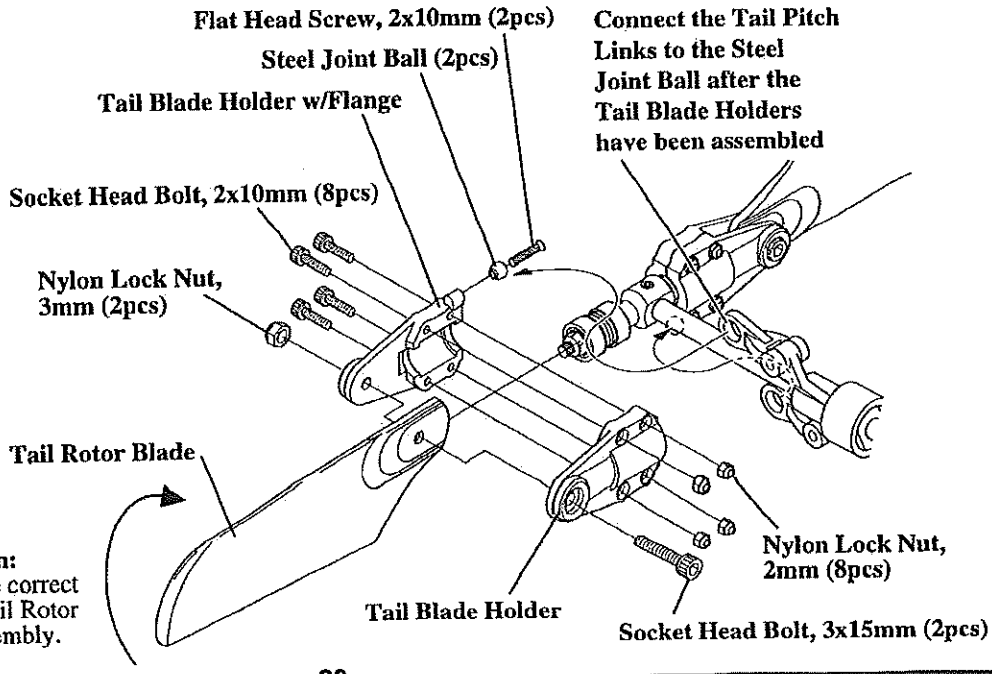


Note:

Slide the Tail Slide Ring Assembly on the Tail Output Shaft before installation of the Tail Rotor Hub. When attaching the Tail Rotor Hub, be certain that the Set Screws 3x3mm engage into the holes at the end of Tail Output Shaft. Use green threadlock.
Check to make sure the Tail Blade Holder Bearings can rotate freely, without play. If binding occurs, loosen the 3mm Nylon Lock Nut.

5-3 TAIL BLADE HOLDER ASSEMBLY

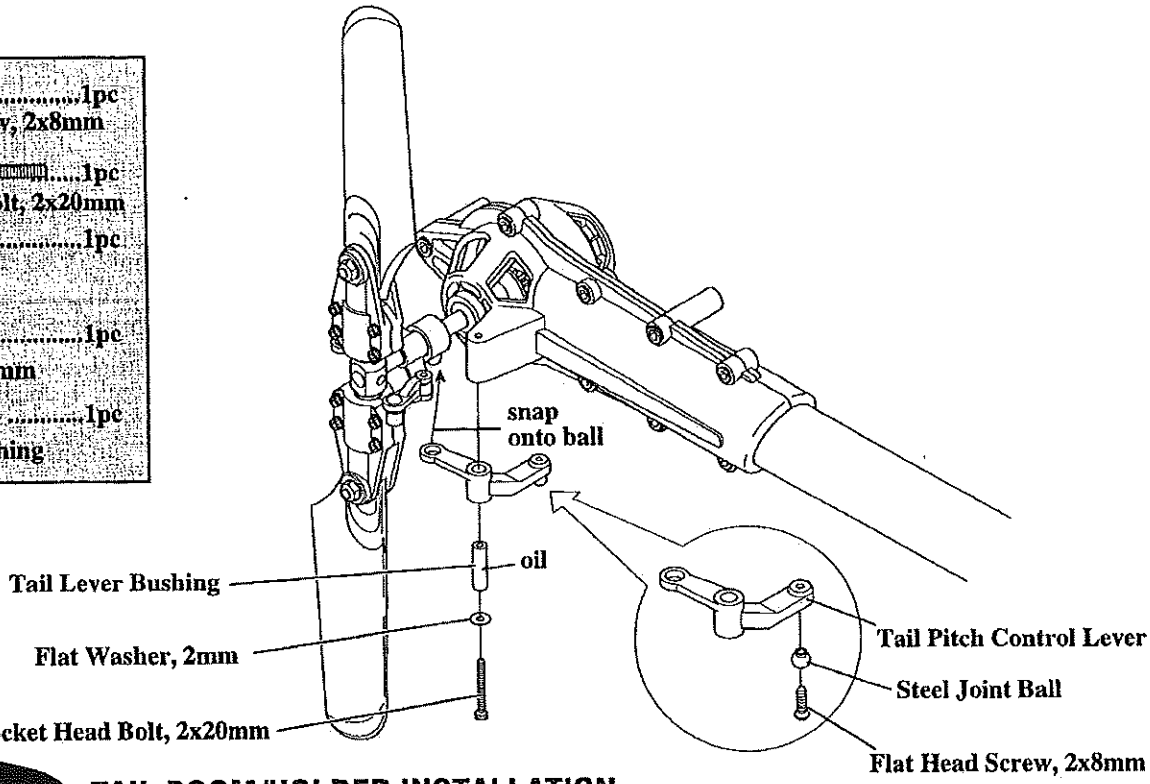
- Flat Head Screw, 2x10mm 2pcs
- Socket Head Bolt, 2x10mm 8pcs
- Socket Head Bolt, 3x15mm 2pcs
- Nylon Lock Nut, 2mm 8pcs
- Nylon Lock Nut, 3mm 2pcs
- Steel Joint Ball 2pcs



Rotation direction:
Be sure to note the correct direction of the Tail Rotor Blades during assembly.

5-4 TAIL PITCH CONTROL LEVER INSTALLATION

- Flat Head Screw, 2x8mm 1pc
- Socket Head Bolt, 2x20mm 1pc
- Steel Joint Ball 1pc
- Flat Washer, 2mm 1pc
- Tail Lever Bushing 1pc

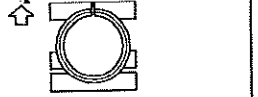


5-5 TAIL BOOM/HOLDER INSTALLATION

- Socket Head Bolt, 3x40mm ...4pcs
- Nylon Lock Nut, 3mm 4pcs

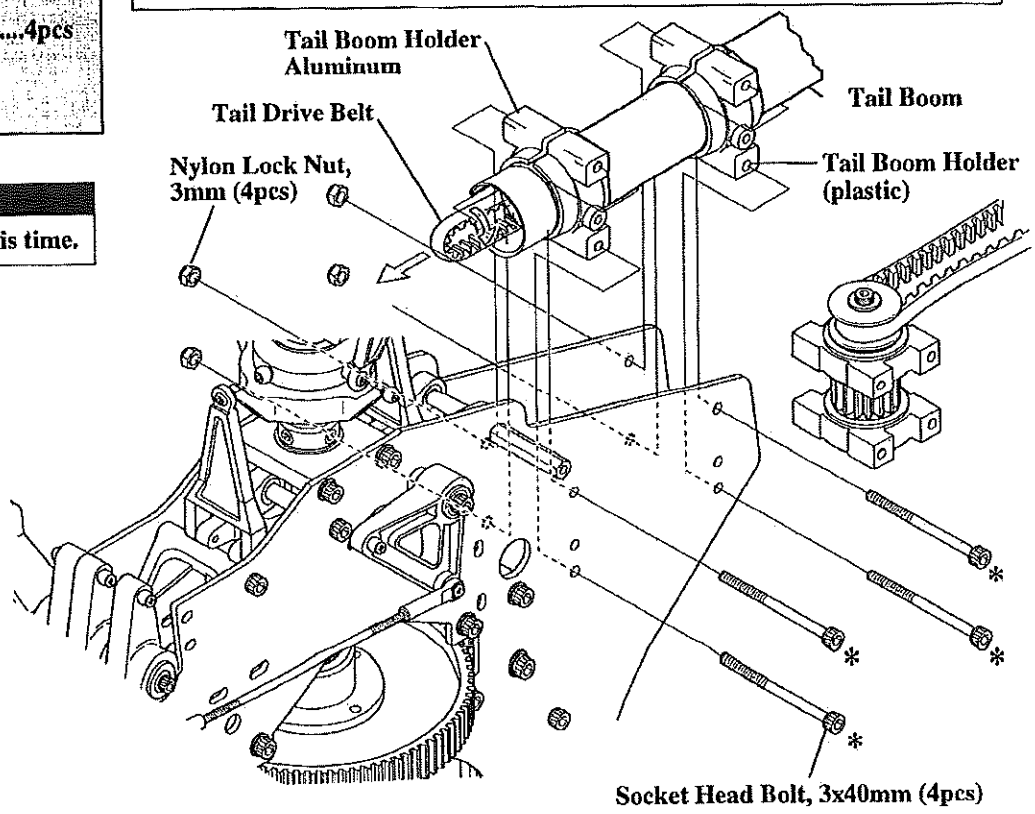
Note:
Do not fully tighten bolts at this time.

Note:
TAIL BOOM HOLDER
Up
Slot

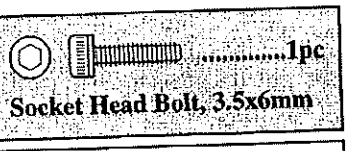


Install the Tail Boom Holder so the sloted side is toward the top. Also, it is important to make sure that the Aluminum Tail Boom holder is at the front of the tail boom as shown.

Note:
Slide the Tail Boom through the Tail Boom Holder and engage the Tail Drive Beltover the Front Pulley. Be certain to note the correct rotation (direction shown on next page). Set the belt tension per the directions in Step 5-6.

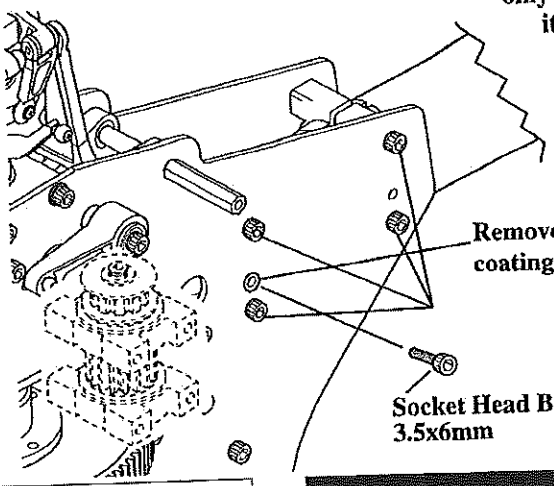


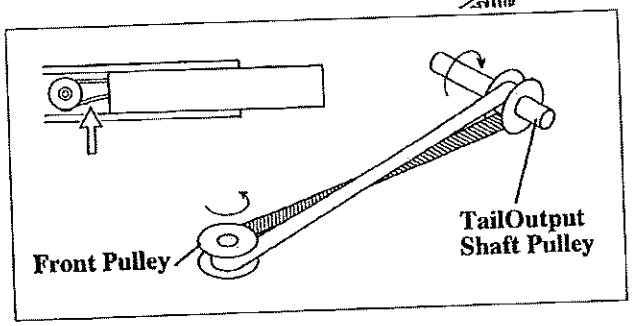
5-6 TAIL BELT ADJUSTMENT/TAIL BOOM GROUNDING



TEAM TIP: It is best for the belt to be run tight all the time. A loose belt will slip during aggressive 3D flight and also wear quicker than a tight one.

As mentioned in Step 5-1, it will be necessary to ground the tail assembly to the main frame of the model to prevent the possibility of radio RF interference caused by "static" from the tail drive during flight. To create a secure ground for the tail assembly, it will be necessary to remove a 1/4" diameter portion of the black powder coating from the left side of the main frame at the location shown in the diagram. Next, install the 3.5x6mm socket head screw into this location and secure. Please note that since this screw is designed to thread only into the aluminum tail mounting clamp, it will not be necessary to loosen this screw to make belt tension adjustments.

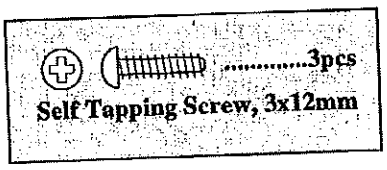


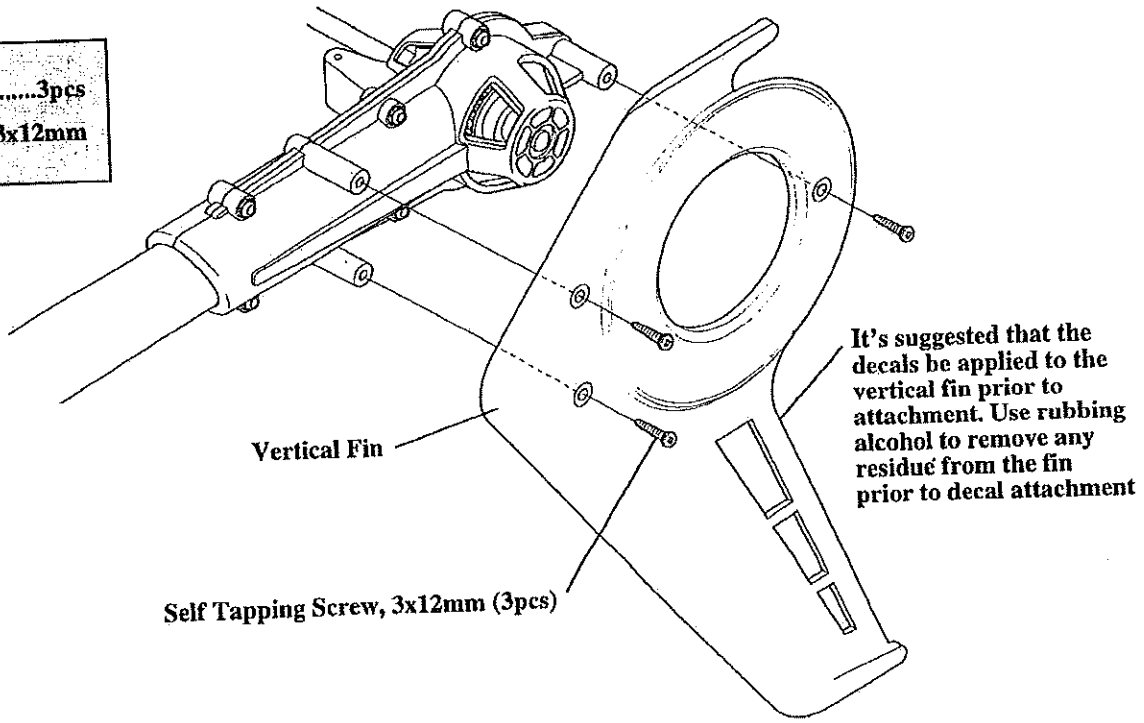


Belt Tension

Belt tension should be set so when pressing with your finger, both sides of the belt does not come in contact with each other. It is recommended to set the belt tension slightly tight at first to prevent slipping and loss of tail drive. Rotate the Tail Drive Belt in the direction shown before installing it onto the front pulley. It is extremely important to install the belt in the proper direction to insure correct rotation of the Tail Rotor Blades.

5-7 VERTICAL FIN ATTACHMENT

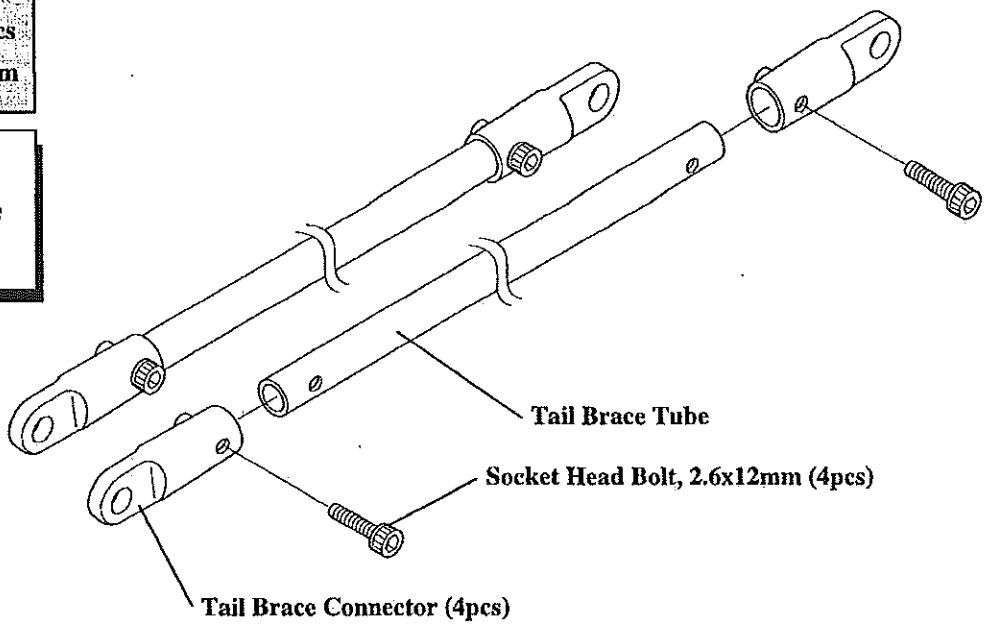




5-8 TAIL BOOM BRACE ASSEMBLY

.....4pcs
Socket Head Bolt, 2.6x12mm

TEAM TIP: It is suggested that the Tail Brace Connectors be bonded to the Tail Brace Tubes using either thick CA adhesive, or JB Weld.



5-9 TAIL BOOM BRACE/HORIZONTAL FIN INSTALLATION

.....2pcs
Socket Head Bolt, 3x10mm

.....2pcs
Socket Head Bolt, 3x15mm

2pcs
Socket Head Bolt, 3x22mm

.....4pcs
Flat Washer, 3mm

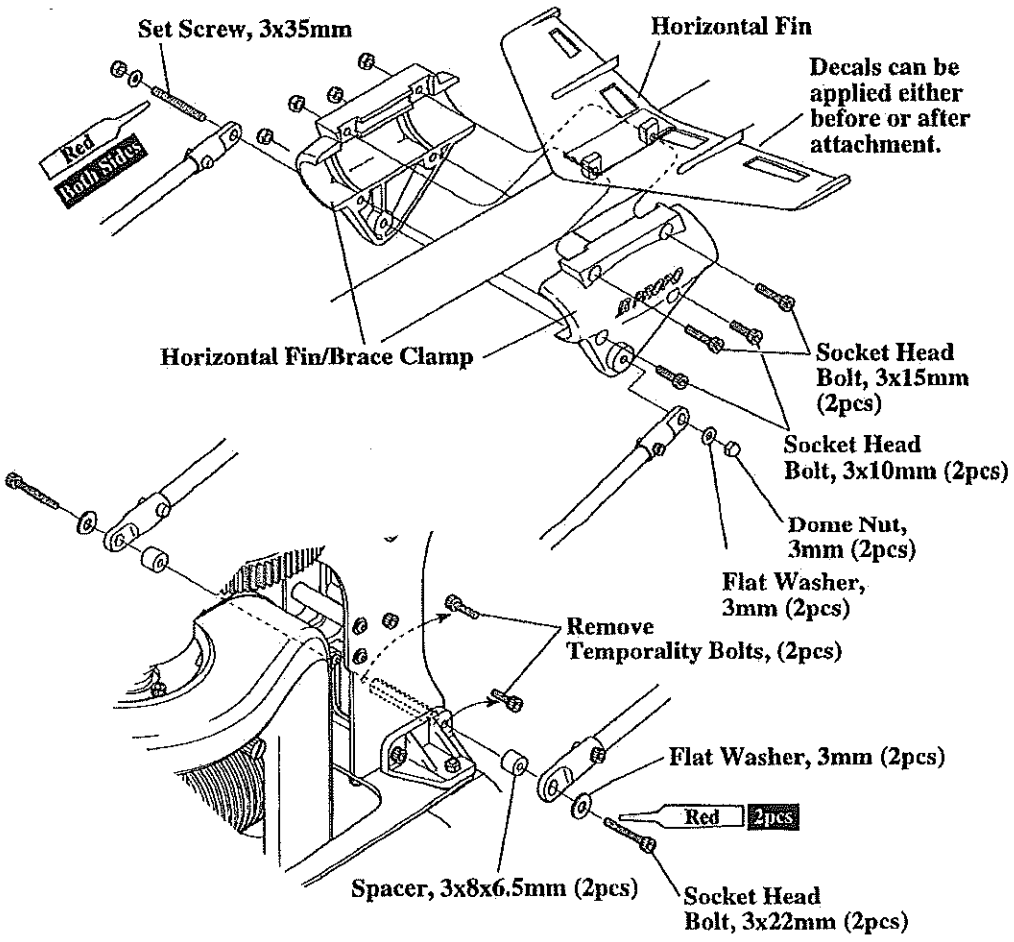
.....2pcs
Spacer, 3x8x6.5mm

.....4pcs
Nylon Lock Nut, 3mm

.....2pcs
Dome Nut, 3mm

Set Screw, 3x35mm 1pc

Use Red Threadlock



6-1 UPPER SERVO TRAY ATTACHMENT

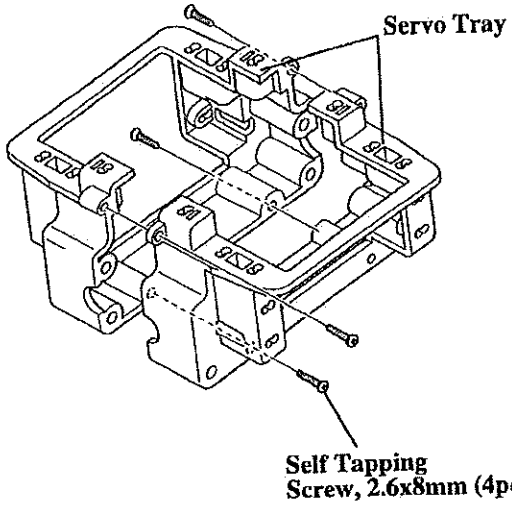
...3pcs
Socket Head Bolt, 3x40mm

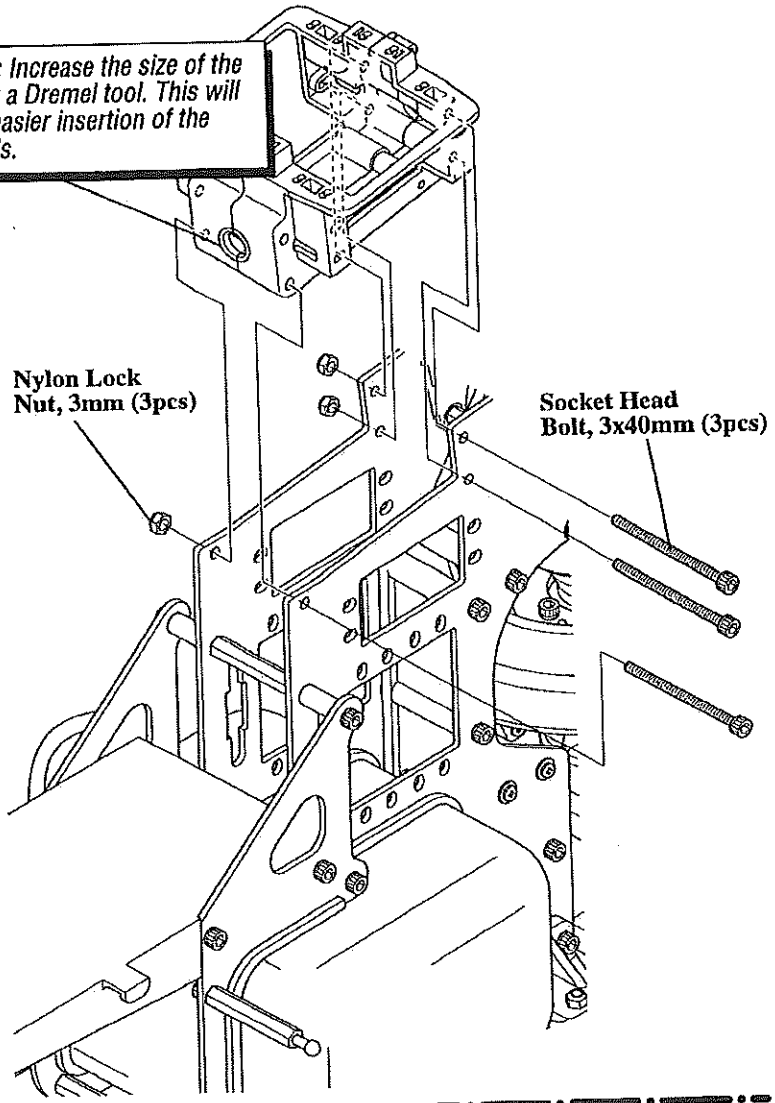
.....3pcs
Nylon Lock Nut, 3mm

.....4pcs
Self Tapping Screw, 2.6x8mm

TEAM TIP: Increase the size of the hole using a Dremel tool. This will allow for easier insertion of the servo leads.

Note:
When installing the Servo Tray, be careful not to overtighten.





OPTIONAL BODY MOUNT ATTACHMENT

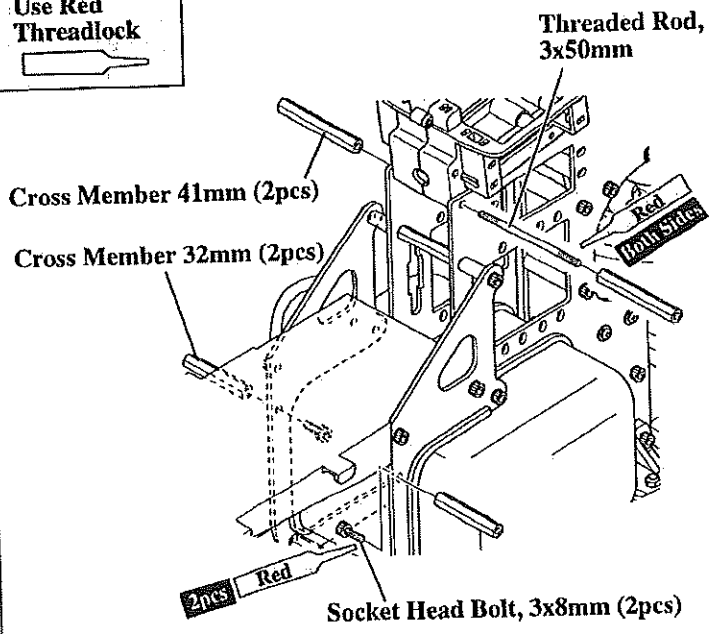
.....2pcs
Socket Head Bolt, 3x8mm

.....2pcs
Cross Member, 41mm

.....2pcs
Cross Member, 32mm

..1pc
Threaded Rod, 3x50mm

Use Red Threadlock



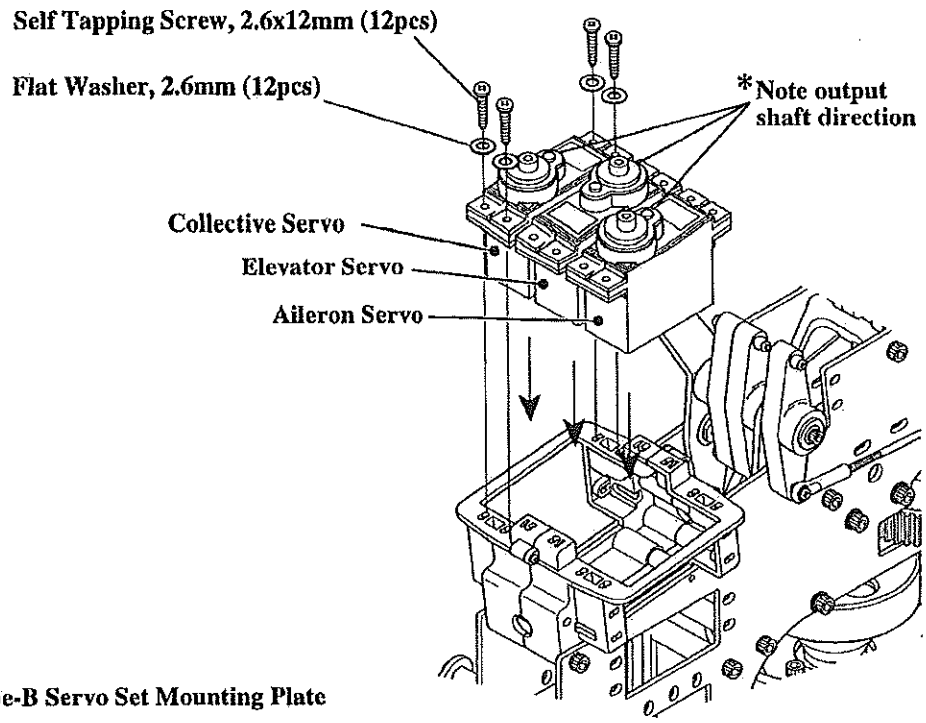
Caution:
If you want to attach the Body very firmly, install the extra 41mm Cross Member, and change to the extra 32mm Cross Member as shown. (In such a case, you can attach the Body at six places with socket head screws). This will provide a more secure canopy mount for 3D type flying.

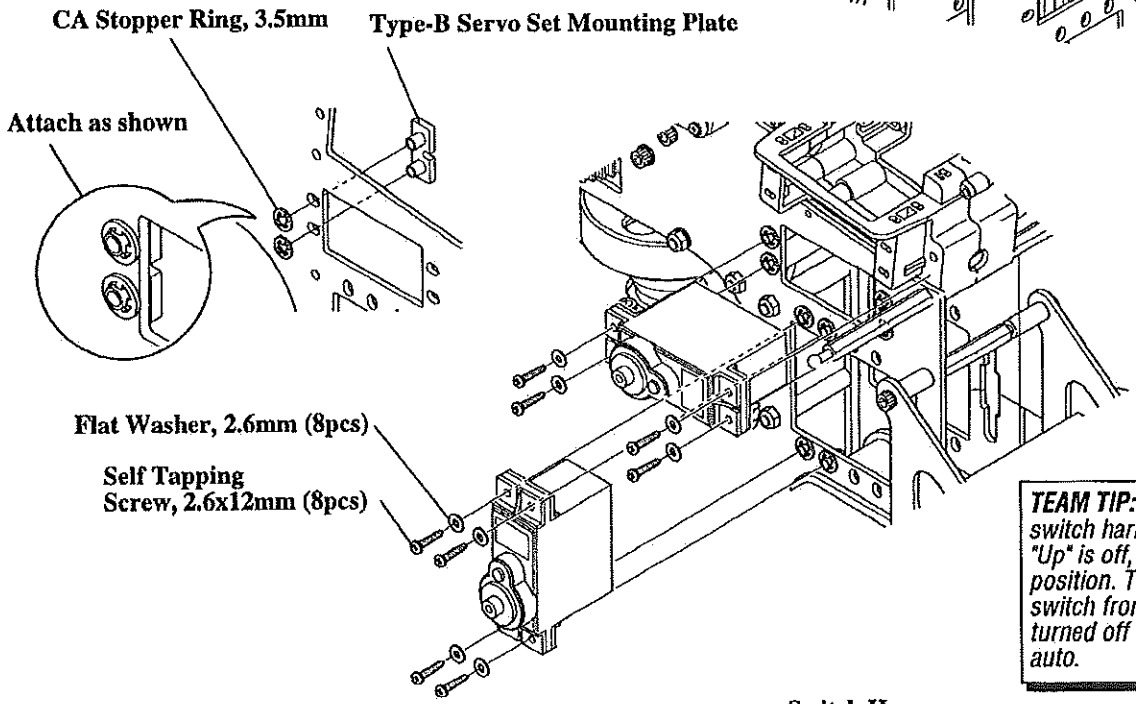
6-2 SERVO/SWITCH HARNESS INSTALLATION

Self Tapping Screw, 2.6x12mm	20pcs
Flat Washer, 2.6mm	20pcs
CA Stopper Ring, 3.5mm	8pcs
Type-B Servo Set Mounting Plate	4pcs

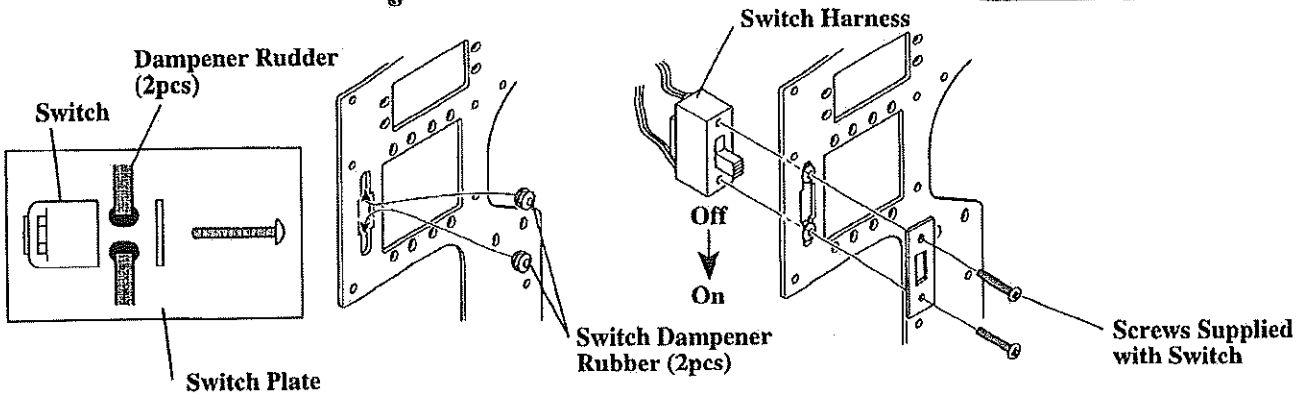
* Note correct Servo Output Shaft orientation during installation.

TEAM TIP: *For increased precision, add the JR Servo Supporters (JRPA255) to the aileron and collective servos.*



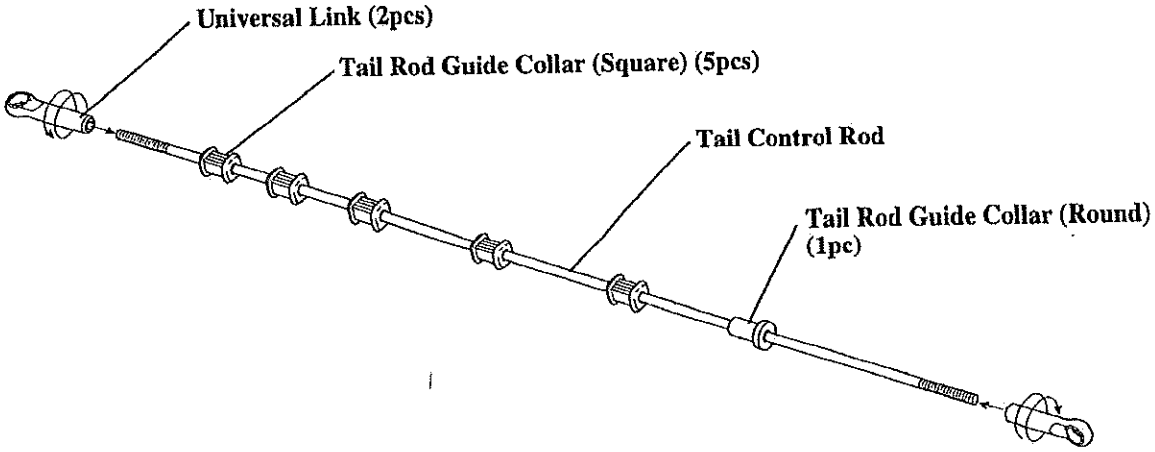


TEAM TIP: *When installing the switch harness, position it so that "Up" is off, and "Down" is the on position. This will prevent the switch from accidentally being turned off in a hard landing or auto.*



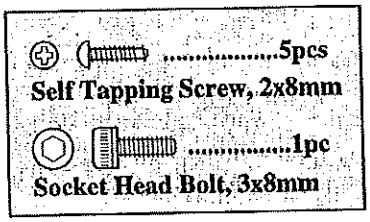
6-3 TAIL CONTROL ROD ASSEMBLY

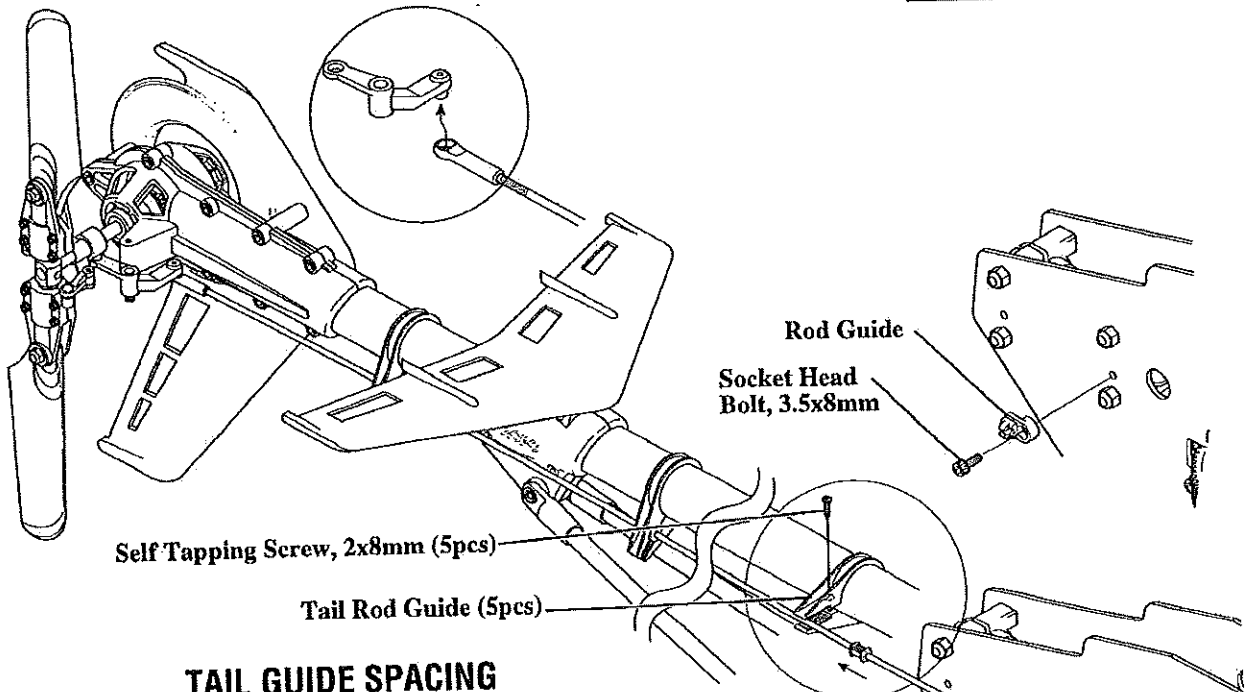
Use JR Ball Link Sizing Tool.



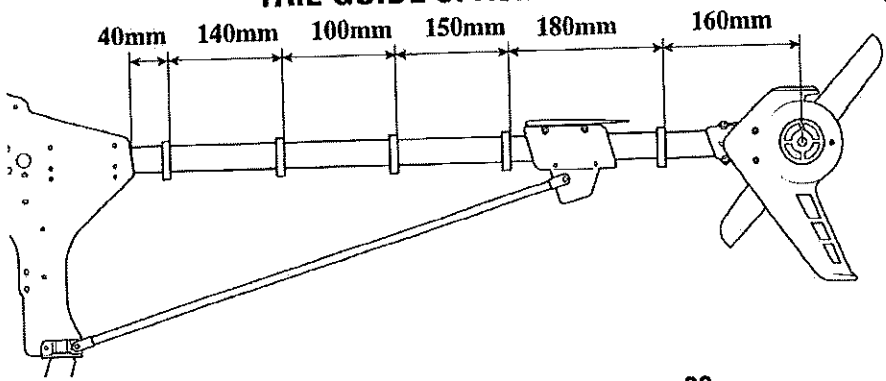
6-4 TAIL CONTROL ROD INSTALLATION

TEAM TIP: Once tail guides are attached to the tail boom, check to insure that the tail control rod will move freely with little resistance. Rotate the tail guides as needed until the system moves as easily as possible. Once this has been achieved, apply a small amount of CA adhesive to bond the tail guides to the tail boom. This will prevent the guides from being moved accidentally.





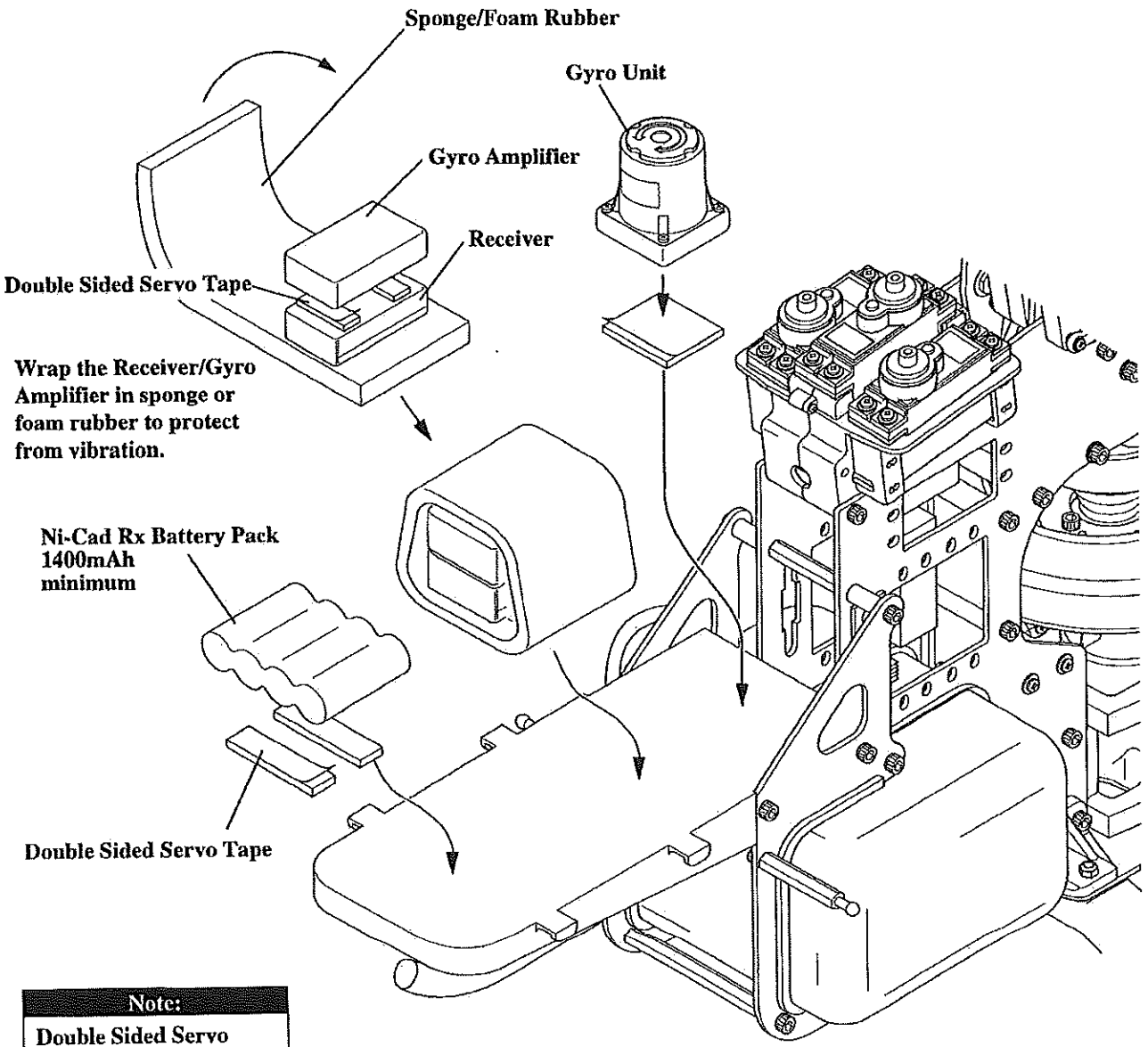
TAIL GUIDE SPACING



6-5 GYRO/RECEIVER/BATTERY INSTALLATION

Note:

Be certain when installing the Gyro Unit to the Front Radio Bed that it does not come in contact with the frame of the helicopter, etc.
Also make sure that the Front Radio Bed is free from oil and debris. Clean with rubbing alcohol if necessary to insure proper adhesion.



Note:

Double Sided Servo Tape and Sponge/Foam Rubber are not included in this kit.

The following preparations are suggested for use with JR radio systems. However, these procedures are applicable to most other brand radio systems. These suggested adjustments are necessary to insure correct installation and attachment of the control linkages and servo horns.

TRANSMITTER PREPARATION

1. Set all trim levers, trim knobs and switches to the neutral, or zero, positions.
2. Turn the transmitter power switch to the "on" position.
3. If you are using a computer radio system that had been previously adjusted to another model, reset all functions and input values to the factory preset position.
4. Move the throttle/collective control stick to the center or half stick position. Next slide the throttle trim lever to the full low position.

RECEIVER FLIGHT PACK PREPARATION

1. With the transmitter still on, slide the receiver switch to its "on" position. All servos should move to the neutral, or center, position.
2. Check to insure that all servos operate with the appropriate control stick.
3. Rest the throttle stick to the center position, making sure the throttle trim is still at low.
4. Turn off the receiver switch first, followed by the transmitter.

SERVO HORN INSTALLATION SUGGESTIONS

For proper operation, it's important that the servo horns are positioned on the servos in the "exact" neutral position. Although most computer radio systems offer a sub-trim feature, it is suggested that the servo horns be manipulated on the servos to achieve the "exact" neutral settings.

Since the servo output spline on a JR system has an odd number of teeth (21), it's possible to reposition the servo arm on the servo at 90° intervals to achieve the proper neutral attachment of the servo horn.

Once the correct arm of the servo horn has been established, it's suggested that the remaining unused arms be removed from the servo horn as shown in the installation diagrams in the following section.

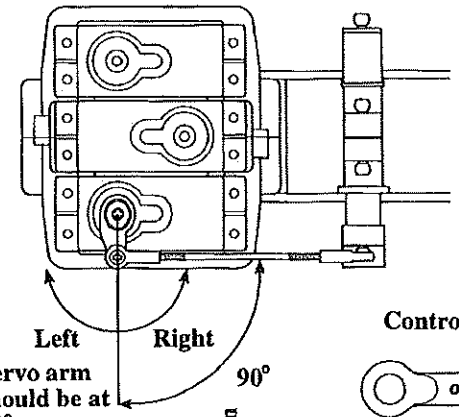
It will also be necessary to enlarge the appropriate hole in the servo horn slightly to allow correct installation of the steel control balls to the servo horn.

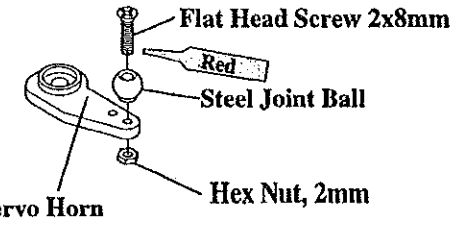
7-1 AILERON LINKAGE CONNECTION

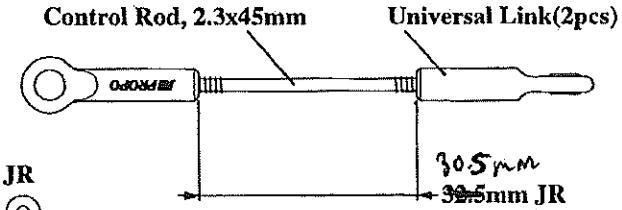
Flat Head Screw, 2x8mm	1pc
Steel Joint Ball	1pc
Hex Nut, 2mm	1pc

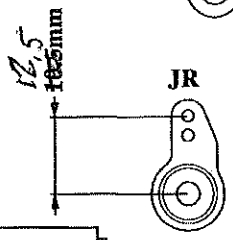
Use Red Threadlock

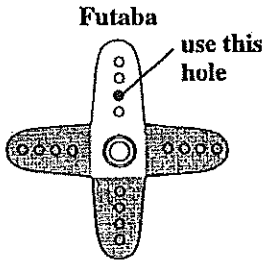
*Option: For smooth operation, pre-size the ball links with the JR ball link sizing tool prior to attachment.











Futaba
Be sure to remove the excess Servo Horn Arms as shown. Secure the Servo Horn using the Servo Horn Screw.

Servo Reversing Direction	
JR	Futaba
Normal	Normal

TEAM TIP: For agressive 3D flying, either heavy-duty nylon (JRPA215) or aluminum servo arms should be used on aileron, elevator, and collective.

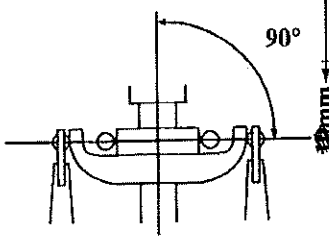
7-2 ELEVATOR LINKAGE CONNECTION

Flat Head Screw, 2x8 mm	2pcs
Steel Joint Ball	2pcs
Hex Nut, 2mm	2pcs

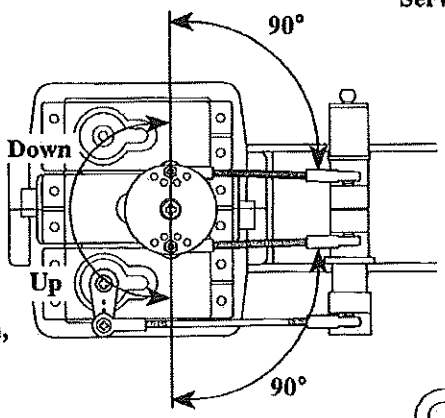
Use Red Threadlock

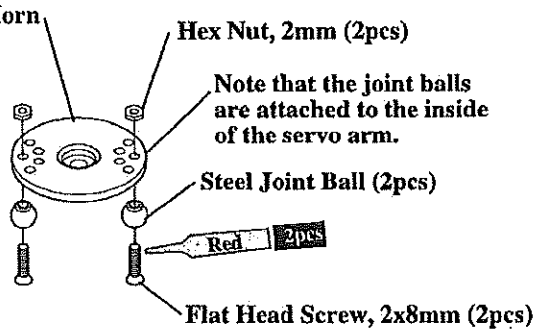
*Option: For smooth operation, pre-size the ball links with the JR ball link sizing tool prior to attachment.

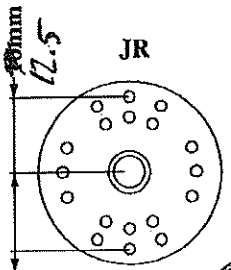
At this time, check to insure that the Swashplate is at a 90° angle to the Main Rotor Shaft in both fore/aft and right/left directions.

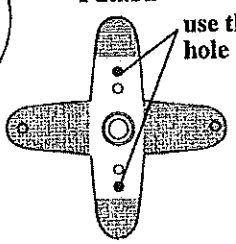


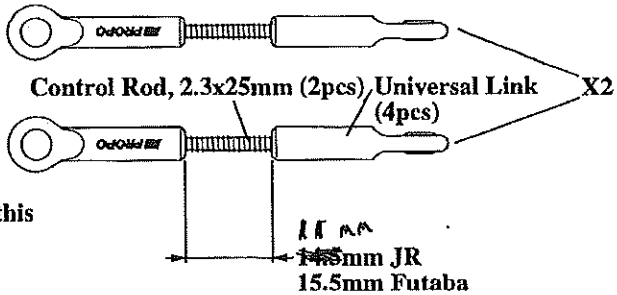
Servo Wheel should be at 90°







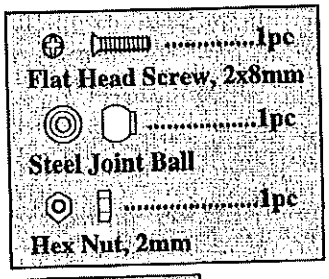


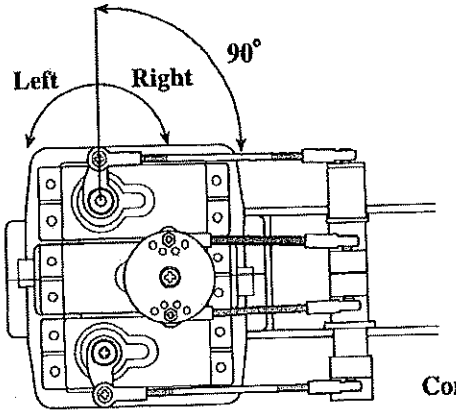


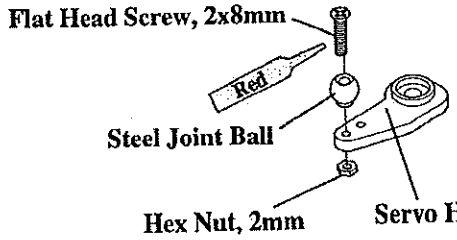
Futaba
Be sure to remove the excess Servo Horn Arms as shown. Secure the Servo Horn using the Servo Horn Screw.

Servo Reversing Direction	
JR	Futaba
Normal	Normal

7-3 COLLECTIVE PITCH LINKAGE CONNECTION

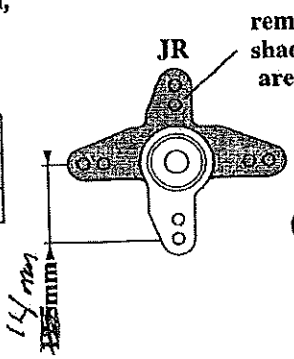


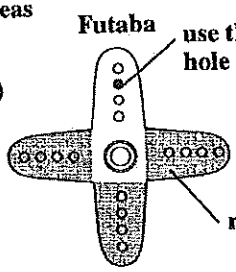


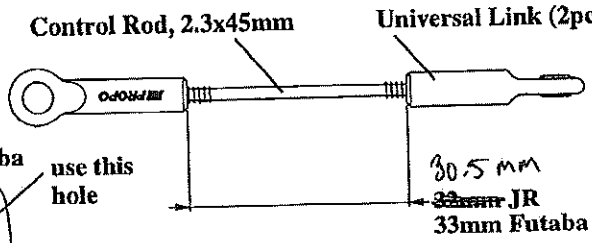


*Option: For smooth operation, pre-size the ball links with the JR ball link sizing tool prior to attachment.

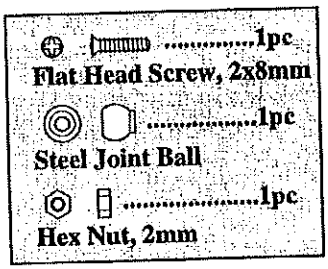
Servo Reversing Direction	
JR	Futaba
Reverse	Reverse



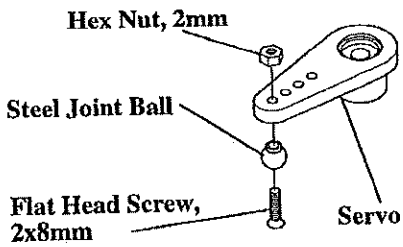




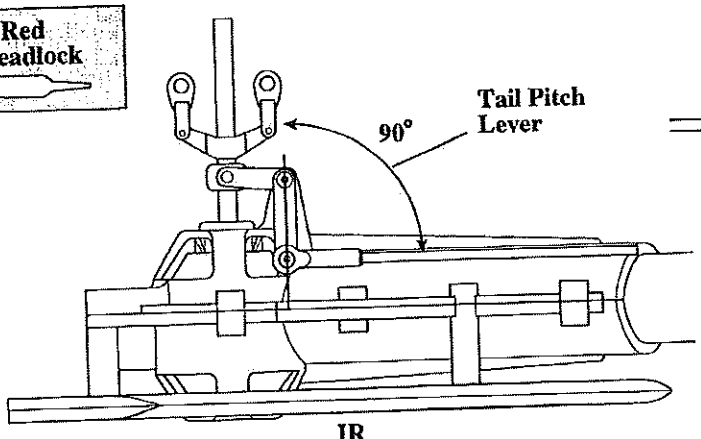
7-4 TAIL CONTROL ROD CONNECTION

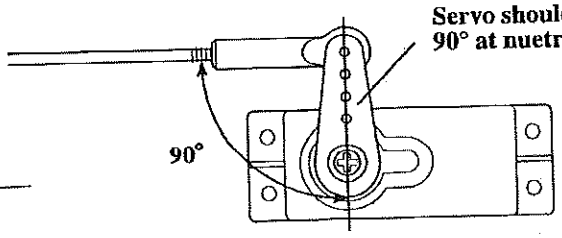


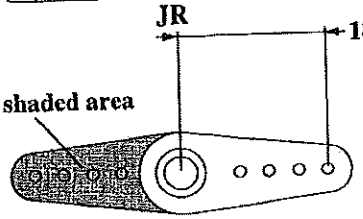
Adjust the length of the Tail Control Rod until both the Tail Pitch Lever and Servo Arm are at 90° as shown below.

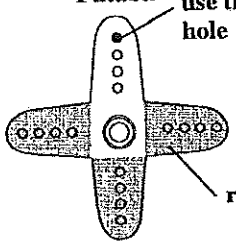


Note that Control Ball is attached to the inside of the Servo Arm.









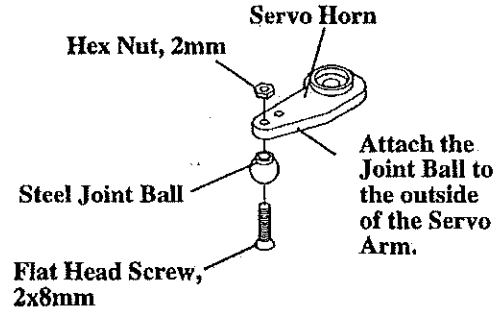
Servo Reversing Direction	
JR	Futaba
Reverse	Reverse

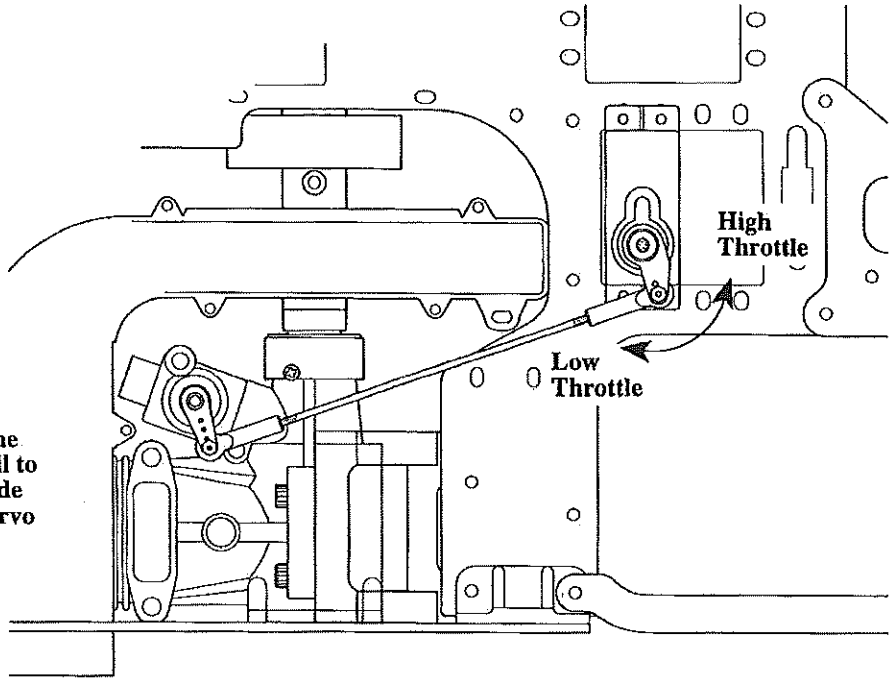
7-5 THROTTLE LINKAGE CONNECTION

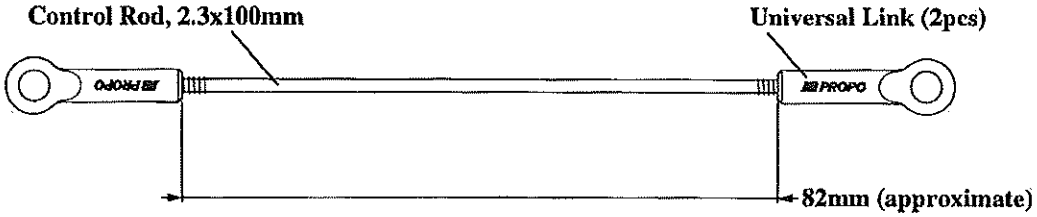
Flat Head Screw, 2x8mm	1pc
Steel Joint Ball	1pc
Hex Nut, 2mm	1pc

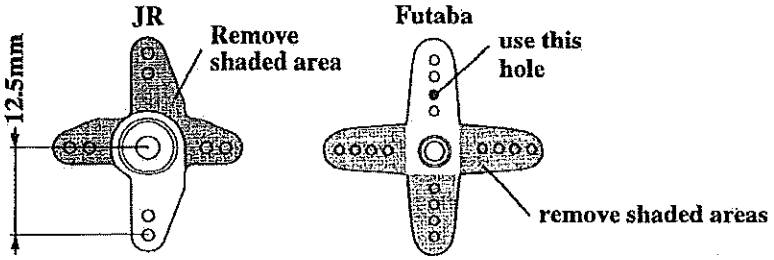
*Option: For smooth operation, pre-size the ball links with the JR ball link sizing tool prior to attachment.

Servo Reversing Direction	
JR	Futaba
Reverse	Reverse

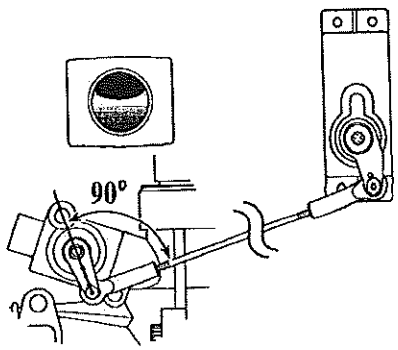




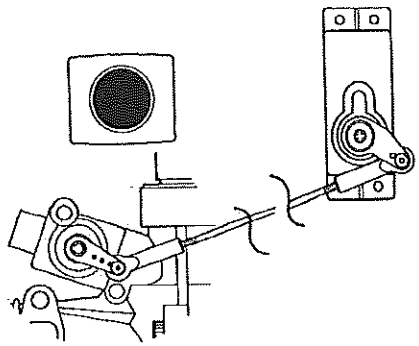




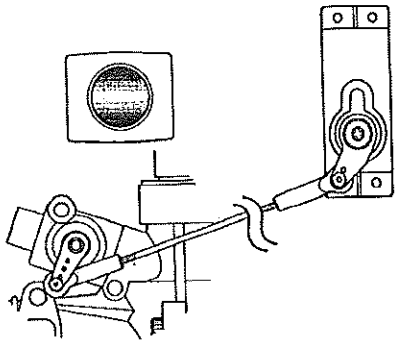
7-5.1 THROTTLE ARM/SERVO HORN POSITIONS



1/2 Stick (Throttle) Position (Throttle Barrel 1/2 open)



High Stick (Throttle) Position (Throttle Barrel Fully Open)



Low Stick (Throttle) Position (Throttle Barrel Fully Closed)

*To avoid differential throttle travel, make certain both the throttle arm and the servo horn are positioned as shown in the above diagrams.

To achieve the correct position of the throttle/servo arm, it may be necessary to re-position the throttle arm on the carburetor. It may also be necessary to adjust the length of the throttle linkage slightly to achieve full open and closed positions of the carburetor.

Throttle Travel Adjustment (Initial Set-Up Only)

It is also possible to increase/reduce the travel of the throttle servo through the travel adjust function found in most computer radio systems. If this function is used, make sure the values for the high and low positions remain equal (same value for high/low). If these values are not equal, it will create a differential, or uneven movement of the throttle, making rotor rpm adjustment and fine tuning more difficult.

Throttle Travel Adjustment (Full 3D Set-Up)

When setting up your throttle linkage for cyclic to throttle mixing with many radio systems, it will be necessary to make any adjustment in the throttle travel limits by mechanical means only. Move the control linkage in or out on the servo/throttle arms until the correct barrel travel is achieved. Please note that it is very important the ATV (travel volume) for both the high and low throttle setting remain at their maximum values to prevent over-travel and binding of the throttle linkage when cyclic to throttle mixing is used.

Note: The use of cyclic to throttle mixing is recommended only for use by experienced pilots.

For initial cyclic to throttle mixing value information, please refer to the JR PCM10 series data sheets located on page 54 of this manual. Please note that the values and mixing channels shown are universal to most radio systems currently available.

Cyclic to Throttle Channel and Mixing Values (most systems)

	Channel		Mixing Value	
Mix #1	Master	Slave	Left	Right
	Aileron(2)*	Throttle (1)*	30	30
Mix #2			Up	Down
	Master	Slave	30	30
	Elevator(3)*	Throttle (1)*	Left	Right
Mix #3 (Optional)			20	25
	Master	Slave		
	Rudder(2)	Throttle (1)*		

*Numbers shown correspond with the correct JR channel numbers

Mixing Value Adjustment

Please note that it will be necessary to determine if the desired mixing values need to be a + or - value based on servo direction, etc.

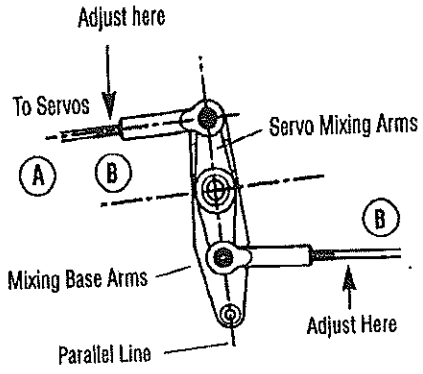
To verify the proper direction, move the control surface in each direction while watching the throttle arm. Throttle should increase each time a control surface input is given. Adjust the + or - value as necessary until the proper mix is achieved.

Note: Also check to confirm that the throttle travel is correct and is not causing a bind in the control linkage after the cyclic mixing has been added.

7-6 CONTROL LEVER/LINKAGE ADJUSTMENT

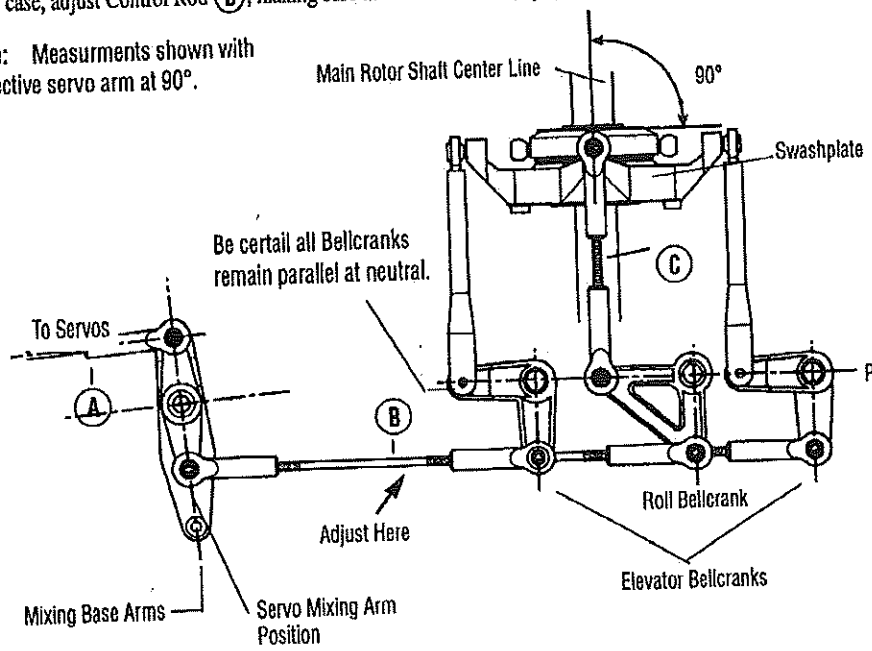
Note: The following adjustments are made with all servos in the center (1/2 stick) or neutral positions.

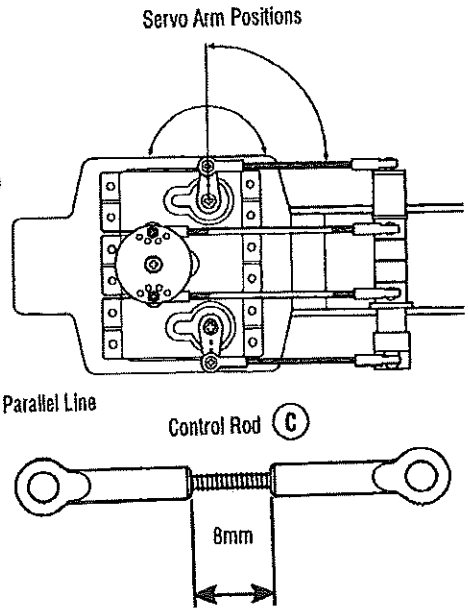
1. Check to insure that both the Elevator (2) and Aileron (1) Servo Mixing Arms are parallel (same angle) to the Mixing Base Arms (2) with all servos in the neutral (center) positions. If these items are not parallel, re-adjust the (A) and (B) Control Rods equally until proper alignment is acheived.



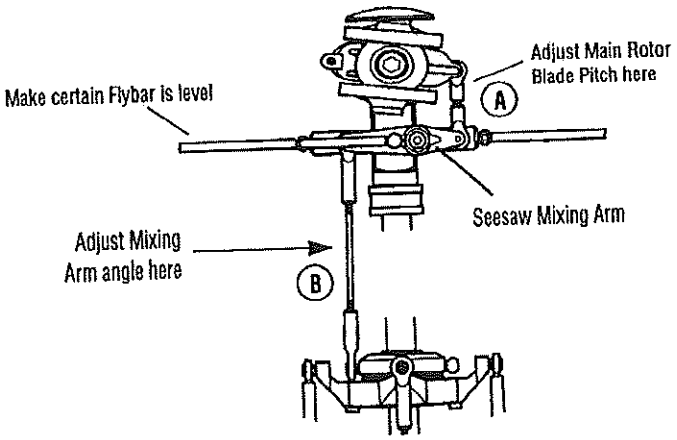
2. Next, check to be sure the Swashplate Assembly is at 90° in all directions (Fore/Aft, Left, Right) to the Main Rotor Shaft Assembly. If this is not the case, adjust Control Rod (B), making sure that both the Roll (1 pc) and Elevator (2 pcs) Bellcranks remain positioned parallel as shown. Also check to insure that control rod (C) is sized 8mm as shown below.

Note: Measurments shown with collective servo arm at 90°.

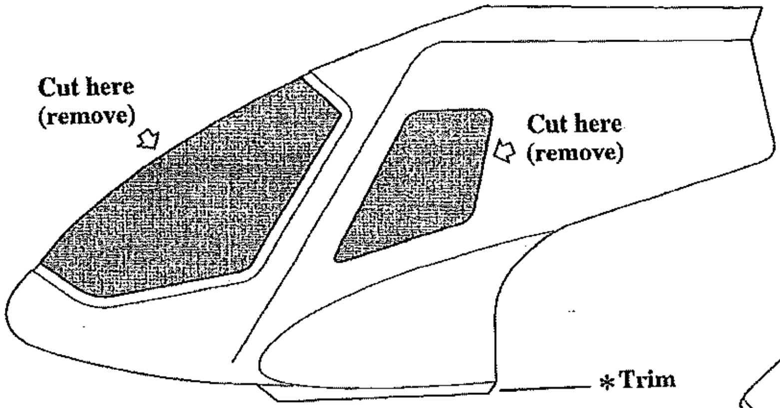


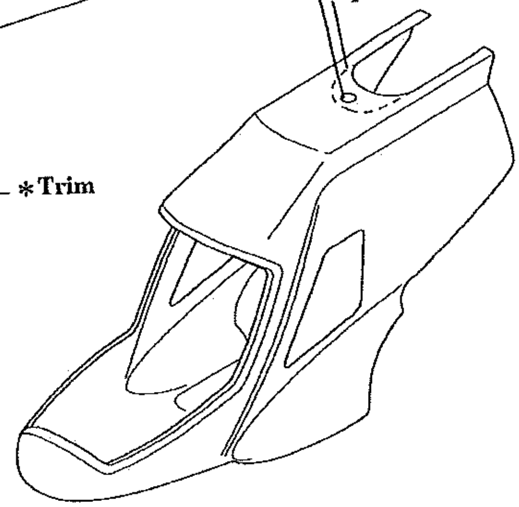


3. Check the Seesaw Mixing Arms (2) and adjust so that with the Flybar Assembly Level, and the Pitch at 1/2 stick (center), the Mixing Arms are level (parallel) as shown. If this is not the case, adjust the Control Rod (B) (2) until this positioning is achieved. Adjustment of the Main Rotor Blade Pitch to the desired settings can be achieved by using Control Rod (A) for adjustment. See page 36 Section 7-3 for Pitch range settings.



8-1 TRIMMING OF BODY ASSEMBLY/CANOPY





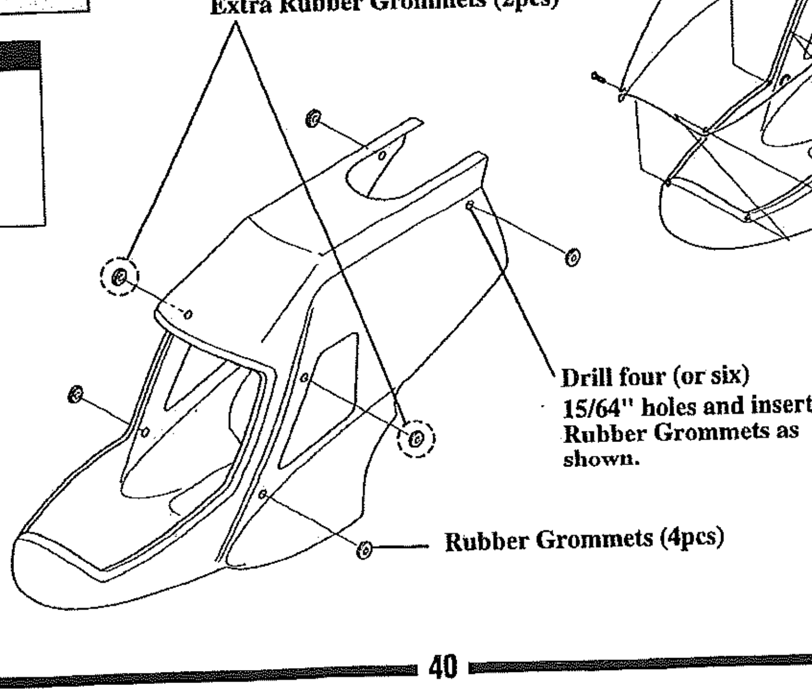
TEAM TIP: *Rather than drill out the small hole, cut the canopy arc open just past the position of this hole. This eliminates the problem of catching the starter on the canopy. It also makes it easier to see the starter adaptor.*

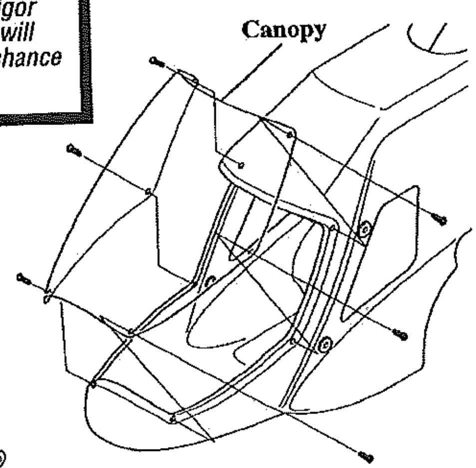
***It may be necessary to trim the lower edge of the canopy slightly if it contacts the lower tank mounts.**

8-2 BODY ASSEMBLY/CANOPY ATTACHMENT

TEAM TIP: *Attach the body assembly to the Vigor (Step 8-3) prior to attaching the canopy. This will create a better canopy fit and will reduce the chance of the canopy cracking at the screw holes.*

Note:
If you added Extra Cross Member L41 in Step 6-1, install extra Rubber Grommets as shown.

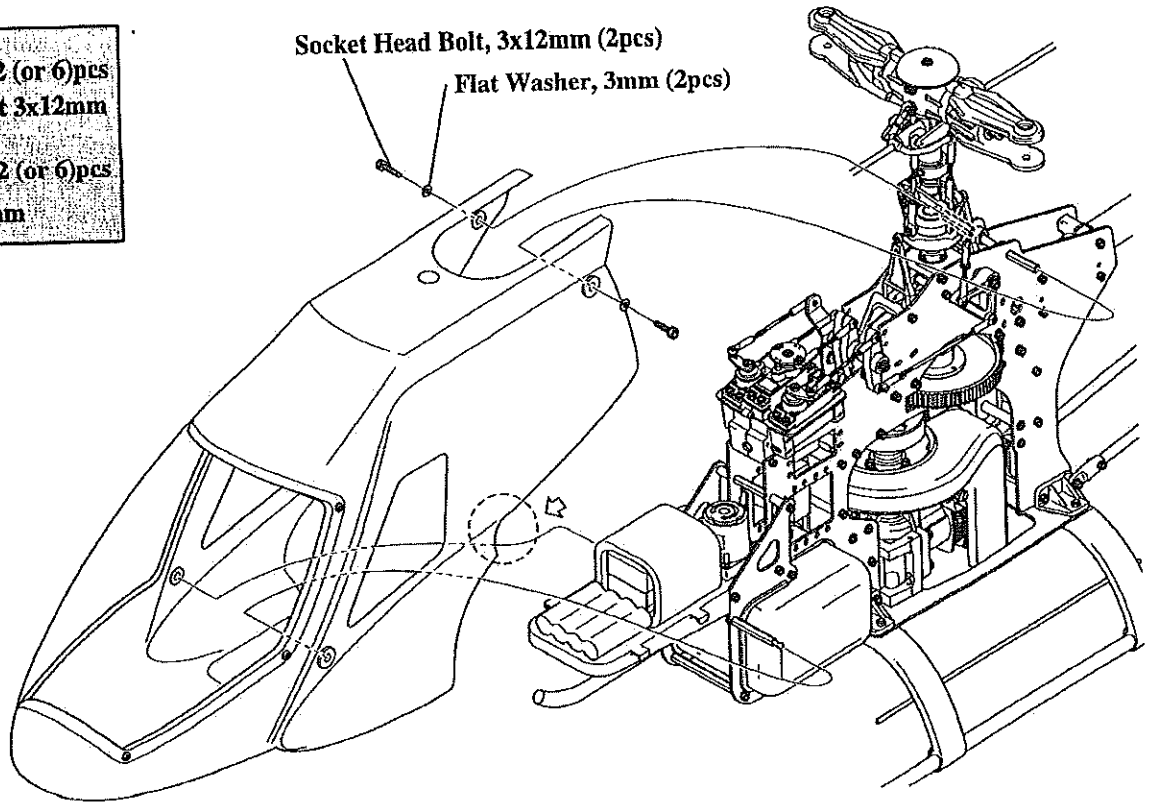




8-3 BODY ATTACHMENT

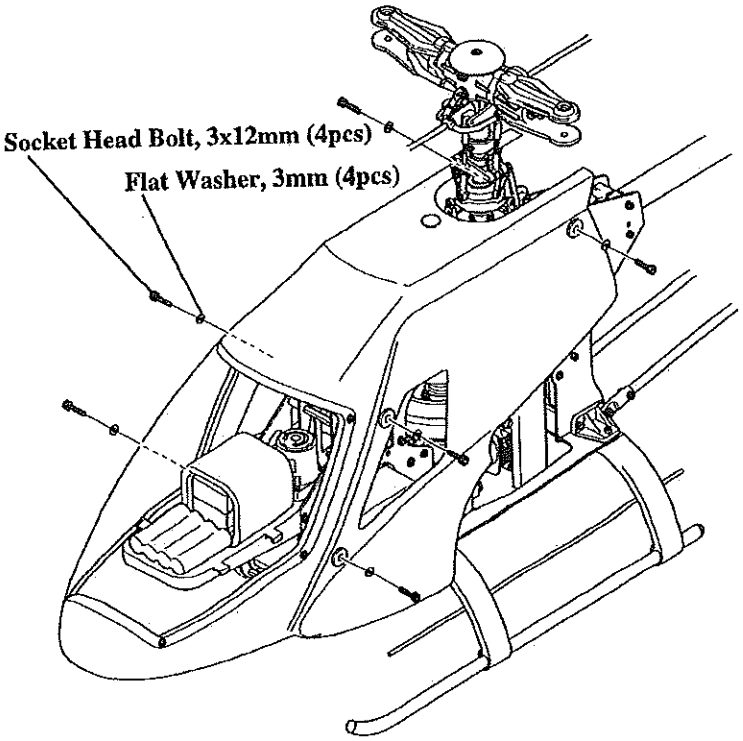
..2 (or 6)pcs
Socket Head Bolt 3x12mm

.....2 (or 6)pcs
Flat Washer, 3mm



Check to insure the Body does not come in contact with any portion of the Main Frame, Muffler, Servo, Servo Horns, etc. Trim for clearance if necessary. Trim and remove a small portion of the canopy shown in the circle above as it is very close to the Cooling Fan Shroud (left side only).

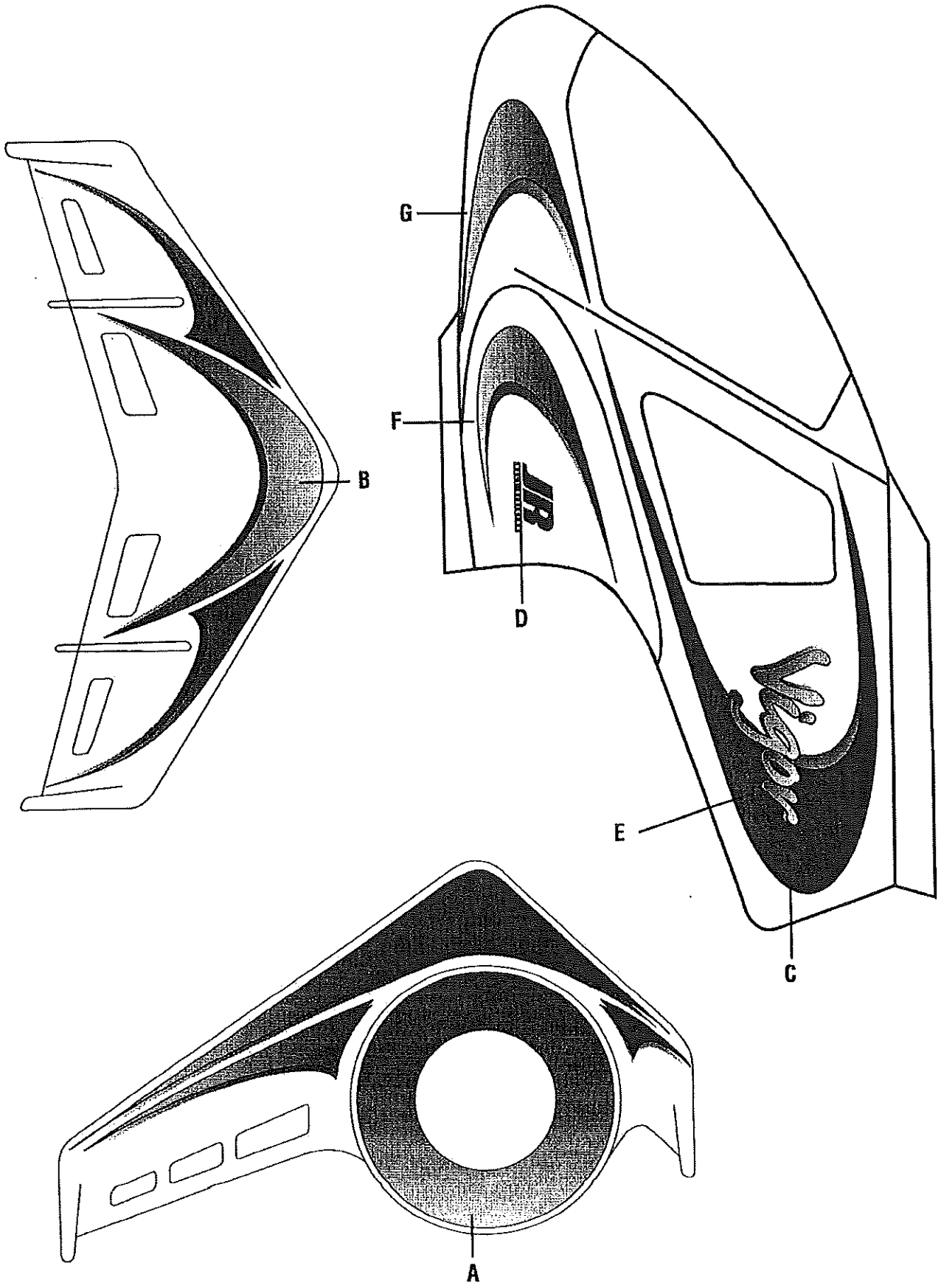
Note:
If you added Extra Cross Member 41, and changed the Cross Member to the Extra Cross Member 32 in Step 6-1, you can attach the Body at six places with socket sead screws as shown.



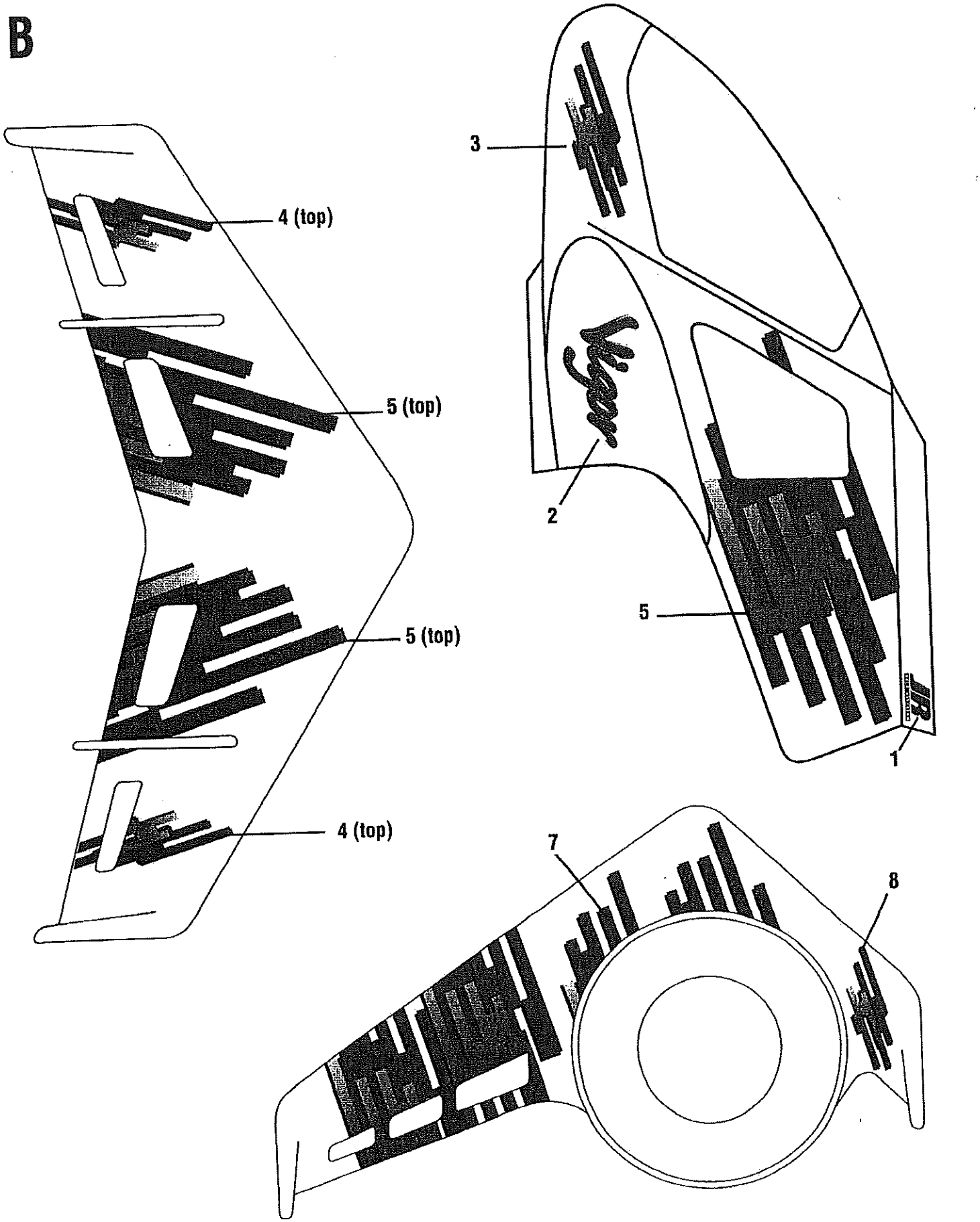
It is suggested that the body decals be applied at this time. Prior to decal attachment, clean the body using rubbing alcohol or lacquer thinner. If using lacquer thinner, make sure it doesn't come in contact with the canopy as it will damage this material.

66r-9804

A

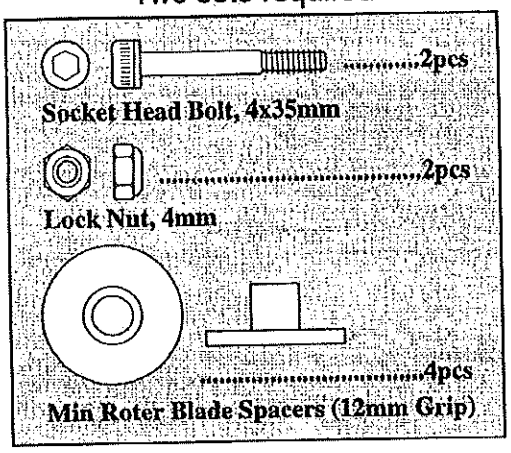


B



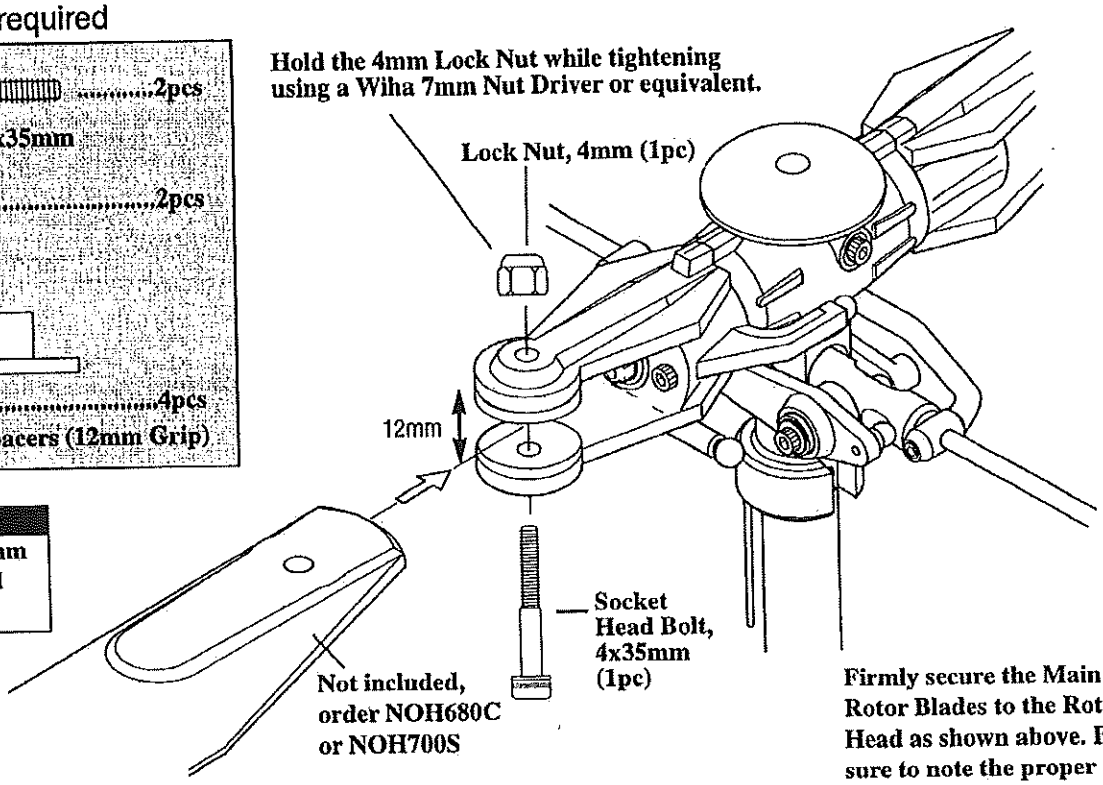
8-4 MAIN ROTOR BLADE ATTACHMENT (BLADES NOT INCLUDED)

Two sets required



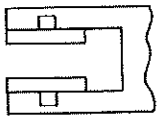
Note:
5x35mm bolts and 5mm nuts are also included with this kit.

Hold the 4mm Lock Nut while tightening using a Wiha 7mm Nut Driver or equivalent.



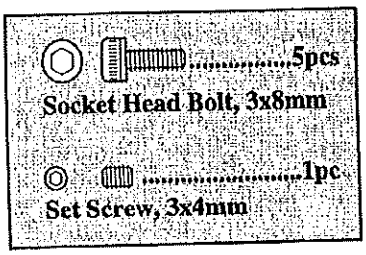
Insert the Main Rotor Blade Spacers as shown:

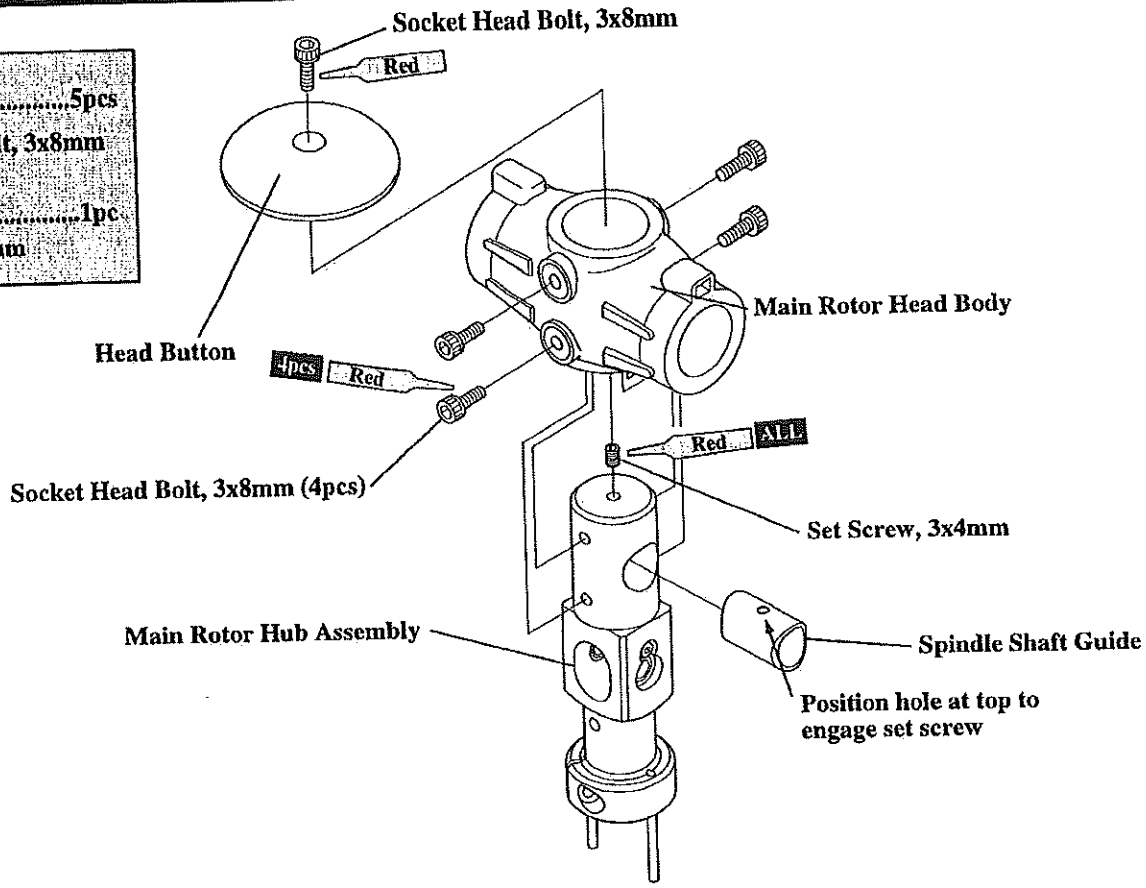
Apply a light drop of CA adhesive to hold the Main Rotor Blade Spacers in place.



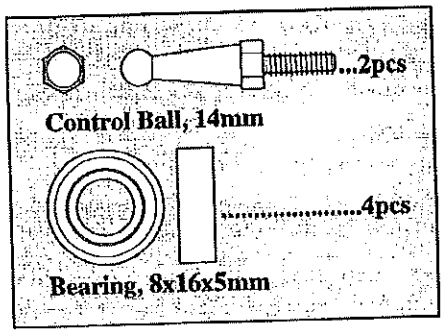
Firmly secure the Main Rotor Blades to the Rotor Head as shown above. Be sure to note the proper direction of the Rotor Blades when assembling (clockwise rotation). Main Blades should be tightened so they can pivot when moderate pressure is applied. Do not allow the Main Blades to swing freely within the Main Blade Holders.

P-1 ASSEMBLY PROCESS – MAIN ROTOR HEAD 1



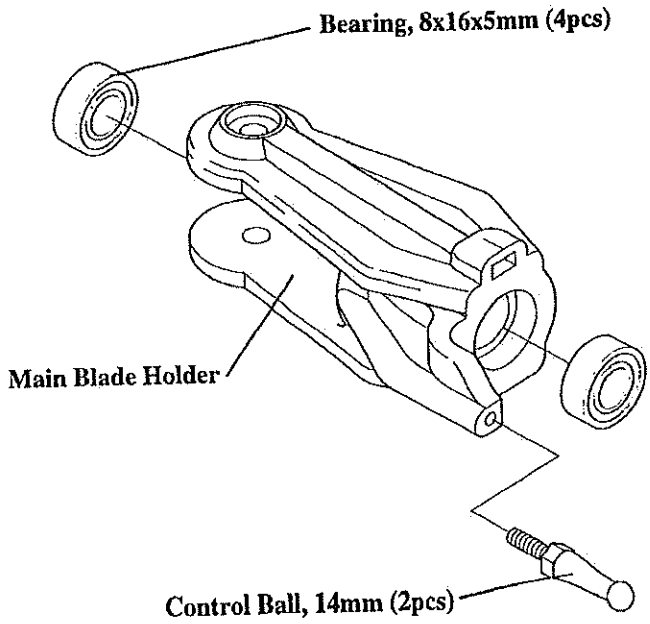


P-2 ASSEMBLY PROCESS – MAIN ROTOR HEAD 2

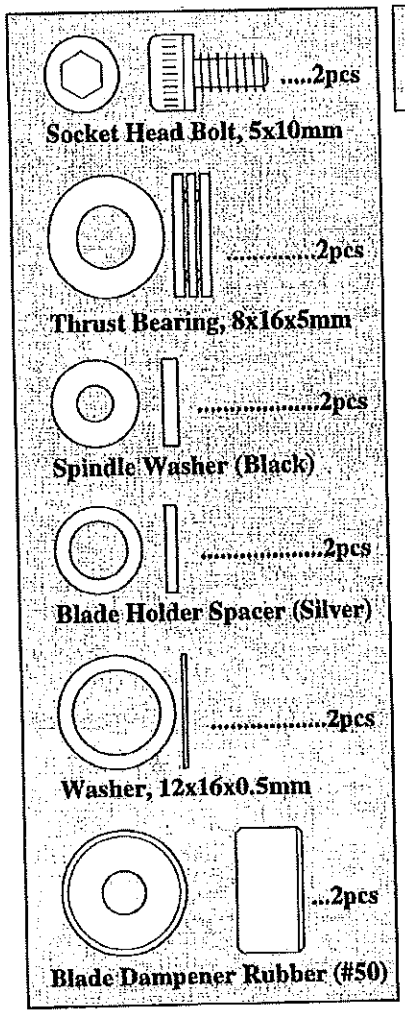


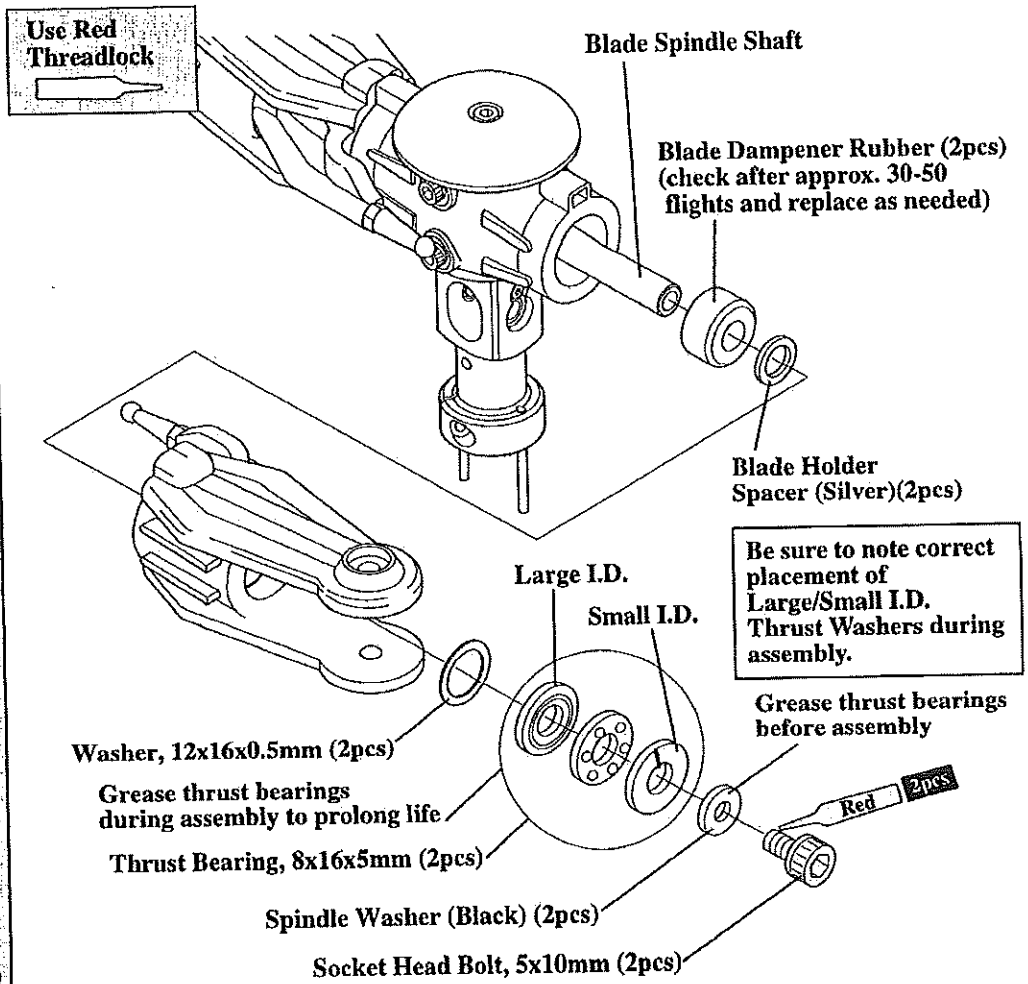
Use caution when inserting the Main Blade Holder Bearings so as not to distort/damage the Main Blade Holders.
Make two Main Blade Holders.

TEAM TIP: JB Weld the bearings into the blade holders to reduce play in the blade holders.

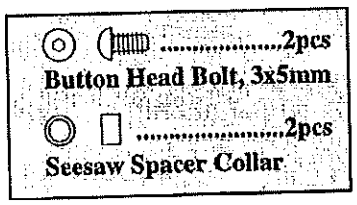


P-3 ASSEMBLY PROCESS PARTS – MAIN ROTOR HEAD 3

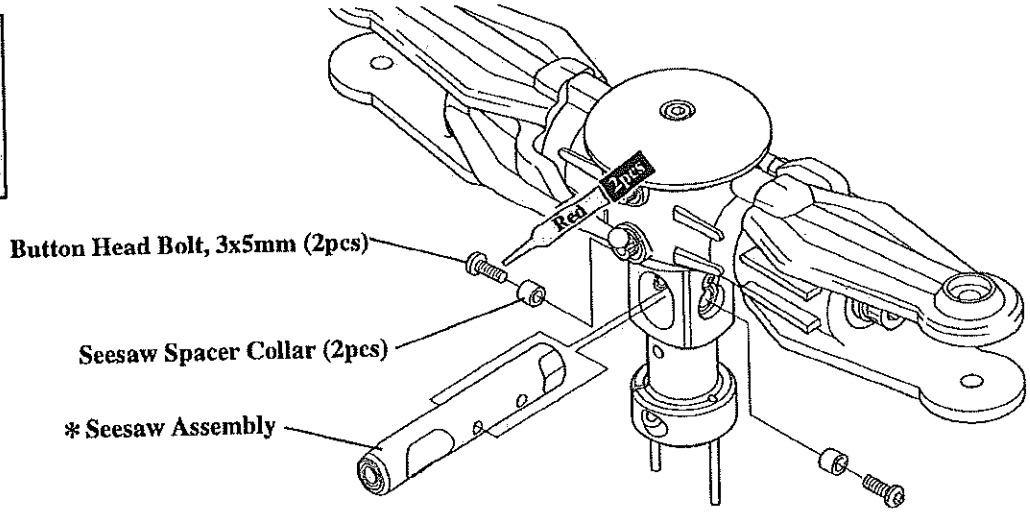




P-4 ASSEMBLY PROCESS - MAIN ROTOR HEAD 4



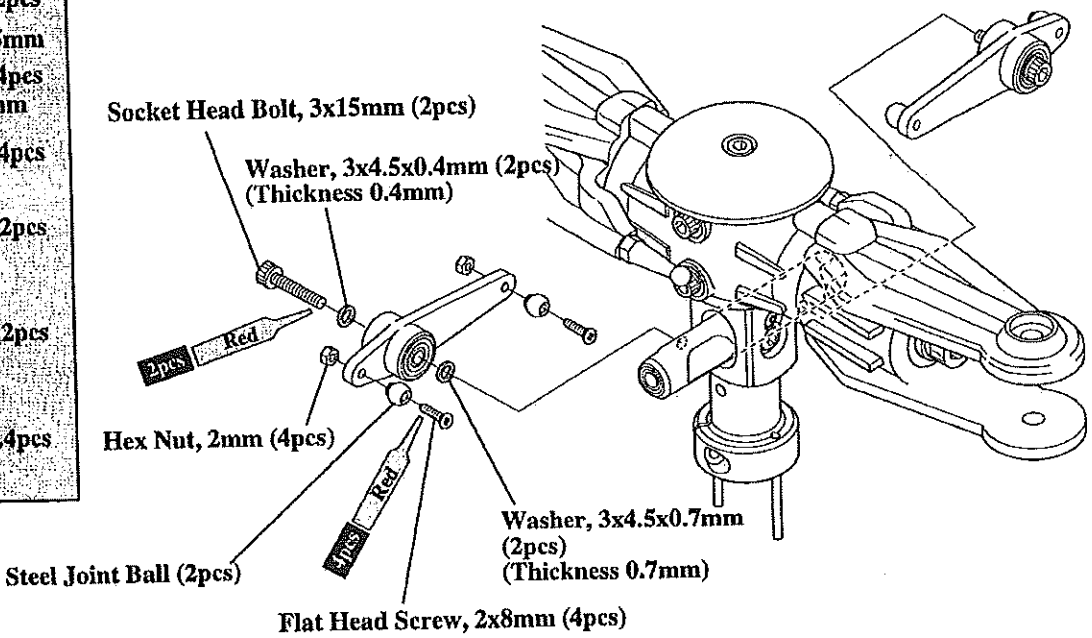
* Be sure to note correct placement of the front and the back of the Seesaw Assembly.



P-5 ASSEMBLY PROCESS – MAIN ROTOR HEAD 5

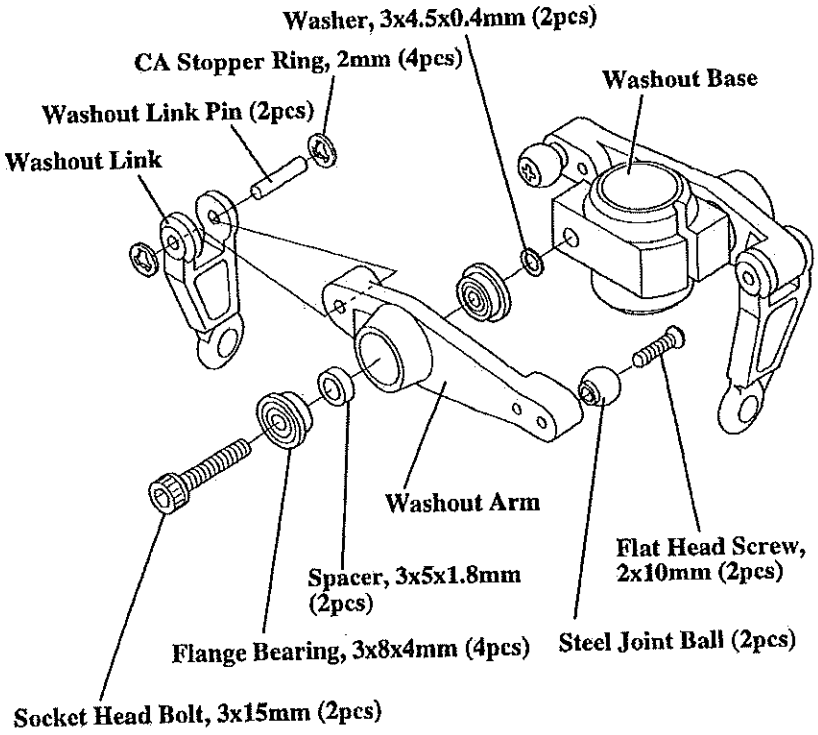
- Socket Head Bolt, 3x15mm 2pcs
- Flat Head Screw, 2x8mm 4pcs
- Steel Joint Ball 4pcs
- Washer, 3x4.5x0.7mm (Thickness 0.7mm) 2pcs
- Washer, 3x4.5x0.4mm (Thickness 0.4mm) 2pcs
- Hex Nut, 2mm 4pcs

Use Red Threadlock



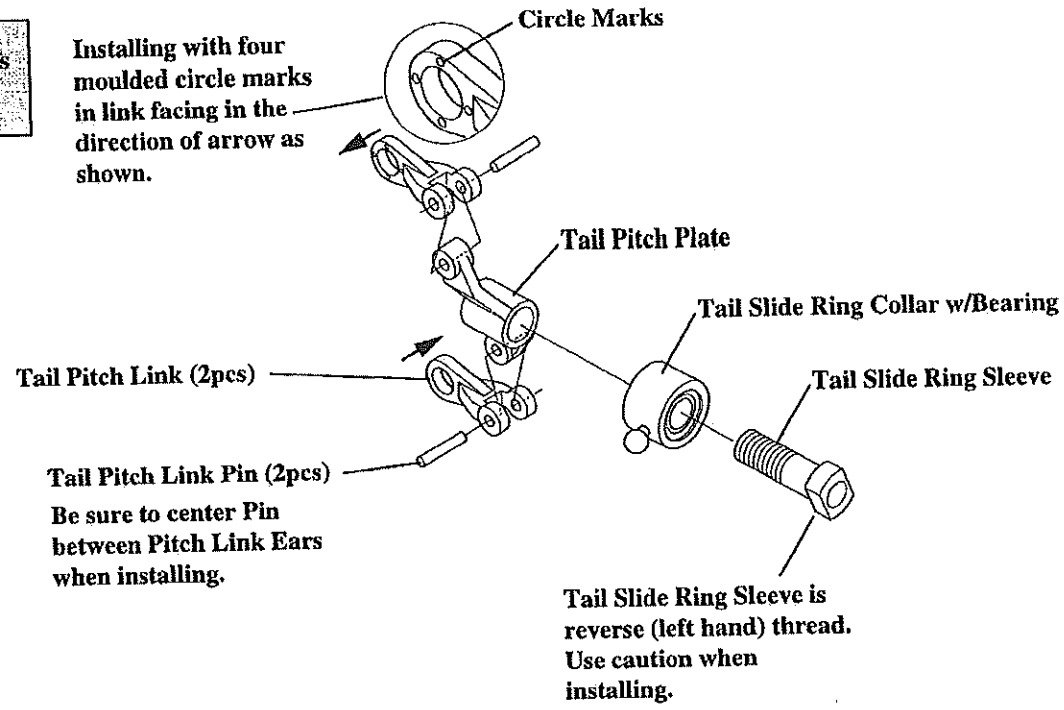
P-6 ASSEMBLY PROCESS – WASHOUT UNIT

- Socket Head Bolt, 3x15mm 2pcs
- Flat Head Screw, 2x10mm 2pcs
- Flange Bearing, 3x8x4mm 4pcs
- Washout Link Pin 2pcs
- CA Stopper Ring, 2mm 4pcs
- Washer, 3x4.5x0.4mm 2pcs
- Spacer, 3x5x1.8mm 2pcs
- Steel Joint Ball 2pcs



P-7 ASSEMBLY PROCESS – TAIL SLIDE RING

2pcs
Tail Pitch Link Pin



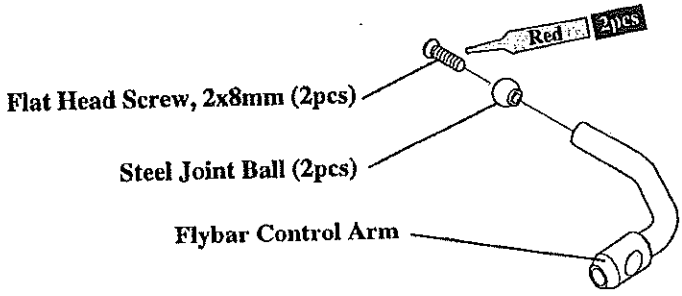
P-8 ASSEMBLY PROCESS – FLYBAR CONTROL ARM

2pcs
Flat Head Screw, 2x8mm

2pcs
Steel Joint Ball

Make two Flybar Control Arms.

Use Red Threadlock



Now that the radio system is completely installed into the helicopter, it's necessary to check and adjust the following:

1. **Servo Direction (Servo Reversing)**
   Check to insure that all servos have been set to the correct direction as shown in the Control Linkage Installation Section (Steps 7-1 to 7-5).

2. **Dual Rates**
   It's suggested that for initial flights, the Dual Rate Function values be set as follows:
   0 Position (low rate) 70%
   1 Position (high rate) 100%

3. **Exponential Settings**
   It's suggested that the exponential rate settings remain in the 0 value position until the initial test flights. After initial flights, adjust the exponential values to achieve the desired control feel.

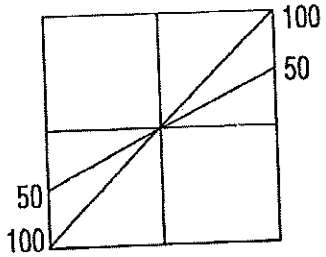
4. **Sub-Trim Settings**
   It's suggested that the correct neutral settings be achieved without the use of the Sub-Trim Function. If sub-trim is used for final flight adjustments, the sub-trim values should not exceed 10. If the sub-trim values are greater, readjust the control linkages or servo arms and reset the sub-trims to 0.

5. **Travel Adjustment**
   The Travel Adjustment Function allows the control surface to be adjusted to achieve maximum travel or surface deflection. When using this feature, it's extremely important that the high/low, up/down values for each channel be set at an equal value or a differential movement will occur (Diagram B). It is especially important the throttle and collective pitch travel limits are set to an equal value (Diagram A).

   Please refer to the diagrams below for clarification.

Correct

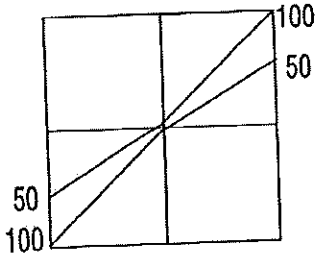
A



Straight & Linear Servo Travel

Incorrect

B



Non-Linear Servo Travel

6. **Pitch/Throttle Curve Adjustment**
   It is very important the throttle and pitch curves are adjusted properly to achieve the best performance from your helicopter. When properly adjusted, the main rotor head rpm should remain consistent throughout all maneuvers and throttle stick positions. A constant rpm will also help to improve the effectiveness and accuracy of the tail rotor and gyro systems.

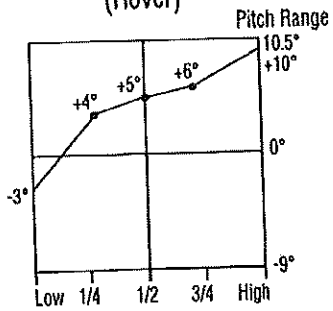
A. **Pitch Curve Adjustment**
   Using a pitch gauge (optional) set the low, mid and high stick pitch settings as shown in the diagram below. Use the Travel Adjust Function to set the maximum high and low pitch required for all flight modes. This pitch travel can then be reduced by altering the pitch curves as shown below.

Pitch Range Settings

Flight Mode	Application	Low Pitch (Low Stick)	Hovering Pitch (Half Stick)	High Pitch (High Stick)
N	Hovering	-2°	+5°	+10°
I	Stunt & Aerobatic Flight	-5°	+5°	+9°
*2	3D Flight	-9°	0°	9°
H	Autorotation	-5°	+5°	10.5°

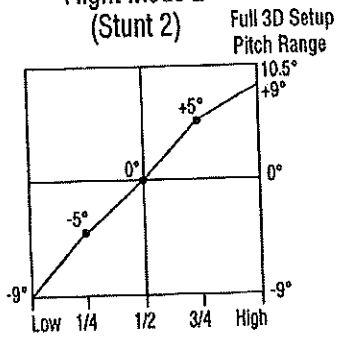
Pitch Curve Settings

Normal (Hover)



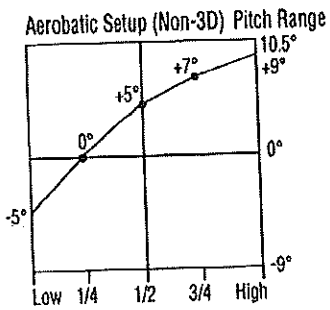
Stick Position

Flight Mode 2 (Stunt 2)



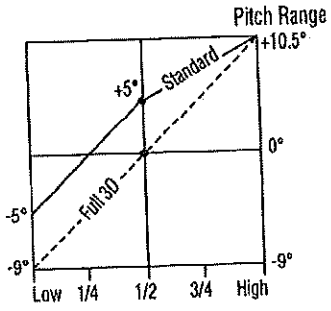
Stick Position

Flight Mode 1 Stunt 1



Stick Position

Autorotation (Throttle Hold)

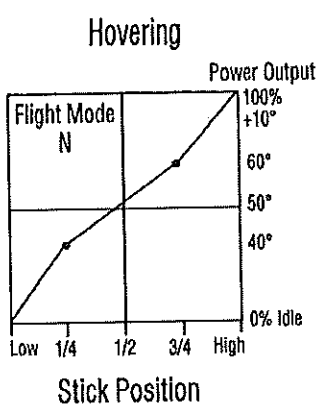


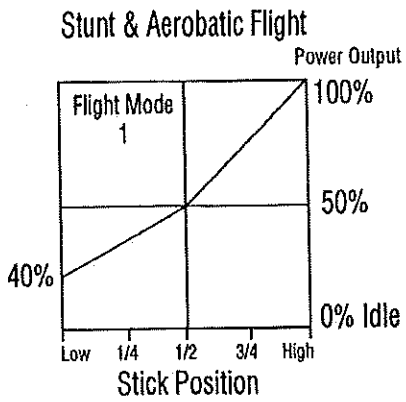
Stick Position

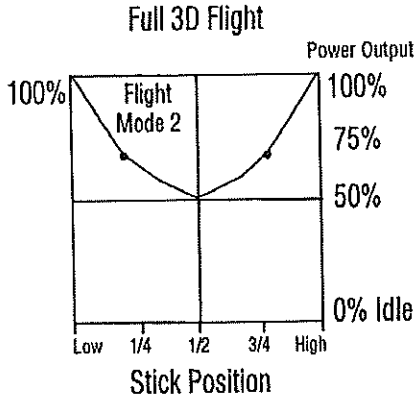
B. Throttle Curve Settings

Below are several examples of possible throttle curves during various flight conditions.

Since throttle curves can vary greatly due to engine and muffler combinations, it will be necessary to fine tune and adjust these values during test flights to achieve a constant main rotor rpm.







Note: The throttle curve examples shown correspond to the pitch curve examples show in Step 6A on the previous page.

It will also be necessary to set the correct idle speed of the engine when the Throttle Hold Function is activated.

This idle value is located within the Throttle Hold Function. This will allow the engine to remain at idle when practicing autorotations.

7. **Revolution Mixing**

   It will be necessary to adjust the revolution mixing to properly compensate for the torque of the engine during all flight conditions (except autorotation).

   Since there are many variables that can alter the value of the revolution mixing (engine, blade pitch, fuel, etc.), it will be necessary to fine tune this function during test flights.

   The following values are shown only as a starting point toward achieving proper compensation:

Flight Mode N	Flight Mode 1	Flight Mode 2 (3D)
Up 40	Up 15	Up 15
Down 20	Down 10	Down 15

8. **Gyro Gain Adjustment**

   It will be necessary to adjust the "gain" or compensation of the gyro to create the correct amount of "holding power" necessary for a solid neutral tail rotor. The intent of the gyro is to compensate for abrupt movements, or wind direction changes, working in conjunction with the Revolution Mixing Function.

   For hovering, it's recommended that you start with the gyro gain at approximately 80° and continue to increase slightly until the tail of the helicopter "hunts," then reduce the value slightly.

   This same adjustment will also be necessary to achieve proper forward flight. Generally, the gyro gain for forward flight will be approximately 10% – 20% less than that of the established hover gain due to aerodynamic forces present in forward flight. This variance depends greatly on the specific gyro used.

   If you are using a dual rate gyro, adjust the gain so you are using the "higher" gain setting for hover and the "lower" gain setting for forward flight.

Gyro Direction

It will also be necessary to confirm the direction the gyro compensates when the body of the helicopter is rotated.

To do this, turn the radio system on and suspend the helicopter by the main rotor head. Next, move the rudder stick to the right and watch the direction that the tail rotor servo arm travels. Now while watching the tail rotor servo arm, rotate the body of the helicopter counterclockwise. The servo arm should move in the same direction as when the rudder stick was moved to the left.

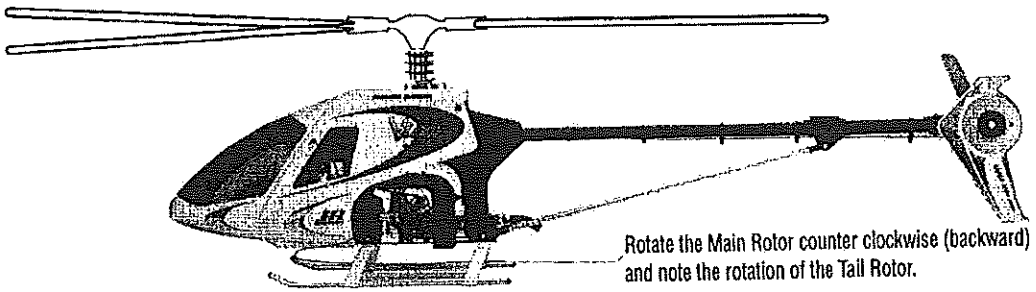
If the arm moves in the opposite direction, reverse the gyro and re-test.

FINAL PRE-FLIGHT CHECK

Once all assemblies have been completed, please review the following suggestions before attempting initial flights.

- Review the instruction book and confirm that all assembly steps have been completed thoroughly.
- Check to verify that the tail rotor assembly rotates in the correct direction (see the diagram below).
- Check to insure that all servos are operating smoothly and in the correct direction. Also verify that there is no binding in the control rods and that each servo horn is secured with a servo horn mounting screw.
- Verify that the gyro is operational and compensating in the correct direction (detailed in Step 6-5, page 33).
- Make sure that both the transmitter and receiver have been fully charged (refer to your radio system instructions for proper charging procedures).
- Check to insure that the throttle is working properly and in the correct direction.

Correct Main/Tail Rotor Rotation Direction



Rotate the Main Rotor counter clockwise (backward) and note the rotation of the Tail Rotor.

BLADE TRACKING ADJUSTMENT

Blade "tracking" is an adjustment to the main rotor blade pitch that must be accomplished during the initial test flights.

Although the blade pitch angle in each blade may appear equal, it is still possible for a set of main rotor blades to run "out of track," making adjustment necessary.

Main rotor blades that are out of track with one another can cause vibration, instability, and a loss of power due to additional drag.

On the initial flight, it will be necessary to increase the blade speed to just before lift-off rpm and view the rotor disc at eye level from a safe distance (approximately 15 to 20 feet).

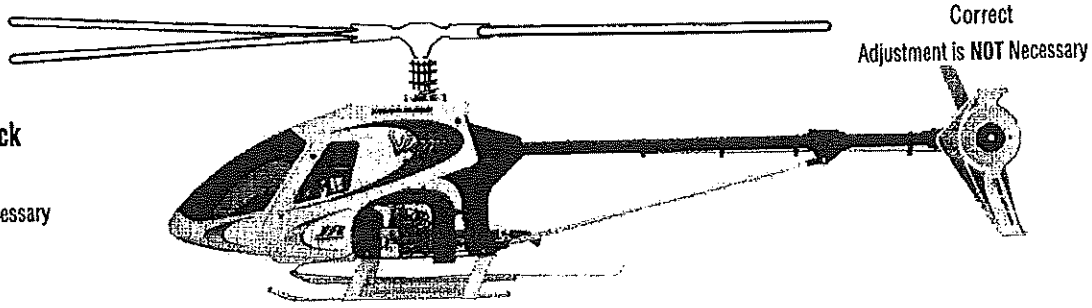
Note which blade is running low (by colored tracking tape) and increase the pitch of the low blade one turn of the ball link at a time until each blade runs in track (on the same plane).

Please refer to the diagrams below to identify the different tracking situations, as well as several methods to mark each rotor blade for tracking identification.

BLADE TRACKING IDENTIFICATION

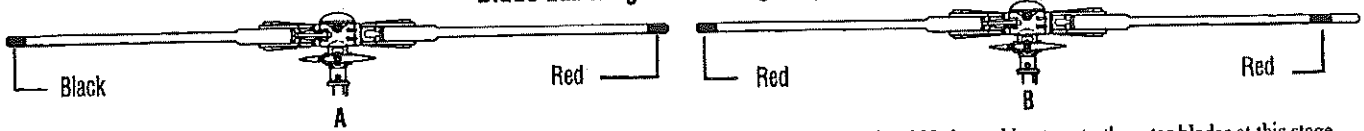
In Track
Correct
Adjustment is NOT Necessary

Out of Track
Incorrect
Adjustment is Necessary



Caution: Be sure to maintain a safe distance from the helicopter (15 to 20 feet) when tracking main rotor blades.

Blade Labeling for Tracking Purposes



A: Use two different blade tracking tape colors (e.g., black and red) at the tip of each main rotor blade.

B: Use the same color blade tracking tape located at different positions on each rotor blade.

Note: Adding additional blade tracking tape to the rotor blades at this stage will make it necessary to re-static balance the main rotor blades.

Engine

After each day of flying, fully drain the fuel tank. Then start the engine and let it idle until the engine and the fuel line are completely burned off. It is also suggested that an after-run oil be used to prevent premature engine corrosion.

Tail Rotor Belt

Periodically check the tension on the Tail Drive Belt (as shown in Step 5-6, page 28) to insure that it has sufficient tension for proper engagement. It is especially important to check this after initial test flights, and if a drastic temperature change has occurred from when the belt tension was originally set.

Check All Nuts and Bolts

A helicopter is subject to high vibration during flight. It is important to check that all screws, nuts and bolts are properly secured after each day of flying. It is also suggested that you perform a "quick" inspection between each initial test flight for approximately the first 6 to 10 flights.

Main Rotor Head

It will be necessary for the main rotor head dampners to be checked/and or replaced every 30–50 flights to maintain maximum rotor head performance. When replacing the main rotor head dampners, apply a light coating of oil to the dampners to prolong life.

It is also suggested at this time that the rotor head thrust bearings be lubricated using a high speed grease. This will prolong the visibility of the thrust bearings.

Washout Base

Lubricate the washout base using light oil every 10–15 flights to insure smooth operating and reduce wear. Inspect the washout base every 50–75 flights. If excess wear is noted, replace as needed.

Tail Pitch Slider

Lubricate the tail pitch slider using light oil every 10–15 flights to insure smooth operation and reduce wear.

Check Ball Link Wear

Check to insure that all universal links fit freely but securely to the control balls. If there is excessive play noted, adjust and or replace the universal link in question.

Battery Maintenance

Check to insure that your batteries are properly mounted and charged. The most frequent cause of crashes (aside from pilot error) is battery failure or disconnection. Be certain that your batteries are fully charged and limit your flight time to 3 or 4 flights between charging. If more flight time is required, purchase a reliable quick field charger.

Cleaning

At the end of each flight or flying session, wipe down your helicopter with a clean towel or rag. This is also a good time to inspect all parts for tightness or fatigue. Remember, a clean, well-maintained helicopter will provide you with many hours of trouble-free flight.

XP8103 DATA SHEET HELI

MODEL NO. _____

MODEL NAME VIGOR 3D/JR G450 GYRO

MODULATION SPCM - ZPCM - PPM _____

			AILE	ELEV	RUDD
DUAL-RATE • EXP	0	D/R	90%	90%	90%
		EXP	+25%	+25%	+30%
	1	D/R	100%	100%	100%
		EXP	+30%	+30%	+30%

AUTO D/R (POS. 1)	ST1	INH • (ACT)
	ST2	INH • (ACT)
	ST2	INH • ACT

INPUT SEL	AUX2	HOLD SW• PIT.TRIM•INH
	GEAR	ACT • INH

	THRO	AILE	ELEV	RUDD	GEAR	PIT	AUX2	AUX3
** REVERSE SW	NORM • (REV)	(NORM) • REV	(NORM) • REV	NORM • (REV)	(NORM) • REV	NORM • (REV)	(NORM) • REV	(NORM) • REV
SUB-TRIM	ADJUST SO THAT NO TRIM IS REQUIRED							
TRAVEL ADJUST	H 150%	L 110%	D 110%	L 150%	+ — %	H 140%	+ 100%	+ 100%
	L 150%	R 110%	U 110%	R 150%	- — %	L 140%	- 100%	- 100%
FAIL SAFE (SPCM)								

Throttle travel must be set to 150% if program mixing is to be used.

		EXP	L	1	2	3	H
* THROTTLE CURVE	N	OFF•(ON)	0%	40%	50%	60%	100%
	1	OFF•(ON)	40%	50%	——	——	100%
	2	OFF•(ON)	100%	75%	60%	75%	100%
* PITCH CURVE	N	OFF•(ON)	-3°	+4°	+5°	+6°	+10°
	1	OFF•(ON)	-5°	0°	+5°	+7°	+9°
	2	OFF•(ON)	-9°	-5°	0°	+5°	+9°
	H	OFF•(ON)	-5°	+5°			+10.5°

GYRO SENS	INH • RUDD D/R • AUTO	0	%
		1	%
		NORM	
		STNT	
		HOLD	
		INVT	

THRO HOLD	INH • (ACT)	POS	
		16%	

THRO HOLD	(INH) • ACT	OFFSET	
		%	

REVO MIX	NORMAL	UP	40°
		DOWN	20°
	STUNT	UP	15°
		DOWN	15°
ACC MIX			

		CHANNEL	SW	EXP	L	1	2	3	H
PROGRAM MIX	MIX1	AILE→THRO	ON	OFF-(ON)	30	–	0	–	30
	MIX2	ELEV→THRO	ON	OFF-(ON)	30	–	0	–	30
				+POS		-POS		OFFSET	
	MIX3	RUDD→THRO		30%		30%		0	

Data Sheets PCM10SxII

MODEL NO. (84) _____

MODEL NAME (61) JR Vigor 3D/JRG450 Gyro

MODULATION (85) SPCM-ZPCM-PPM

	THRO	AILE	ELEV	RUDD	GEAR	PITCH	AUX2	AUX3	AUX4	AUX5
REVERSE SW (11)	(R) N	R (N)	R (N)	(R) N	R (N)	(R) N	R (N)	R (N)	R (N)	R (N)
TRAVEL ADJUST (12)	H %	L 110 %	D 110 %	L 150 %	+ — %	+ 140 %	+ — %	+ — %	+ — %	+ — %
	L %	R 110 %	U 110 %	R 150 %	– — %	– 140 %	– — %	– — %	– — %	– — %
SUB-TRIM (15)	Adjust so that no trim is required									
TRIM RATE (83)	50 %	100 %	100 %	100 %						

			AILE	ELEV	RUDD
D/R EXP (13)	0	D/R	90 %	90 %	90 %
		EXP	+25%	+25%	+30%
		TYPE			
	1	D/R	100 %	100 %	100 %
		EXP	+30 %	+30 %	+30 %
		TYPE			
	2	D/R	%	%	%
		EXP	%	%	%
		TYPE			
AUTO D/R (23)	ST-1	INH(ACT)	0 (1) 2	0 (1) 2	0 (1) 2
	ST-2	INH(ACT)	0 (1) 2	0 (1) 2	0 (1) 2
	ST-3	INH·ACT	0 · 1 · 2	0 · 1 · 2	0 · 1 · 2
	ST-4	INH·ACT	0 · 1 · 2	0 · 1 · 2	0 · 1 · 2
	HOLD	INH(ACT)	0 (1) 2	0 (1) 2	0 (1) 2
STUNT TRIM (25)	ST-1	INH(ACT)	Adjust as necessary during flight		
	ST-2	INH(ACT)			
	ST-3	INH·ACT			
	ST-4	INH·ACT			
	HOLD	INH(ACT)			

THROTTLE HOLD (16)	HOLD SW	INH·(HOLD GEAR)
	POS	Adjust for Idle
	AUTO CUT	(INH)·ACT
	POS	

FUNCTION SELECT (17)	FLIGHT EXTRA		(INH)·GEAR AILE
	GEAR SW		(INH)·GEAR HOLD
	AUX2 SW		(INH)·ACT
	PIT. LEVER	LOW	(INH)·ACT
		HI	(INH)·ACT

GYRO SENS (44)	INH AUX3 AUTO	0	90				
		1	65				
		2	65				
		NR	S1	S2	S3	S4	HD
		0	1	2			1

			CHANNEL MASTER	CHANNEL SLAVE	TRIM	SW	OFFSET	+GAIN	-GAIN
PROGRAM MIX (51) - (58)	1	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER			
	2	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER			
	3	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER			
	4	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER			

							EXP		L	1	2	3	4	5	6	H
	5	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF·ON	IN	0							100
								OUT								
	6	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF·ON	IN	0							100
								OUT								
	7	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF·ON	IN	0							100
								OUT								
	8	INH·ACT		→	OFF·ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF·ON	IN	0							100
								OUT								

		EXP		L	1	2	3	4	5	6	H
THRO CURVE (18) TH,TRIM=SLOW HOV.T=CENTER	N	OFF (ON)	IN	0	25	50	75	——	——	——	100
			OUT	0	40	50	60	——	——	——	100
			HOV.SEL	——	HOV	HOV	HOV	HOV	HOV	HOV	——
	1	OFF (ON)	IN	0	50	——	——	——	——	——	100
			OUT	40	50	——	——	——	——	——	100
	2	OFF (ON)	IN	0	25	50	75	——	——	——	100
			OUT	100	75	60	75	——	——	——	100
	3	OFF • ON	IN	0				——	——	——	100
			OUT					——	——	——	
	4	OFF • ON	IN	0				——	——	——	100
			OUT					——	——	——	
PITCH CURVE (68) P,TRIM=CENTER HOV.P=CENTER	N	OFF (ON)	IN	0	25	50	75	——	——	——	100
			OUT	(-3°)	+4°	+5°	+6°				+10°
			HOV.SEL	——	HOV	HOV	HOV	HOV	HOV	HOV	——
	1	OFF • ON	IN	0	25	50	75	——	——	——	100
			OUT	-5°	0°	+5°	+7°	——	——	——	+9°
	2	OFF • ON	IN	0	25	50	75	——	——	——	100
			OUT	-9°	-5°	0°	+5°	——	——	——	+9°
	3	OFF • ON	IN	0				——	——	——	100
			OUT					——	——	——	
	4	OFF • ON	IN	0				——	——	——	100
			OUT					——	——	——	
	HOLD	OFF (ON)	IN	0	50	——	——	——	——	——	100
			OUT	-5°	+5°	——	——	——	——	——	+10.5°
or	3D HOLD			-9°	0°	——	——	——	——	——	+10.5°

	N	RIGHT • LEFT	UP 40%	DN 20%	HOV. POS.						
				L	1	2	3	4	5	6	H
TAIL ROTOR CURVE (47)	1	NOR	IN	0	25	50	——	——	——	——	100
		ORG	OUT	-8	-3	-8	——	——	——	——	-12
	2	NOR	IN	0	25	50	75				100
		ORG	OUT	-12	-8	-3	-8	——	——	——	-12
	3	NOR	IN	0							100
		ORG	OUT								
	4	NOR	IN	0							100
		ORG	OUT								
STUNT MIX RATE		1/1 • 1/2 • (1/4) • 1/10									

TRIM OFFSET (82)	HV.T	HV.P	LO.P	HI.P	AILE	ELEV	RUDD

Rudder→Throttle 4→1 MIX (41)	R	+30 %
	L	-30 %
MODE SELECTION	NR (S1) (S2) S3 • S4 • AX2	

FAIL-SAFE (77)	Z	MODE	HOLD • 1.0s • 0.5s • 0.25s
		MEMORY	
	S	MEMORY	Throttle at 1/4 stick

PILOT LINK (78)	INH • MST • SLV

Aileron→Throttle 2→1 MIX (41)	R	+30 %
	L	-30 %
MODE SELECTION	NR (S1) (S2) S3 • S4 • AX2	

SWASHPLATE MIXING TYPE (65)	(1 SERVO) • 3SERVO - 120°CCPM			
	1SERVO	ELE → AIL	D	0 %
			U	0 %
		AIL → ELE	L	0 %
			R	0 %
	SWITCH	NR • S1 • S2 • S3 • S4 • HD		
3 SERVO 120° CCPM	AIL %	ELE %	PIT %	

Elevator→Throttle 3→1 MIX (41)	U	+30
	D	-30
MODE SELECTION	NR (S1) (S2) S3 • S4 • AX2	

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MODEL NO. (84) _____

MODEL NAME (81) JR Vigor 3D/JRG450 Gyro

MODULATION (85) SPCM-ZPCM-PPM

	THRO	AILE	ELEV	RUDD	GEAR	PITCH	AUX2	AUX3	AUX4	AUX5
REVERSE SW (11)	(R) N	R (N)	R (N)	(R) N	R (N)	(R) N	R (N)	R (N)	R (N)	R (N)
TRAVEL ADJUST (12)	H %	L 110 %	D 110 %	L 150 %	+ — %	+ 140 %	+ — %	+ — %	+ — %	+ — %
	L %	R 110 %	U 110 %	R 150 %	– — %	– 140 %	– — %	– — %	– — %	– — %
SUB-TRIM (15)	Adjust so that no trim is required									
TRIM RATE (83)	50 %	4	4	4						

			AILE	ELEV	RUDD
D/R EXP (13)	0	D/R	90 %	90 %	90 %
		EXP	+25 %	+25 %	+30 %
		TYPE			
	1	D/R	100 %	100 %	100 %
		EXP	+30 %	+30 %	+30 %
		TYPE			
	2	D/R	%	%	%
		EXP	%	%	%
		TYPE			
AUTO D/R (23)	ST-1	INH(ACT)	0 (1) 2	0 (1) 2	0 (1) 2
	ST-2	INH(ACT)	0 (1) 2	0 (1) 2	0 (1) 2
	ST-3	INH·ACT	0·1·2	0·1·2	0·1·2
	ST-4	INH·ACT	0·1·2	0·1·2	0·1·2
	HOLD	INH(ACT)	0 (1) 2	0 (1) 2	0 (1) 2

THROTTLE HOLD (16)	HOLD SW	INH·(HOLD) GEAR	
	POS	Adjust for idle	
	AUTO CUT	(INH)·ACT	
		POS	
	Delay	1/4 1/2 (3/4) 1	

FUNCTION SELECT (17)	FLIGHT EXTRA	(INH) GEAR AILE	
	GEAR SW	(INH) GEAR HOLD	
	AUX2 SW	(INH)·ACT	
	PIT. LEVER LOW	(INH)·ACT	
	PIT. LEVER HI	(INH)·ACT	
	ADT STUNT	INH(ACT)	

GYRO SENS (44)	INH · AUX3 · AUTO	0	90					
		1	65					
		2	65					
		NR	S1	S2	S3	S4	HD	
		0	1	2			1	

			CHANNEL MASTER	CHANNEL SLAVE	TRIM	SW	OFFSET			+GAIN	-GAIN
PROGRAM MIX (51) - (58)	1	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER					
	2	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER					
	3	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER					
	4	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER					
							EXP		L	1 2 3 4 5 6	H
	5	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF · ON	IN	0		100
								OUT			
	6	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF · ON	IN	0		100
								OUT			
	7	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF · ON	IN	0		100
								OUT			
	8	INH · ACT		→	OFF · ON	NR·S1·S2·S3·S4 HD·AX2·GER	OFF · ON	IN	0		100
								OUT			

		EXP		L	1	2	3	4	5	6	H
THRO CURVE (18) TH.TRIM=SLOW HOV.T=CENTER	N	OFF (ON)	IN	0	25	50	75				100
			OUT	0	40	50	60				100
			HOV.SEL	—	HOV	HOV	HOV	HOV	HOV	HOV	—
	1	OFF (ON)	IN	0	50						100
			OUT	40	50						100
	2	OFF (ON)	IN	0	25	50	75				100
			OUT	100	75	60	75				100
	3	OFF • ON	IN	0							
			OUT								100
	4	OFF • ON	IN	0							
			OUT								100
PITCH CURVE (68) P.TRIM=CENTER HOV.P=CENTER	N	OFF (ON)	IN	0	25	50	75				+10°
			OUT	-3°	+4°	+5°	+6°				—
			HOV.SEL	—	HOV	HOV	HOV	HOV	HOV	HOV	100
	1	OFF • ON	IN	0	25	50	75				+9°
			OUT	-5°	0°	+5°	+7°				100
	2	OFF • ON	IN	0	25	50	75				+9°
			OUT	-9°	-5°	0°	+5°				100
	3	OFF • ON	IN	0							
			OUT								100
	4	OFF • ON	IN	0							
			OUT								100
	HOLD	OFF (ON)	IN	0	50						+10.5°
			OUT	-5°	+5°						+10.5°
or	3D HOLD			-9°	0°						

				L	1	2	3	4	5	6	H
TAIL ROTOR CURVE (47)	N	NOR	IN	L	1	2	3				H
		ORG	OUT	+5	+3						-3
	1	NOR	IN	0	25	50	75				100
		ORG	OUT	-8	-3	-8					-12
	2	NOR	IN	0	25	50	75				100
		ORG	OUT	-12	-8	-3	-8				-12
	3	NOR	IN	0							100
		ORG	OUT								
	4	NOR	IN	0							100
		ORG	OUT								
MIX RATE		1/1 • 1/2 • (1/4) • 1/10									

← **Note:** Omit Tail Rotor Curve if Heading Lock/Tail Lock Gyro is used (all output values 0)

TRIM OFFSET (82)	HV.T	HV.P	LO.P	HI.P

Rudder→Throttle 4→1 MIX (41)	R	+30 %
	L	-30 %
MODE SELECTION	NR (S1) (S2) S3 • S4 • AX2	

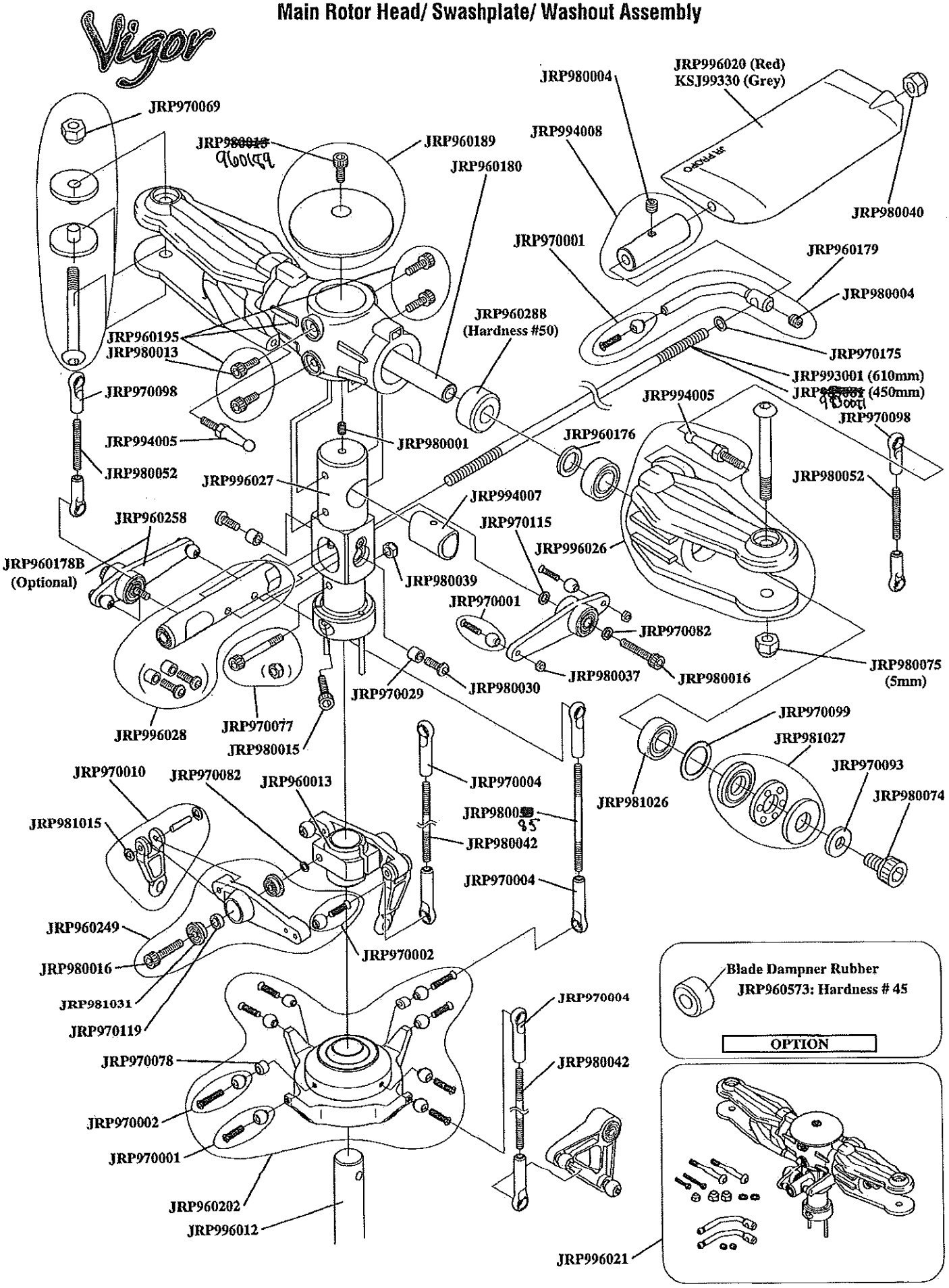
FAIL-SAFE (77)	Z	MODE	HOLD • 1.0s • 0.5s • 0.25s
		MEMORY	
	S	MEMORY	Throttle at 1/4 stick

Aileron→Throttle 2→1 MIX (41)	R	+30 %
	L	-30 %
MODE SELECTION	NR (S1) (S2) S3 • S4 • AX2	

SWASHPLATE MIXING TYPE (65)	(1 SERVO) • 3SERVO - 120°CCPM • 3SERVO - 140°CCPM		
	1SERVO	ELE → AIL	D 0 %
			U 0 %
		AIL → ELE	L 0 %
			R 0 %
	SWITCH	NR • S1 • S2 • S3 • S4 • HD	
3 SERVO 120° CCPM	AIL %	ELE %	PIT %
3 SERVO 140° CCPM	AIL %	ELE %	PIT %

Elevator→Throttle 3→1 MIX (41)	U	+30
	D	-30
MODE SELECTION	NR (S1) (S2) S3 • S4 • AX2	

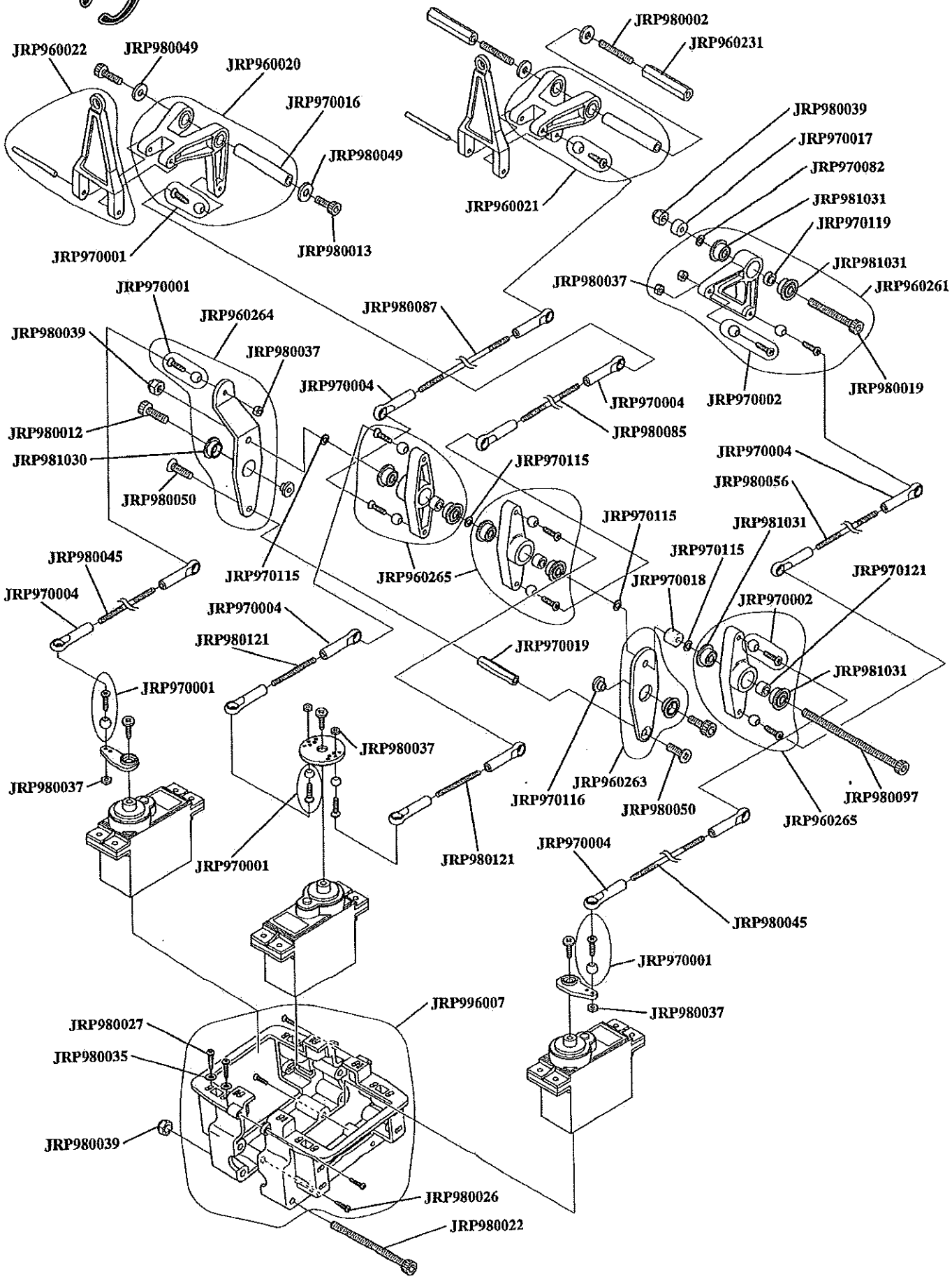
Main Rotor Head/ Swashplate/ Washout Assembly



VIGOR MANUAL PARTS LISTINGS
Main Rotor Head/ Swashplate/ Washout Assembly

Part #	Description	Quantity	Comments/ Additional Contents
980013	Socket Head Bolt, 3x8mm	10	
980004	Set Screw, 4x4mm	10	
996020	Elevator Arm, Front	1	Complete w/all Hardware
994008	Flybar Weights	2	Complete w/Set Screws
960189	Head Button	1	Complete w/one 3x8mm Socket Head Bolts
960180	Blade Spindle Shaft	1	Complete w/two 5x10mm Socket Head Bolts
970001	Steel Joint Ball w/2x8mm Screw	10	Complete w/ten 2x8mm Screws
980040	Nylon Lock Nut, 4mm	10	
960179	Flybar Control Arm	2	Complete w/Steel Joint Ball and Screws
960288	Blade Dampeners, 50	2	
960195	Main Rotor Body	1	Complete w/four 3x8mm Socket Head Bolts
970098	Universal Ball Link (short)	10	
994005	Control Ball, 14mm	2	
960176	Blade Holder Spacer	2	
980001	Set Screw, 3x4mm	10	
980052	Control Rod, 2.3x15mm	2	
960258	Seesaw Mixing Arm Assm. w/BB	1	Complete w/all Hardware
960178B	Seesaw Mixing Arm w/BB (23) (optional)	2	Hardware not included
980039	Nylon Lock Nut, 3mm Low Profile	10	
994007	Spindle Shaft Guide	1	
970115	Washer, .03x4.5x0.7	10	
996026	Main Blade Holder	2	Complete w/two 14mm Control Balls
970082	Washer, .03x4.5x0.4	10	
980037	Hex nut, 2mm	10	
980030	Button Head Bolt, 3x5mm	10	
970069	Blade Bolts w/Spacers	2	Complete w/two 4mm Bolts, and 12mm Grip Spacers
980075	Nylon Lock Nut. 5mm	10	
980016	Socket Head Bolt, 3x15mm	10	
970029	Seesaw Spacer Collar	2	
970077	Main Rotor Shaft Bolt, 3x22mm	2	Complete w/two Lock Nuts and Washers
996028	Seesaw Shaft Assembly	1	Complete w/all Hardware
970010	Washout Link	2	Complete w/all Hardware
981015	CA Stopper Ring	10	
960013	Washout Base	1	
970004	Universal Ball Link	10	
980053	Control Rod, 2.3x50mm	2	
980042	Control Rod, 2.3x30mm	2	
981026	Bearing, 8x16x5mm	2	
970099	Washer, 12x16x0.5mm	2	
981027	Thrust Bearing, 8x16x5mm	2	
970093	Spindle Shaft Washer	2	
980074	Socket Head Bolt, 5x10mm	10	
960573	Blade Dampeners, 45	2	
996021	Main Rotor Head Assembly, Complete	1	Pre-assembled w/all Hardware
970002	Steel Joint Ball w/2x10mm Screw	10	Complete w/ten 2x10mm screws
960249	Washout Arm w/BB	1	Complete w/all Hardware
980016	Socket Head Bolt, 3x15mm	10	
981031	Bearing w/Flange, 3x8x4mm	2	
970119	Spacer, 3x5x1.8mm	2	
970078	Joint Ball Spacer, 2.75mm	2	
960202	Aluminum Swashplate Assembly	1	Complete w/all Hardware
996012	Main Rotor Shaft	1	

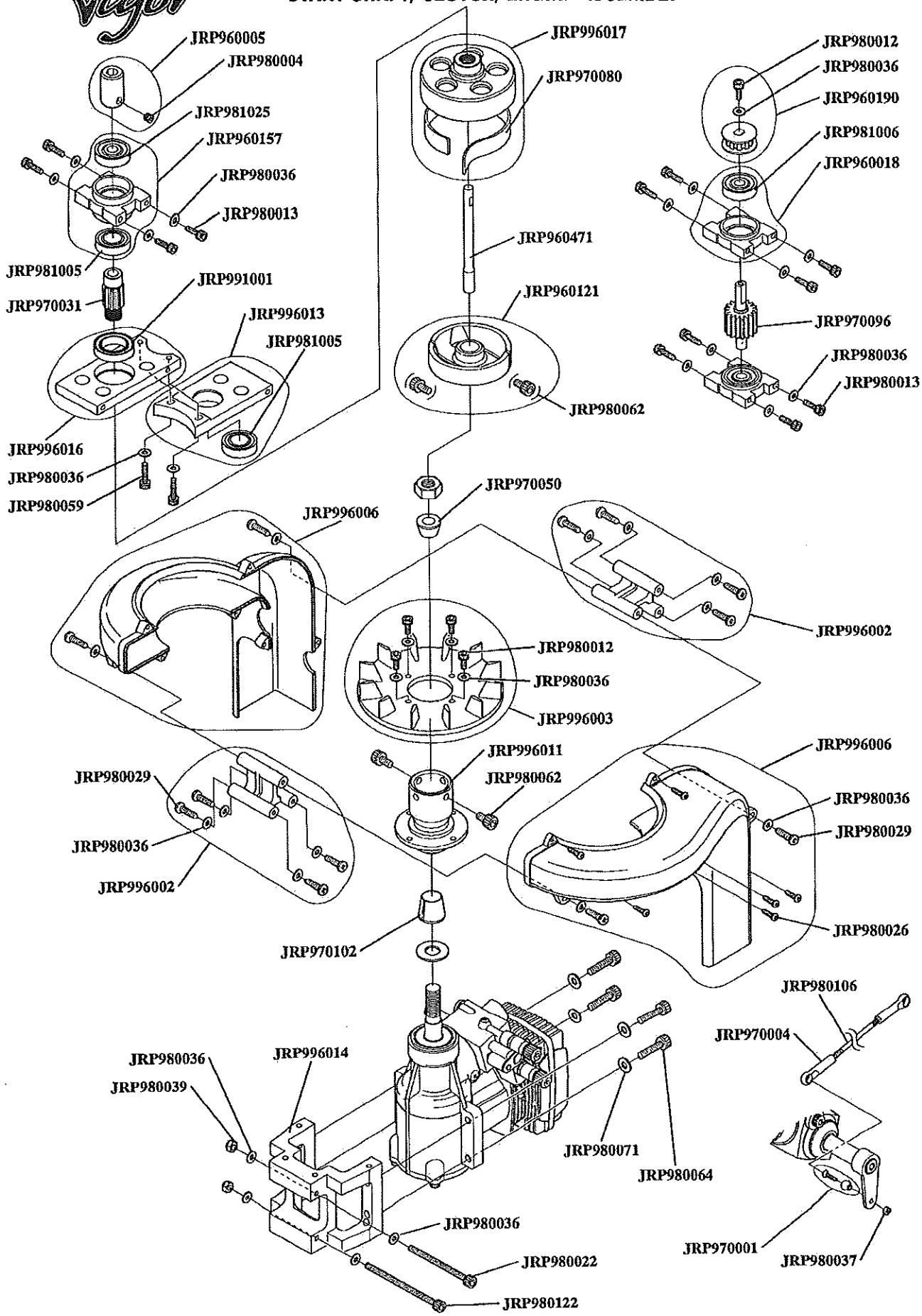
Vigor CYCLIC MIXING ARMS/AILERON/ELEVATOR CONTROL ARMS



VIGOR MANUAL PARTS LISTINGS
Cyclic Mixing Arms/Aileron/Elevator Control Arms

Part #	Description	Quantity	Comments/ Additional Contents
960020	Elevator Arm: Front	1	Complete w/Bushing Steel Joint Ball 2x8mm Flat Head Screw
960021	Elevator Arm: Rear	1	Complete w/Bushing Steel Joint Ball 2x8mm Flat Head Screw
960022	Swashplate A Arm	2	Complete w/two A-Arm Pins
996007	Upper Servo Tray	1	Complete w/all Hardware
960261	Roll Bellcrank	1	Complete w/Bearings 2 - Steel Joint Balls 2 - 2x8mm Flat Head Screws 2 - 2mm Hex Nuts
960263	Mixing Base Arm: Roll	1	Complete w/Bearings
960264	Mixing Base Arm: Collective	1	Complete w/Bearings 2 - Steel Joint Ball 2 - 2x8mm Flat Head Screw 2 - 2mm Hex Nut
960265	Mixing Lever: Cyclic	3	Complete w/Bearings 6 - Steel Joint Balls 6 - 2x8mm Flat Head Screws
970001	Joint Ball w/2x8mm Screw	10	
970002	Steel Joint Ball w/2x10mm Screw	10	
960116	Mixing Base Nut	2	
970004	Universal Ball Link	10	
970016	Elevator Arm Bushing	2	
970017	Roll Bellcrank Spacer	2	
970018	Mixing Lever Spacer	2	
970019	Mixing Base Cross Member	1	
970082	Washer, 3x4.5x.4mm	10	
970115	Mixing Lever Bushing B	2	
970119	Spacer, 3x.5x1.8mm	10	
980012	Socket Head Bolt, 3x6mm	10	
980013	Socket Head Bolt, 3x8mm	10	
980019	Socket Head Bolt, 3x22mm	10	
980027	Self Tapping Screw, 2.6x12mm	10	
980035	Flat Washer, 2.6mm	10	
980037	Hex Nut, 2mm	10	
980045	Control Rod, 2.3x45mm	2	
980056	Control Rod, 2.3x85mm	2	
980050	Flat Head Screw, 3x8mm	10	
980085	Control Rod, 2.3x55mm	2	
980087	Control Rod, 2.3x120mm	2	
981031	Bearing, Flanged, 3x8x4mm	2	
980121	Control Rod, 2.3x25mm	2	
980049	Nylon Washer, 5x8x0.5mm	10	
980039	Nylon Lock Nut, 3mm low profile	10	
980002	Set Screw, 3x18mm	10	
960231	Main Frame Standoff, 24mm	2	
981030	Bearing, Flanged, 5x8x2.5mm	1	
970121	Spacer, 3x5x1.8mm	2	
980097	Socket Head Bolt, 3x55mm	5	
980026	Self Tapping Screw, 2.6x8mm	10	
980022	Socket Head Bolt, 3x40mm	10	

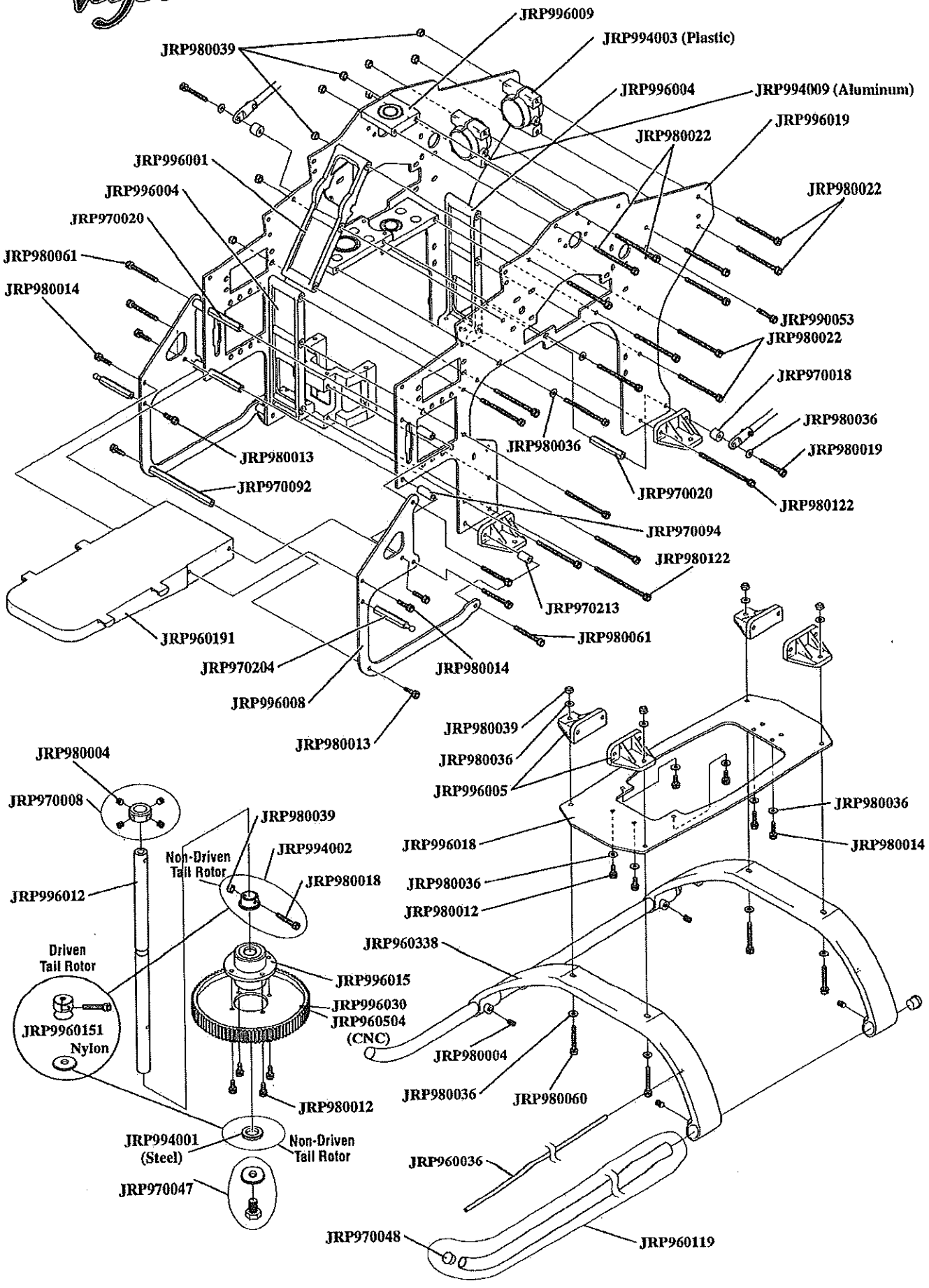
START SHAFT/ CLUTCH/ ENGINE ASSEMBLY



VIGOR MANUAL PARTS LISTINGS
Start Shaft/ Clutch/ Engine Assembly

Part #	Description	Quantity	Comments/ Additional Contents
960005	Hex Shaft Adaptor	1	Complete w/two 4x4mm Set Screws
980004	Set Screw, 4x4mm	10	
981025	Bearing, Sealed, 5x19x6mm	2	
960157	Start Shaft Bearing Block w/BB	1	
980036	Flat Washer, 3mm	10	
980013	Socket Head Bolt, 3x8mm	10	
996017	Clutch Bell Assembly w/BB	1	Complete w/Bearing & Clutch Lining
970080	Clutch Lining	1	
960471	Start Shaft	1	
960121	Clutch Assembly	1	Complete w/two 4x6mm Bolts
980062	Socket Head Bolt, 4x6mm	10	
981005	Ball Bearing, 10x19x7mm	2	
970031	Pinion Gear, 9 Tooth	1	
991001	Ball Bearing, 15x24x5mm	1	
996013	Long Bearing Block "B"	1	Complete w/Bearing
996016	Long Bearing Block "A"	1	Complete w/Bearing
980059	Socket Head Bolt, 3x14mm	10	
980012	Socket Head Bolt, 3x6mm	10	
960190	Front Tail Belt Pulley	1	Complete w/Bolt & Washer
981006	Ball Bearing, 6x19x6mm	2	
960018	Bearing Block, Tail Pinion w/BB	1	Complete w/Bearing
970096	Tail Drive Pinion	1	
970050	Taper Collet "B", Upper	1	
996006	Cooling Fan Shroud	1	1-left, 1-right half Complete w/Screws
996002	Cooling Shroud Brackets	2	Complete w/Screws and Washers
996003	Cooling Fan Blades	1	Complete w/Screws and Washers
996011	Cooling Fan Hub	1	
980062	Socket Head Bolt, 4x6mm	10	
980029	Self Tapping Screw, 3x12mm	10	
970102	Taper Collet "C", Lower	1	
980039	Nylon Lock Nut, 3mm Low Profile	10	
996014	Engine Mount	1	
980022	Socket Head Bolt, 3x40mm	10	
980122	Socket Head Bolt, 3x50mm	10	
980071	Flat Washer, 4mm	10	
980064	Socket Head Bolt, 4x15mm	10	
970001	Steel Joint Ball w/2x8mm Screw	10	Complete w/ten 2x8mm Screws
980037	Hex Nut, 2mm	10	
970004	Universal Ball Link	10	

MAIN FRAME/LANDING GEAR/AUTOROTATION ASSEMBLY

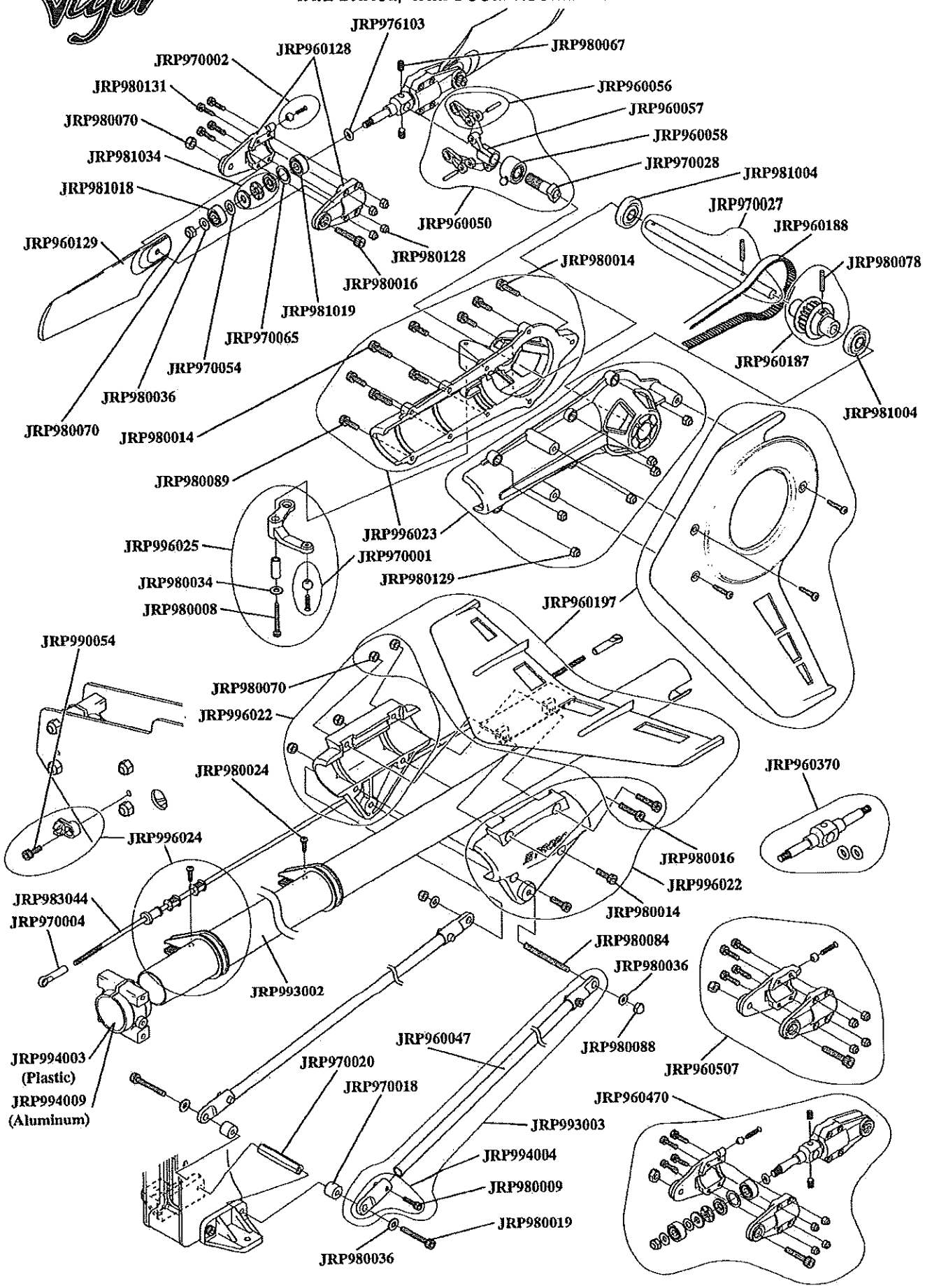


VIGOR MANUAL PARTS LISTINGS
Main Frame/Landing Gear/Autorotation assembly

Part #	Description	Quantity	Comments/ Additional Contents
980039	Nylon Lock Nut, 3mm Low Profile	10	
996009	Upper Main Shaft Bearing Block w/BB	1	Complete with Ball Bearing
994003	Tail Boom Mounting Clamp (Plastic)	1	
994009	Tail Boom Mounting Clamp (Aluminum)	1	Complete w/one 3.5x6 & one 3.5x8 Bolt
996004	I-Beam Crossmember "B"	2	
996019	Main Frame Set (Aluminum)	1	Complete Set (2pcs)
980022	Socket Head Bolt, 3x40mm	10	
996001	I-Beam Crossmember "A"	1	
970020	Main Frame Crossmember, 32mm	2	
980061	Socket Head Bolt, 3x25mm	10	
980014	Socket Head Bolt, 3x10mm	10	
990053	Socket Head Bolt, 3.5x6mm	10	
970018	Mixing Lever Spacer	2	
980036	Flat Washer, 3mm	10	
980019	Socket Head Bolt, 3x22mm	10	
980122	Socket Head Bolt, 3x50mm	10	
980013	Socket Head Bolt, 3x8mm	10	
970092	Main Frame Crossmember, 64mm	2	
970094	Spacer, 3x6x14mm	2	
970213	Spacer, 3x6x10mm	2	
996008	Fuel Tank Mounting Frames	2	
970204	Canopy Mounting Standoff	2	
960191	Front Radio Bed	1	
980004	Set Screw, 4x4mm	10	
970008	Main Shaft Collar	1	Complete w/four 4x4mm Set Screws
996012	Main Rotor Shaft	1	
9960151	LSD Slipper Clutch Assembly	1	Complete w/Bolt, O-ring, and Plastic Spacer
994002	Autorotation Assembly Collar	1	Complete w/Bolt & Lock Nut
980018	Socket Head Bolt, 3x18mm Long Shank	5	
996005	Landing Strut Mounts	4	
980014	Socket Head Bolt, 3x10mm	10	
996018	Carbon Bottom Frame Plate	1	
980012	Socket Head Bolt, 3x6mm	10	
960338	Landing Struts, white	2	
980004	Set Screw, 4x4mm	10	
980060	Socket Head Bolt, 3x20mm	10	
960036	Antenna Tube	3	
960119	Landing Skids	2	Complete w/four Skid Caps
970048	Landing Skid Caps	4	
996015	Autorotation Assembly	1	
996030	84T Molded Main Drive Gear	1	
970047	Main Shaft Washer and Bolt	1	Complete w/one 6x10mm Hex Bolt
994001	Steel Auto Hub Washer	1	

Vigor

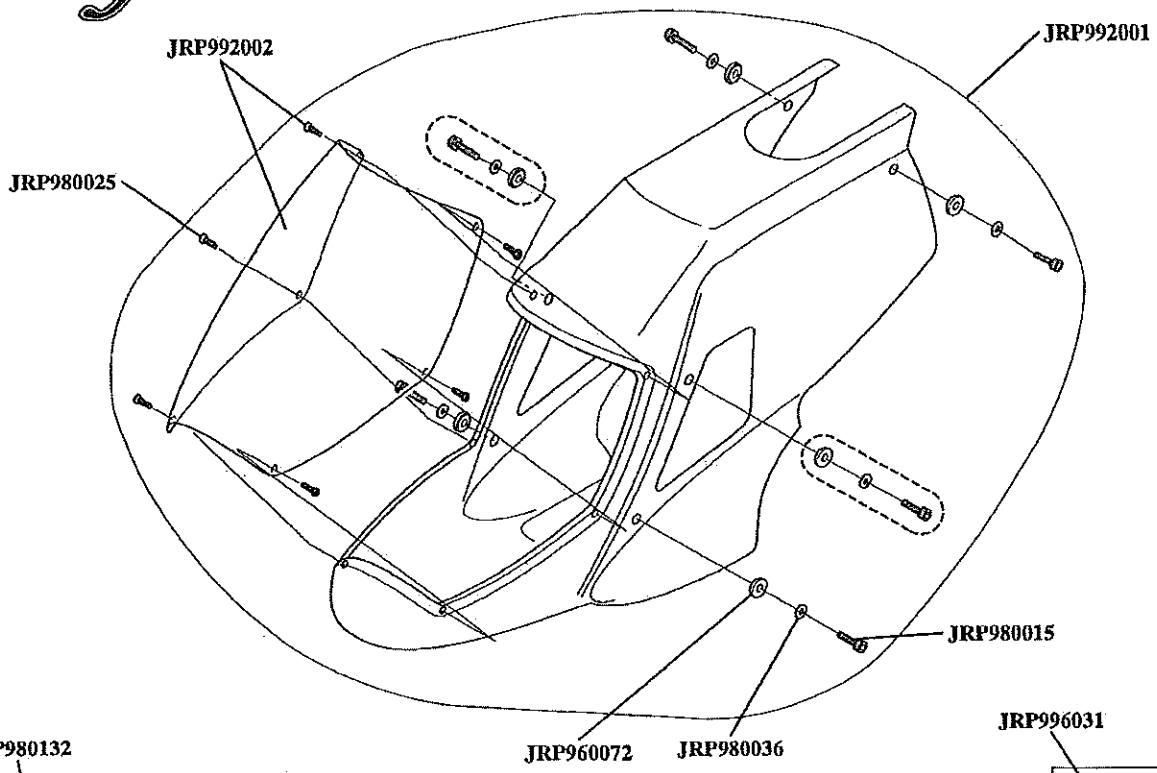
TAIL BRACE/ TAIL BOOM ASSEMBLY

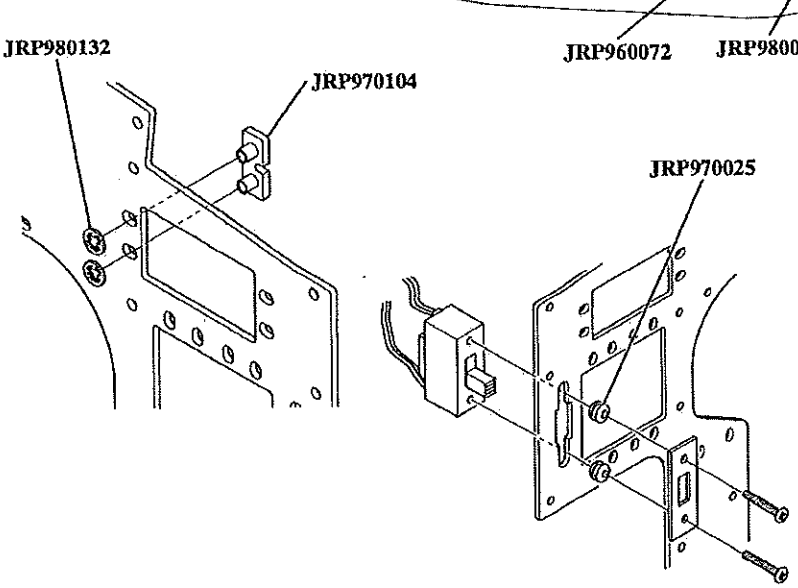


VIGOR MANUAL PARTS LISTINGS
Tail Brace/ Tail Boom Assembly

Part #	Description	Quantity	Comments/ Additional Contents
994004	Tail Brace Connector	1	Complete w/Bolt
960047	Tail Brace Tube	2	
996024	Tail Rod Guide Set	5	Complete w/all Hardware
996022	Horizontal Fin/Brace Clamp	1	Complete w/all Hardware
960197	Tail Fin Set	1	1- Vertical and 1- Horizontal Fin w/Hardware
970020	Main Frame Standoff , 32mm	2	
980009	Socket Head Bolt, 2.6x12mm	10	
980014	Socket Head Bolt, 3x10mm	10	
980016	Socket Head Bolt, 3x15mm	10	
980024	Self Tapping Screw, 2x8mm	10	
980036	Flat Washer, 3mm	10	
980070	Nylon Lock Nut, 3mm	10	
980084	Set Screw, 3x30mm	5	
980088	Dome Nut, 3mm	10	
993003	Tail Brace Set	1	2 Brace Tubes, 4 Brace Connectors and Hardware
983044	Tail Control Rod	1	
993002	Tail Boom	1	
970002	Steel Joint Ball w/ 2x10mm Screw	10	Complete w/ten 2x8mm Screws
960128	Tail Blade Holder Set	1	1 Complete Set (4pcs)
976103	O-Ring, Tail Hub	2	
980131	Socket Head Bolt, 2x10mm	10	
981034	Thrust Bearing, 4x9x4mm	2	
981018	Open Bearing, 4x10x4mm	2	
960129	Tail Rotor Blades	2	
970054	Washer, 4x7x0.5mm	2	
970065	Washer, 7x10x1mm	2	
981019	Sealed Bearing, 4x10x4mm	2	
980128	Nylon Lock Nut, 2mm	10	
960050	Tail Slide Ring Assembly	1	Complete, pre-assembled
980067	Set Screw, 3x3mm	0	
960056	Tail Pitch Link	2	Complete w/two Pins
960057	Tail Pitch Plate	1	
960058	Tail Slide Ring	1	Complete w/Bearing
970028	Tail Slide Ring Sleeve	1	
981004	Bearing, 5x13x4mm	2	
970027	Tail Output Shaft	1	Complete w/Spring Pin
960188	Tail Drive Belt	1	
980078	Spring Pin, 2x13mm	5	
960187	Tail Case Pulley	1	Complete w/Spring Pin
996023	Tail Case Set, Black	1	1-Left, 1 Right Half Complete w/Hardware
970001	Steel Joint Ball w/2x8mm Screw	10	Complete w/ten 2x8mm Screws
980129	Nylon Lock Nut, 2.6mm	10	
980089	Socket Head Bolt, 2.6x10mm	10	
996025	Tail Pitch Control Lever, w/Steel Sleeve	1	Complete w/all Hardware
980034	Flat Washer, 2mm	10	
980008	Socket Head Bolt, 2x20mm	10	
970004	Universal Ball Link	10	
970018	Mixing Lever Spacer	2	
980019	Socket Head Bolt, 3x22mm	10	
960470	Tail Rotor Hub Assembly, Complete	1	Complete Assembly
960507	Tail Blade Holder Set w/Hardware	1	1 Complete set (4pcs) with Hardware
960370	Tail Center Hub w/O-rings	1	Complete w/two O-Rings

BODY SET/ FUEL TANK ASSEMBLY





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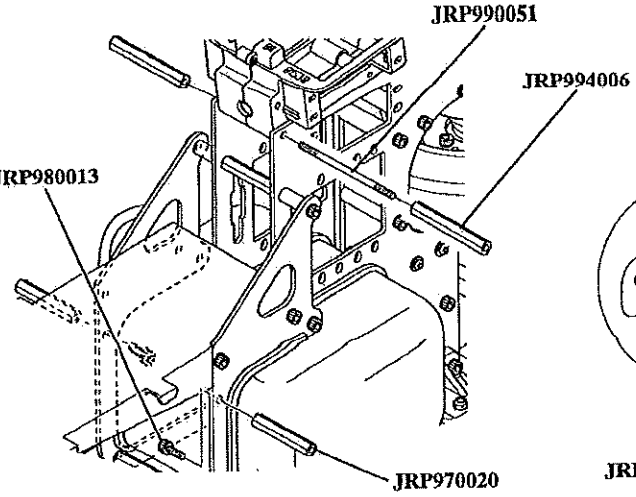
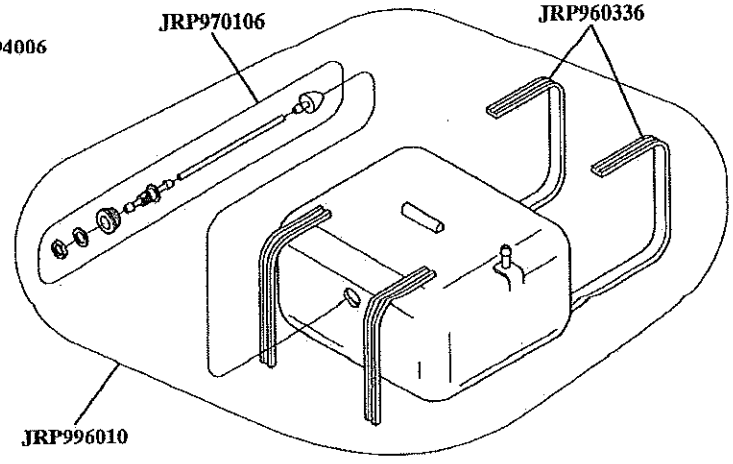
Assembly Manual

JRP996029

Decal





VIGOR MANUAL PARTS LISTINGS
Body Set/ Fuel Tank Assembly

Part #	Description	Quantity	Comments/ Additional Contents
992002	Vigor Canopy Lens	1	Complete w/Screws
992001	Vigor Body Set	1	Complete w/Canopy Lens and Screws
980025	Self Tapping Screw, 2.6x8mm	10	
960072	Rubber Body Grommets	4	
980036	Flat Washer, 3mm	10	
980015	Socket Head Bolt, 3x12mm	10	
980132	CA Stopper Ring, 3.5mm	10	
970104	Servo Mounting Plates, Type B	10	
970025	Switch Mounting Grommets	4	
990051	Threaded Rod, 3x50mm	2	
994006	Main Frame Standoff, 41mm	2	
980013	Socket Head Bolt, 3x8mm	10	
970020	Main Frame Standoff, 32mm	2	
970106	Fuel Tank Hardware Set	1	Complete with Stopper, Clunk, Nut, and Washer
996010	Vigor Fuel Tank Set	1	Complete with all Tank Hardware
960336	Tank Mounting Rubber (3 ft)	1	
996031	Vigor Instruction Manual	1	
996029	Vigor Decal Set	1	

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