

X 90 EP



Technical Data:


Overall Length	1340 mm
Overall Height	430 mm
Overall Wide	210 mm
Main Rotor Diameter	ca.1560 mm
Tail Rotor Diameter	ca.280 mm
Gear Ratio	9:1:4.7 (others Optional)
Gross Weight	4200g - 4600g (Depending on Equipment and Main Blades used)

PLEASE READ AND UNDERSTAND THE INSTRUCTIONS THOROUGHLY BEFORE ASSEMBLY

INTRODUCTION

Please read this manual carefully. It is essential for the correct assembly of the

X90EP

For the correct assembly and safe flying, this manual uses this  symbol where special attention is required in the assembly of your model. It is very important that you follow the instructions at these points in the manual. Failure to do so can lead to the loss of control of the model without warning and the possibility of serious accidents or injury.



NOTE Failing to carry out the instructions at this point in the assembly manual will probably result in an electronic or mechanical failure occurring without warning..



IMPORTANT Means that special care is required at this point for correct assembly.

Disclaimer:

Whilst every effort has been made to supply the correct information in this manual, The Manufacturer and Distributor cannot guarantee that the purchaser will interpret or follow these instructions as intended and therefore the Manufacture and Distributor assumes no liability for damage or claims that may occur from the use/misuse of this product.

Do not be fooled it is NOT easy to fly R/C Helicopters

It may look easy when watching an experienced pilot flying his model, but perseverance and hours of practice will be needed before you will be able to fly and operate the model safely. RJX HOBBY suggests you join a club or seek help from an experienced pilot to help you in your first hops off the ground and then as with all things the more you practice the better you will become. Who knows you could be the neXT90- world champion.

WARNING

The fuel used in model helicopter engines is highly inflammable and poisonous to human beings. For your own safety and that of others, you should exercise care when handling and storing it. Always read the label on the container and please note the cautions below.

1. Model helicopter fuel is highly inflammable. Do not smoke or light fires near your fuel.
2. We recommend that you keep your fuel in metal cans or plastic bottles and to store it where there is no risk of fire.
3. Please keep fuel away from the starter battery. It only needs one spark and.....!!!
4. Wipe up spilt fuel immediately. Do not take any chances.
5. Do not leave fuel in the sun or in your car on a hot day.
6. Before refuelling, shut off the engine and wait until it cools down.
7. Always drain the fuel tank of your helicopter at the end of a flying session. It is good practice.

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HOW TO USE THIS INSTRUCTION MANUAL

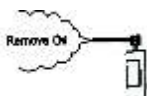
This manual contains the detailed instructions to build and set up the **X⁹⁰EP**. Please follow it to ensure that you achieve the best performance and mechanical integrity from your finished kit. For those of you who already have experience of model helicopters, we still suggest that you assemble and adjust your model according to these instructions for the best results. Please keep your copy of this manual in a safe place and refer to it when replacing spare parts or upgrading.



Use CA (Superglue or similar) at this point



Remove oil and grease then apply threadlock. (This applies throughout the manual)





Remove oil and grease. (This applies throughout the manual)

Please refer to the list at the end of this instruction manual when you need spare parts.

TO PREVENT LOOSE SCREWS AND BOLTS

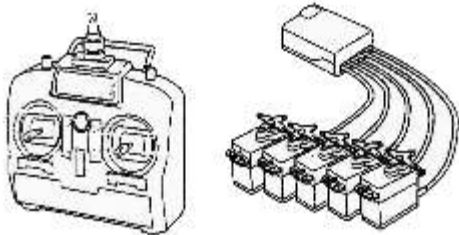

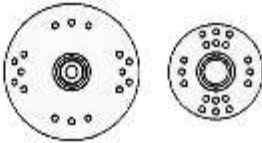






Regardless how tight the nuts, bolts and screws are tightened, they will still slowly come loose over a period of time due to vibration from the helicopter. Should this happen the helicopter will become out of control or severely damaged causing a very potential dangerous situation.

We strongly recommend that you apply threadlock to any nuts, bolts or screws that are indicated by these signs.















There are two types of threadlock, blue (soft)  and red (hard) . Use blue threadlock on screws that have to be removed regularly and red threadlock for screws that should be fixed permanently. Clean them with Alcohol (or similar) before you apply the threadlock.

ADDITIONAL ITEMS REQUIRED TO COMPLETE THE



		
<p>Choose a CCPM compatible PCM Radio System for Helicopters with a minimum of 6 channels.</p>	<p>Gyro system with Heading Hold</p>	<p>Three large and two small disks or arms are required</p>
		
<p>1x Servo extension 100 mm (depending on Servos)</p>	<p>Brushless Motor (Outrunner) 400KV-560KV(10S-12S)</p>	<p>10-12S Li-Po Batterie Pack</p>
		
<p>Li-po/Ion Charger</p>	<p>100A-120A Brushless Motor ESC for 10S-12S</p>	<p>690mm - 720mm Main Blades (for kits without Blades)</p>

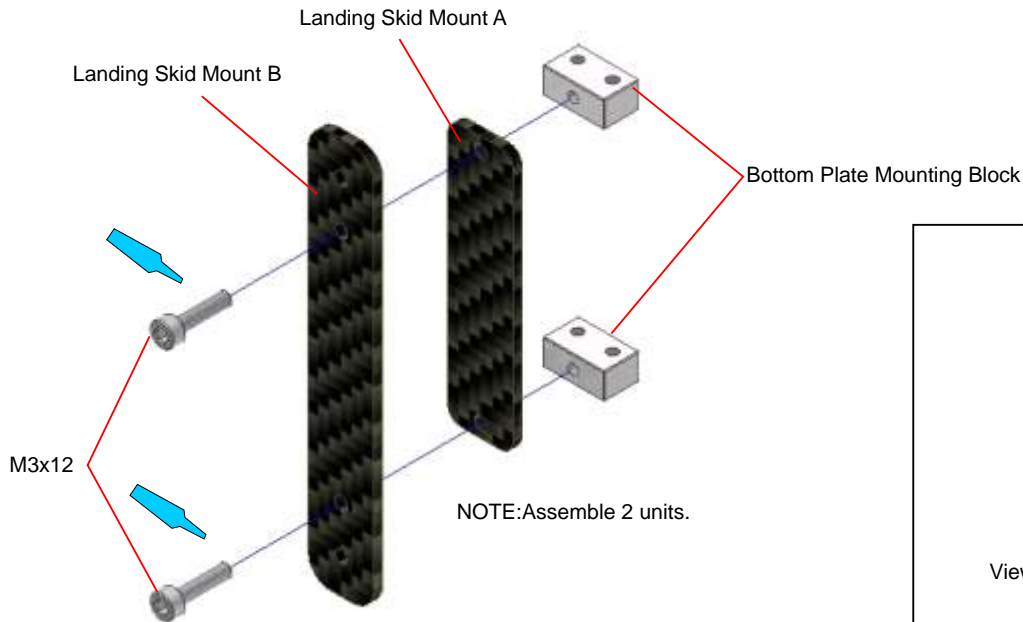
TOOLS REQUIRED (NOT INCLUDED)

			
Allen Drivers 1,5mm - 2mm - 3mm - 4mm	Phillips Drivers Large,Middle, Small	Nut Drivers 4,5mm - 5,5mm - 7mm	
			
Cutter	Universal Pliers	Scissors	
			
Sandpaper	Ball Link Plier	Metric Ruler	Pitch Gauge
			
Cyanoacrylate (CA/Superglue)	Epoxy 30 Minutes	Grease	Ball Link Tool
			
Ball Link Driver			

STEP 1-1 Landing Skid Support Assembly



LANDING SKID MOUNTS inside the bag of the **MAIN FRAME**

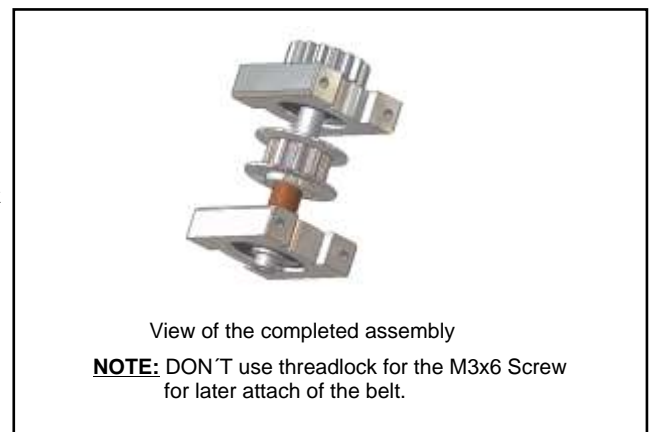
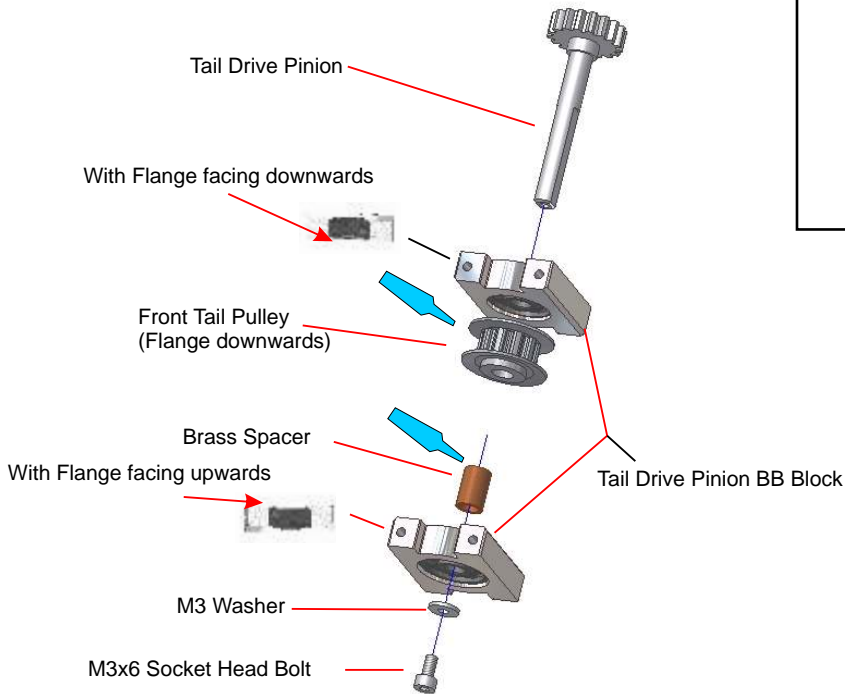
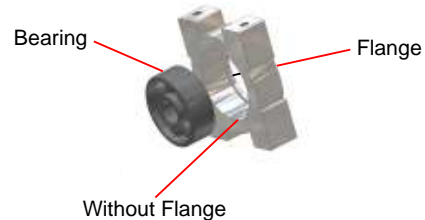


STEP 1-2B Tail Drive Pinion Gear Assembly (Belt Version)



IMPORTANT:

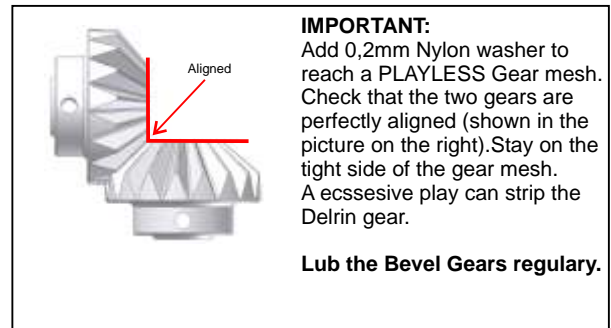
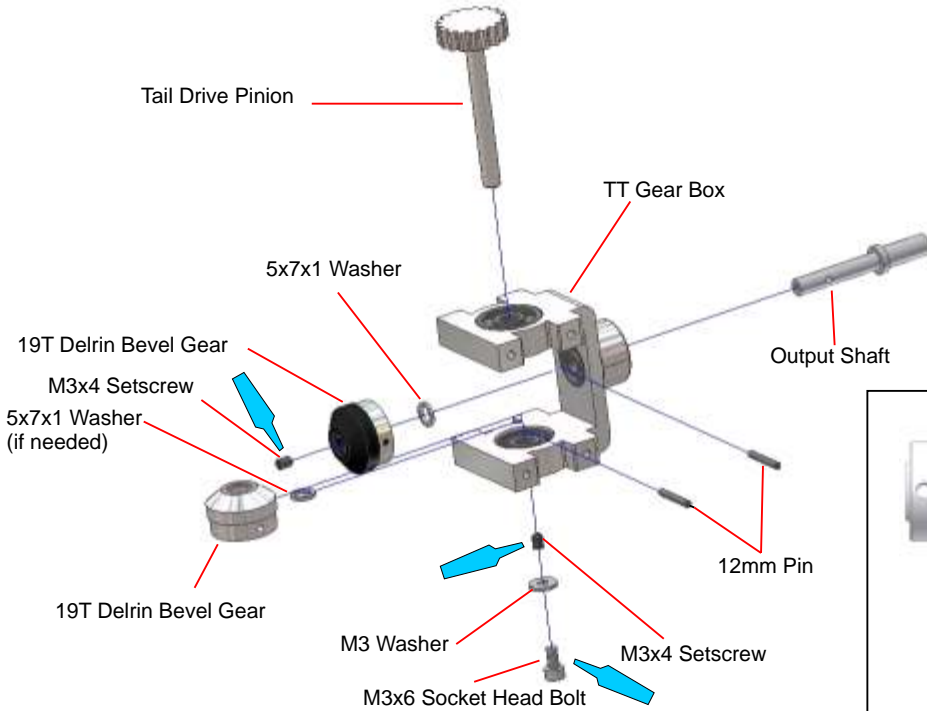
One end of the BB Block is machined with a flange to retain the Bearing. Assemble it as shown in the diagram below.



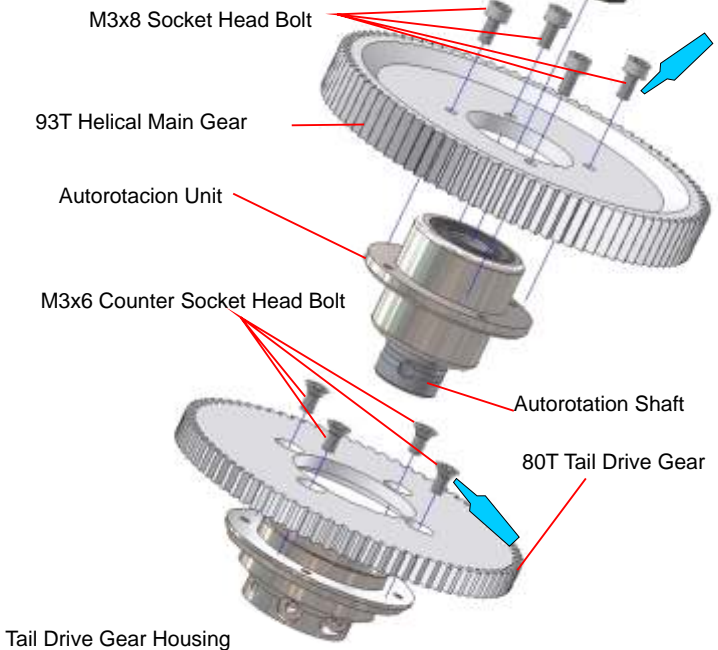
STEP 1-2TT Tail Drive Pinion Gear Assembly (TT Version)



IMPORTANT: Start assembly with the **OUTPUT SHAFT**.
This step is preassembled. PLEASE CHECK AND ADD THREAD LOCK

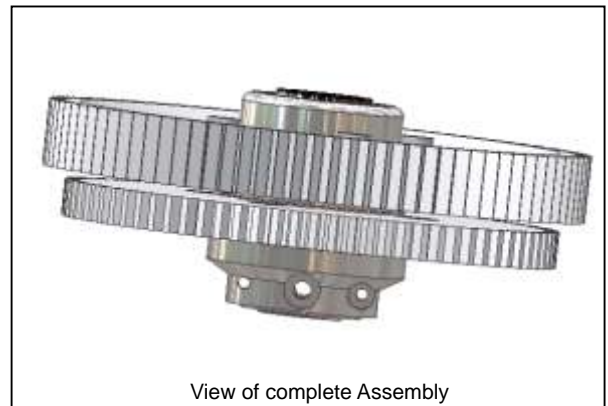


STEP 1-3 Drive Gear Assembly



Autorotacion Spacer
IMPORTANT: Stepped side facing downward and entering completely inside the bearing.

CAUTION:
 Clean off any dust on drive gears. Add grease to the one way bearing, to ensure smooth operation. Don't fix the four M3x6 bolts before having all four in place.

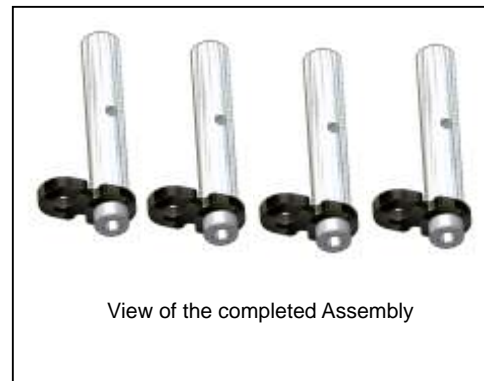
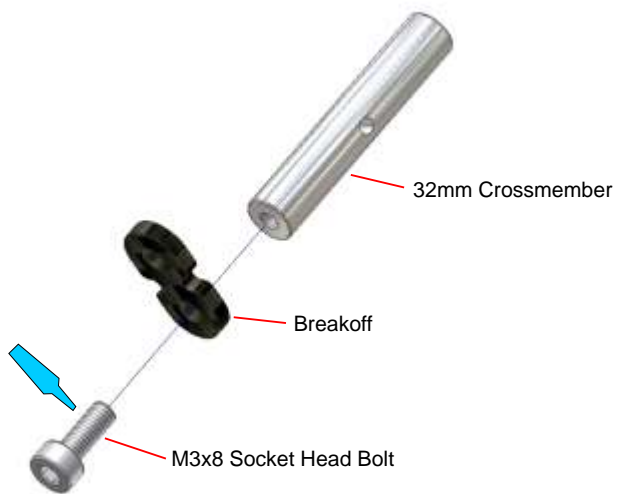


OPTIONAL:
 93T Helical Main Gear

STEP 1-4 Canopy Stands



BREAKOFF are inside the bag of the **MAIN FRAME**

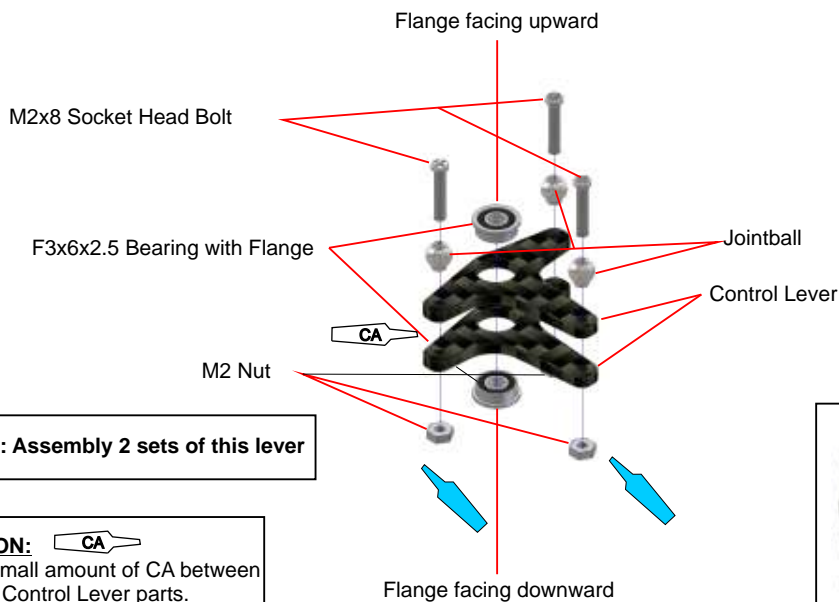


NOTE: Assemble 4 sets


STEP 1-5 Swash Control Lever Assembly



CONTROL LEVER inside the bag of the **MAIN FRAME**



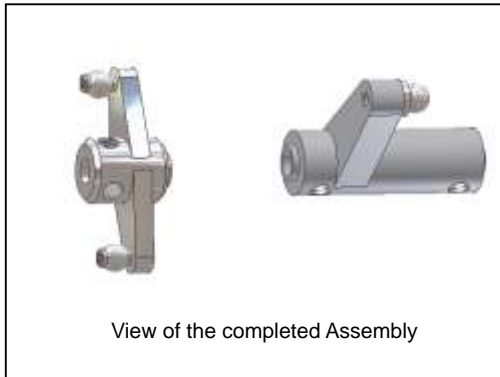
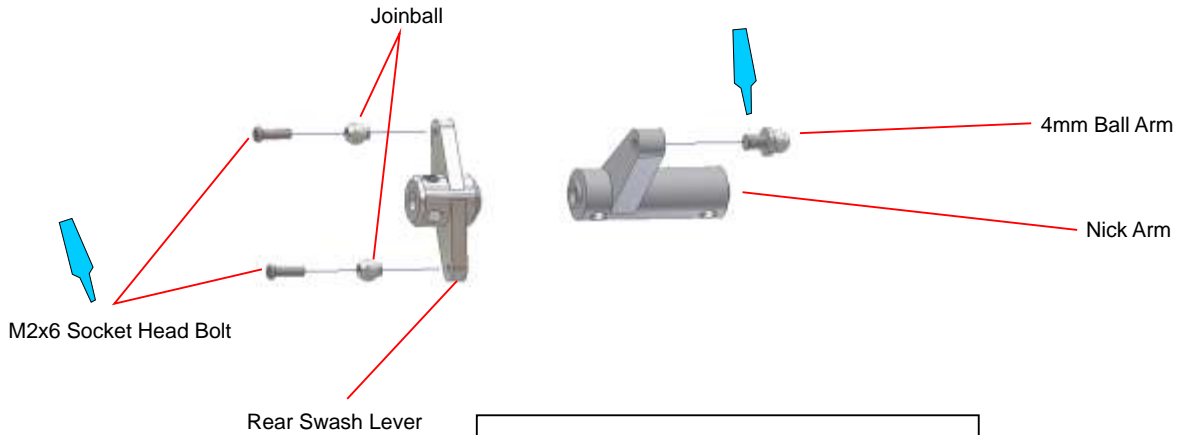
NOTE: Assemble 2 sets of this lever

CAUTION:  Add a small amount of CA between the two Control Lever parts.

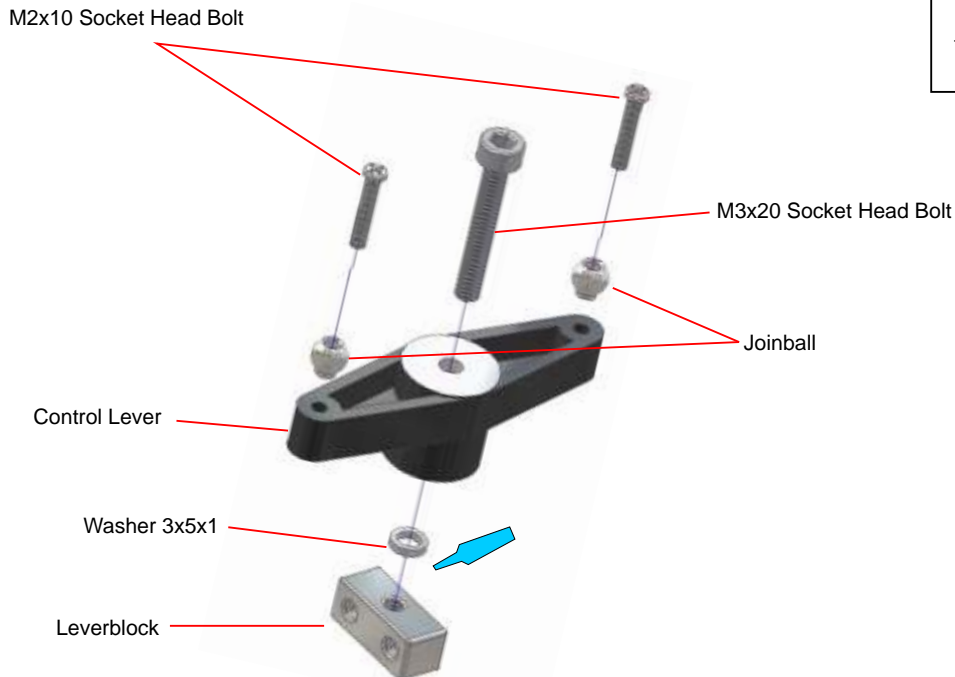
Add a 0.2mm Shim between the bearings if necessary



STEP 1-6 Rear Swash Control Assembly



STEP 1-7 Front Tail Arm Assembly



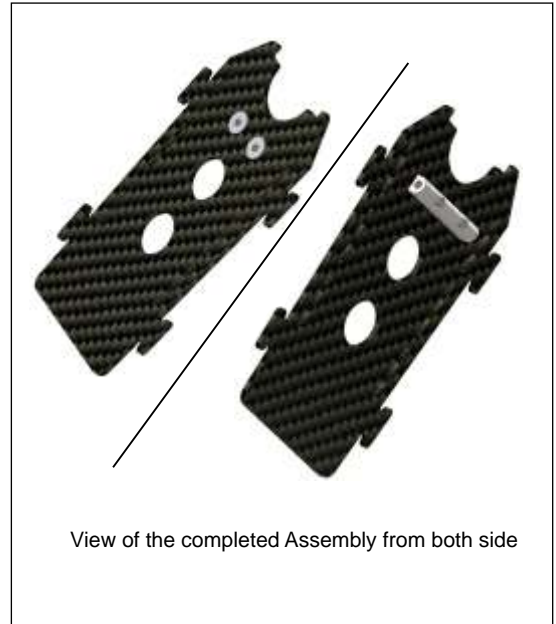
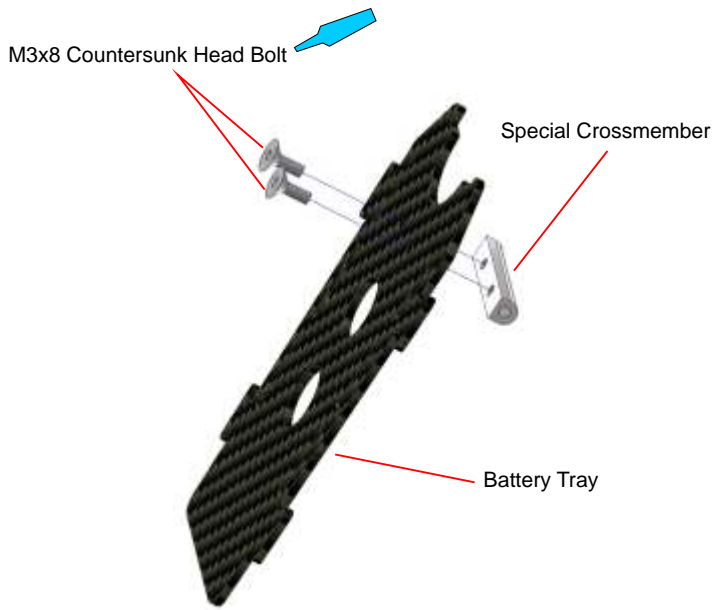
CAUTION:
Do NOT over tighten the M3x20 bolts to avoid breaking the bearings.



STEP 1-8 Battery Tray Assembly

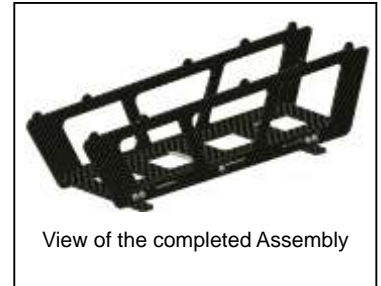
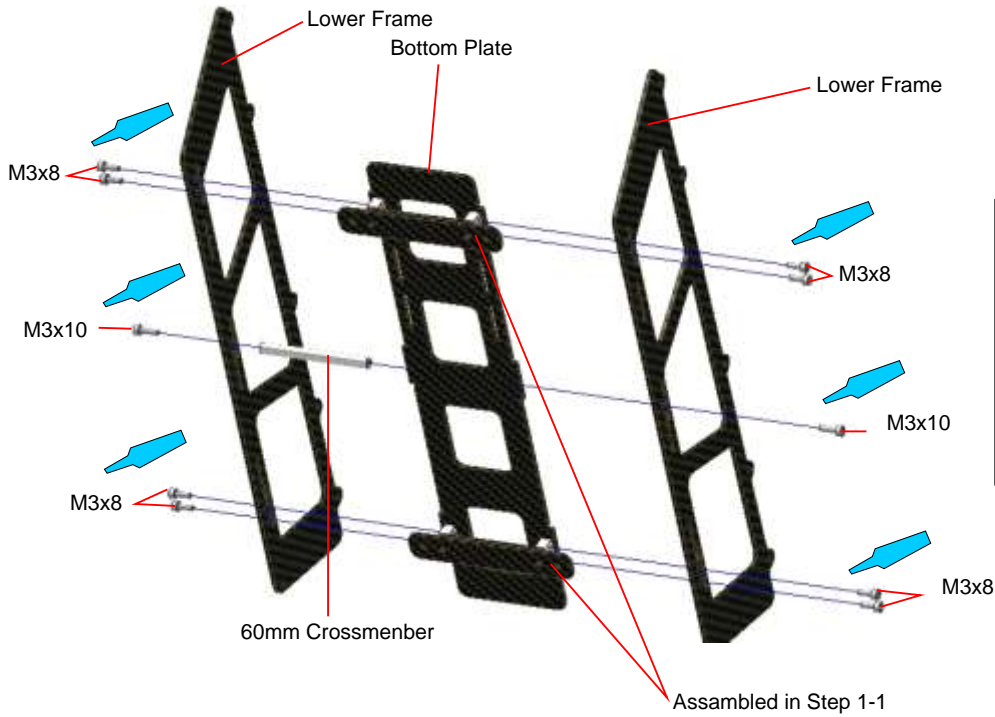


BATTERY TRAY inside the bag of the MAIN FRAME



STEP 2-1 Lower Main Frame Assembly

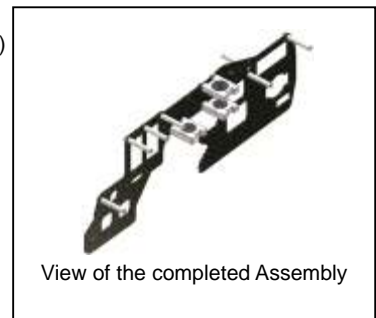
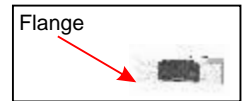
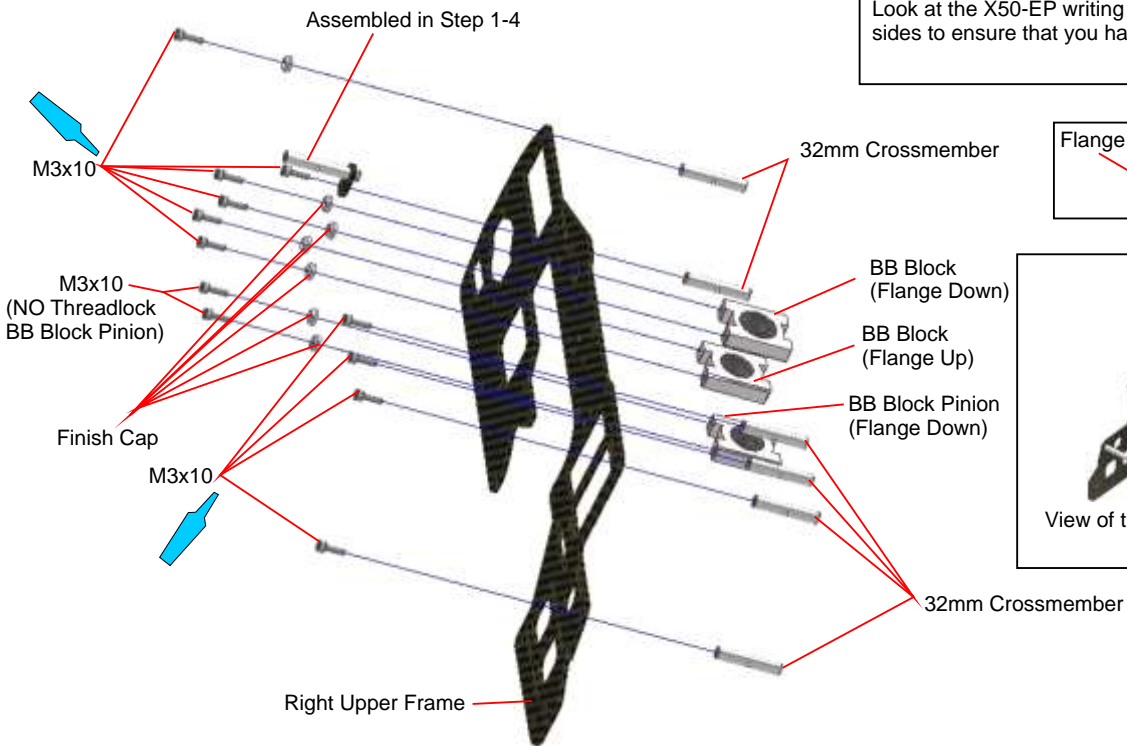
 **USE THREADLOCK**



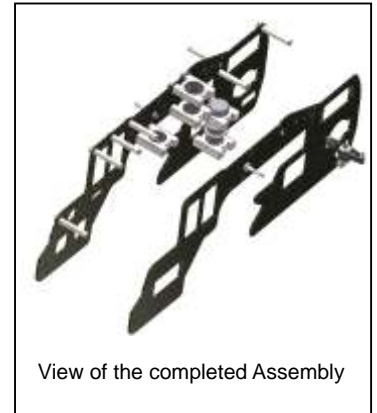
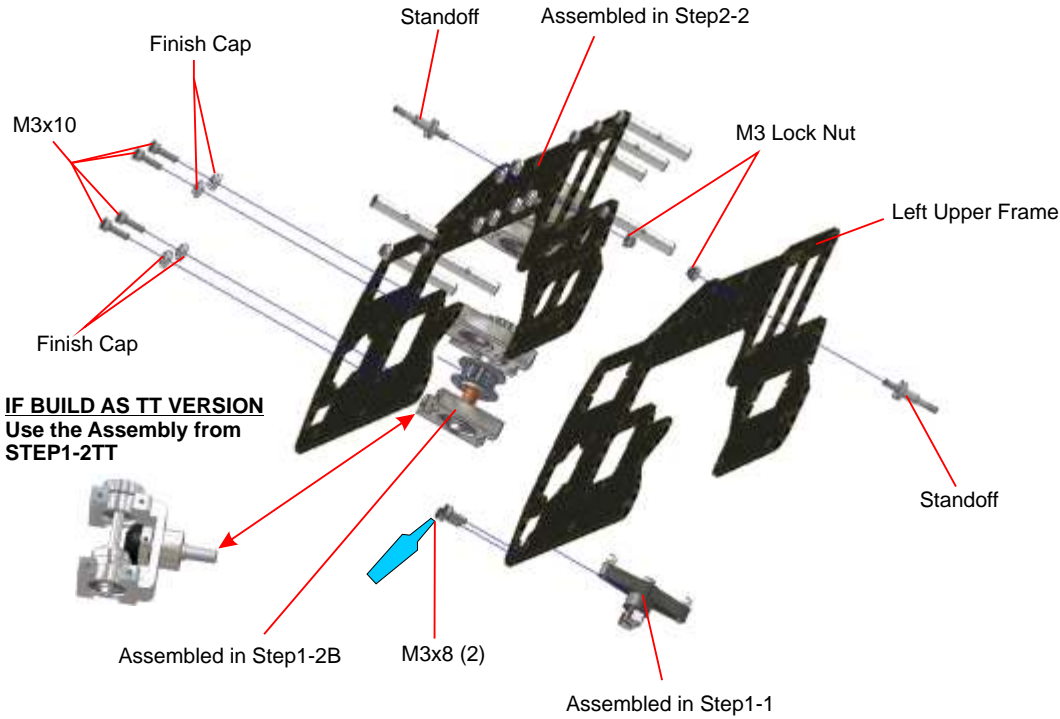
STEP 2-2 Upper Main Frame Assembly

 **USE THREADLOCK**

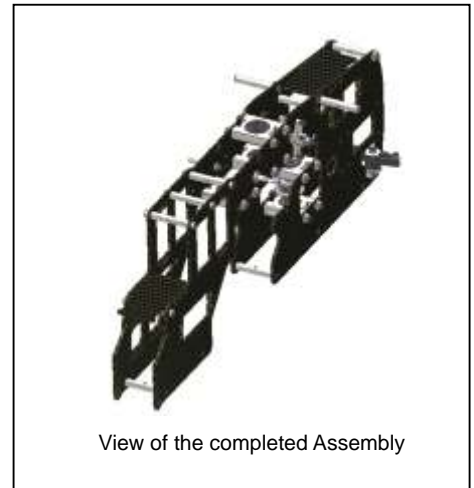
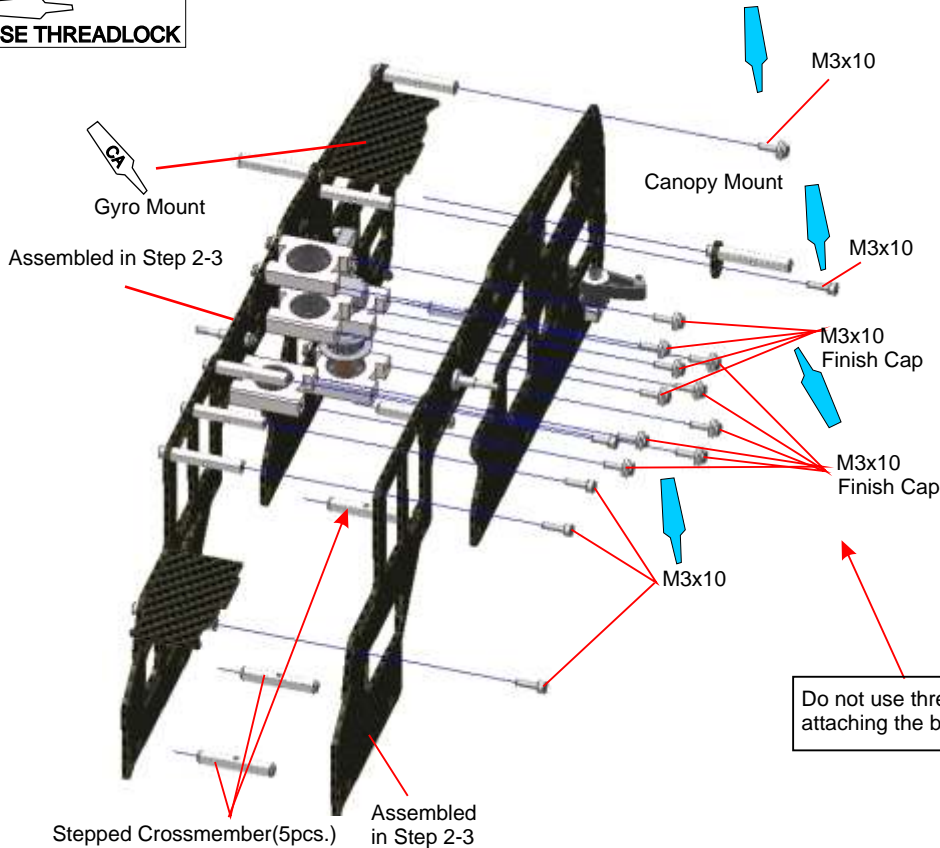
CAUTION:
The upper main frame sides are NOT the same. Look at the X50-EP writing cutout on the frame sides to ensure that you have the correct sides.



STEP 2-3 Upper Main Frame Assembly



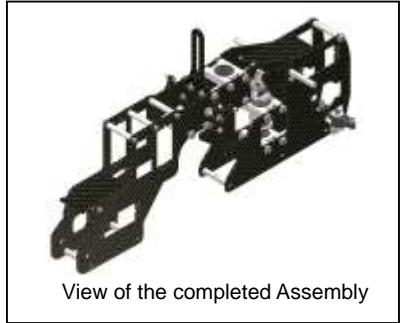
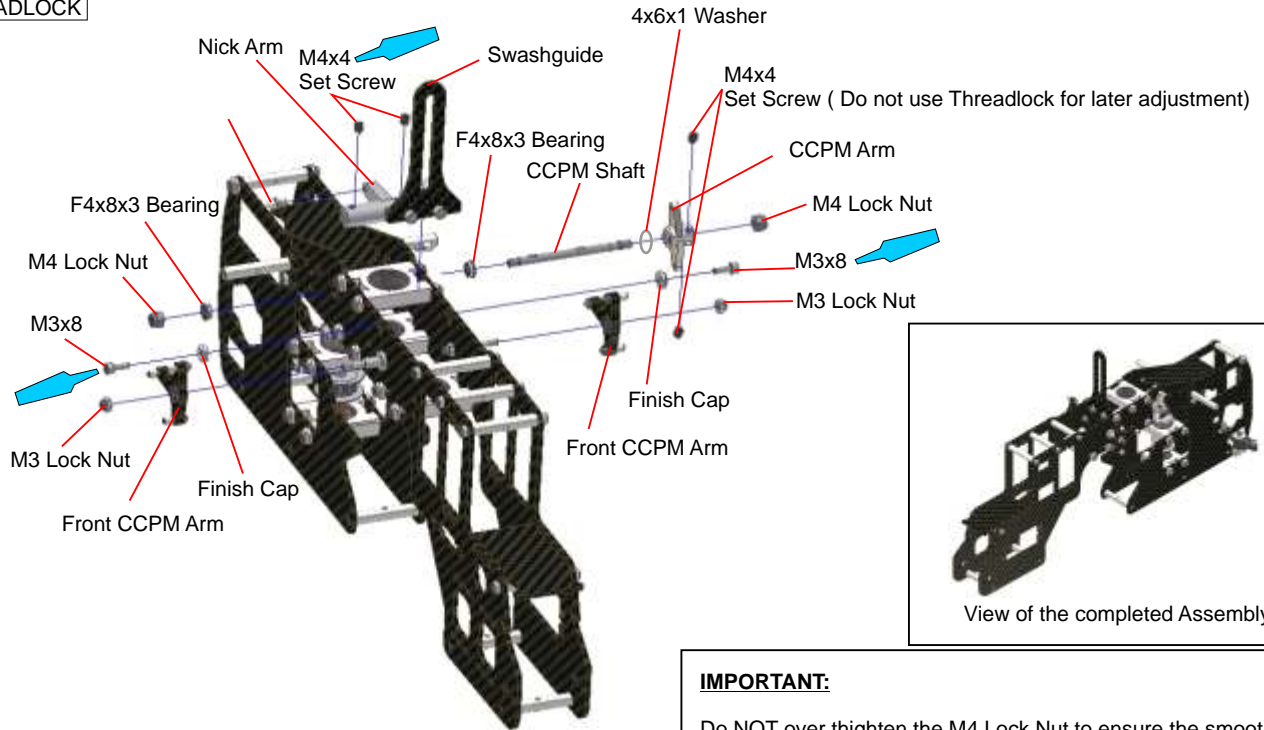
STEP 2-4 Upper Main Frame Assembly



Note:
To ensure a perfect fit of the Gyro Mounts use CA to fix them.

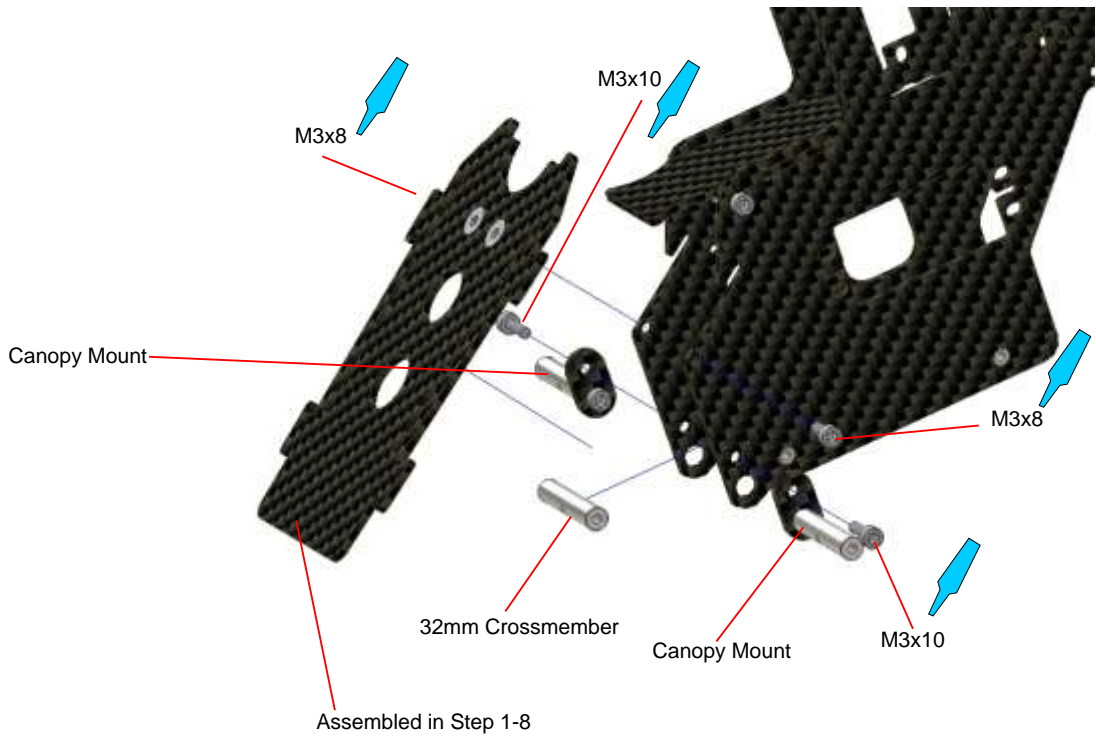
Do not use threadlock here to be able attaching the belt in a later Step

STEP 2-5 Upper Main Frame Assembly



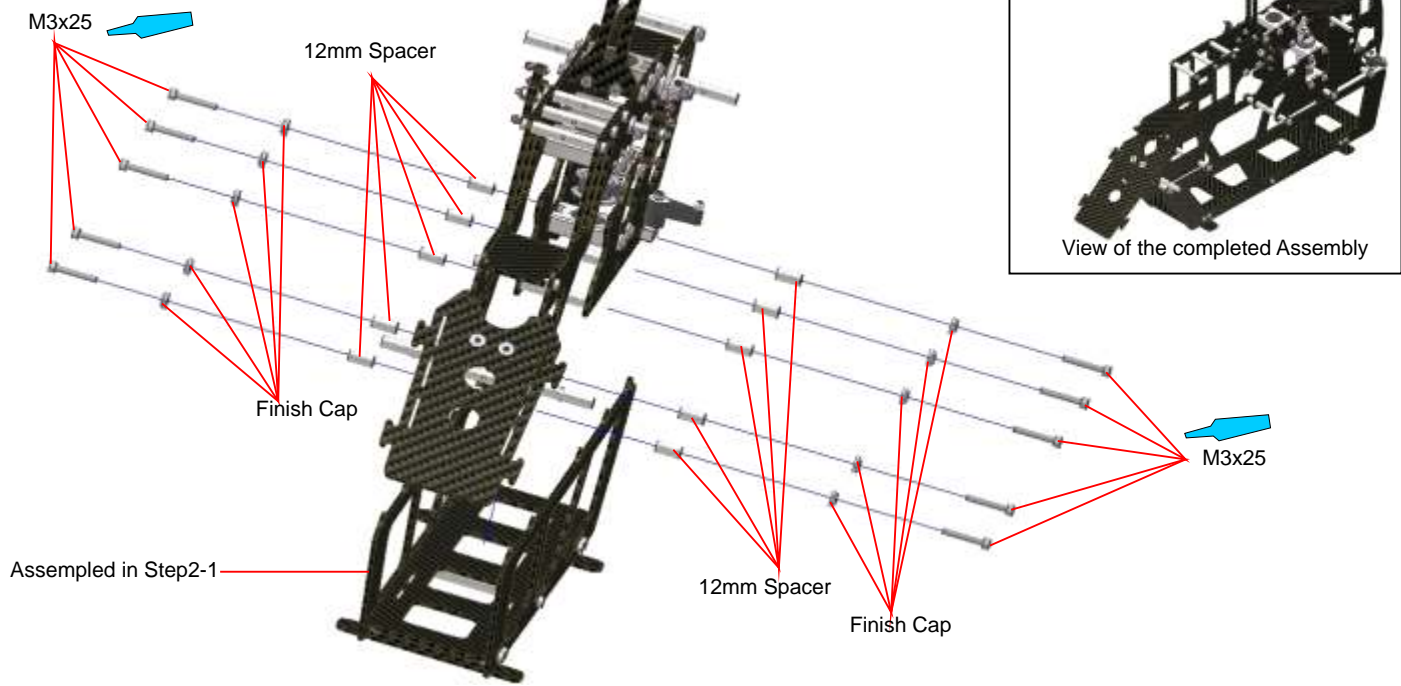
IMPORTANT:
Do NOT over tighten the M4 Lock Nut to ensure the smooth operation of the assembly.

STEP 2-6 Upper Main Frame Assembly

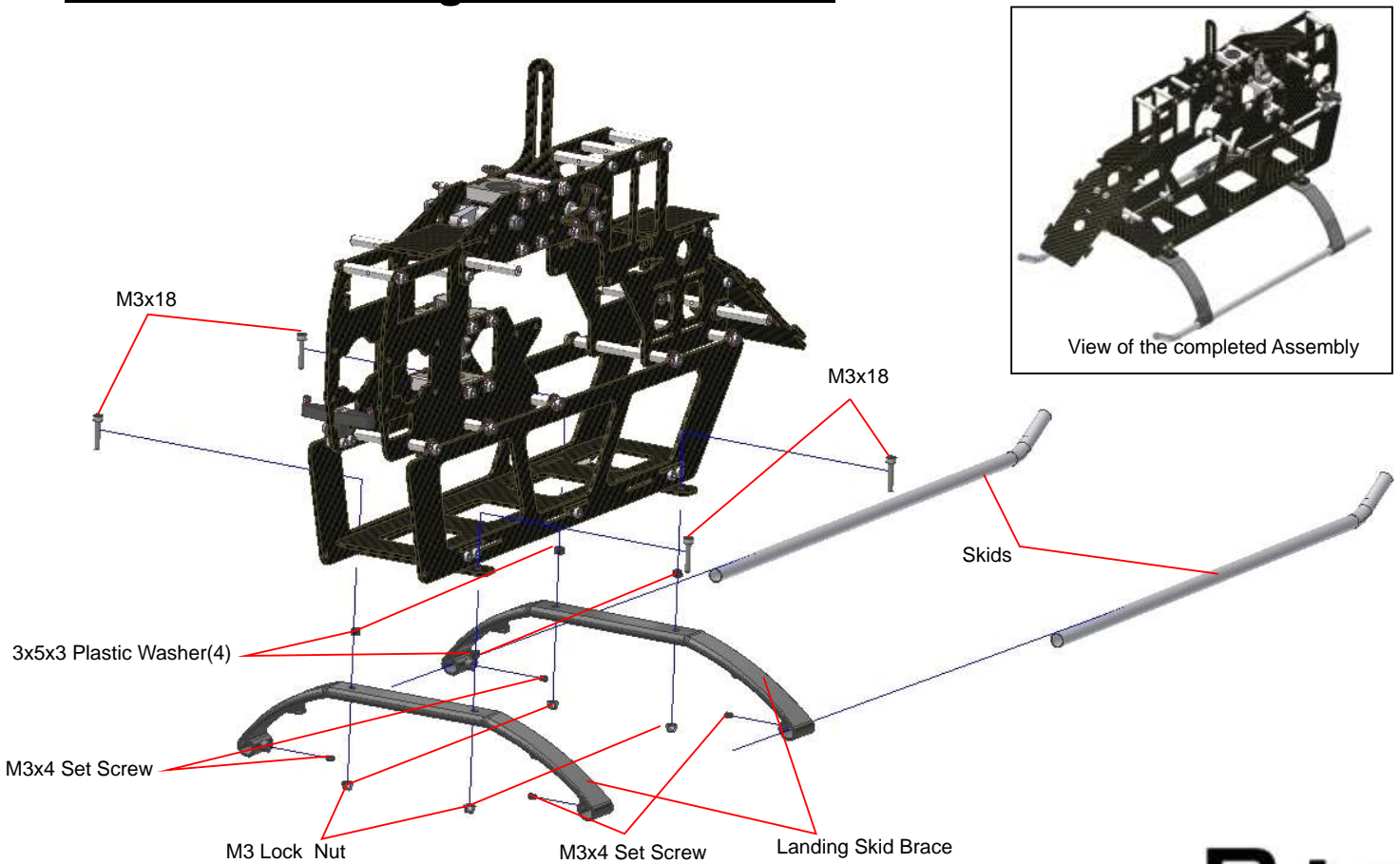


STEP 2-7 Main Frame Assembly

 **USE THREADLOCK**

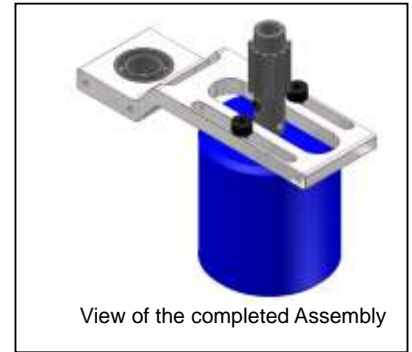
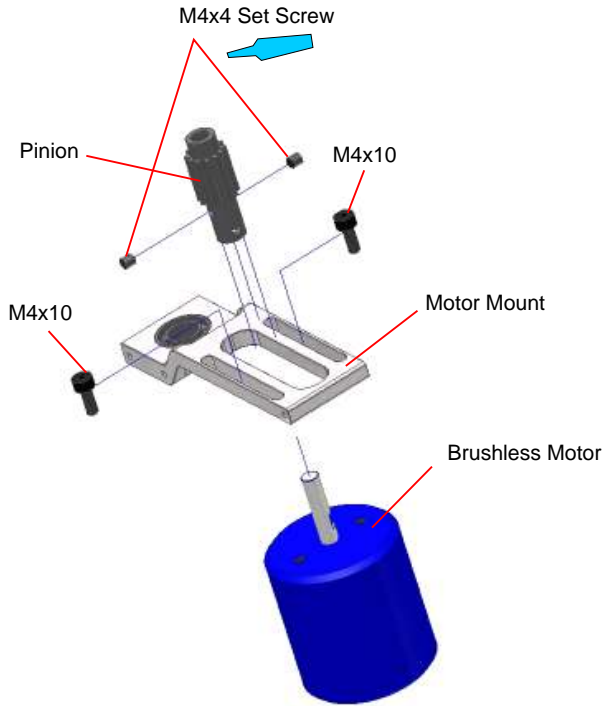


STEP 2-8 Landing Skid Attachment



STEP 3-1 Drive Gear Instalation

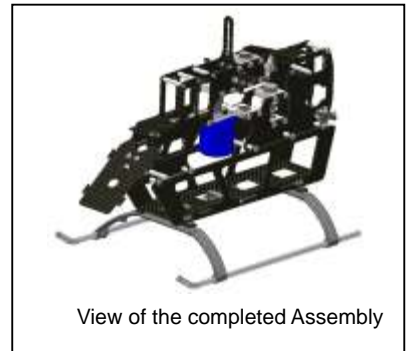
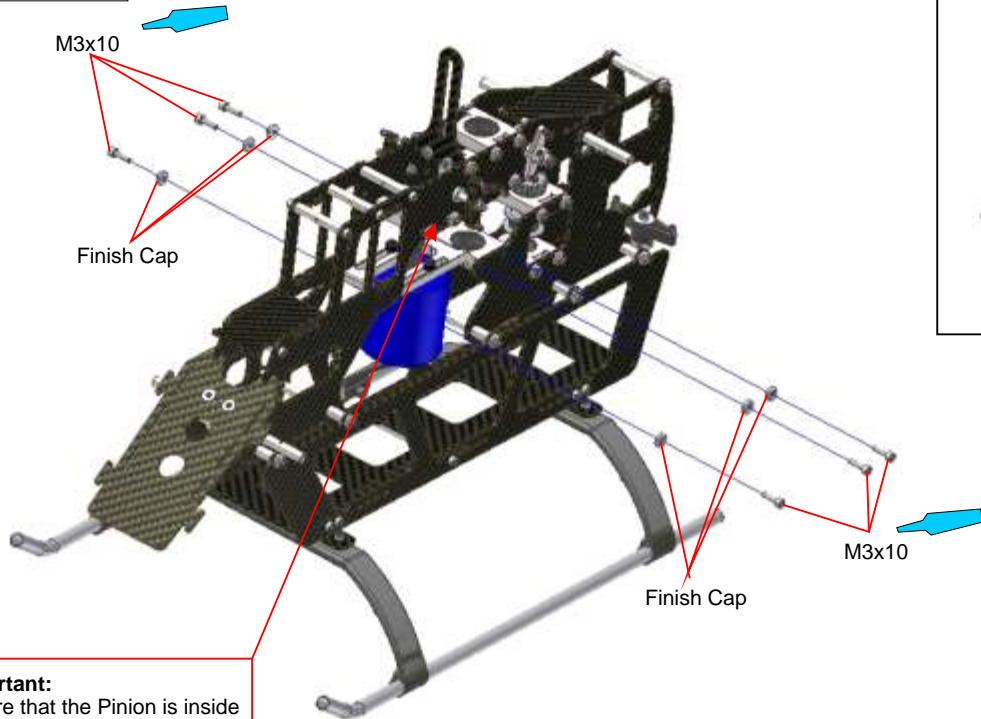
USE THREADLOCK



Note:
Do not tighten the two M4x10 screws. On some motors you can use up to 4 Set Screws to fix the Pinion. Depending on the KV of the Brushless Motor the Pinion and/or the Main gear must be changed to reach a good ratio.

STEP 3-2 Drive Gear Instalation

USE THREADLOCK

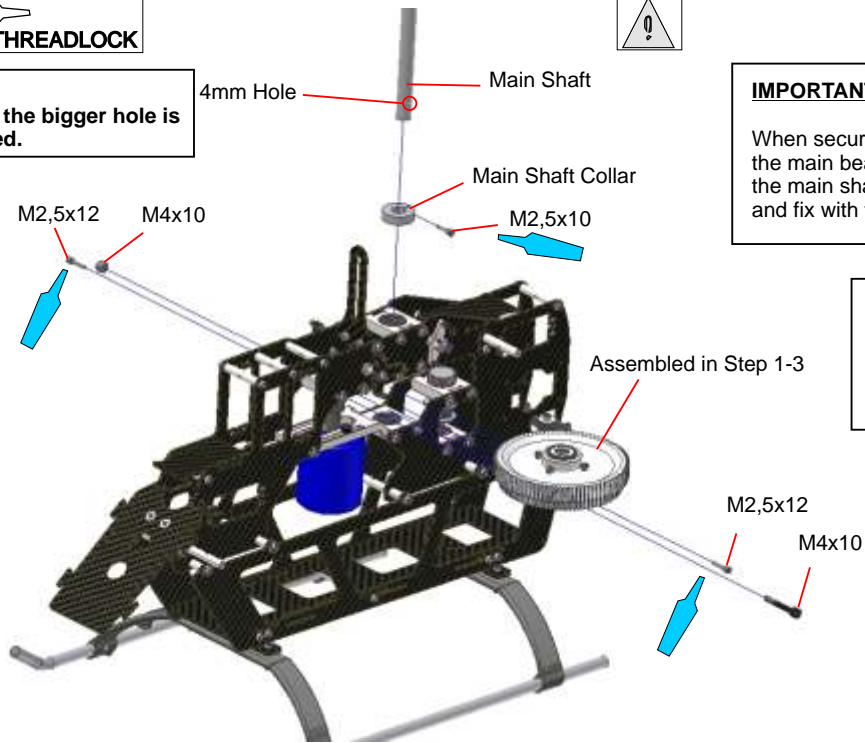


Important:
Ensure that the Pinion is inside the bearing.

STEP 3-3 Drive Gear Instalation

 **USE THREADLOCK**

NOTE:
Insure the bigger hole is inserted.



IMPORTANT:
When securing the main shaft, pull it upwards through the main bearings to eliminate any freeplay. Next press the main shaft collar firmly onto the upper bearing block and fix with threadlock the four M4x4 set screws.

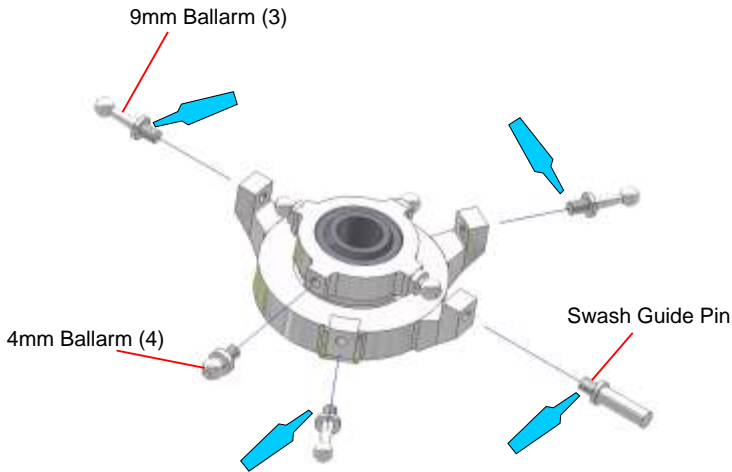
NOTE:
DO NOT tighten the Jesus Bolt too much. If tighten to much the Tail Gear Housing could deform.



NOTE:
Depending on Motor and Ratiu selected the distance between main gear and motor position will change. Ensure to archive a perfect gear mesh. On high power setups, please leave the backlash as samll as possible without beeing to tight.

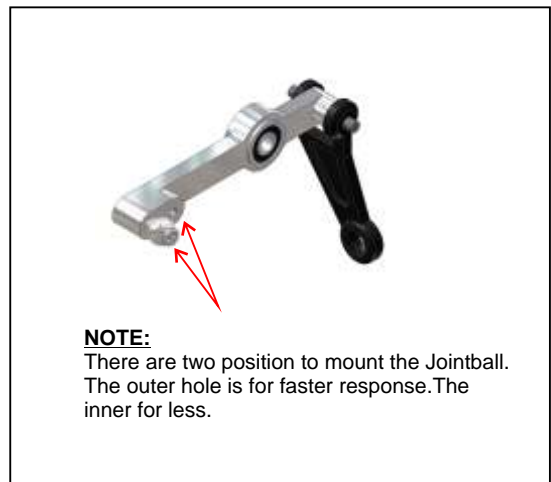
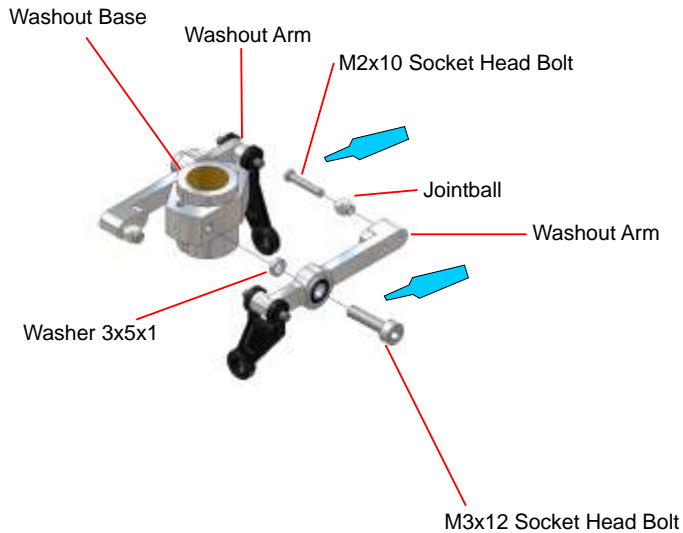
STEP 4-1 SWASHPLATE ASSEMBLY

 **USE THREADLOCK**



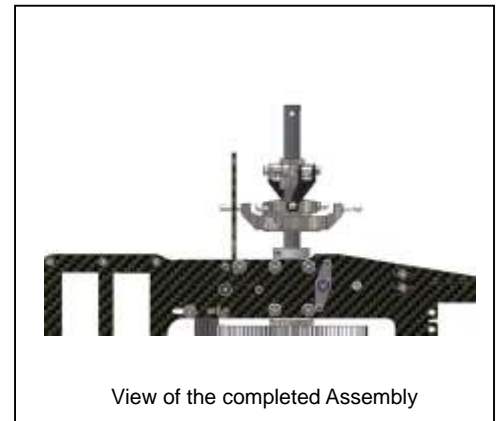
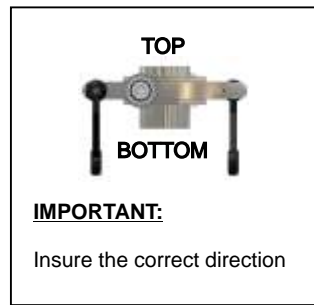
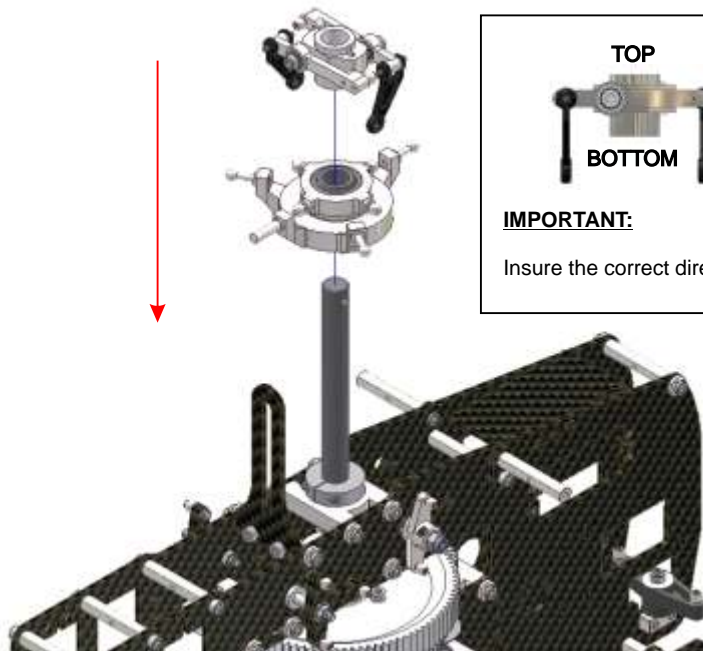
STEP 4-2 WASHOUT ASSEMBLY

 **USE THREADLOCK**



NOTE:
Do NOT over tighten the M3x12 Bolts to avoid damage to the bearings.

STEP 4-3 SWASHPLATE / WASHOUT INSTALLATION

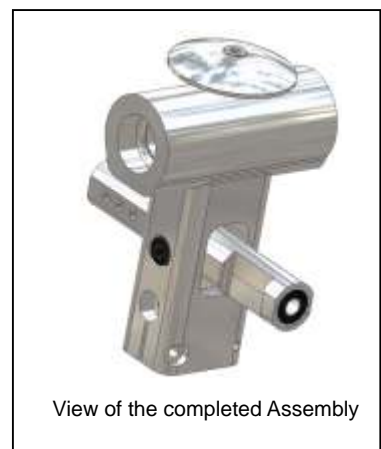
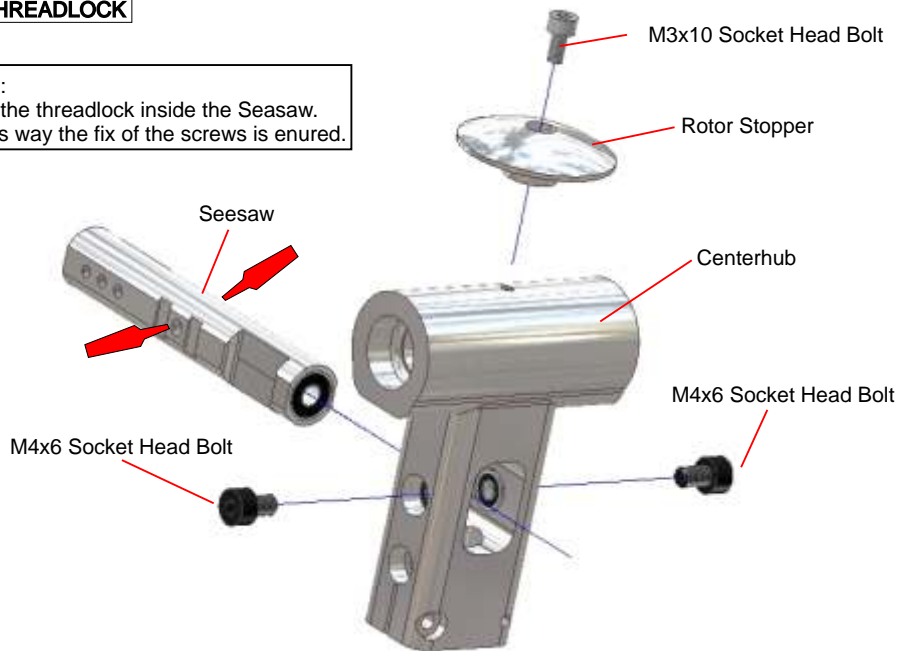


NOTE:
Attach the two Washoutlinks to the swash plate.

STEP 4-4 SEESAW INSTALLATION

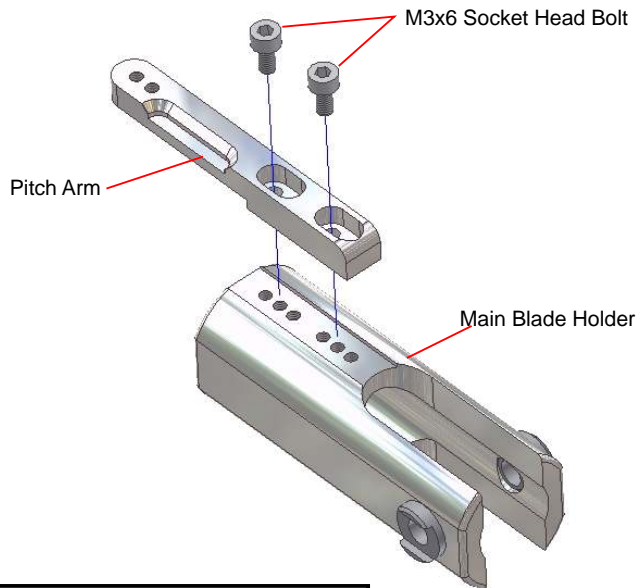
 **USE THREADLOCK**

NOTE:
Apply the threadlock inside the Seesaw.
On this way the fix of the screws is ensured.



IMPORTANT:
Do NOT over tighten the M4x6 Socket Head Bolt to fix the Seesaw. Hard type of thread lock is necessary.

STEP 4-5 MAIN BLADE HOLDER ASSEMBLY



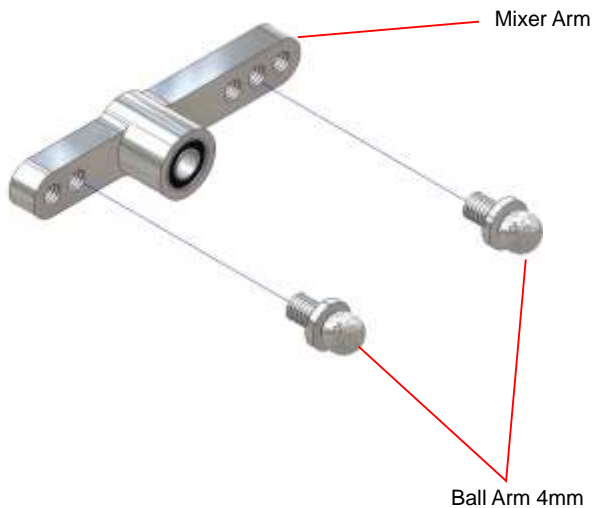
NOTE: Assemble 2 sets of the Main Blade Holder.
Detailed adjustments in Step 4-13.



STEP 4-6 MIXER ARM ASSEMBLY

IMPORTANT:

Mixer settings are explained in Step 4-13 more detailed.



NOTE: Assemble 2 sets of this mixer arm

NOTE:

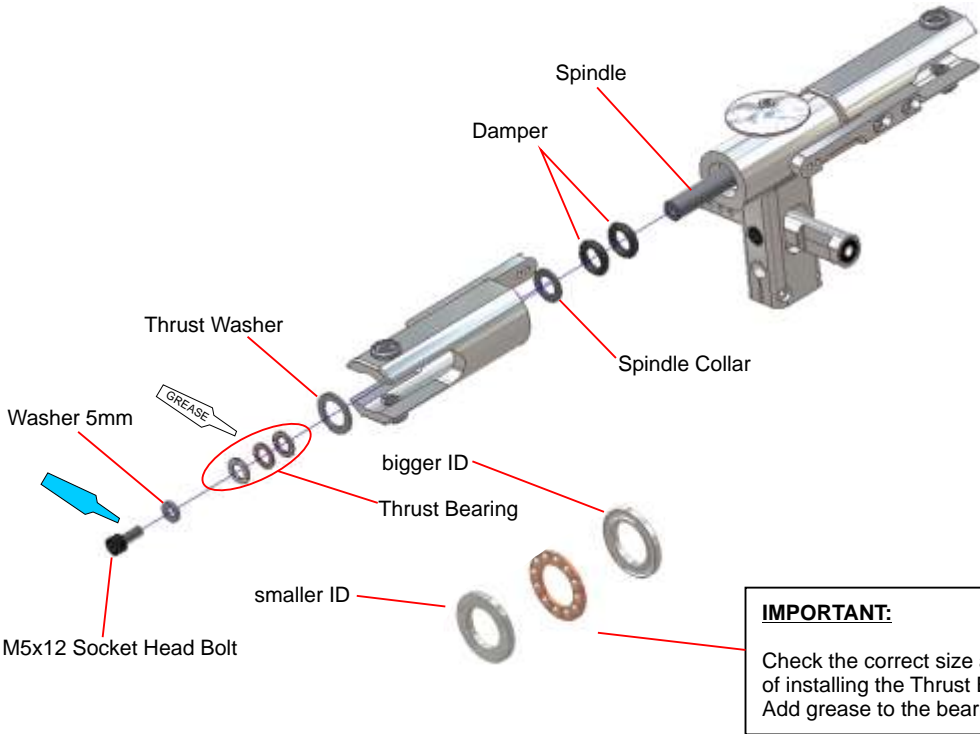
Don't use in this step threadlock to fix the Ball arm.



STEP 4-7 MAIN ROTOR HEAD ASSEMBLY

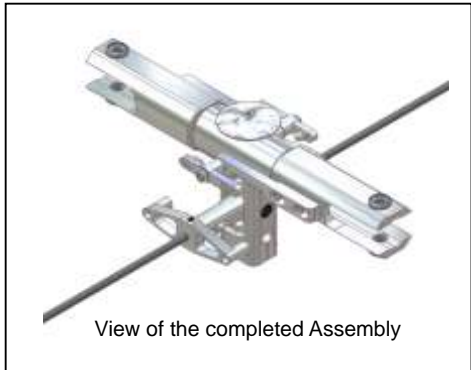
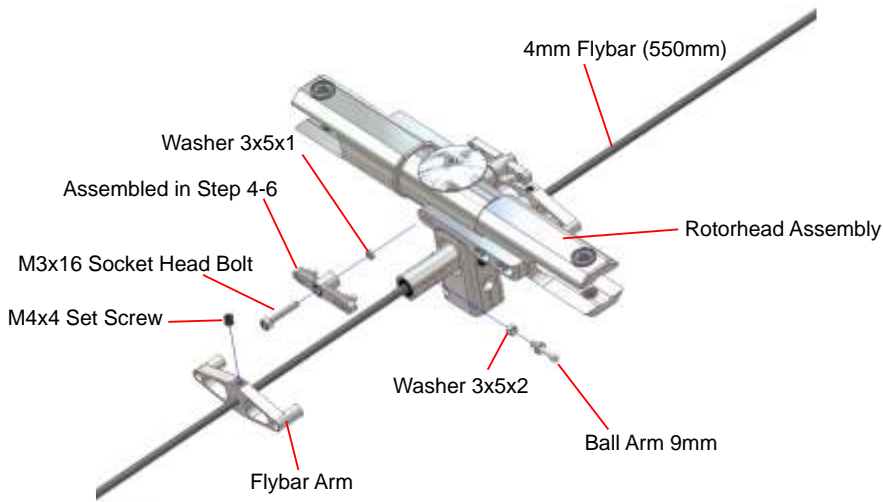


NOTE:
Use silicon grease for the dampers. This also needs to be reapplied as part of your on going maintenance (after about 30 to 40 flights) to ensure that the dampers not getting dry.



IMPORTANT:
Check the correct size and way of installing the Thrust Bearing. Add grease to the bearing.

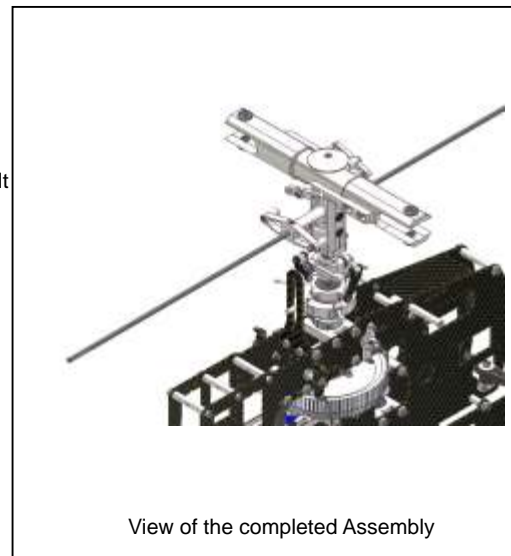
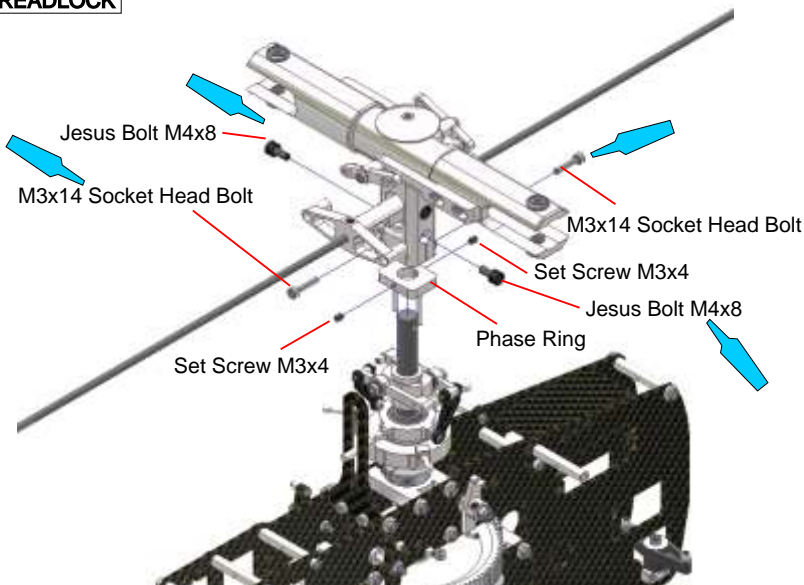
STEP 4-8 MAIN ROTOR HEAD ASSEMBLY



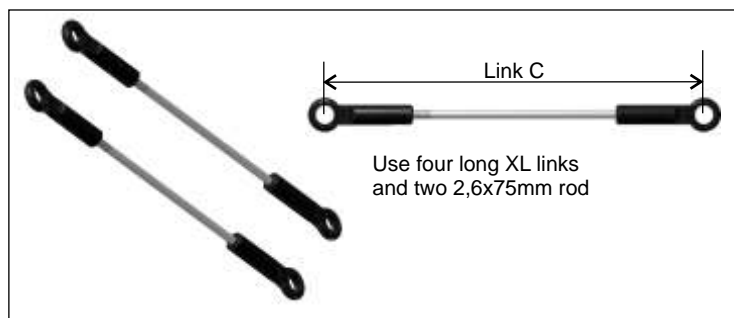
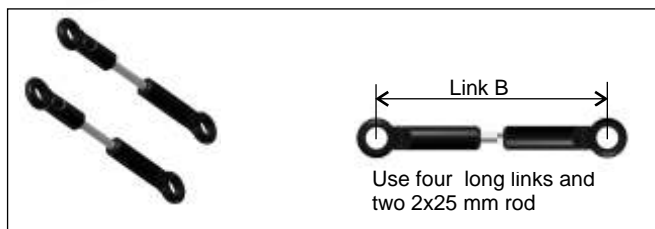
NOTE:
Assemble both sides of the Rotor head the same way. Do NOT use threadlock for later adjustments.

STEP 4-9 MAIN ROTOR HEAD ASSEMBLY

 USE THREADLOCK



STEP 4-10 CONTROL ROD INSTALLATION



NOTE:

The size of the linkage rod can vary depending on the head setup. In the STEP 7-2 will be an example of setup with the according sizes of the linkage rods.

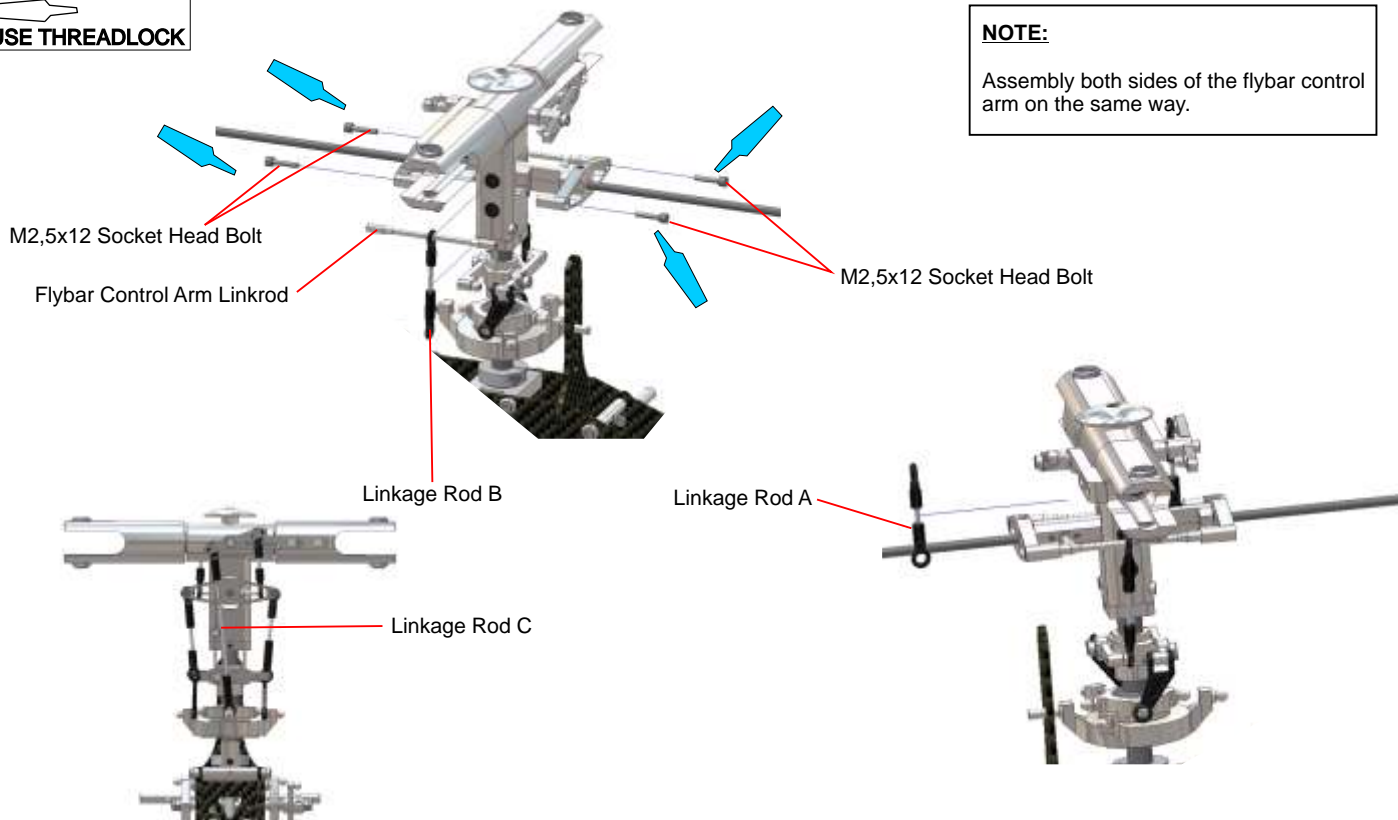
By looking closely, you will notice on the universal links the letters RJX (on the small) and RJXHOBBY on the large links. ensure this are always pointed outside from the ball as shown in the diagram below.



STEP 4-11 CONTROL ROD INSTALLATION

 **USE THREADLOCK**

NOTE:
Assembly both sides of the flybar control arm on the same way.



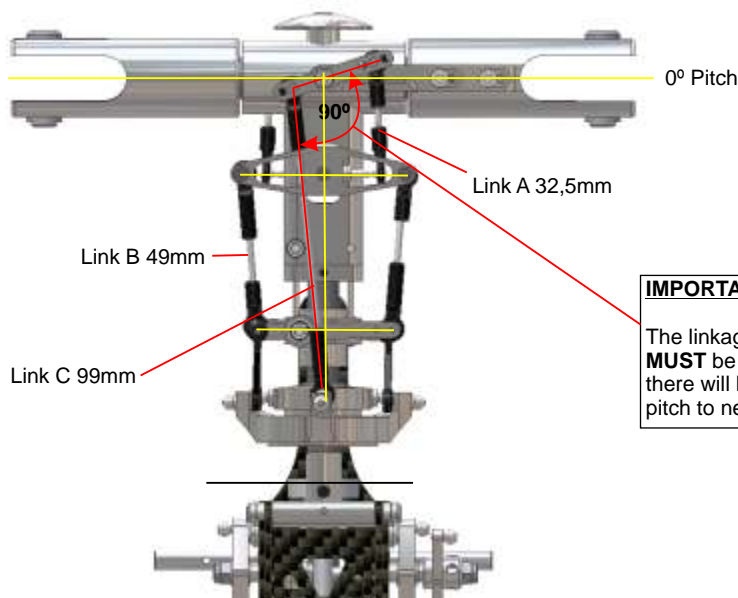
STEP 4-12 ROTOR HEAD SETUP

IMPORTANT: SECURE ALL JOINT BALLS AND SCREWS WITH THREADLOCK

NOTE:

In this STEP will be explained one setup of the rotor head what is good point for 3D maneuvers. There are many other settings possible. Linkage rod sizes from the rotor head are changing depending on this settings.

The size of the linkage rod is measured from center to center of the hole (see STEP 4-10).



IMPORTANT:
Ensure that all is leveled (yellow lines) and on the main blades you have 0° pitch. This means all controls are linear.

IMPORTANT:
The linkage rod coming from the swash **MUST** be 90° to the mixer arm. If not there will be different angles from positive pitch to negative.

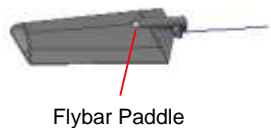
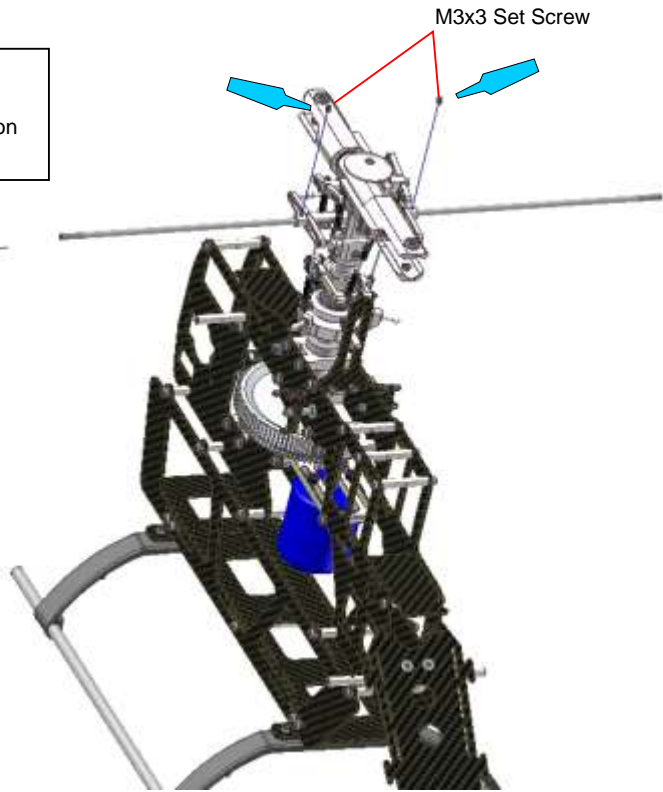
STEP 4-13 MAIN ROTOR HEAD ASSEMBLY

 **USE THREADLOCK**

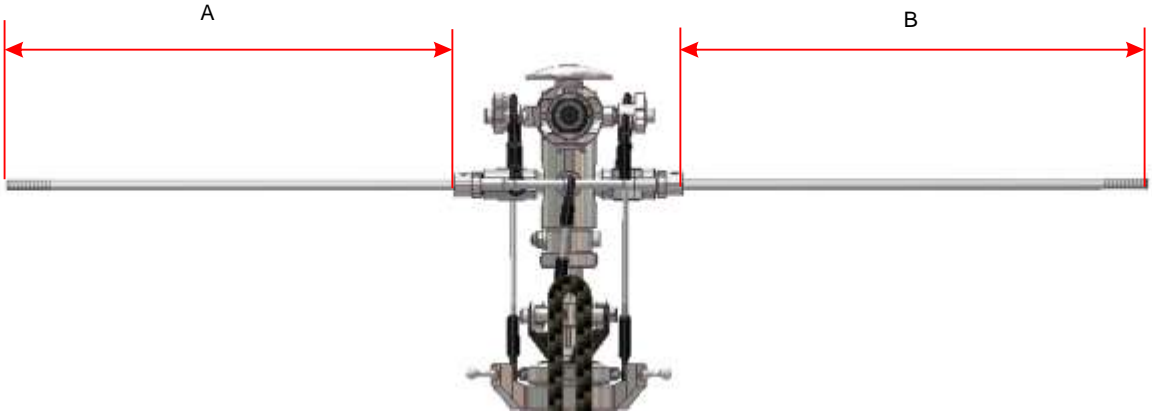


Ensure the two M3x3 Sets Screws are on the D-Cut of the Flybar.

IMPORTANT:
Insure the correct direction of the Flybar Paddle.



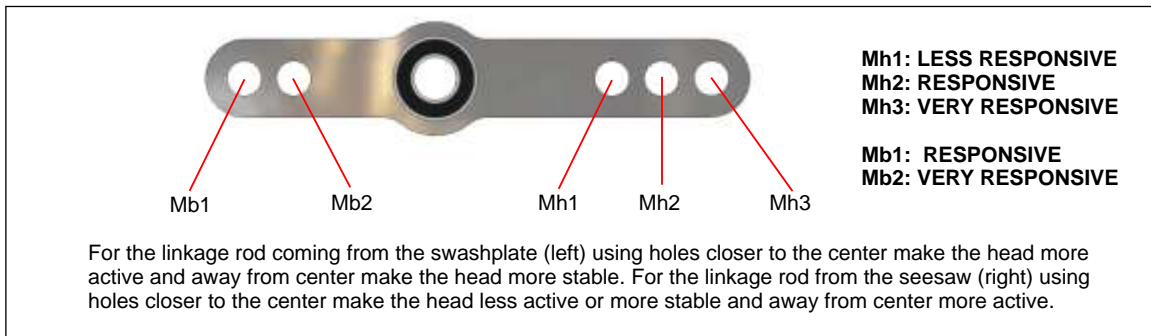
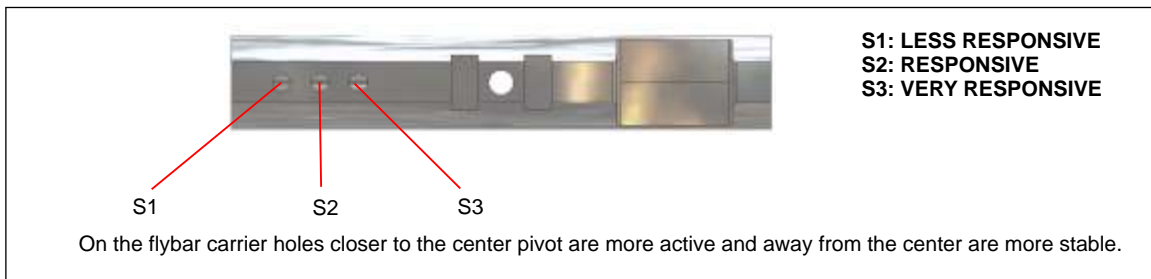
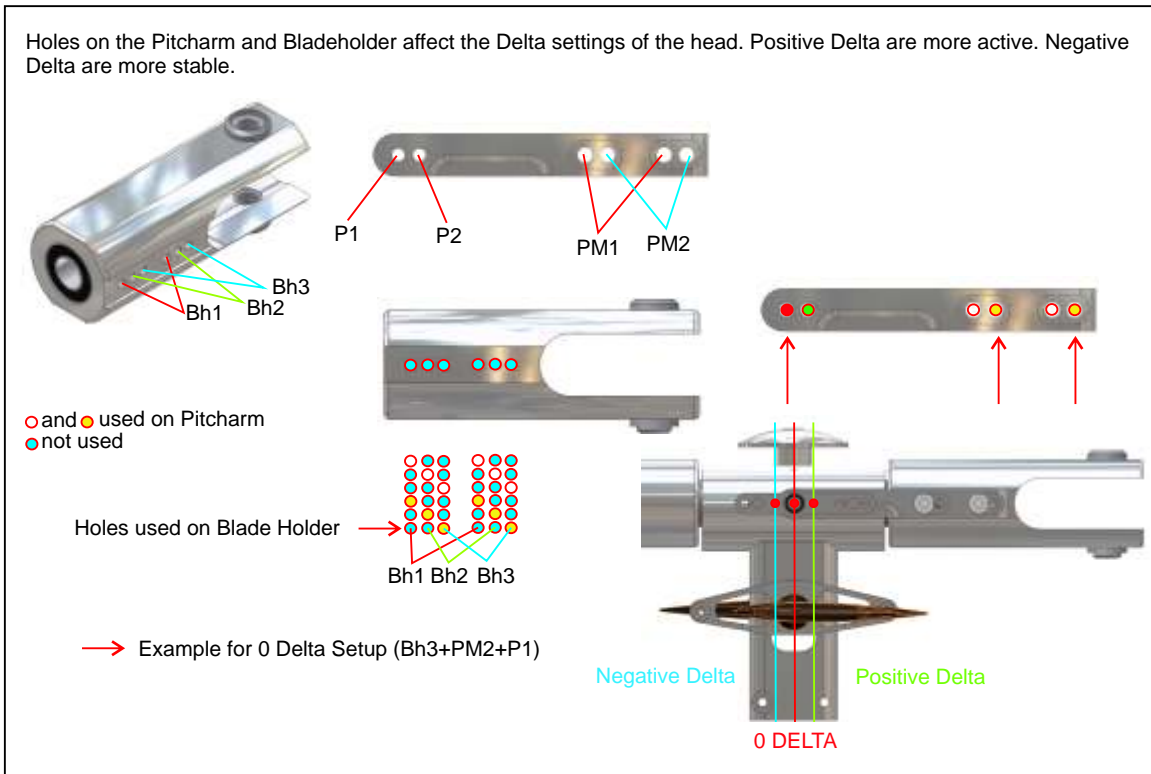
NOTE:
Adjust so that A and B are exactly the same distance and secure with the M4x4 Set Screws firmly.



IMPORTANT:
Center the flybar in the seesaw firmly before securing the control arm. Check to be sure that there is no sideplay in the flybar before securing the control arm. Ensure that the finished assembly moves freely in all axis.

STEP 4-14 ROTOR HEAD SETUP

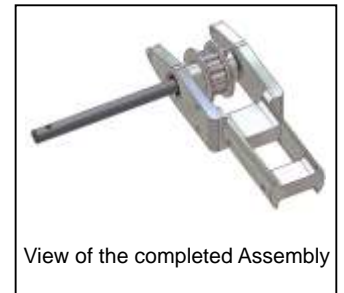
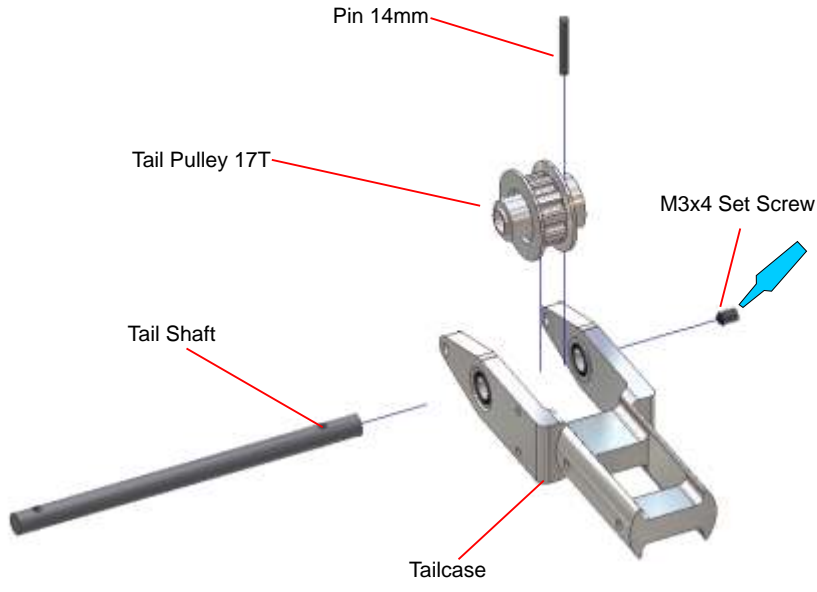
In the diagrams below are explained the different settings possibilities of this rotor head. There are many setups with different results. Adjust this settings on demand of you and your capability. Some of the settings can produce binding. Ensure that the ATV settings in the radio and linkage rod adjustments allowing no bindings. This is important to achieve a good performance of the rotor head.



IMPORTANT:

When using very responsive settings the forces applied to the CCPM servos are higher than normal. Plastic servo gears can suffer or break. Servos with metal gears are recommended for those settings.

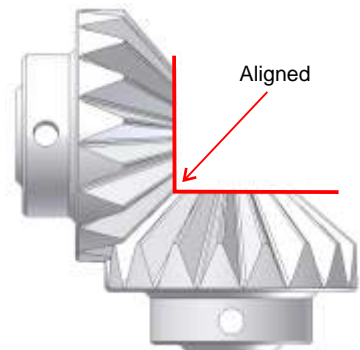
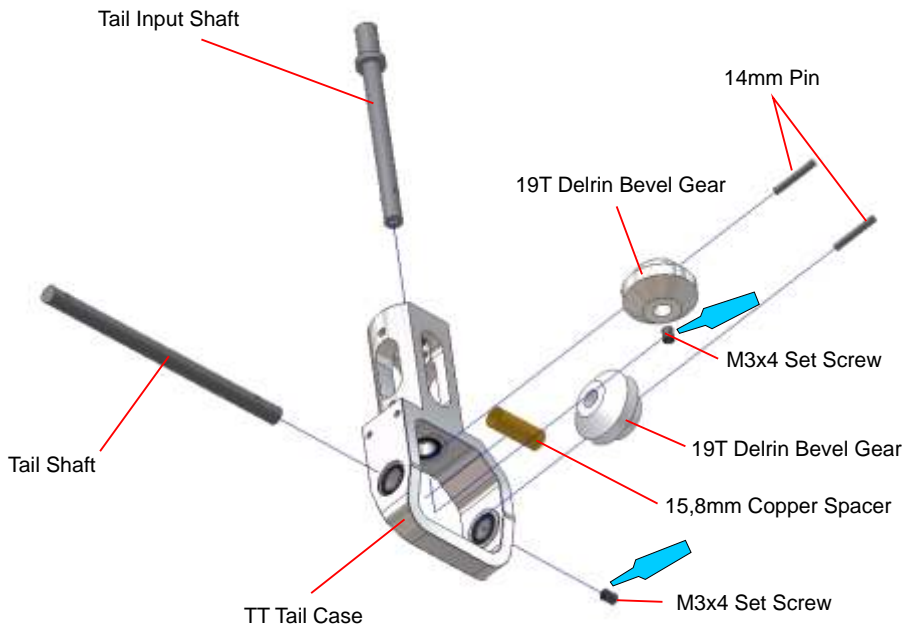
STEP 5-1B TAILCASE ASSEMBLY (Belt Version)



STEP 5-1TT TAILCASE ASSEMBLY (TT Version)



This step is preassembled. PLEASE CHECK AND ADD THREAD LOCK

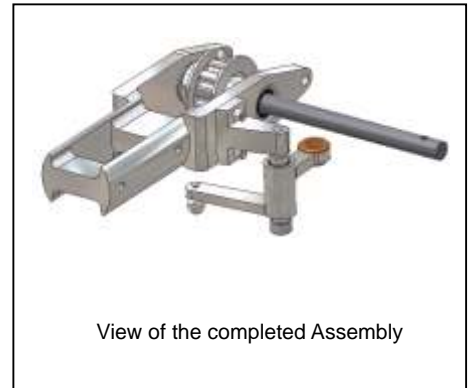
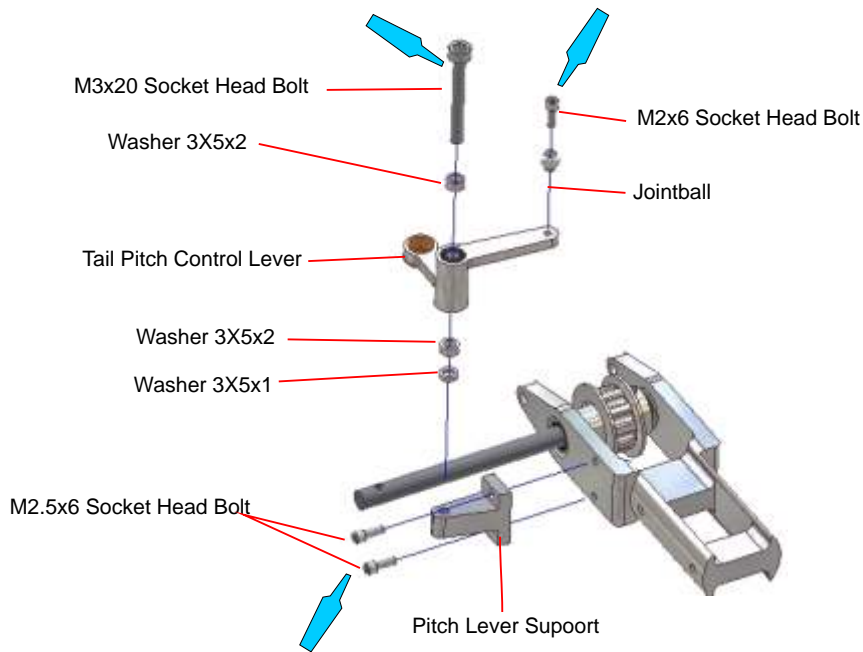


IMPORTANT:
Add 0,2mm Nylon washer to reach a PLAYLESS Gear mesh. Check that the two gears are perfectly aligned (shown in the picture on the right). Stay on the tight side of the gear mesh. A excessive play can strip the Delrin gear. **Lub the Bevel Gears regularly.**

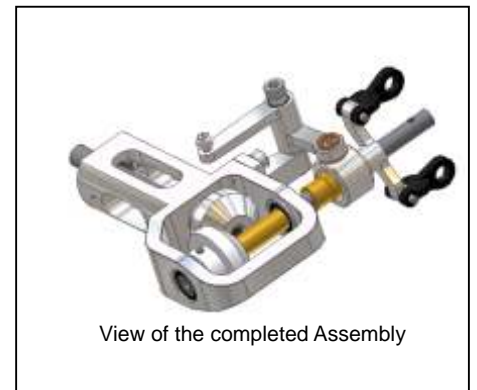
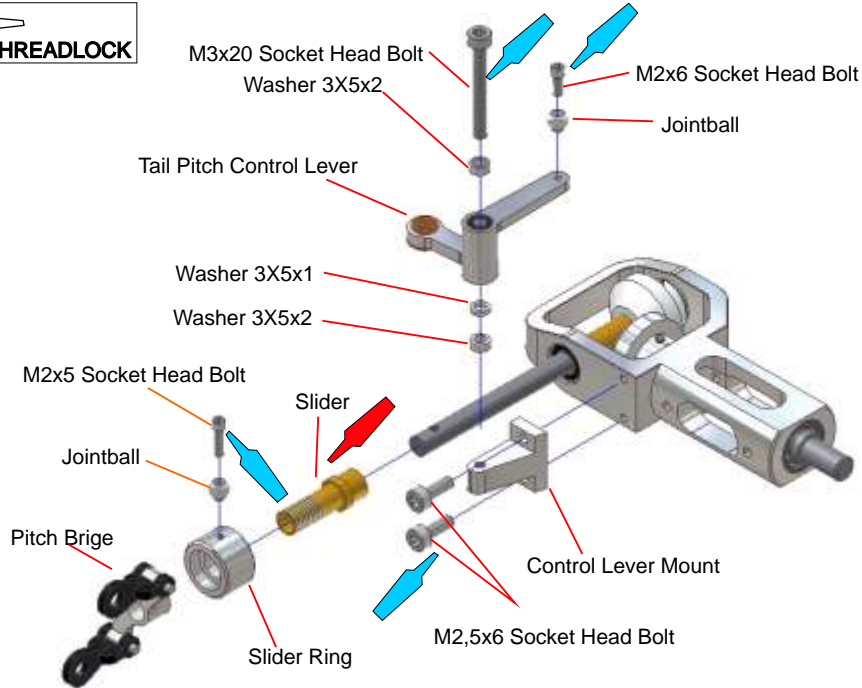
STEP 5-2B TAILCASE ASSEMBLY (Belt Version)



NOTE:
Do not over tighten the M3x20 bolts to avoid breaking the bearings.



STEP 5-2TT TAILCASE ASSEMBLY (TT Version)



STEP 5-3 TAILCASE ASSEMBLY (TT+Belt Version)

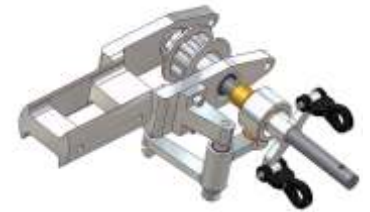
 **USE THREADLOCK**



IMPORTANT:
Check the pre installed assembly and add red threadlock on the copper sleeve.



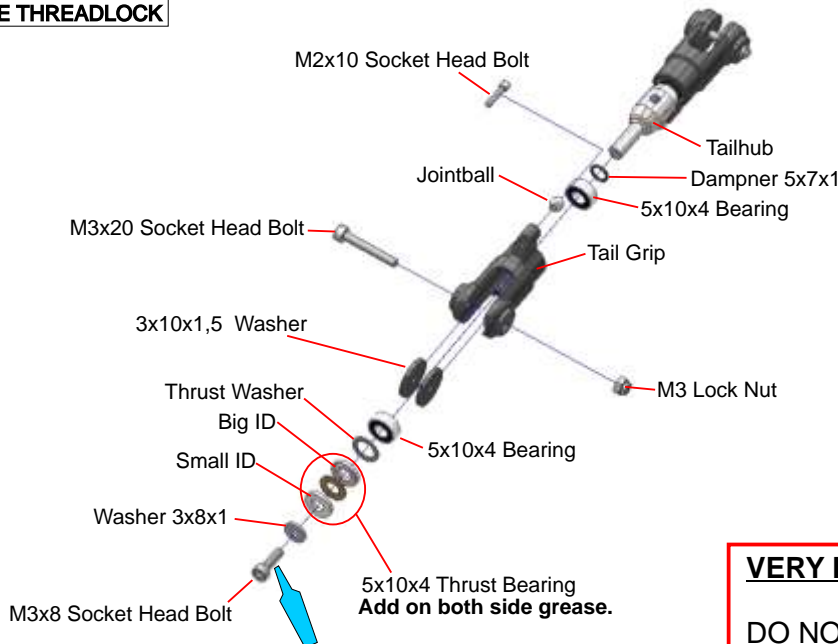
NOTE:
Check that the Joint ball is working freely and smoothly in the tail pitch control lever.



View of the completed Assembly

STEP 5-4 TAILROTOR ASSEMBLY (TT+Belt Version)

 **USE THREADLOCK**



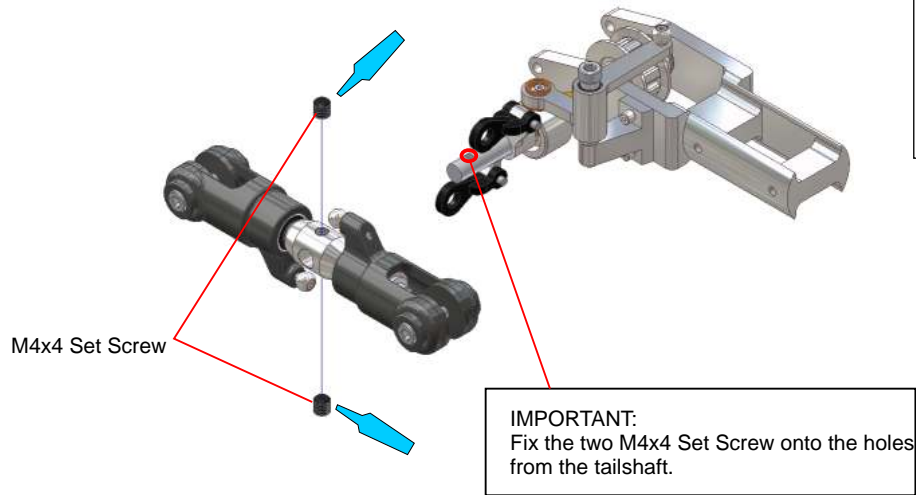
View of the completed Assembly

VERY IMPORTANT:

DO NOT USE METAL TAIL BLADE HOLDERS!

When using higher head speed than 1900 RPM do NOT use larger tail blades than 95mm.

STEP 5-5 TAILCASE ASSEMBLY (TT+Belt)



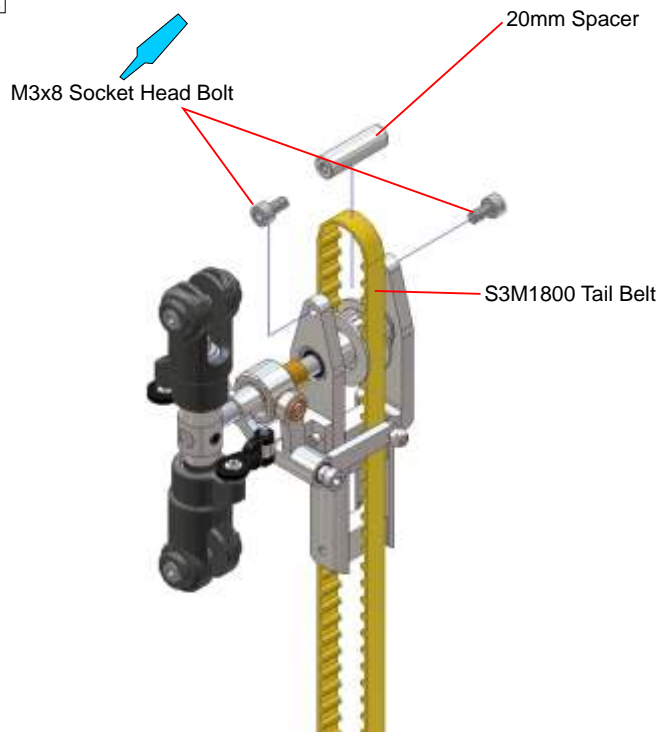
NOTE:

Clip the linkage into the jointball and check that the assembly works smooth.



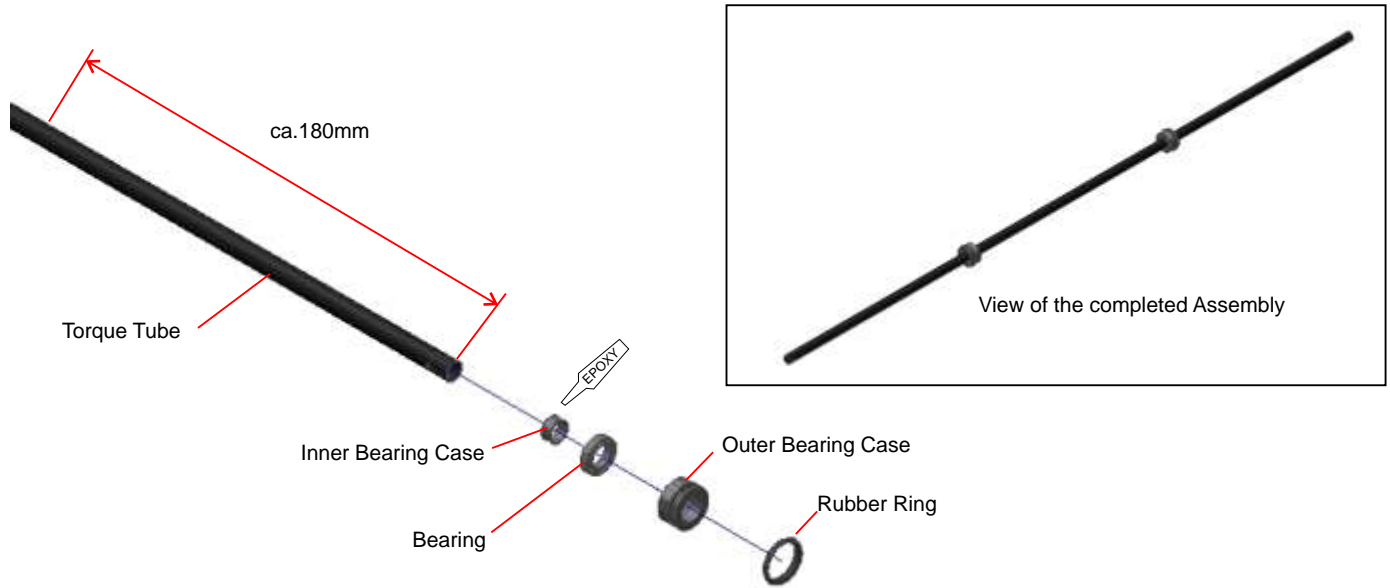
View of the completed Assembly

STEP 5-5B TAILCASE ASSEMBLY



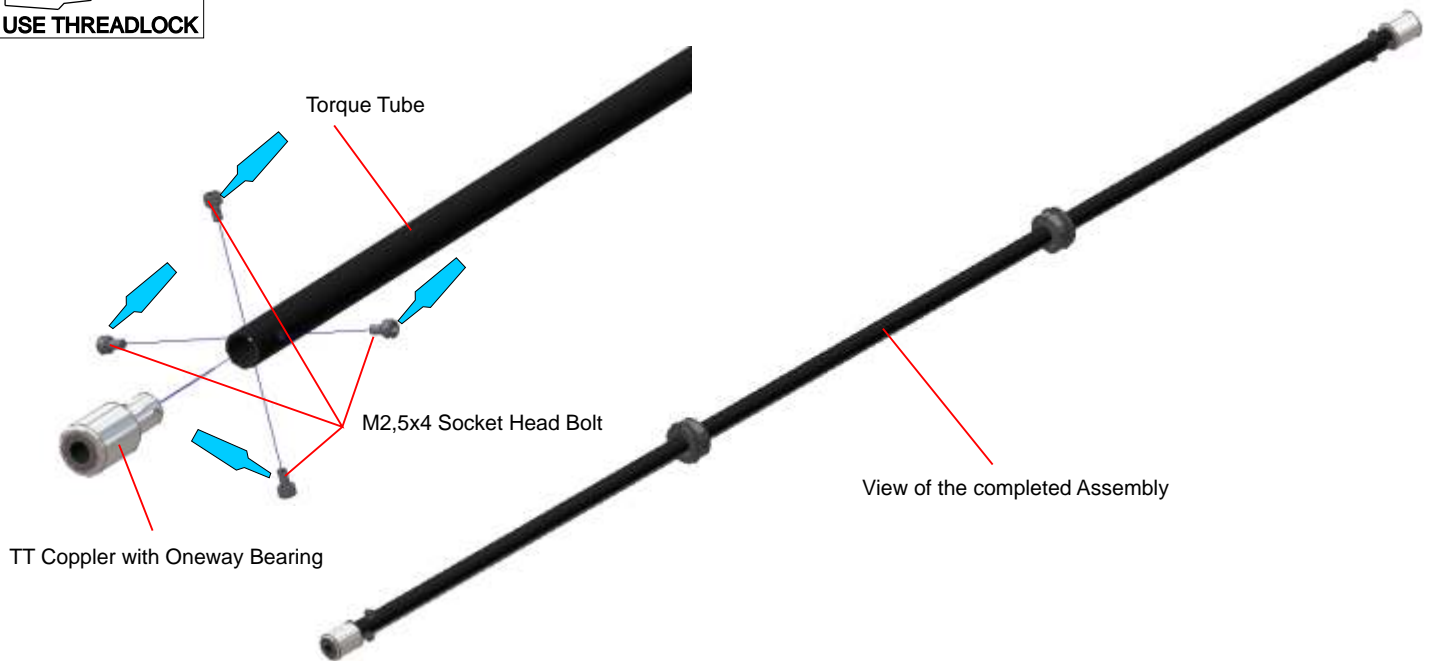
View of the completed Assembly

STEP 5-6TT Torque Tube ASSEMBLY

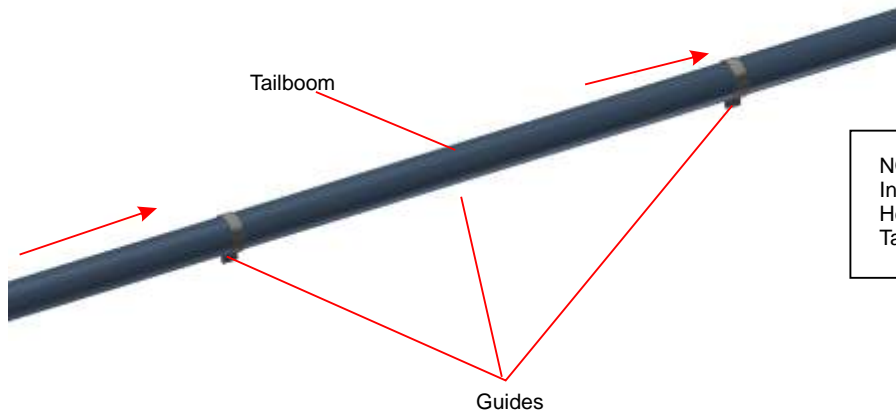


Note:
Fix the Torque Tube Bearing Support with EPOXY.
Take special Care that no EPOXY get inside the
Bearing when assembly.

STEP 5-6TT Torque Tube ASSEMBLY

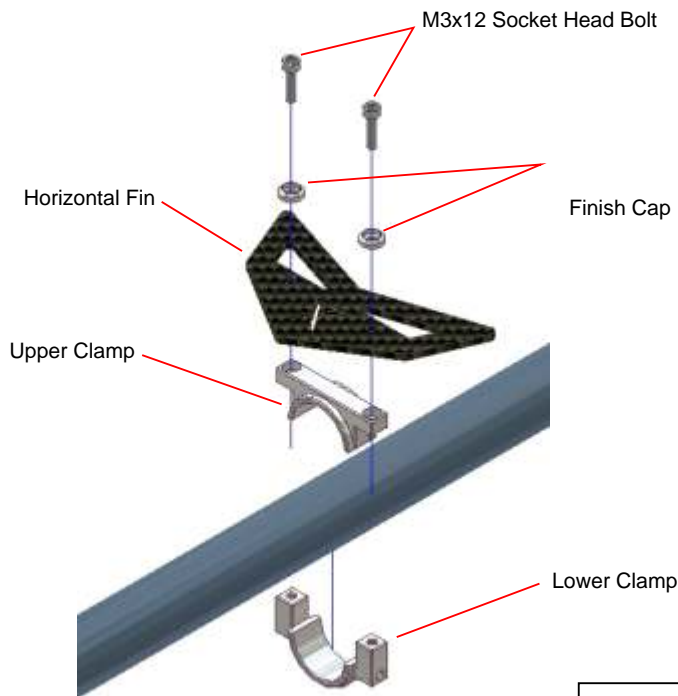


STEP 5-7 TAIL BOOM INSTALATION (TT+Belt Version)



NOTE:
In case the guides are hard to install.
Heat them up and push them over the
Tailboom.

STEP 5-8 TAIL BRACE ASSEMBLY (TT+Belt Version)



NOTE:

Do NOT yet tighten the M3x12 Socket Head Bolt.
There will adjustments handed later with the Tail
Brace.

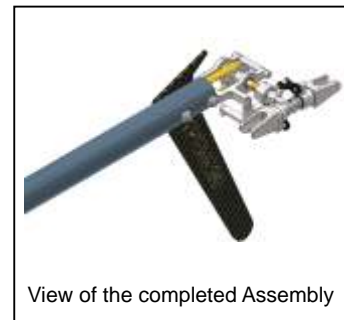
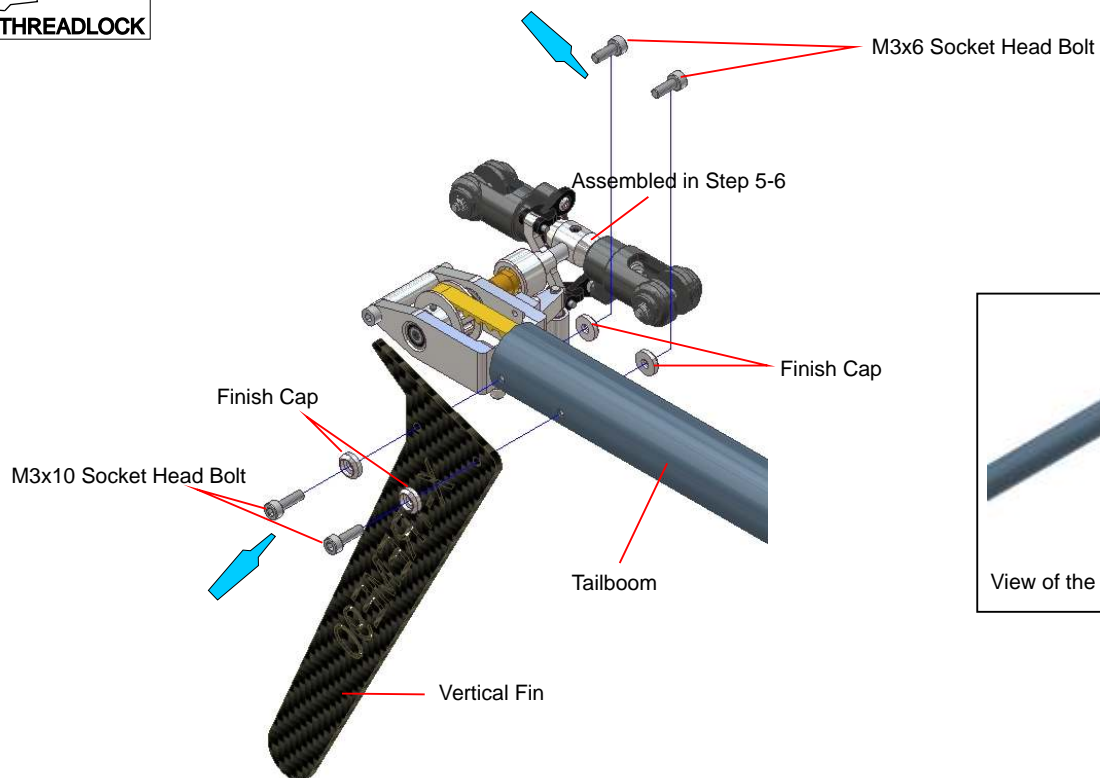


View of the completed Assembly

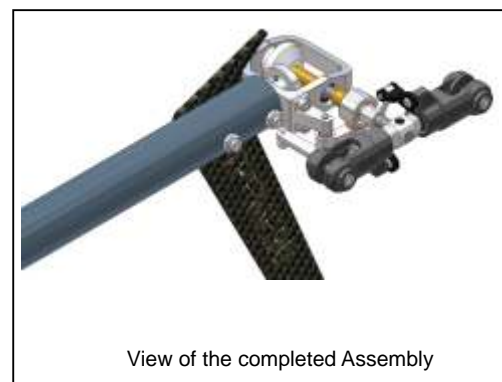
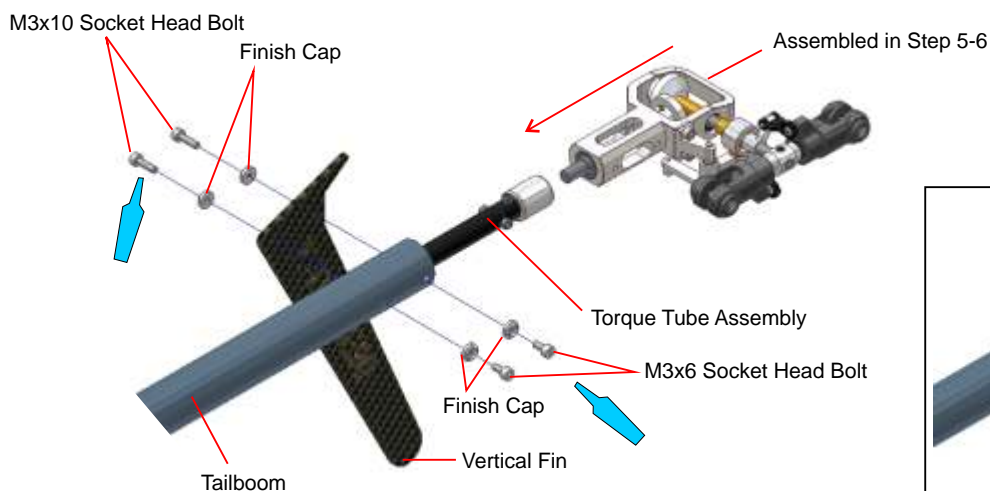
NOTE:

When installing without the Horizontal Fin use two M3x8
Socket Head Bolts instad of M3x12.

STEP 5-9 TAILCASE ASSEMBLY (Belt Version)

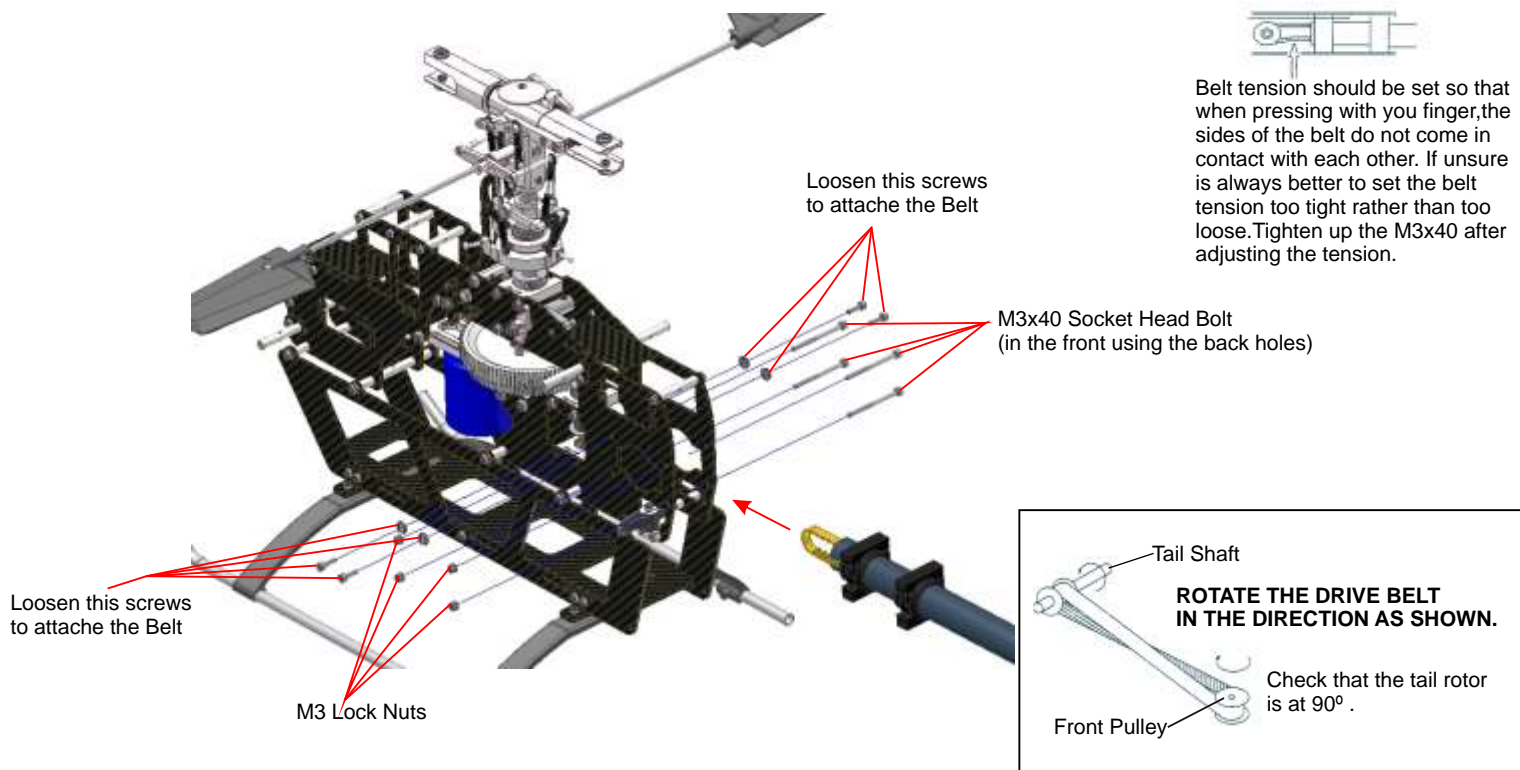


STEP 5-9TT TAILCASE ASSEMBLY

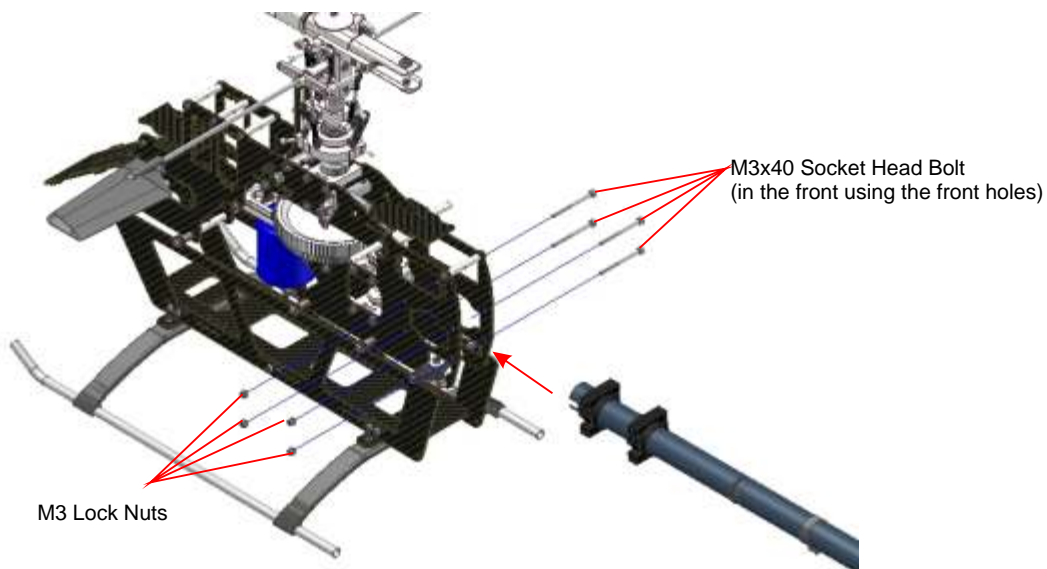


Note:
Add some grease on the Rubbers and inside of the Tailboom to introduce the Torque Tube assembly easily.

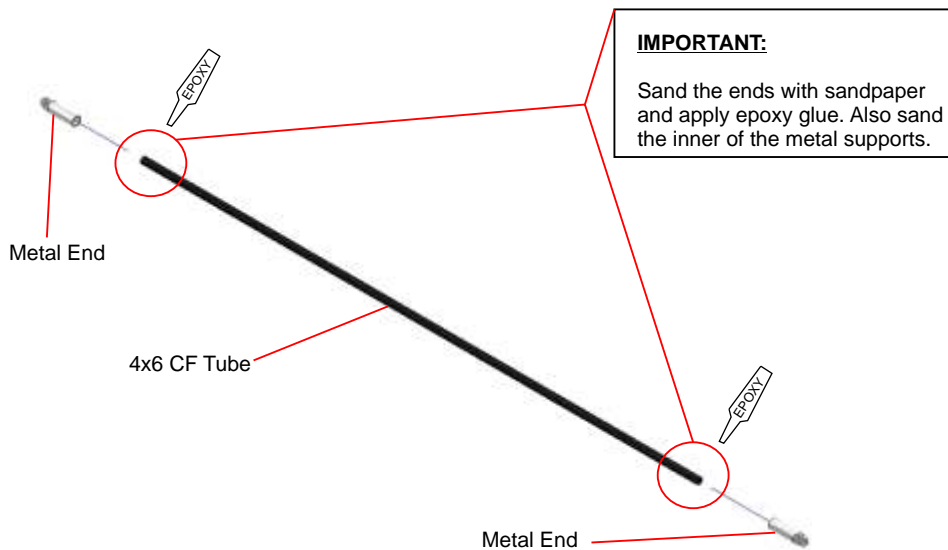
STEP 5-10B TAIL BOOM INSTALATION (Belt Version)



STEP 5-10TT TAIL BOOM INSTALATION (TT Version)



STEP 5-11 TAIL BRACE ASSEMBLY (TT+Belt Version)



NOTE:
Place a long M3 Screw like shown in the diagram on both ends. This way you ensure they are exactly parallel.

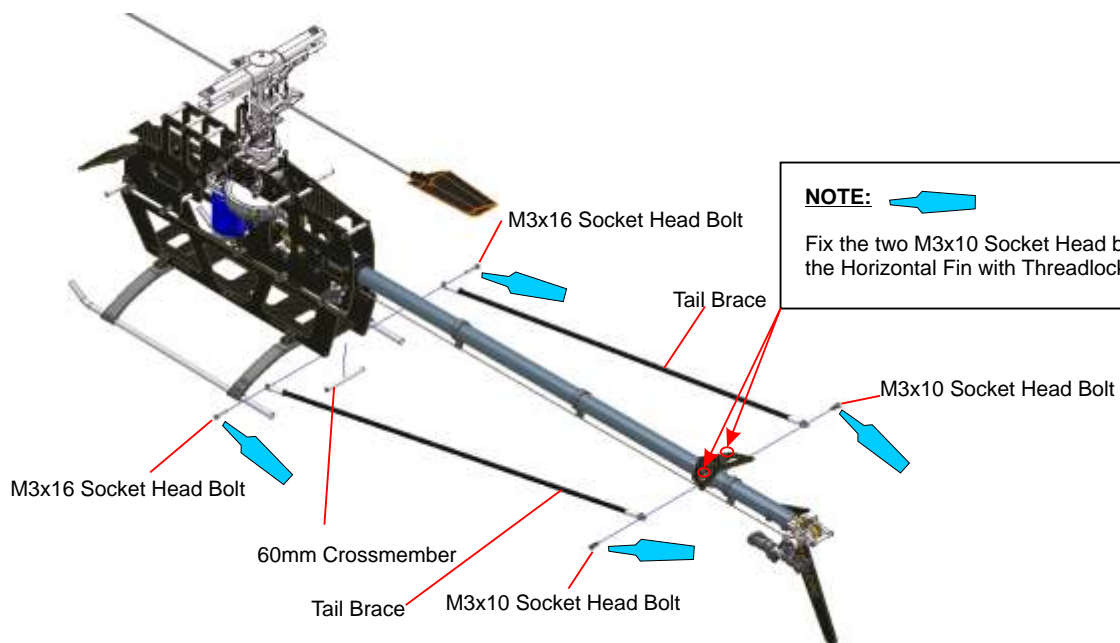
You can use M2x12 screws and M2 Nuts to ensure the CF Tube in the Metal End by drilling a 2mm hole through the drilled holes in the Metal Ends.

Assembly to sets of the Tail Brace

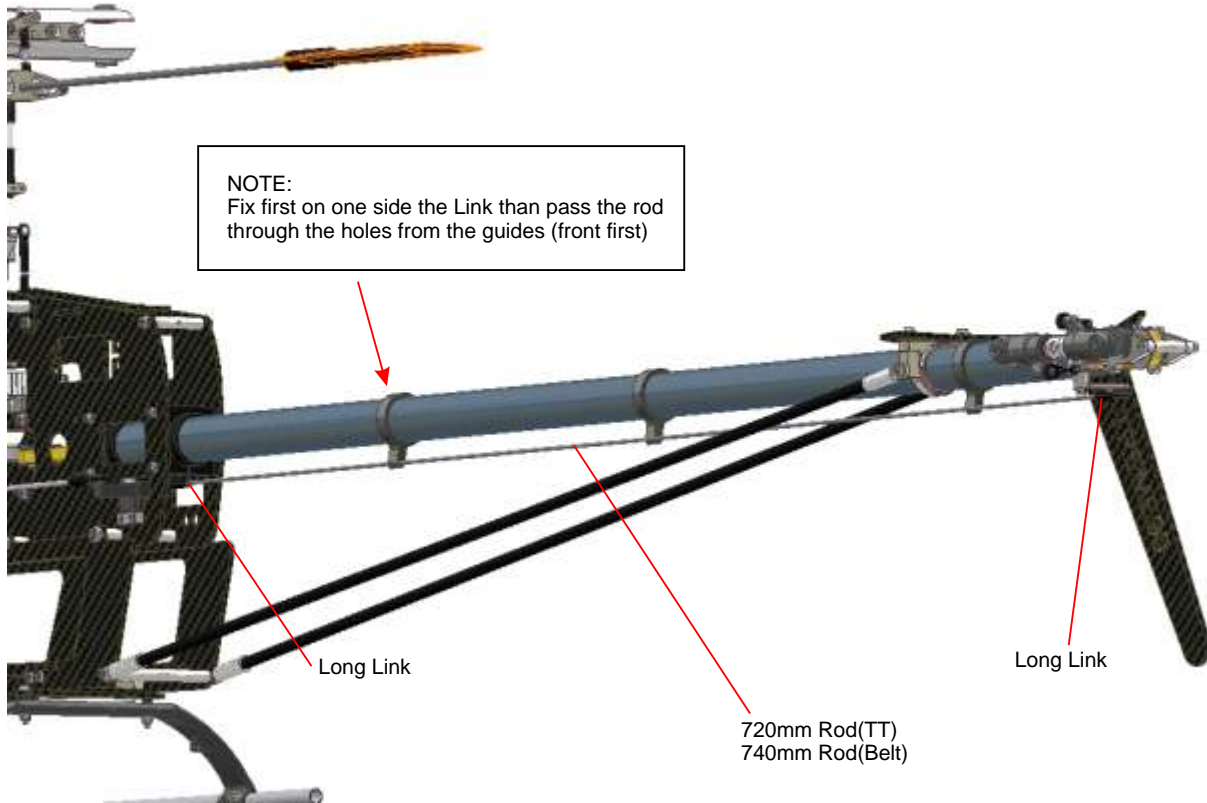
STEP 5-12 TAIL BRACE INSTALLATION (Belt+TT Version)



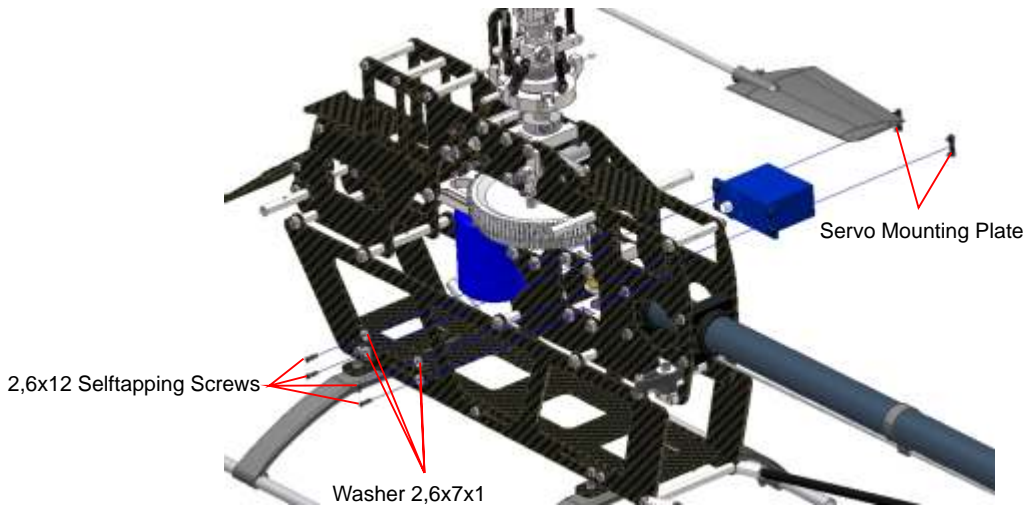
View of the completed Assembly



STEP 5-13 TAIL CONTROL ROD ASSEMBLY



STEP 6-1 SERVO INSTALLATION



Note:
After fixing the Servo into the Frame pass the cable to the front and fix it with the delivered cable straps to the frames.

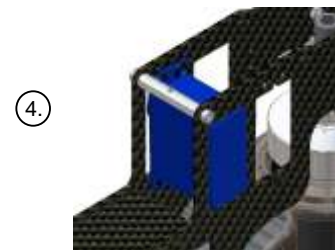
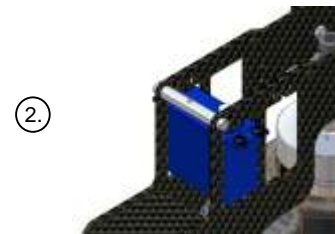
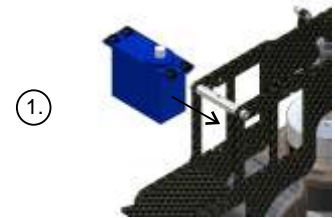
IMPORTANT:

Depending on servo type used for cyclic, you have to install the servo from inside the frames. When installing from outside the servo horn may touch the canopy. In the diagram below you see how to insert the servo into the frames.

1. Attach the servo mounting plate into the grommets from the servo.

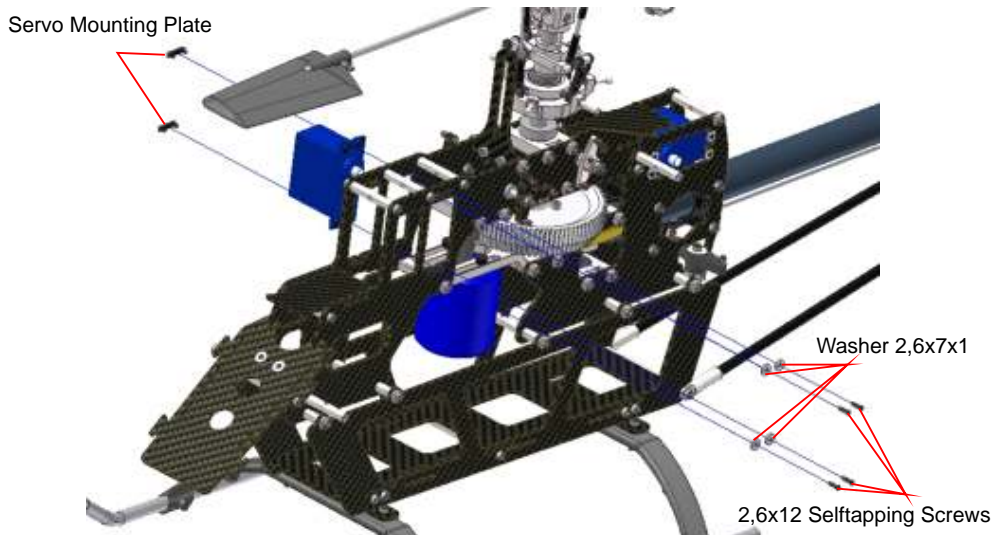


2. Steps to follow to inserting the servo.

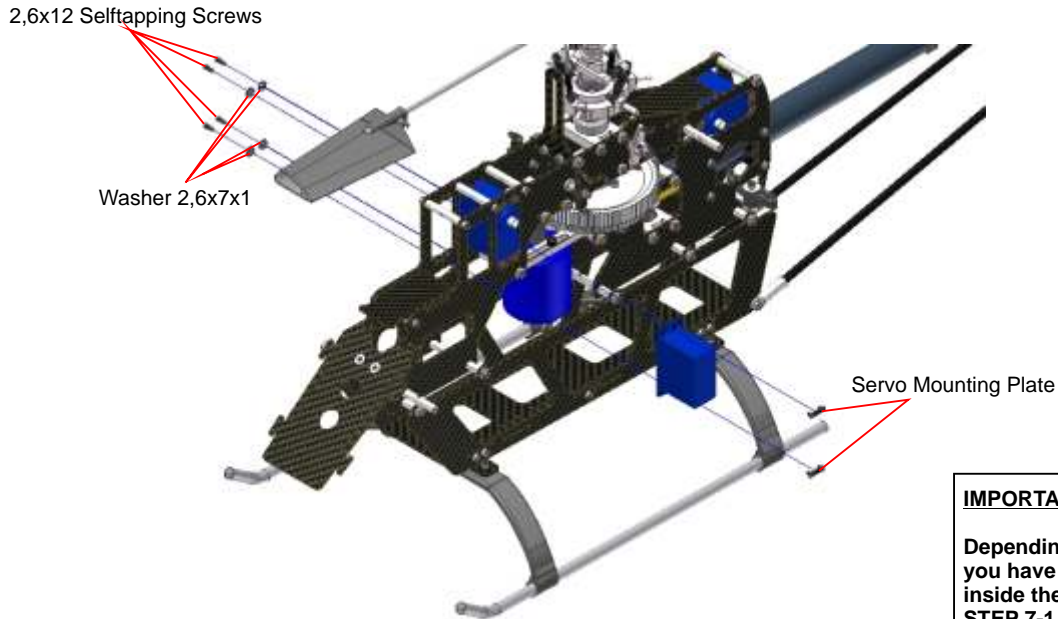


When you have the servo in this position fix it with the four Selftapping Screws and Washers as shown on the left.

STEP 6-2 SERVO INSTALLATION



STEP 6-3 SERVO INSTALLATION



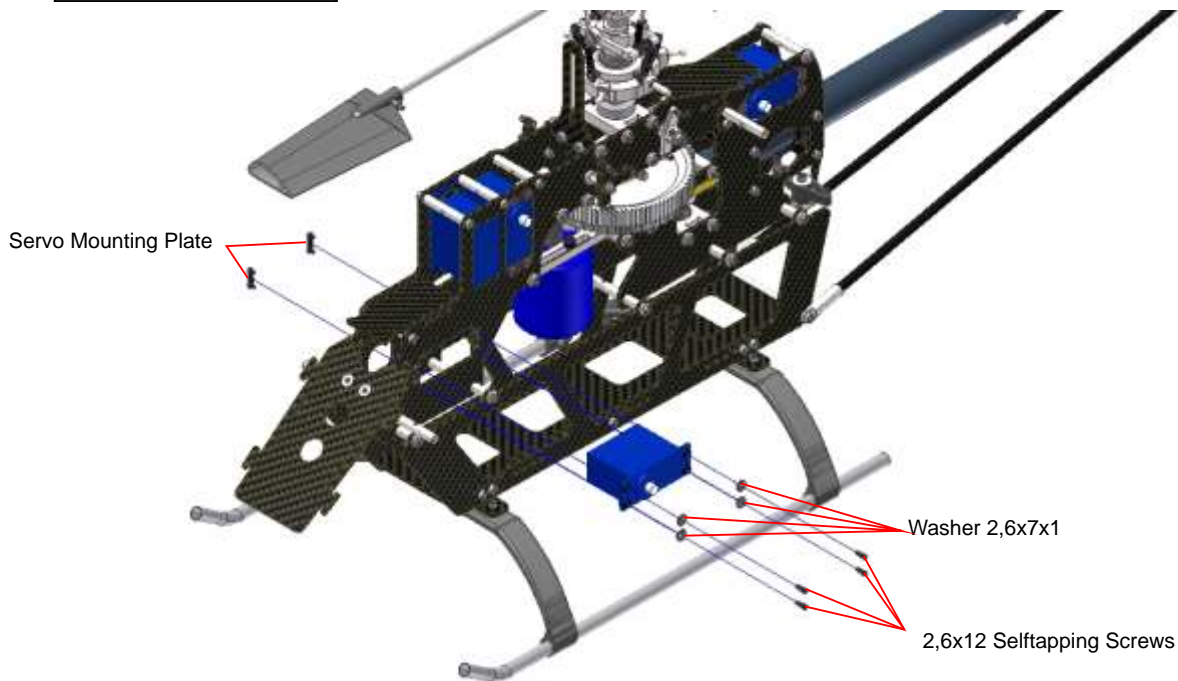
IMPORTANT:

Depending on servo type used you have to install the servo from inside the frames shown in STEP 7-1.

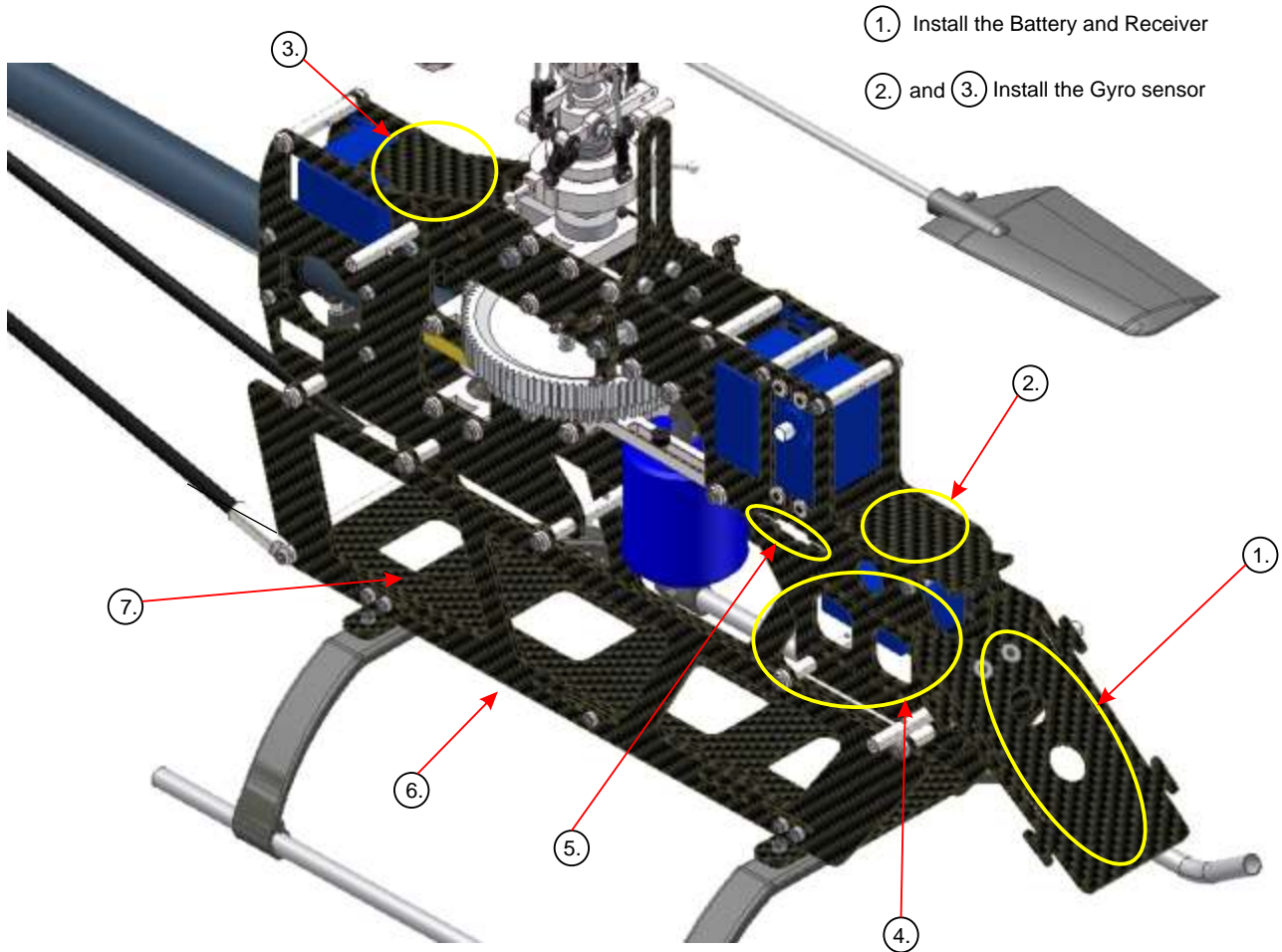
STEP 6-4 SERVO INSTALLATION

NOTE:

For more easier assembly use CA glue to fix the Servo Mounting Plates before installing the servo.



STEP 6-5 RECEIVER / GYRO / BATTERY INSTALLATION



①. Install the Battery and Receiver

②. and ③. Install the Gyro sensor

④. Install the Gyro Amp or Governor Amp.

⑥. Install the ESC.

⑤. Install the the Switch harness

⑦. Install the Flight Pack.

NOTE:

a) Be sure to keep all the lead wires, etc., away from all servo arms, rods and sharp edge of the helicopter mechanics. After final installation group these wires together.

b) It is suggested that both the receiver and gyro amplifier be isolate from vibration by wrapping them in foam, then securing them to the model using double-sided adhesive tape.

c) Be sure when installing the gyro to the gyro mounting plate that it does not come in contact with the frame of the helicopter and that the mounting surfaces are free from all, residue, etc. Clean if necessary to ensure proper adhesion. There are cutouts in the frame to secure the gyro sensor with hook and loop tape.

STEP 6-6 SERVO ARM PREPARATION AND INSTALLATION



NOTE:

Before attaching any of the servo output arms, turn on your radio and check that all of the primary control functions and trims are set to neutral. Pay special attention to the throttle/pitch channel where the stick has to be positioned manually unless your transmitter has a digital or graphical display of the output. If you have this feature, set the stick to give a read out of 50%. If you do not have this feature you will need to set the stick to the neutral position by eye. If you also have hovering pitch and throttle trim knobs, these should also be set to their mid positions to give equal amounts of +/- output. Once you have done this, all of the servos should be at their mid points and have equal amounts of rotation in both directions.

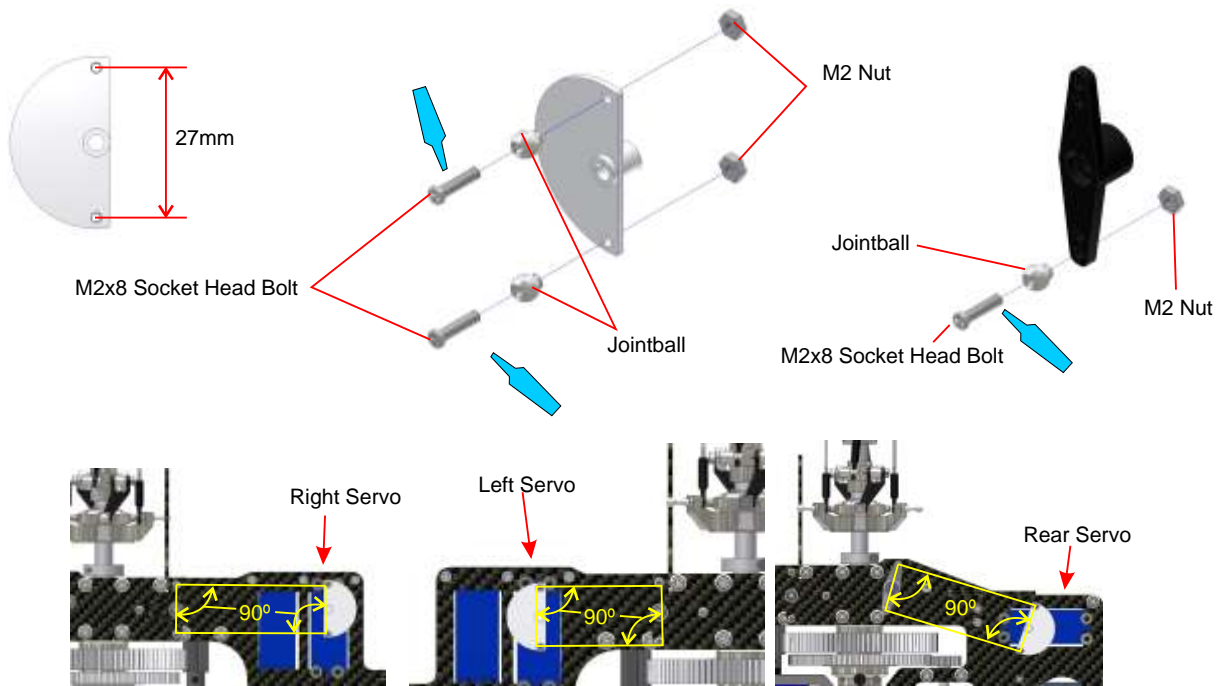
Initial set up can now begin.

Choose the thickest output arms/discs that you have, and that can accommodate the joint balls at a radius of 13.5mm each. For the left/right servos try the disc/arm on the output shaft until you find a position where a suitably spaced pair of holes sits closest to the centre line of the servo case. For the front servo, imagine a rectangle whose four corners sit on the four joint balls making up this linkage. The holes in the disc/arm should sit on the line that forms the short end of this rectangle. Please refer to the diagram again for clarification.

If you cannot find an exact position use the one nearest and make minor adjustments with the appropriate sub trim and not the main trim.

Remove the disc/arms one at a time and noting which side the joint balls fit, attach them as shown. Also note the use of spacers under the joint balls fitted to the left/right servo discs/arms.

Cut off the excess material or unused arms as shown and refit the finished disk/arm in its original position. Fix securely with the screw that came with the servo.



IMPORTANT:

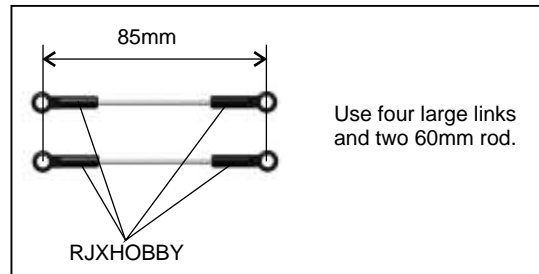
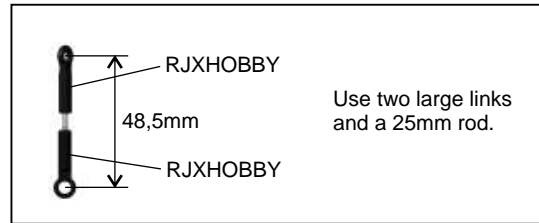
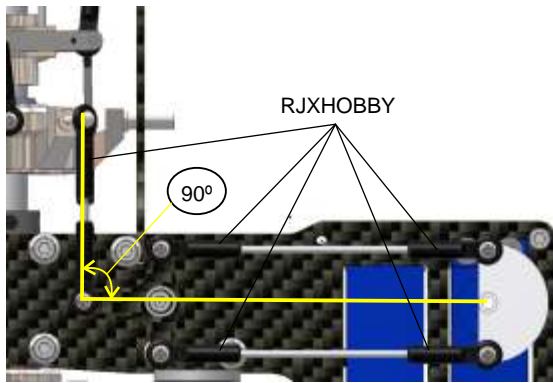
Be sure that all arms are 90° and parallel to each other like shown in the diagrams above.

1. Attach the jointball to the servo horns on the left, right, rear, throttle (ensure the carburetor is at 50% opened, if not adjust the throttle arm on the carburetor) and tail servo as shown in the diagram above.
2. Mount the servo horns firmly with the screw included in the servo. Use threadlock on servos with metal gears to secure the screws.
3. Be sure to connect the servos according your transmitter manual.
4. Make sure all servo horns are positioned as shown above. If the servo horn is not parallel as shown, minor centering adjustments can be made using the radio's subtrim.

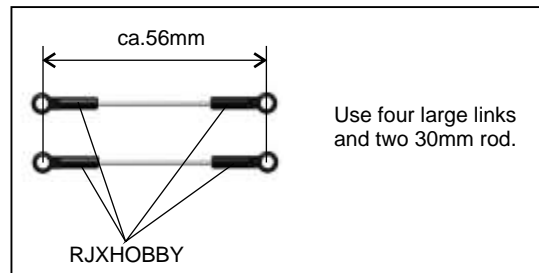
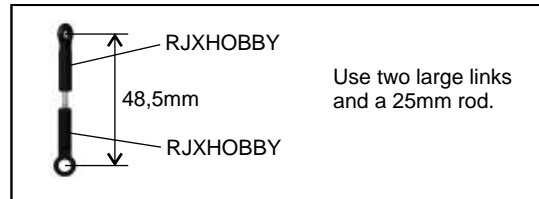
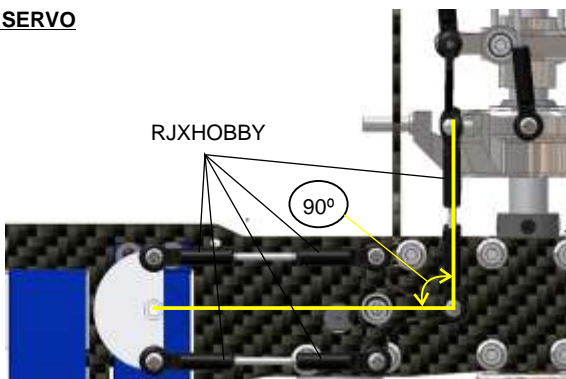
STEP 6-7 LINKAGE CONNECTION

**NOTE: Assemble the linkage as shown below
Check the correct side of the link with the logo.**

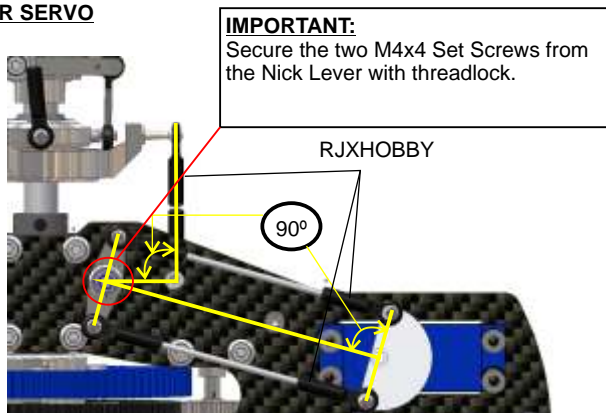
1. RIGHT SERVO



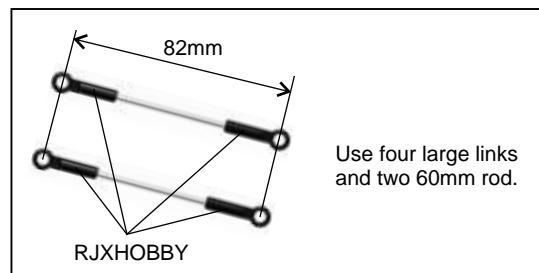
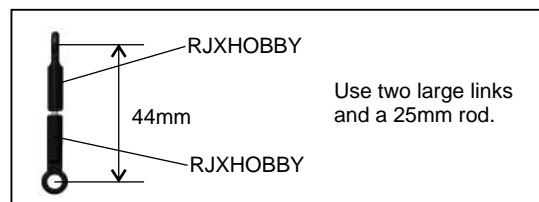
2. LEFT SERVO



3. REAR SERVO

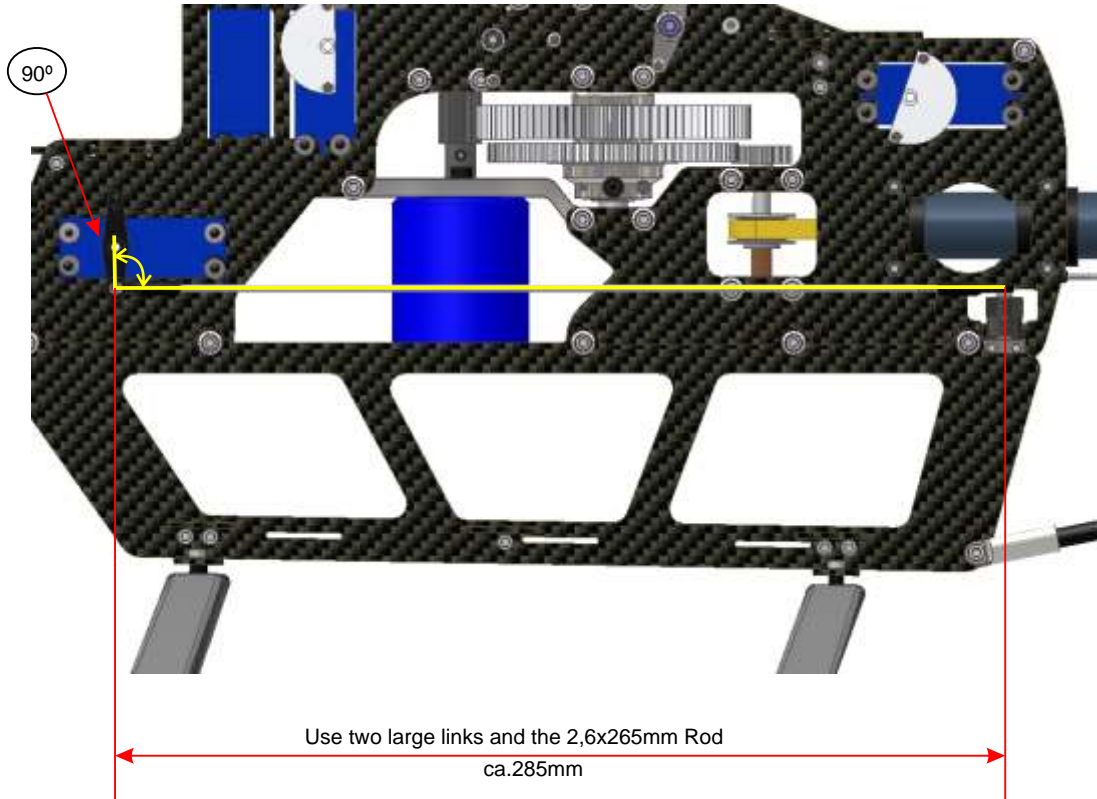


IMPORTANT:
Secure the two M4x4 Set Screws from the Nick Lever with threadlock.

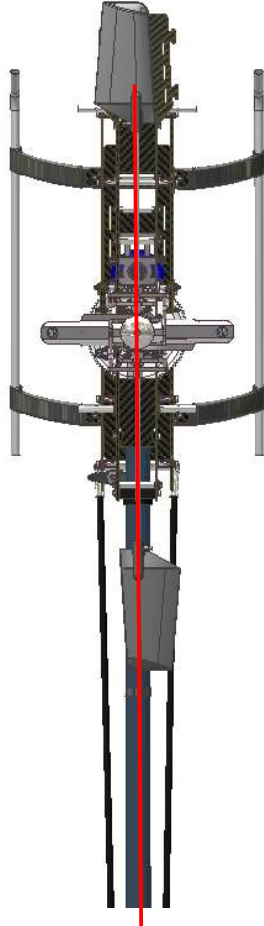


STEP 6-8 LINKAGE CONNECTION

5. TAIL SERVO



STEP 7-1 PHASE RING ADJUSTMENT



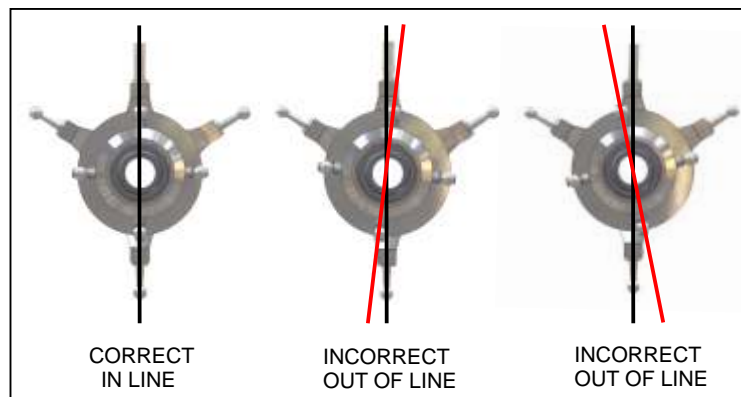
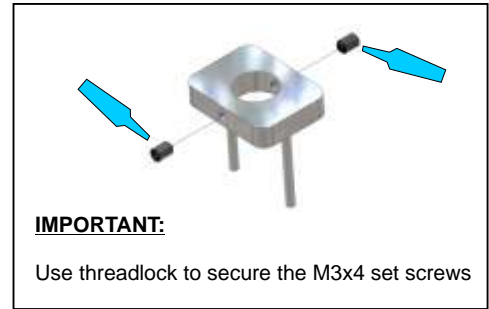
CENTER LINE OF THE HELICOPTER

NOTE:

Once the swashplate is leveled it is important to set the phasing of the washout base. This is done by rotating the rotor head until the flybar is perfectly in line with the body and the tailboom of the helicopter (see the diagram next).

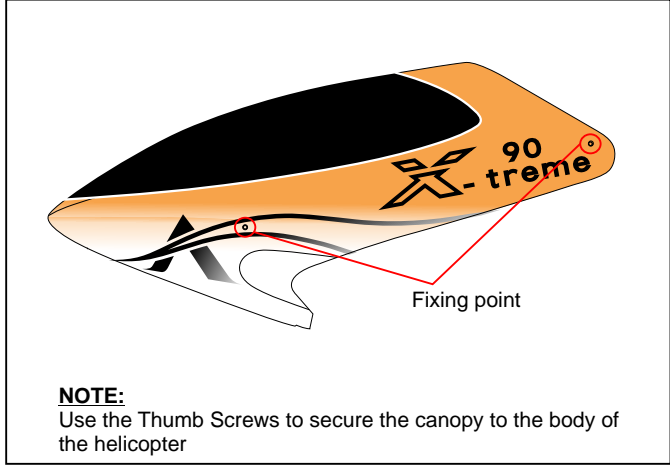
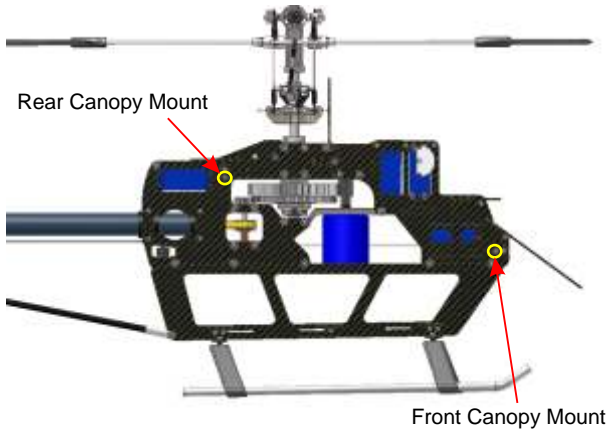
The washout driver is now turned to line up the joint balls on the upper swashplate ring with the center line of the helicopter (see below) allow a small amount of clearance between the washout base and the phase ring when at full pitch. When you are satisfied tighten the phase ring to the mainshaft with the M3x4 set screws applying threadlock. Ensure to get this settings right as it will affect how the helicopter behaves in hover and when doing acrobatics.

Different adjustments can be done depending on main blades and their characteristics.

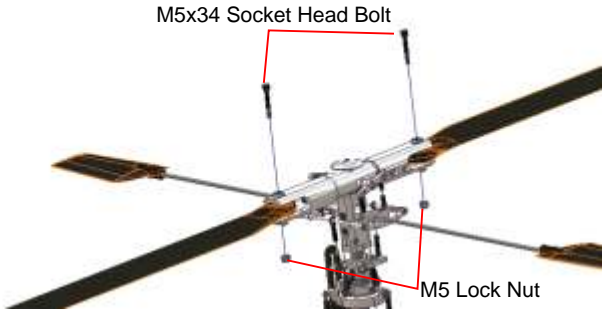
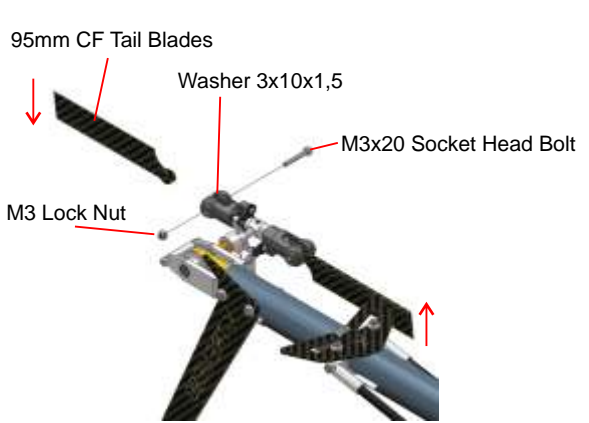


STEP 7-2 CANOPY ATTACHMENT

NOTE:
Put the rubbers grommets for about 3 min. in hot water to insert them more easier in the canopy.



STEP 7-3 MAIN / TAIL BLADE INSTALLATION



IMPORTANT: Check that the CF Tail Blades are attached correctly, as shown in the upper graphic.
WHEN USING LARGER TAIL BLADES THAN 95MM, DO NOT PASS MORE THAN 1900 RPM ON THE HEAD.



STEP 8-1 FINAL SERVO AND RADIO SETUP

Rudder and Throttle Servo Adjustments

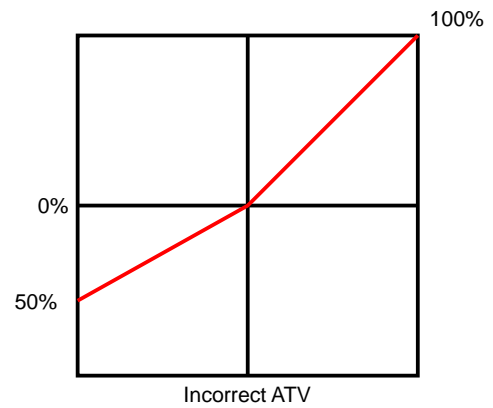
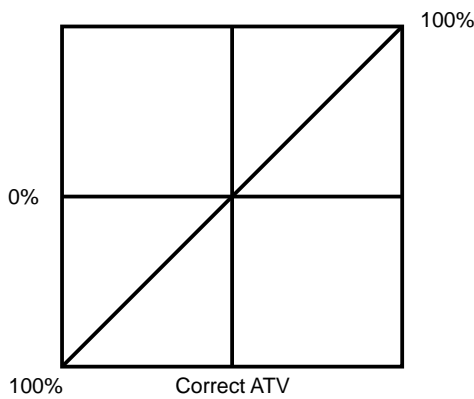
1. Checking the servo rotation.

With the radio transmitter and receiver switched on, move the rudder and throttle sticks, and check that each servo moves in the correct direction. If either servo moves in the wrong direction, it will be necessary to reset that servo using the appropriate reversing function on your transmitter.

2. Travel Adjust.

Switch the transmitter and receiver on, then move the rudder and throttle sticks to their extremes and see if each servo moves to its full control position. If either servo moves too far and binds up it will be necessary to reduce the ATV for that channel, likewise if it does not move far enough you will have to increase it. For any given channel, the value in both directions should be equal. Do not exceed a maximum ATV difference of 10%. If the throttle ATV is unbalanced by more than this amount, then the servo sub trim or the positions of the arms on throttle servo and/or on the carburetor will have to be repositioned. If the rudder ATV is unbalanced by more than 10% then the servo sub trim and/or tail pitch arm neutral setting should be re-checked and any necessary adjustments made.

NOTE: Try to get the mechanical set up as close possible to the values given in this manual and you will find that final trimming will be so much easier. Using the transmitter to correct a poor mechanical set up will result in a model that is very difficult to trim and fly.



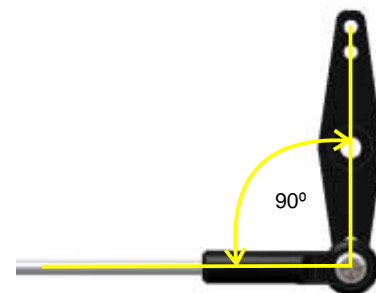
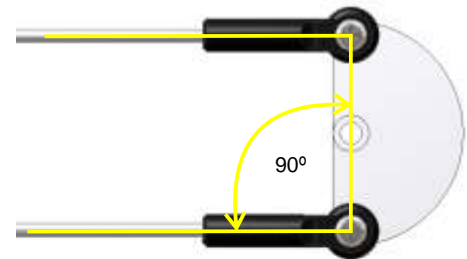
3. Sub trim Function

When the rudder stick and trim are in their mid position make sure that the servo horn and tail control rod are at 90° as shown next. If you cannot achieve the desired servo arm position use the sub trim function to make minor adjustments.

NOTE: It is necessary to keep the sub trim values as close to zero as possible to make final setting up simple.

If you are not using a head locking gyro it will be necessary to adjust the revolution mixing to compensate for the torque changes of the engine during all flight conditions (except autorotation). We recommended that the initial Revo mix values be set to approximately 10% for hovering and 5% for stunt/aerobatic flight. Since there are many variables that can alter the values of the revolution mixing, it will be necessary to fine tune these according to your flying style. If you are using a dual function gyro ie one that can be switched between normal and head locking mode, then please refer to your gyro's instructions for more information.

NOTE: The Revo mixing values must be set for a helicopter with a clockwise rotating head.



STEP 8-2 FINAL SERVO AND RADIO SETUP

Now that the radio system is fully installed the following items require precise adjustment to achieve the best results.

1. Dual Rates

If dual rates are available for the aileron, elevator and rudder channels, then please ensure that they are all set to the same position for high and low ie. all up or all down. Either switch position may be selected as the low or high rate. Please see your radio manual for further information.

2. Exponential Setting

We suggest that exponential rate settings for the elevator and aileron remain at zero during the initial test flights. When the model has been properly trimmed you may adjust the exponential values to achieve the control feel that suits you. When using a fast response gyro on the rudder the exponential value should be adjusted to approximately 40% to 60% to improve control response and reduce any hunting of the tail.

3. Sub Trim

We suggest that the correct settings be achieved with the minimum use of this function. If the sub trim is used for final adjustments, the values should not vary by more than +/- 10 from the neutral point. If the values need to be greater than this then please reset the sub trim to zero and recheck and/or re-adjust the control linkages.

4. Throttle Hold Function

When this switch is activated, the throttle channel is set to hold the engine to a pre-set idle while still leaving control of the collective pitch active. This is very useful when practicing autorotation landings. It is recommended that the throttle hold value be adjusted to give an idle rpm which is slightly above normal.

5. Gyro Gain Adjustment

The "gain" or holding power of the gyro will have to be set to prevent the tail moving due to changes of wind direction and engine torque. If the gain is too low the helicopter tail will move making it difficult to control. Please refer to your gyro's instructions for the correct set up procedures. Increasing the gain provides more tail stability up to a point when hunting from side to side will occur. We recommended that you start with a gain value of approximately 80% and continue to increase it until the tail of the helicopter starts to Hunt (goes back and forth very quickly). At this point you should reduce the gain a little at a time until the tail becomes stable again. 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 for hovering, and is due to the aerodynamic forces present in forward flight. **TO HARD TAIL ACTION CAN STRIP THE TT GEARS.**

6. Gyro Direction

The gyro direction has to be set correctly. An uncontrollable pirouette will occur on take off if it is not. To set the gyro direction, turn the radio system on and move the rudder stick to the right noting in which direction the servo arm moves. Next suspend the helicopter by the rotor head, watch the servo arm as you rotate the body of the helicopter counter clockwise. The servo arm should move in the same direction as observed previously. If the arm moves in the opposite direction, reverse the gyro direction and re-test.

NOTE: We recommend that a good quality high-speed servo be used for controlling the tail rotor. Please refer to your gyro's instructions for further information.

STEP 8-3 FINAL SERVO AND RADIO SETUP

7. Collective Pitch Setup.

A Pitch Gauge will be required for this operation

	LOW	MIDDLE	HIGH
NORMAL	-4°	+5.5°	+10°
IDLE UP	-10°	0°	+10°
AUTOROTATION	-14°	0°	+14°

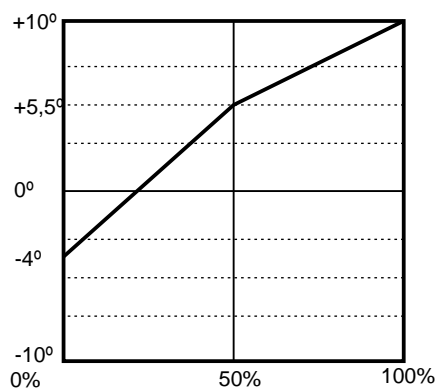
The total pitch range of the **X⁹⁰-TREME** is approximately 30 degrees depending the rotor head settings you have done. With a maximum and minimum pitch of +15 and -15 degrees. This means that the center value is 0 degrees. Attach a pitch gauge to one rotor blade and check that the collective pitch setting at centre stick is indeed 0 degrees. If the pitch value is slightly more or less then adjust the length of the connecting rod until the value is correct and then do the same for the other blade.

3D Settings

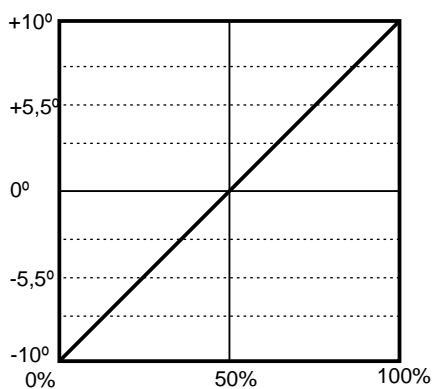
With the center pitch value set now to 0 degree, it will be necessary to set the maximum positive and negative values to those shown in the tables above. If the values do not correspond try increasing or decreasing the pitch curve, use the swashplate CCPM mixing function on your transmitter, increase or decrease as necessary without causing binding. If you still have difficulty in obtaining the maximum positive or negative pitch values shown in the tables recheck the pitch control rod lengths, and re-adjust as necessary.

8. Pitch Curve

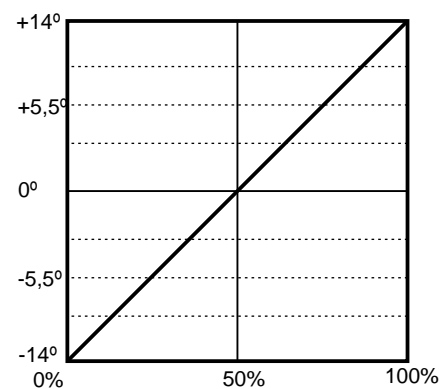
This setting allows you to set the pitch of the main blades to the corresponding position of the collective stick. Adjust the main blades to give the settings shown in the chart below. You may find it necessary to make minor adjustments to these values to suit your particular setup.



STICK POSITION
NORMAL MODE



STICK POSITION
IDLE UP



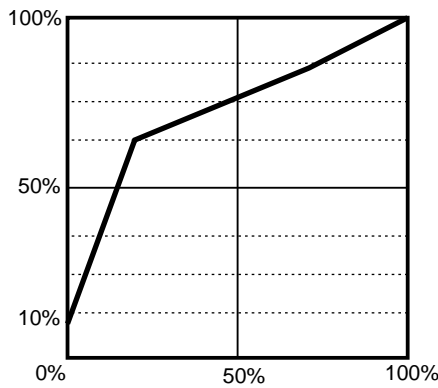
STICK POSITION
AUTOROTATION

STEP 8-4 FINAL SERVO AND RADIO SETUP

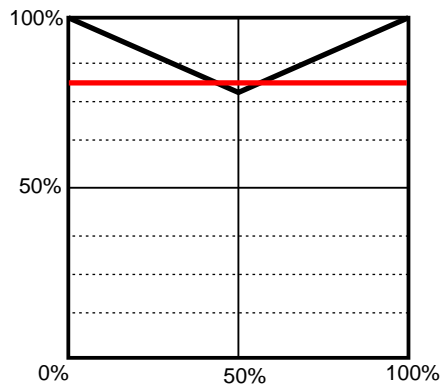
9. Throttle Curve

It is very important to match the throttle curves to those of the main blades. The rotor head should not exceed 2,000 RPM under any circumstances.

NOTE: Throttle curves values can vary greatly due to Brushless Motor and ESC combinations and so it will be necessary to fine tune these settings by test flying to achieve the best results.

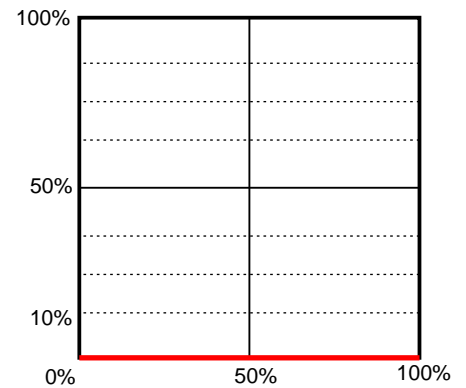


STICK POSITION
NORMAL MODE



RED LINE FOR ESC WITH
GOVERNOR MODE

STICK POSITION
IDLE UP



STICK POSITION
AUTOROTATION
THROTTLE HOLD

10. ESC Setup

For optimum results it is important that the ESC is set up to run properly, and since this depends on the Lipo packs used to reach the lowest Amps Possible to not damage the Brushless Motor,ESC or Lipo packs.

Follow the instructions of the ESC Manual and set it up correctly.

11. Final Checks before attempting to flights

Before attempting to fly please go through this manual and double check your work again.

Check that the main and tail rotor blades turn in the correct direction.

STEP 8-5 FINAL SERVO AND RADIO SETUP

Caution: Be sure to maintain a safe distance of at least 5 meters from the helicopter when observing the track of the main rotor disc.

Blade tracking ensures that both of the main blades are set to the same pitch angle, and if done correctly will make your helicopter smooth in operation.

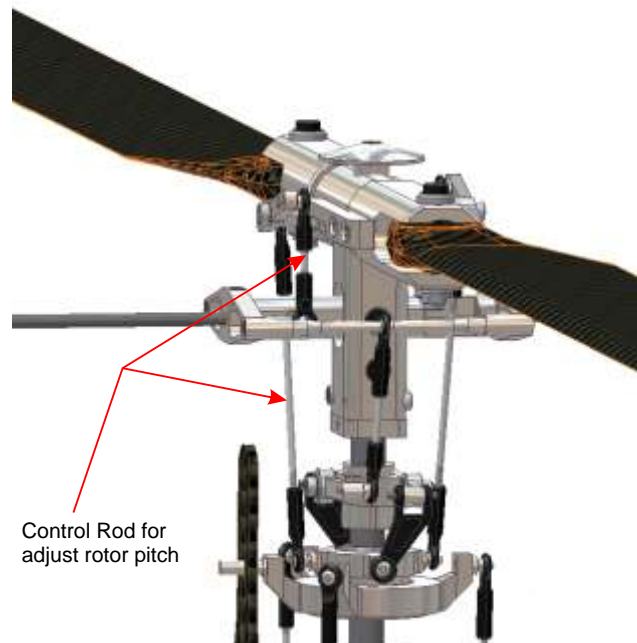


Caution: Be sure to maintain a safe distance of at least 5 meters from the helicopter when observing the tracking of the main rotor disc.

Adjustment should be done using the following method.

Increase the pitch of the low blade by extending its connecting link by one full turn. Note you can only make this adjustment in increments of one full turn otherwise you will be trying to fit the link on to the ball joint the wrong way round. (The "RjX" on the link must face outwards). Check the tracking again and if the tips of the rotor blades are now in line, you have finished and are ready for your first flight. If the blades still require adjustment then reduce the pitch of the high blade this time. Repeat this procedure until the blades are tracking true.

A check of the tracking should be part of your pre-flight routine. If it has suddenly gone out it is an indication that something is wrong and needs immediate investigation.



PLEASE READ BEFORE FLIGHT

The **X⁹⁰-TREME** is the perfect choice for intermediate and expert level R/C Helicopter pilots, however, Radio controlled models such as this can crash and cause serious damage to people and property if not properly assembled and flown with great care. Please exercise the highest levels of caution and safety when operating this model and if you are a beginner, please seek help from an experienced RC heli pilot.

Pre-Flight

Check the battery voltages of the transmitter and receiver packs. Do not risk that “last flight”, it really might be the last.

Check to ensure the main rotor and the tail rotor are free from damage. Do not fly with suspect components. Range check the transmitter to a distance of at least 60–75 meter from the model with the transmitter antenna down, checking all control movements.

After filling the tank with fuel, make sure that there is no leakage.

Ensure that the throttle stick is at idle and always hold the rotorhead firmly before attempting to start the engine. Throttle hold should be switched on to make sure that the engine does not respond to accidental movements of the throttle stick, especially when carrying the model to the launch pad.

When Flying.

Do not fly your **X⁹⁰-TREME** near to any houses, high voltage wires or busy roads.

Be sure to fly within the range of your radio.

Always keep your eyes on your model when flying, it can change attitude or get out of sight in a very short time.

Never hover with the rotor at eye level. Be sure to keep the model at a safe height and altitude.

If you feel that something is wrong with your model while flying, land it immediately and check it over. Do not take any chances.

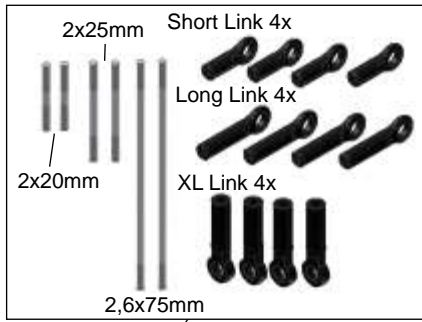
After Flight

When the rotor speed has slowed sufficiently, use the palm of your hand on the head button to bring it to a stop. Check to ensure that nothing has come loose.

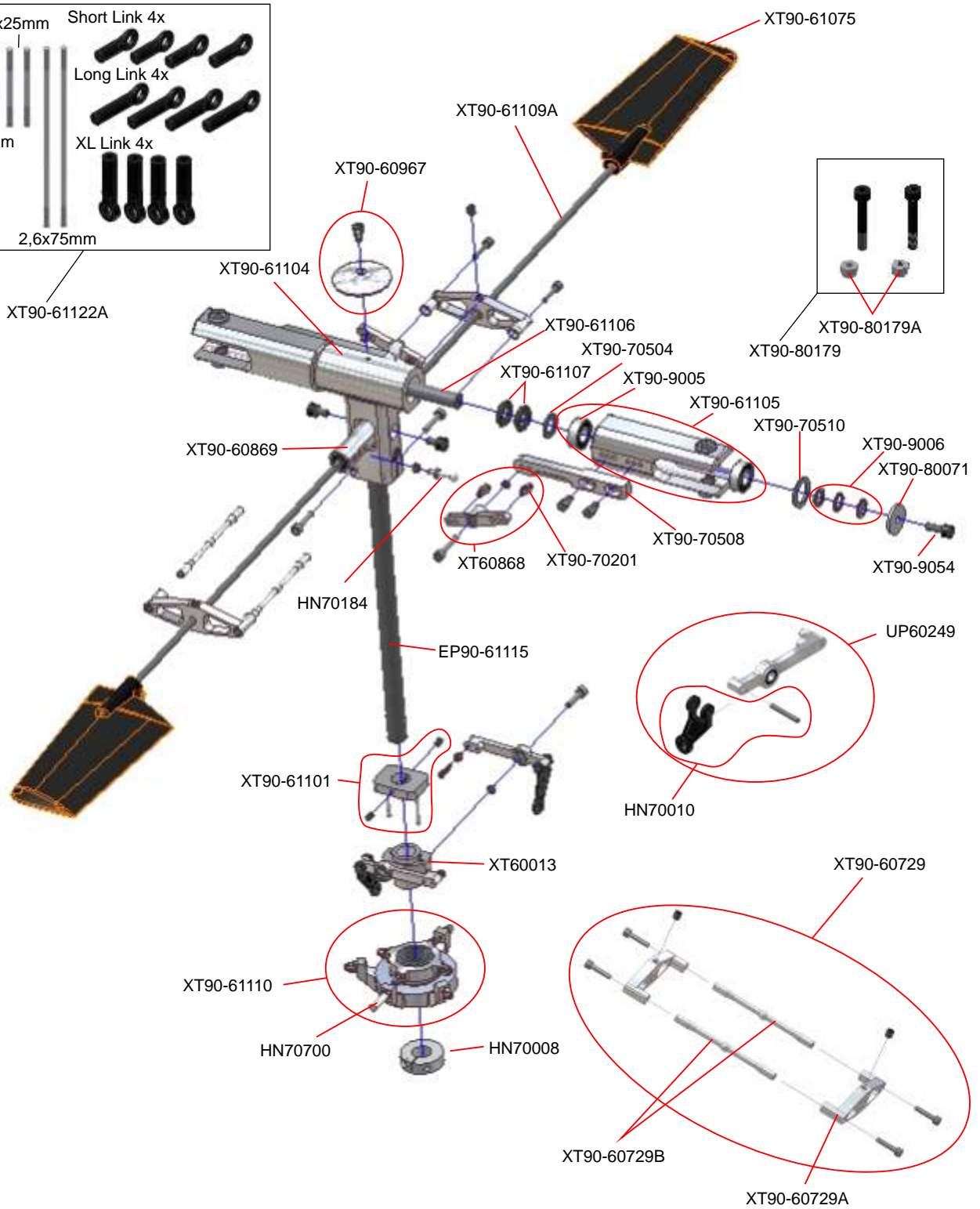
If the main rotor or other parts have made contact with the ground do not take any chances. Replace them before the next flight even they look to be in good condition.

Make sure the receiver, battery and gyro are still secure.

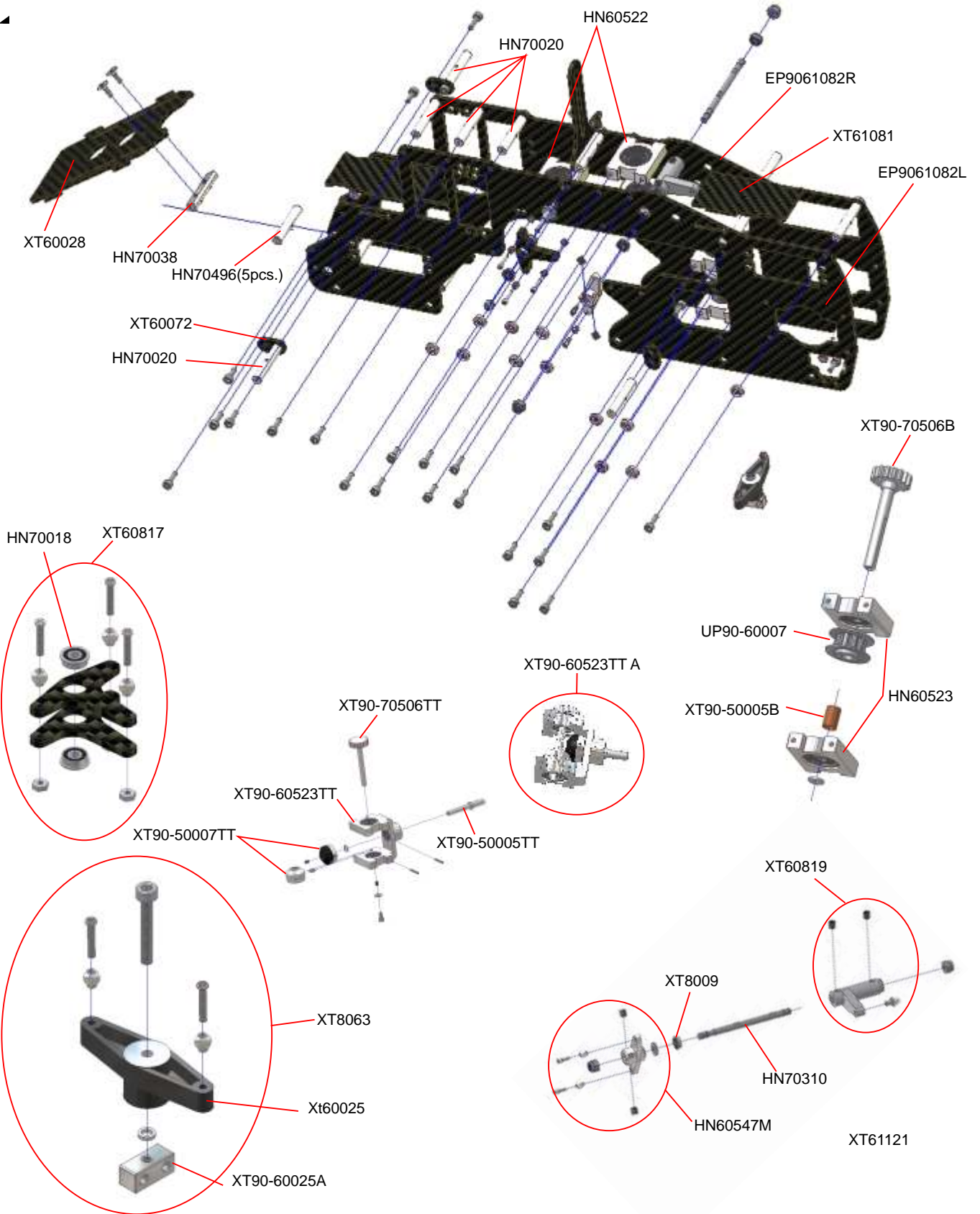
Make a periodical check of the Helicopter to make sure there is no damage or loose screws. Also check fuel tubing in both tank's. Check all bearings to ensure they are working smooth, they can cause glitches if they are damaged.



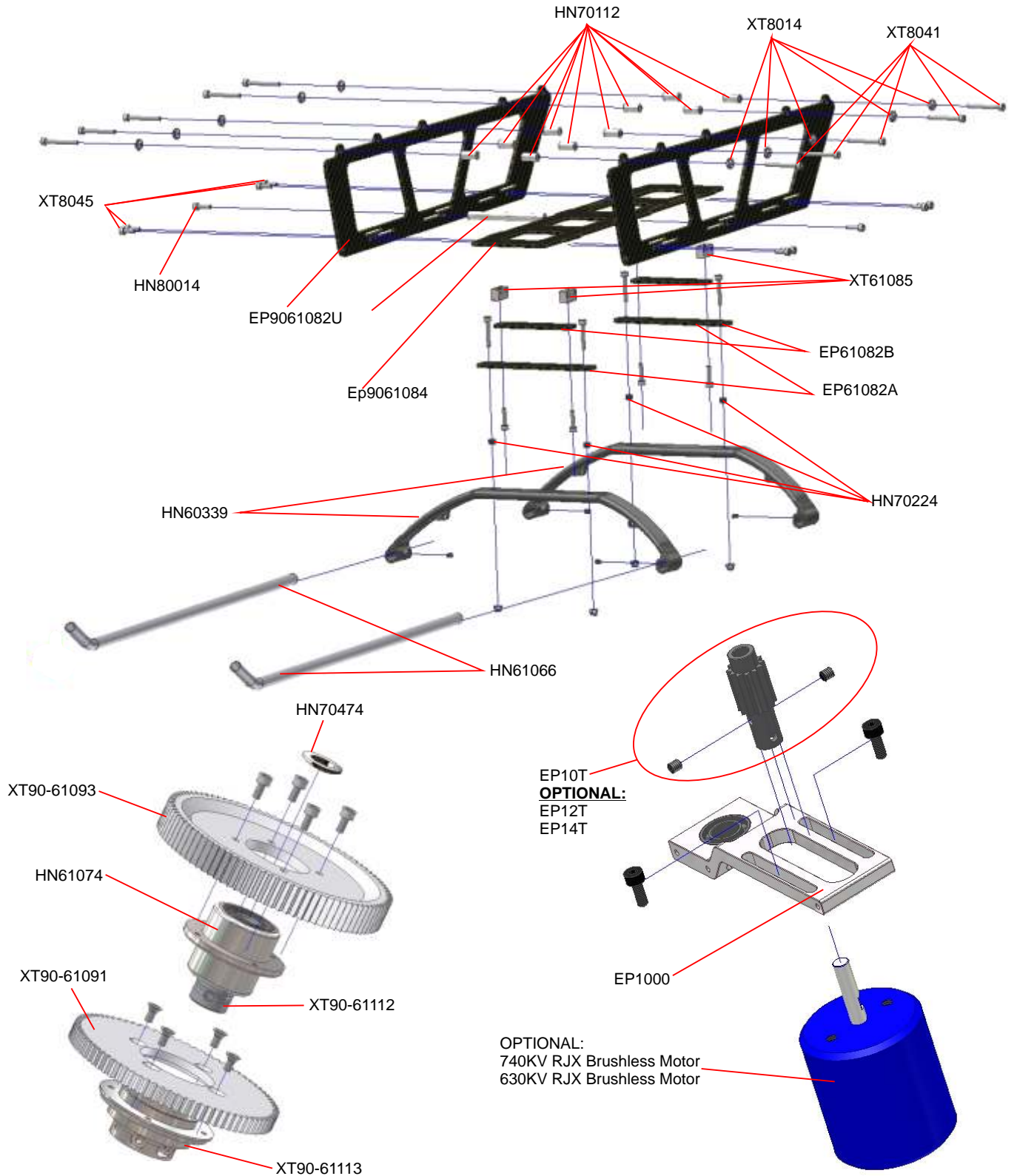
XT90-61122A



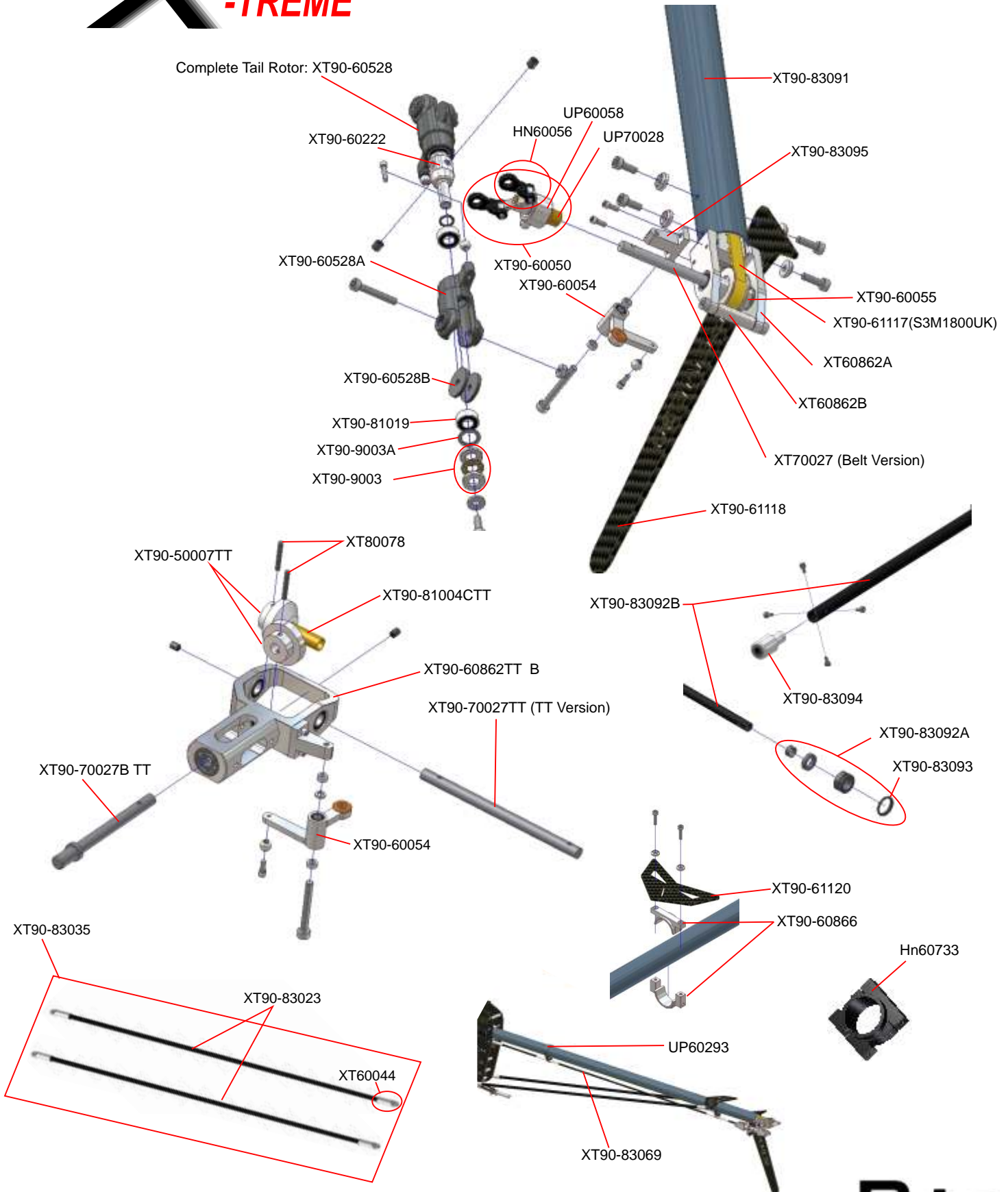
SOME OF THE LISTED SPARE PARTS ARE NOT SOLD SEPERATLY



SOME OF THE LISTED SPARE PARTS ARE NOT SOLD SEPARATELY
P2



SOME OF THE LISTED SPARE PARTS ARE NOT SOLD SEPERATLY



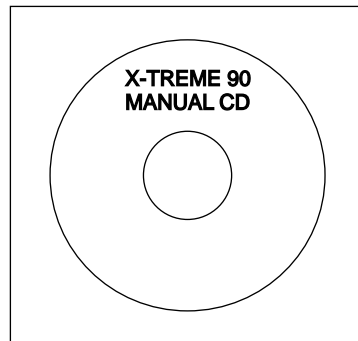
SOME OF THE LISTED SPARE PARTS ARE NOT SOLD SEPERATLY

P5



XT90-82276Y = Yellow

XT90-82276O = Orange



XT90-0002

SOME OF THE LISTED SPARE PARTS ARE NOT SOLD SEPERATLY

P6



XT90-9032	SCREW HS_M4X20 FOR ENGINE MOUNT
XT90-9033	SCREW HS_M5X12 FOR SPINDLE
XT90-9034	SCREW HS_M5X34 FOR MAIN BLADES HOLDER (SPECIALLY)
XT90-9035	SCREW HS_M2.5X12 FOR FLYBAR CONTROL ARM
XT90-9036	SCREW HS_M4X40 SPECIALLY (FOR R.JX90 MUFFLER AND HATORI)
XT90-9037	SCREW HS_M4X6 FOR CENTER HUB
XT90-9038	SCREW HS_M4X8 FOR CENTER HUB / AUTOSHIFT
XT90-9039	SCREW HS-M4X16 FOR ENGINE MOUNT
XT90-9040	SCREW HS_M3X8
XT90-9041	SCREW HS_M3X10
XT90-9042	SCREW HS_M3X12
XT90-9043	SCREW HS_M3X14
XT90-9044	SCREW HS_M3X40
XT90-9045	SCREW HS_M3X6
XT90-9046	SCREW HS_M2.5X4
XT90-9047	SCREW HS_M3X20
XT90-9048	SCREW HS_M2X8
XT90-9049	SCREW HS_M2X10
XT90-9050	SCREW HS_M2.5X10
XT90-9051	SCREW HS_M2X6
XT90-9052	SCREW HS_M3X16
XT90-9053	SCREW HS_M3X25
XT90-9054	SCREW HS_M4X10
XT90-9055	SCREW HS_M4X6 FOR CENTER HUB
XT90-9056	SCREW HS_M2.5X6 (WHITE)
XT90-9057	SCREW HS_M2X6 (WHITE)
XT90-9058	SCREW HS_M3X12(WHITE)
XT90-9059	SCREW HS_M2X5 (WHITE)
XT90-9060	SCREW HS_M2X8(WHITE)
XT90-9061	SCREW HS_M3X25 (WHITE)
XT90-9062	SCREW HS_M3X8(WHITE)
XT90-9063	SCREW HS_M2.5X12 (WHITE)
XT90-9064	SCREW HS_M3X6(WHITE)
XT90-9065	SCREW HS_M3X10(WHITE)
XT90-9066	SCREW HS_M3X16(WHITE)
XT90-9067	SET SCREW M3X5
XT90-9068	SET SCREW M3X3
XT90-9069	SET SCREW M4X4
XT90-9070	SET SCREW M3X4
XT90-9071	NYLON WASHER 5X8X0.2 FOR TORQUE TUBE (FOR ALL HELIS)
XT90-9072	WASHER 5X6.5X1 FOR FRONT TAIL GEAR BOX
XT90-9073	WASHER 3X8X1
XT90-9074	WASHER 3X5X2
XT90-9075	WASHER 4X6X1
XT90-9076	WASHER_2.6X7X0.8
XT90-9077	WASHER 4X6X4
XT90-9078	WASHER 3X5X1
XT90-9079	4mm SPRING WASHER M4 (FOR ENGINE)
XT90-9080	SCREW HS_M2.6X12 (FOR SERVO)
XT90-9081	SERVO LINE (1METER) ASSY
XT90-9082	NUT M2
XT90-9083	Xt90 ALL SCREWS

SOME OF THE LISTED SPARE PARTS ARE NOT SOLD SEPERATLY