

SYLPHIDE E12



COMPETITION MODEL

ASSEMBLY INSTRUCTIONS



※This photo depicts an assembled model

Specifications

Length	1,402mm
Height	426mm
Width	182mm
Gross Weight (not including main rotor blades)	5,200g ~
Main Rotor Dia. (with 720 main blades)	1,605mm
Tail Rotor Dia.	288mm
Gear Ratio	11.5 : 1 : 4.79(T10)
	10.45 : 1 : 4.79(T11)
	9.58 : 1 : 4.79(T12)
	8.85 : 1 : 4.79(T13)

[WWW.JRPROPO.CO.JP](http://www.jrpropo.co.jp)

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INTRODUCTION

Thank you for choosing JR products.

The Sylphide E12 is an electric helicopter designed for F3C competition use.

The width of the spiral drive gear supplied the Sylphide E12 is greater than the ones used in 90-class GP helicopters. This boosts gear strength and reduces noise.




Special carbon frames allow more flexible power system choices. The model includes many newly designed parts such as a 12mm mast, ASG rotorhead, and tail gear case "ASG tail gear case v2" which correspond with the new F3C rules, allowing the Sylphide E12 model deliver flight performance like never before.

In order to obtain maximum performance from the model, please assemble and adjust according to the following instructions. Please read this Instruction Manual thoroughly and make sure you understand all the contents before starting assembly.

This product uses high voltage batteries. Please read the Instruction Manuals for all related parts and make sure you follow the guidelines correctly. Mistakes may lead to fire or other disasters.

Be Sure to Observe for Safety

Do not assemble or fly the product without seeking expert assistance. Be sure to receive guidance from our distributor or an advanced operator. An instructor is also requested to fully observe not only the instructions and precautions in this manual but also rules and manners for flight. In order to prevent fire or injury, always observe the precautions with each flight. If you have caused an accident during flight or in other circumstances, we will take no responsibility for it or any resulting damages. When flying the product, care should be fully taken (at your responsibility) to enjoy, safe and pleasant flight. The manual describes warnings, dangers and cautions required for safe assembly and pleasant flight. They are very important for preventing accidents such as fire, injury, etc. Symbols are used to indicate the precautions for preventing accidents from erroneous handling of the product. These symbols have the following meanings. Read the precautions mentioned in each process before proceeding.

 Danger	Neglect of this precautionary notice is very likely to result in death or serious injury of the user.
 Warning	Neglect of this precautionary notice is likely to result in death or serious injury or damage to properties.
 Note	Neglect of this precautionary notice is not likely to result in death or serious injury but may result in wound or damage to properties.
Request	This indication provides the information on assembly and handling, which you have to understand for safe and pleasant flight of the Product.

"Serious injury" , "wound" , "damage to properties" , and "user" are defined below.

Serious injury:	Refers to a fracture of bone, poisoning, etc. After effects may require you to be hospitalized or go to hospital for a long period of time.
Injury:	Refers to an injury, burn (high-/low-temperature), electric shock, etc. which requires you to be hospitalized or go to hospital for a long period of time.
Damage on properties:	Refers to expensive damage to a house, household goods, domestic livestock, or other animals.
User :	Refers firstly to the person who assembles and operates the product. It also includes not only the person who purchased the product, but also his or her family, guests, and anyone else to whom the product has been lent or transferred.

This Product is not a toy. It requires expertise and skill to operate correctly. When flying care should be taken to correctly handle the electric accessories to ensure safety.

Keep in mind that a radio control helicopter, which is controlled by a weak electric radio frequency, may go out control for many reasons - always pay attention to yourself and your surroundings.

TAKE GUIDANCE FROM OUR DISTRIBUTOR OR ADVANCED OPERATOR

This 12-cell Lithium Polymer (Li-Po) battery powered model is designed for use in competitions and should be operated by advanced pilots. Some of the handling methods are different from those of regular glow fuel helicopters or small/medium sized remote control helicopters.

If you are a beginner with R/C helicopters, do not try to assemble or fly this model by yourself.

Because the SYE12 can be assembled with ease, it may look simple and easy to assemble it. However, it actually requires extremely delicate assembly, adjustment and operation. Take appropriate guidance from our distributor or an advanced operator so that you can fully exhibit its full performance and enjoy flying it. If you are an average user you may assemble the model according to the procedures detailed in the manual. If you may notice a fault or a failure you may not be able to proceed. When you cannot complete the assembly properly by yourself, it is recommended you take guidance from our distributor or an advanced operator. Also, at the time of flight be sure to take guidance. Flying the helicopter alone may involve great danger as well as damaging its precious mechanics. Getting proper guidance helps prevent accidents and damage. Remember to assemble correctly and pay utmost attention to safety.

If an instructor has questions regarding assembly contact our distributor .

Buy a Radio Control Insurance Policy

Although this radio control helicopter is great fun, it could be a deadly weapon. Therefore, give sufficient consideration as to where to fly it and the surrounding circumstances. Be sure to buy a “radio control insurance policy” as a precaution. For details of how to buy this, inquire with our distributor or a nearby radio control model shop.

Be careful when handling parts like the battery or charger

Lithium batteries with high capacity and high voltage are used in this helicopter.

Improper handling may result in electric shock, burn, explosion, or fire.

Do not use the charger or batteries near an open flame. If a power generator is used, do not use a open flame near it, the fuel, or any related devices.

Cigarettes may also cause fire - do not operate this product or related devices while smoking.

Please follow the guidance from related Instruction Manuals while using this product.

When linking the connectors, please wear fire-resistant gloves to prevent electric shock and burns.

When not flying, please unplug the battery connectors.

While storing or moving the battery, please use special battery cases.

Do not store batteries in a high temperature environment such as a car trunk on a hot day.

PRECAUTIONS FOR HANDLING

- Immediately after flight, the motor, speed control and battery are very hot. Be careful to avoid a fire or burn.
- The accessories such as battery and electrical parts should be handled with care. If its coating is torn or the connector is shorted, you could be burnt or injured. Read the instructions for use of such accessories before handling.
- Do not charge or discharge the battery near an open fire or in a hot environment.
- Unnecessary disassembly or modification of any components is strictly prohibited. Neglect of this could result in a fault and/or accident.
- Stop the motor before doing the following actions:
 - ① when you make adjustments to the helicopter body or the control system;
 - ② when you replace any accessories or parts;
 - ③ when the helicopter has something wrong or when you note unusual noise, smell or vibration;
 - ④ when danger is expected.
- Use the parts within their service limits, if indicated.
- For a pleasant flight, apply a thin layer of grease to the gear and try to keep appropriate gear backlash. Also, frequently check often if the moveable parts move smoothly. Tighten the bolts, grease, or replace parts if necessary.

Precautions for Safe Flight

Although you may believe you have taken all possible care during assembly, the model could still crash due to slight assembly failure, operational mistake, service failure (loose bolts, etc.), interference and so on. Always keep in mind that the radio control helicopter, which is controlled by radio frequency, may go out of control for some reason, and the operator should pay attention to himself/herself and the surrounding circumstances at all times for a safe flight.

- ◎ To fly the helicopter, it is necessary to fully master operational skills for flight as well as basic flight methods. Receive guidance from our distributor or an experienced operator and operate under their instructions.
- ◎ If you notice an abnormality before flight, be sure to eliminate the cause before flying.
- ◎ If two or more radio devices are used simultaneously on the same frequency, you cannot operate the helicopter because of interference. If someone else is using the same frequency, operation may stop. If there is interference despite no one using the same frequency, a source of interference exists. Never fly until this interference has been cleared.

Flying Site and Range

- ① The flying range of the helicopter is defined as a distance where it can receive the radio frequency signal from the transmitter. However its true range is where you can confirm the behaviors of the helicopter with your own eyes.
- ② Never operate the helicopter in a place where you may lose sight of it, or the radio signal from your transmitter fails to reach it - as a crash is very likely.
- ③ Try to understand the surroundings at all times and never fly in bad weather, such as strong wind or rain, at night or in low visibility.
- ④ Never fly in a place where there are people, cars, schools, hospitals, other buildings or obstacles, or by a river or on the seashore; fly at an exclusive airfield where radio signals are controlled.
- ⑤ Do not fly near roads, tracks, electric lines, high-tension lines or other objects determined dangerous.
- ⑥ Please do not let the noises of main rotor blades or other parts disturb the surroundings.

Observe these rules and manners to help enjoy this R/C helicopter.

The following items are precautions for the operator flying the SYE12. Be sure to observe them - failure to observe them may result in serious accidents or injuries.

① The following persons or those in the following states should never operate the SYE12.

- infants, children, or other persons who have no knowledge or experience of R/C helicopters;
- pregnant woman;
- when you are tired, ill, under influence of medicine or alcohol and cannot make proper judgment in safe operation;
- when you are a beginner or borrow someone's radio control helicopter and have not taken sufficient safety guidance on the operating methods; or
- those who are believed to be incapable of flying a radio control helicopter.

② Wear easy-to-move clothes.

- Choose to wear clothes whose edges or hems can not come into contact with the rotating parts of the helicopter, the antenna or controls on the transmitter, endangering you.
- It is very dangerous if accessories such as rings, bracelets, etc. are caught by the helicopter or the transmitter. Remove them and bundle long hair so that they will not be caught.
- In order to protect your feet, wear solid, easy-to-move shoes, avoiding sandals or high-heel shoes.
- Wear a cap, gloves, sunglasses or goggles as required.

③ Do not fly the Helicopter in an unnatural posture.

- Avoid standing on an unstable or slippery place.
- Do not fly while looking backward, sitting or lying.
- Do not bring the helicopter too close to the operator or surrounding people (if there are bystanders, make sure that they are behind the operator).

④ Take sufficient flight breaks.

- An excessively long flight makes the operator lose his/her concentration due to fatigue, leading to accidents. Take adequate flight breaks. Avoid an unreasonably long flight, which could result in unexpected accidents or injuries.

- ① Make sure that the bolts for the blades (main rotor, tail rotor) are properly tightened (there should be some movement possible). Check all the other screws to confirm they are properly tightened. Retighten any loosened screws.
- ② Make sure that no tool used for assembly or adjustment has been left in the helicopter body, and that all the parts affecting the flight performance are free from fault.
- ③ Keep the airfield as neat and tidy as possible and place the helicopter in a stable place (objects such as cables, wires, strings, debris of broken parts, screws, etc., may be scattered by the wind pressure from the rotor and damage the helicopter).
- ④ Make sure the batteries inside the transmitter and the helicopter are fully charged.
- ⑤ Turn on the transmitter first and then turn on the receiver.
- ⑥ Conduct a distance (range) test of the transmitter. With its antenna collapsed, move 15m or so from the helicopter. Move the controls and confirm movement of the helicopter servos follows the sticks. If it does not move properly, check the cause and have it repaired, if necessary.
- ⑦ - ⑧ Extend the transmitter's antenna to its full length. Put the receiver's antenna through an antenna pipe and make sure that it can easily receive the radio signal, paying heed to ensure it cannot to be caught by the movable parts (do not bend or bundle it).
 - ⑧ When using a 2.4GHz transmitter set, please adjust the antenna as directed in the manual supplied with the transmitter.

◎ Starting

- ① When starting the motor, make sure that there is no person, animal or obstacle around the helicopter, which may be caught by the rotors.
- ② After starting the motor, please understand setting the throttle stick / trim to slowest position stops the motor. Rising the rotation speed suddenly is very dangerous. Start the rotation gradually by means of turning on the slow start functions in ESC. After the main rotor is rotating, abrupt stick operation will cause the helicopter to rise quickly. Please set the stick to medium-slow position and wait. Make sure the rise of the rotor speed follows your stick operation.
- ③ When moving to a take-off site, note that if your clothes contact the transmitter's stick, the rotor may start running abruptly. Please proceed with caution.
- ④ When floating the helicopter into the air, be sure to remain at least 10m or so from it.
- ⑤ To set up the transmitter or adjust the Helicopter, first land. Pay heed not to allow part of your body or clothes to contact the transmitter's stick by mistake, and do not put the transmitter down in a standing position because wind, etc. may tip the transmitter over, bumping the throttle stick, causing the helicopter to leap into the air abruptly, endangering yourself or others.
- ⑥ Do not put your hand or any objects into the movable parts while they are running.
- ⑦ When checking the tracking adjustment stay at least 5m or more from the helicopter.

◎ Stopping

Move the throttle stick down and allow the motor and main rotor blades to stop completely. Hold the rotor head by hand, remove the power-supplying batteries, and switch off the receiver. Turn off the transmitter last.

Precautions during Flight

- ① If you note an abnormality such as unusual noise, vibration, etc. during flight, land the helicopter in a safe place swiftly and eliminate the cause prior to flying again.
- ② If the main rotor comes into contact with the ground during flight its appearance may look faultless, but fine cracks or distortions may have occurred in different parts. If you continue to fly it in that condition, the cracks may extend, allowing the inner lead weight to fly out or cause the main rotor to come off the main rotor grip, thus leading to a serious accident. If the main rotor is damaged even slightly or if there is a possibility of damage, replace it with a new one immediately.
- ③ Never look away from the helicopter during flight. If you do so even for a short period of time, it may change its posture or you may lose sight of it, and lose control. Always assume the worst-case scenario and all care should be taken to prevent a crash.
- ④ Do not fly (or hover) the helicopter keeping the main rotor at eye level because it is dangerous. Always ensure that the main rotor is higher than eye level.
- ⑤ Never allow the power of the transmitter or the helicopter to run low (Set the transmitter timer, etc as a precautionary measure).
- ⑥ Do not touch the main rotor or tail rotor while they are running.

Inspection after Flight

- ① After a flight is completed inspect the following: Check screws for tightness and parts for wear, deterioration and damage. Wipe off dirt and water drops from the helicopter (if dirt on the movable parts is left uncleaned for a long time, they may move less smoothly or more irregularly, having a bad effect on flight performance).
- ② Make sure the motor, ESC, and battery are not abnormally hot.
- ③ When storing the helicopter for a long period of time, clean it before storage.
 - Store it in a dry, safe place beyond the reach of infants.
 - If it has damage or a problem, repair or replace before storage.
- ④ To lubricate or replace parts, follow the relevant parts assembly processes in the manual and the instructions in the parts lists.
- ⑤ Check whether or not the receiver and gyro are firmly secured, and free from problems.
- ⑥ Check the receiver antenna wire from time to time because its core may have been snapped. If snapped inside the coating it may not be apparent. Have it checked periodically by the manufacturer.
- ⑦ Once your flight is finished, be sure to remove the battery from the helicopter.

Consumable Parts and Other Parts

When replacing consumable parts, use our specified original parts or our authorized optional ones. Do not modify these parts. Our product warranty does not cover any troubles resulting from use of non-original parts. Do not use out-of-standard parts, because they may cause an accident or a problem exposing you to great danger.

—PRODUCT WARRANTY AND INDEMNIFICATION OF LIABILITY—

SAFETY PRECAUTIONS

This is a sophisticated hobby Product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury, or damage to the Product or other property. This Product is not intended for use by children. The Product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

PRODUCT WARRANTY

Thank you for purchasing this product. The following describes the provisions on product warranty and liability indemnity. Read them thoroughly before using the product.

1. The product has been delivered to you after strict inspection. After unpacking the kit, be sure to check its contents. If there are any faulty parts, contact our Distributor prior to assembling the helicopter.
2. For any pre-assembled item (rotor head, etc.), be sure to check assembly of parts and tightness of bolts and nuts. If an abnormality is noted, contact our Distributor.
3. For product faults and failures noticed before completion of assembly, we will replace the relevant parts with new ones only when we have determined them as a clear incipient failure. Even if a specific faulty part has an effect on other faultless ones, our product warranty only covers the faulty item. If you have even the slightest suspicion on some parts during assembly, contact our Distributor.
4. Note that our product warranty does not cover any failures of parts which have resulted from your handling during assembly.
5. The component parts of the product have been fully examined and checked in their design phase and manufactured under a full management system. We have also confirmed through long-term tests that they have no quality problem. However wear, deterioration, service life of parts, and the performance of the helicopter depend greatly on the working environment at your site (assembly, adjustment, flight condition, storage), and the characteristics of the helicopter differ considerably depending on these unidentifiable factors. As it is virtually impossible for us to have direct involvement with the product under your management, we will take no responsibility for any product failures which have occurred during use after completion of assembly, and any accidents or losses attributable to them. Note also that we will take no responsibility when you have used parts other than our original ones or those produced by our authorized optional parts manufacturer, or for any other problems or accidents resulting from modifications.

LIABILITY INDEMNITY

1. The Product, by its nature, includes dangerous elements depending on how it is handled. When flying it, operate it at your own risk, paying full heed to the surrounding persons and objects as well as yourself. Note that we will take no responsibility for any accidents of whatever cause during use of this product. It is recommended to buy a radio control or recreation insurance policy just in case of unexpected accidents. For details of the radio control insurance policy, inquire with our distributor or a nearby radio control model shop or insurance agent.

REPAIR AND AFTER-SALES SERVICE, TRANSFER OF THE PRODUCT

REPAIR AND AFTER-SALE SERVICE

For Repair and After Sales Services of a JR Helicopter, please consult with your JR Helicopter distributor.

Transfer of Product

The manual may be accompanied by a supplemental manual, additional manual or errata because of improvements to the product or typographical errors of the manual. They may include very important information for flight.

【For Transferor】

When transferring the product hand over the accompanying documents together.

【For Transferee】

Check the accessories at the time of handing over the helicopter. If you are not sure what has accompanied the manual, check with your JR Helicopter distributor.

* These days an increasing number of goods have been transferred (sold and purchased) through Internet auction. The relevant parties are kindly requested to check the condition of the helicopter and the existence of the accessories and it is their responsibility to trade openly.

INSTRUCTIONS FOR DISPOSAL BY USERS IN THE EUROPEAN UNION

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, where you purchased the product.

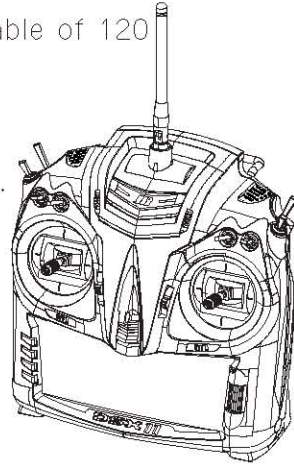
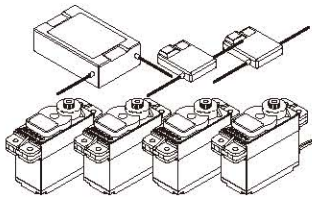


ADDITIONAL ITEMS REQUIRED

1

A complete radio system capable of 120 degree CCPM

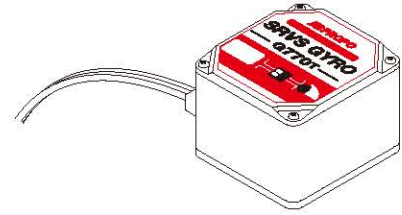
DSX12
DSX11
DSX 9,Etc.



2

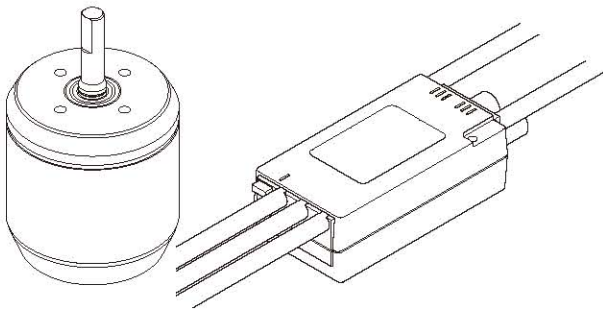
Gyro System

(Recommended to use a Gyro with resistance against electromagnetic noise such as the G770T)



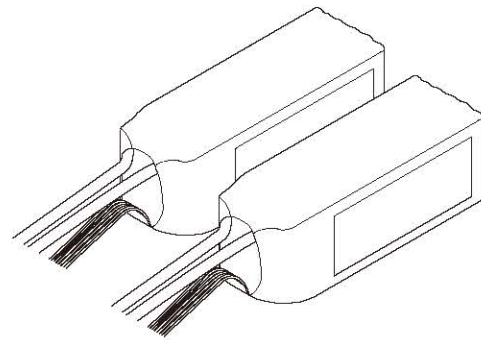
3

Brushless motor & ESC



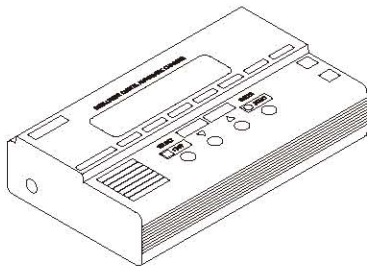
4

Lithium Polymer Battery: 6 Cell,
5000-6000mA, 2pcs.



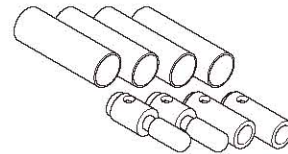
5

Lithium Polymer Battery Charger, balancer,
and Power Source



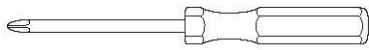
6

Connectors

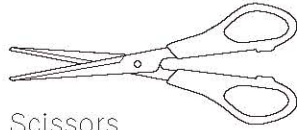


※See Page 55 for details.

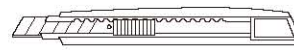
TOOLS REQUIRED FOR ASSEMBLY



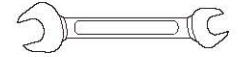
Philips Screwdrivers
(large and small)



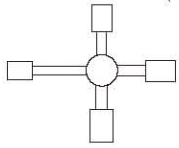
Scissors



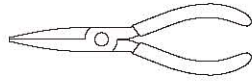
Hobby Knife



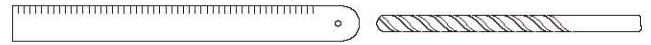
Wrench:13mm



Nut Driver
(4mm,5mm,5.5mm,7mm)

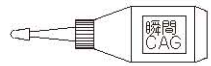


Long-nose Pliers

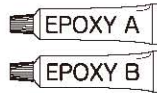


Rule:25cm or longer

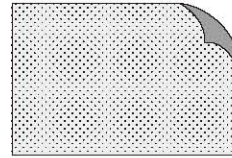
Drill:4mm,6mm



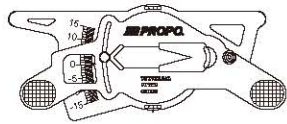
CA Glue



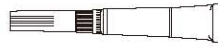
Epoxy Glue A & B
(Hardening Time: 30 Min. or More)



Sandpaper of #300 to 400



Universal Pitch Gage
NO.60326



Thrust Bearing Grease
NO.61005



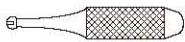
Oil Touch Pen
NO.61296

Other general tools required for making a model

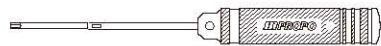
USEFUL TOOLS



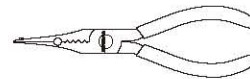
JR Universal Link Driver(NO.61360)



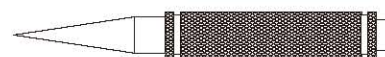
JR Universal Link Trimmer(NO.60219)



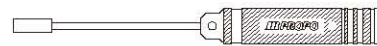
JR Hex Driver : 1.5mm(NO.61401)
2mm(NO.61402)
2.5mm(NO.61403)
3mm(NO.61404)
4mm(NO.61598)



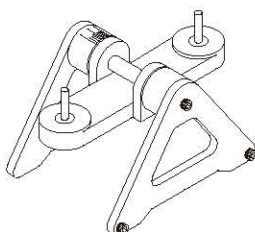
JR Universal Ball Pliers C(NO.60242)



Reamer or Stepped Reamer



Box Driver : 4.5mm
5mm
5.5mm(NO.61583)
7mm(NO.61584)

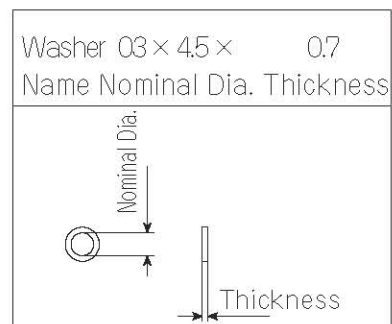
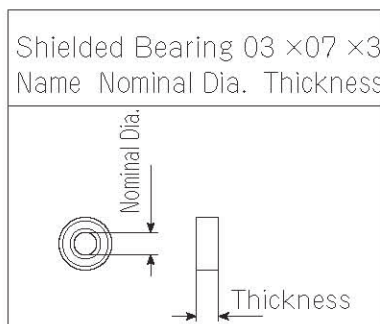
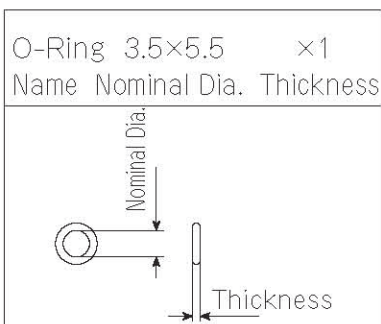
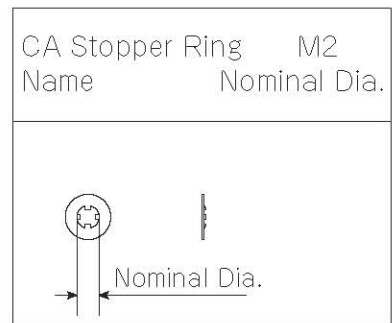
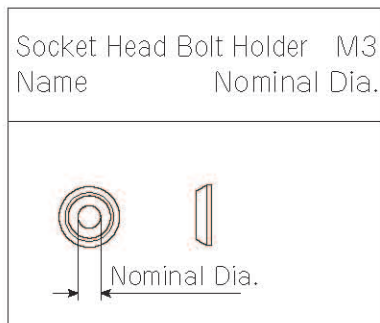
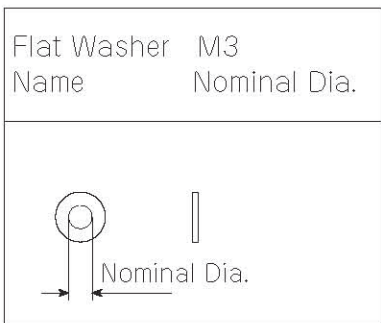
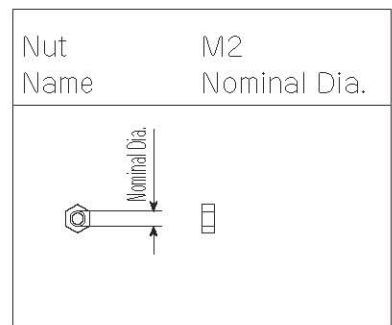
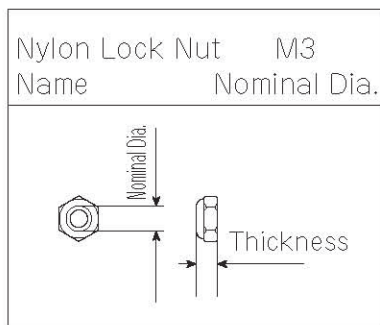
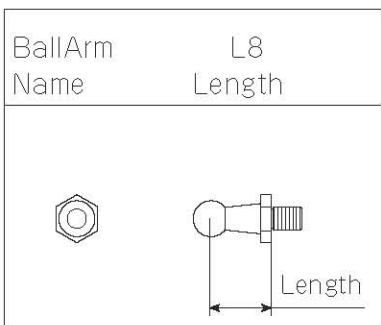
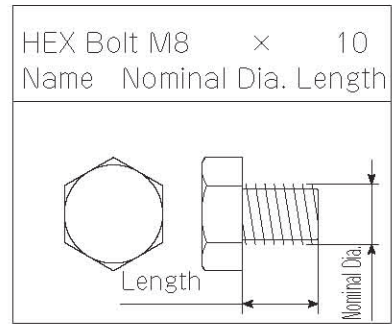
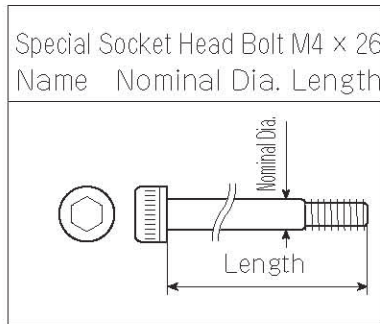
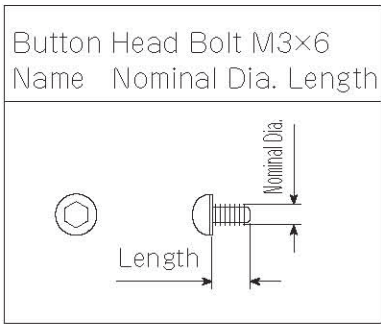
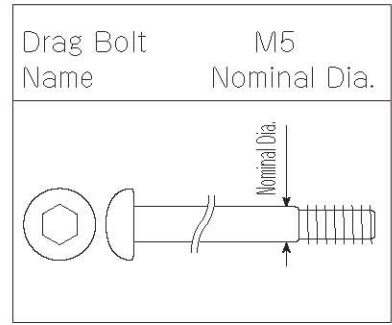
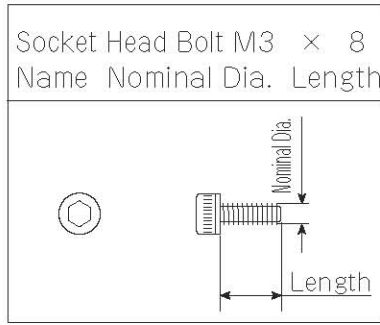
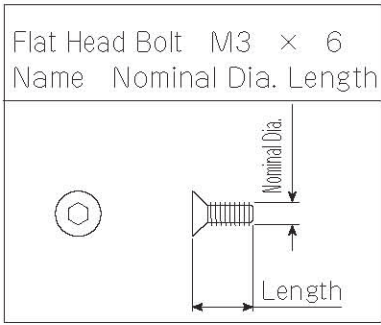
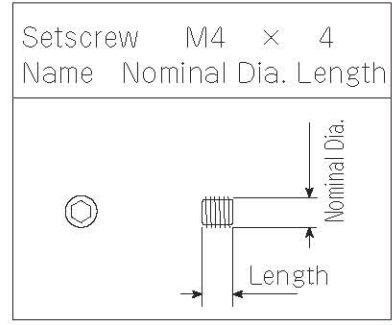
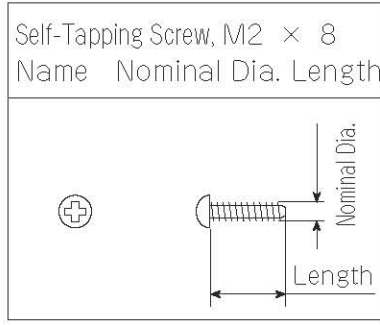
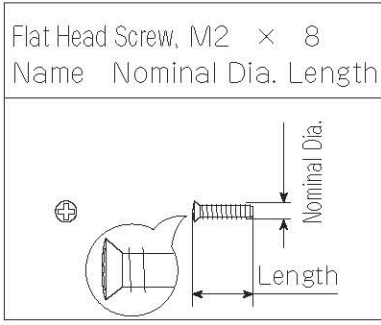


Blade Balancer

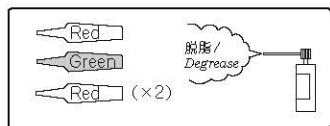
— TYPES OF BOLT AND NUTS, HOW TO DISTINGUISH SIZES —

The following illustrates the bolts used for SYE12. Check the dimension of each part used during assembly.

These are just examples for each type- several different sizes are used during assembly.






—HOW TO AVOID LOOSENING OF BOLTS, ETC., EPOXY ADHESIVE, INSTANT ADHESIVE—

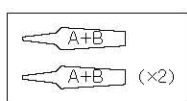


Bolts may be loosened if they are exposed to vibration for a long period of time. For this reason, it is necessary to take proper countermeasures to prevent them from being loosened. In each process, the bolts and matching tapped holes marked with the symbols shown above should be degreased with alcohol and adhered with a screw locking agent such as JR Thread lock (green: hard, red: soft).

The same applies for parts marked with the same symbols. A parenthesized number added to the symbol indicates the number of bolts to be applied with the screw locking agent. For example, a spindle shaft is fixed with two bolts, and only one symbol is indicated, omitting the rest. However, the symbol is suffixed with a number such as (x 2). In this case, the screw locking agent needs to be applied to the two bolts (note that, if multiple pieces of the same part are used, the symbols including those for their bolts may be omitted).

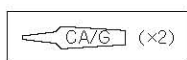
Note: When applying the screw locking agent to a bearing-containing part, care should be taken not to allow it into the bearing (it could cause a problem). There are two kinds of screw locking agents. As mentioned above, green denotes a hard agent and red a soft one; use them properly, according to the instructions. When red (soft) agent is required, the mark is  used, and when the green (hard) one is required, the mark is  used. Specifically important areas are marked with a symbol . If this symbol is indicated, degrease more elaborately. After assembly, if you want to remove the bolts, etc. secured with the screw locking agent, burn it off by adequately heating it with a torch or a soldering iron (if you try to remove them by force, you may damage the bolt or wrench and fail to remove the part). When burning off the screw locking agent, care should be taken not to deform the surrounding resin parts.

—EPOXY ADHESIVE AGENT—



Bond the relevant parts marked with the following symbol, using an epoxy adhesive agent with a hardening time of 30 minutes or more. As with the screw locking agent, a number "(x 2)" next to the symbol denotes the number of parts required to be adhered.

—INSTANT ADHESIVE AGENT—



Bond the relevant parts marked with the following symbol, using an instant adhesive agent. As with the screw locking agent, a number "(x 2)" next to the symbol denotes the number of parts required to be adhered.

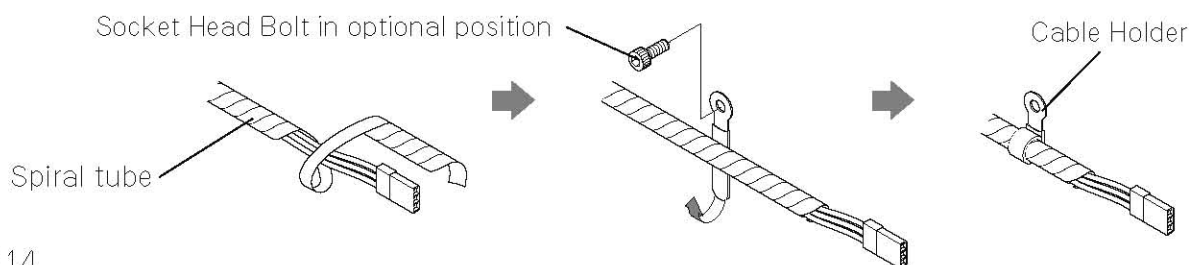
—INDICATION OF TEMPORARY FIXATION—



The areas marked with the following symbol should be temporarily fixed until assembly and relevant process are completed. A number "(x 2)" next to the symbol denotes the number of parts required to be temporarily fixed.

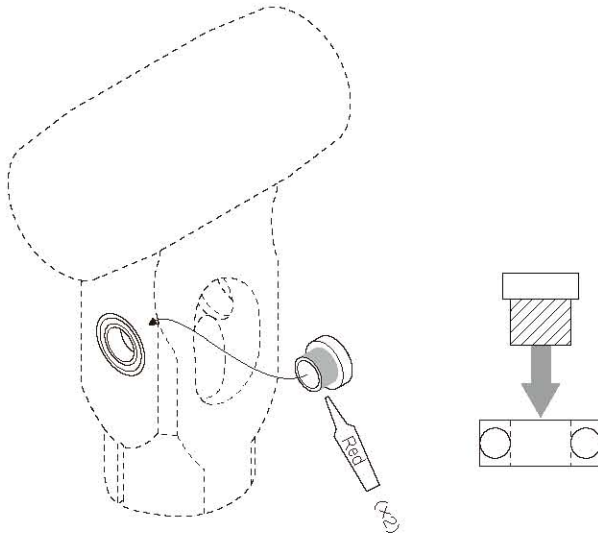
—HOW TO USE CABLE HOLDER AND SPIRAL TUBE—

The following components are provided to protect lead harness of servo or gyro. Be sure to provide protection to prevent lead harness from entanglement with moving parts or rotating parts as shown below.



BONDING OF INNER COLLAR, UNIVERSAL LINK

In some assembly steps, there is an indication to bond an inner collar to a bearing. For portions with this indication, degrease the bearing and inner collar well, and bond them with screw lock agent as shown below.



The figure on the left shows an example of bonding a bearing to its collar. In this case, apply a small amount of screw lock agent to contact surfaces of the bearing (mounted to center hub) and its center collar. When bonding, be sure to avoid ingress of screw lock agent inside the bearing.

UNIVERSAL LINKS

There are four kinds of universal link.

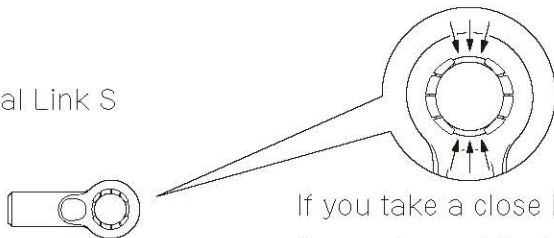
Each universal link has a front and back side and is mounted in the specified direction at the time of attaching the linkage. The following describes how to tell the front and back. At the time of attaching the linkage, pay heed to the direction of each universal link during assembly. (this is common to all JR models except the Parkmite)

Universal Link

The side marked "JR PROPO" is the front. At the time of fitting the linkage, attach the universal link to joint ball by pressing the back side onto the ball.



Universal Link S

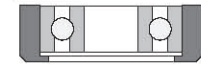


If you take a close look at the central hole, its edge is stepped as shown in the figure above. Attach the universal link S to joint ball while pressing the stepped side onto the ball.

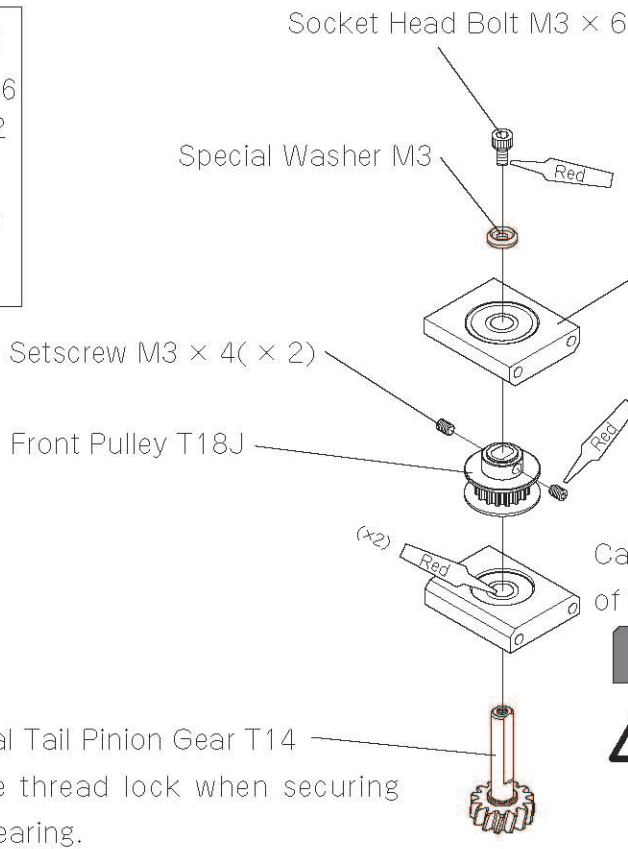
1-1 TAIL PINION BEARING BLOCK ASSEMBLY

- x1
- Socket Head Bolt M3 x 6
- x2
- Special Washer M3
- x1
- Setscrew M3 x 4
- x1
- Special Washer M3

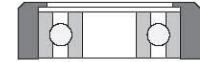
WARNING



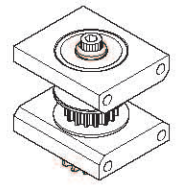
Carefully note the orientation of the bearing block.
Tail Pinion Bearing Block(x 2)



Carefully note the orientation of the bearing block.







WARNING

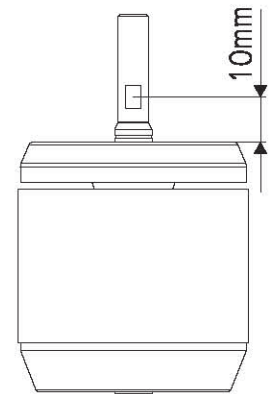
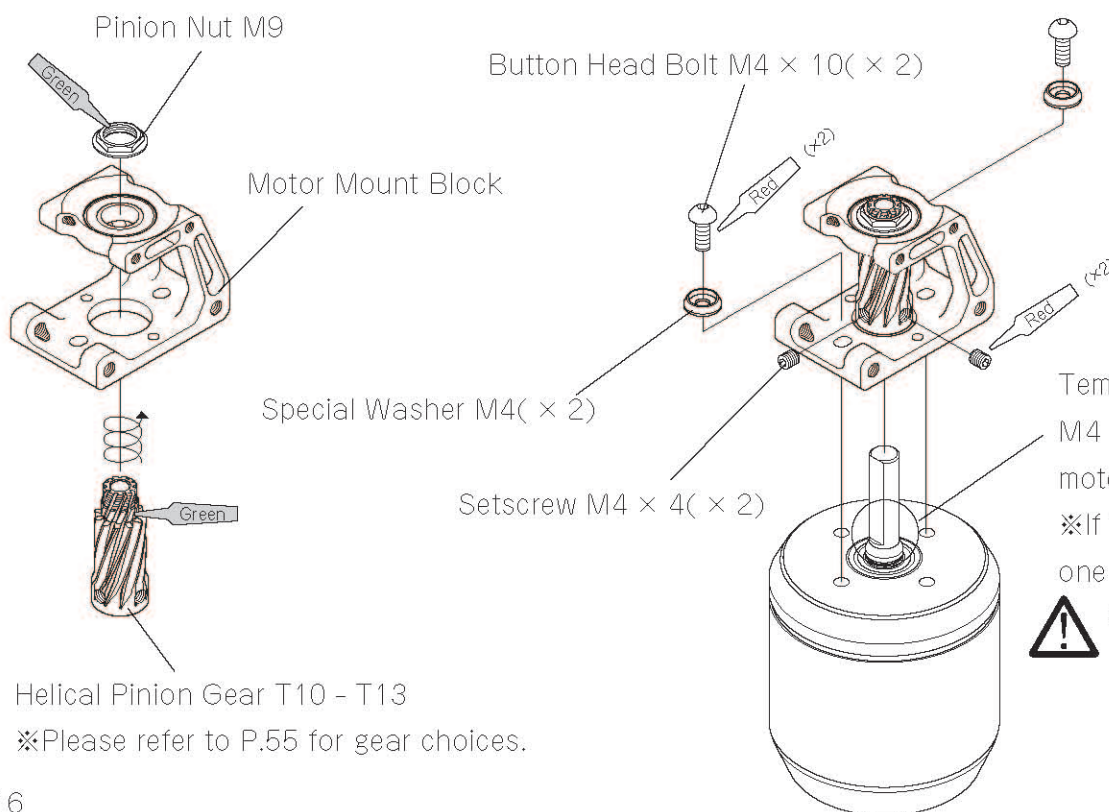


Complete Assembly

1-2 MOTOR AND MOTOR MOUNT BLOCK INSTALLATION

- x2
- Pinion Nut M9
- x2
- Setscrew M4 x 4
- x1
- Special Washer M4
- x2
- Special Washer M4

Set screw 'flat' position








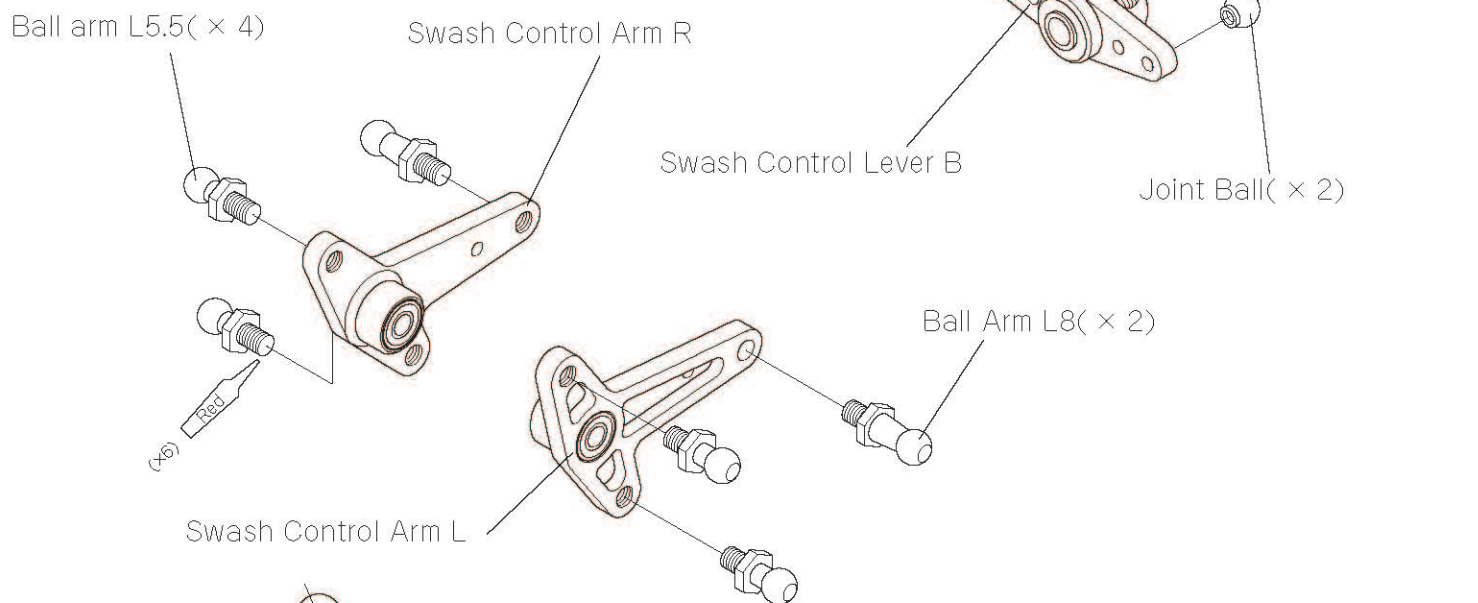
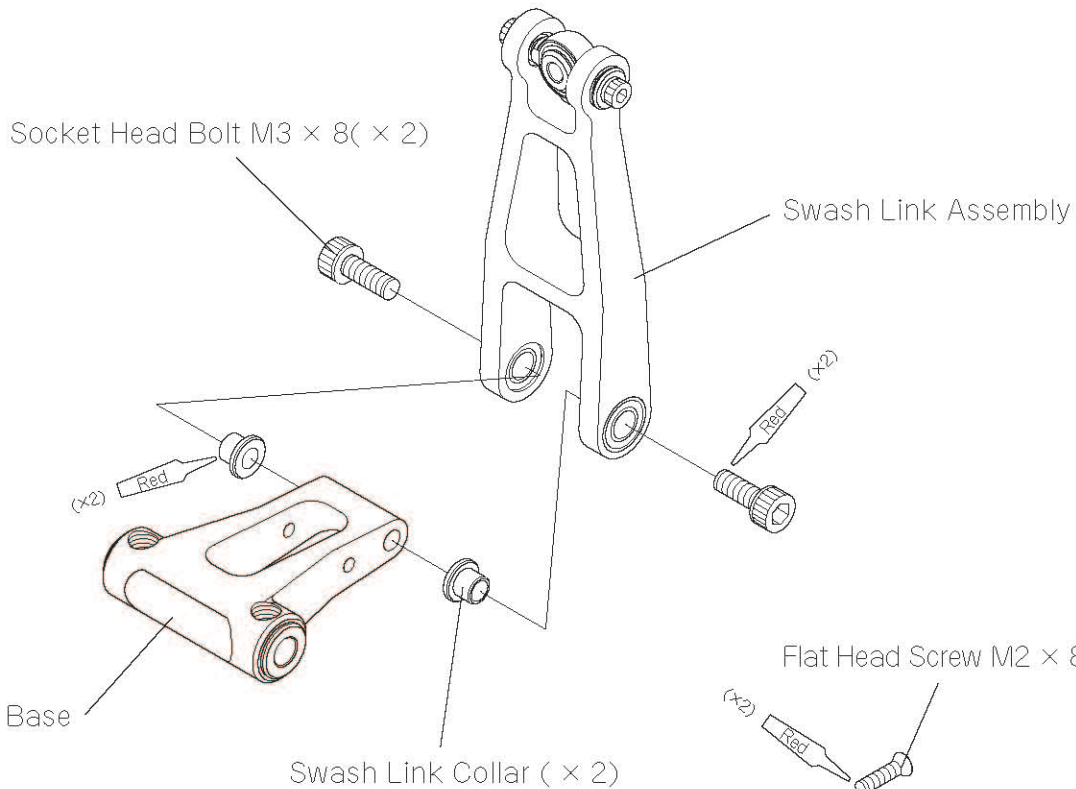
Temporarily tighten the setscrew M4 x 4 onto the 'flat' on the motor shaft.

※If there is no 'flat', please file one as shown above.

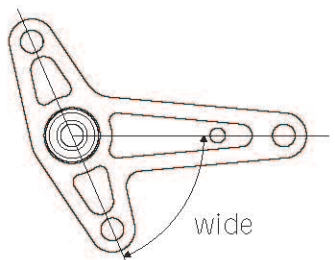
WARNING

1-3 SWASH CONTROL LEVER ASSEMBLY

		.....x2
Swash Link Collar		.....x2
Joint Ball		.....x2
Socket Head Bolt M3 x 8		.....x2
Flat Head Screw M2 x 8		

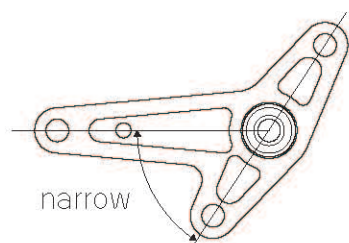


Left side





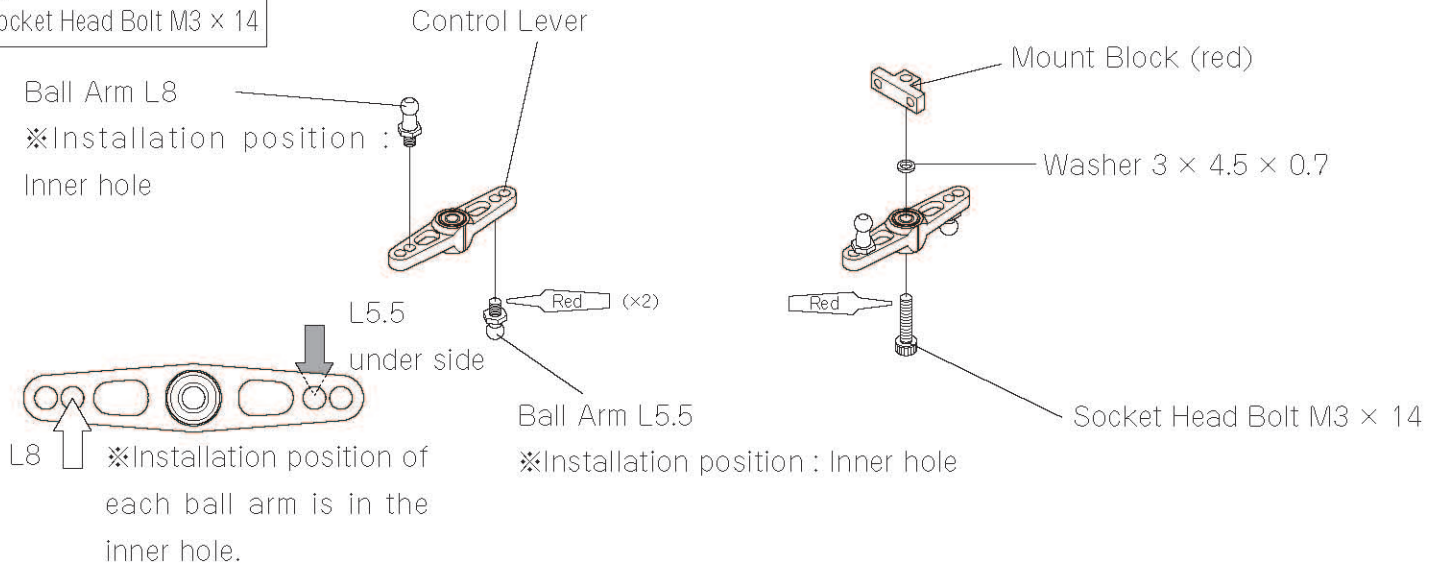
※The Swash Control Arms must be orientated correctly (left and right).

Right side




1-4 CONTROL LEVER ASSEMBLY

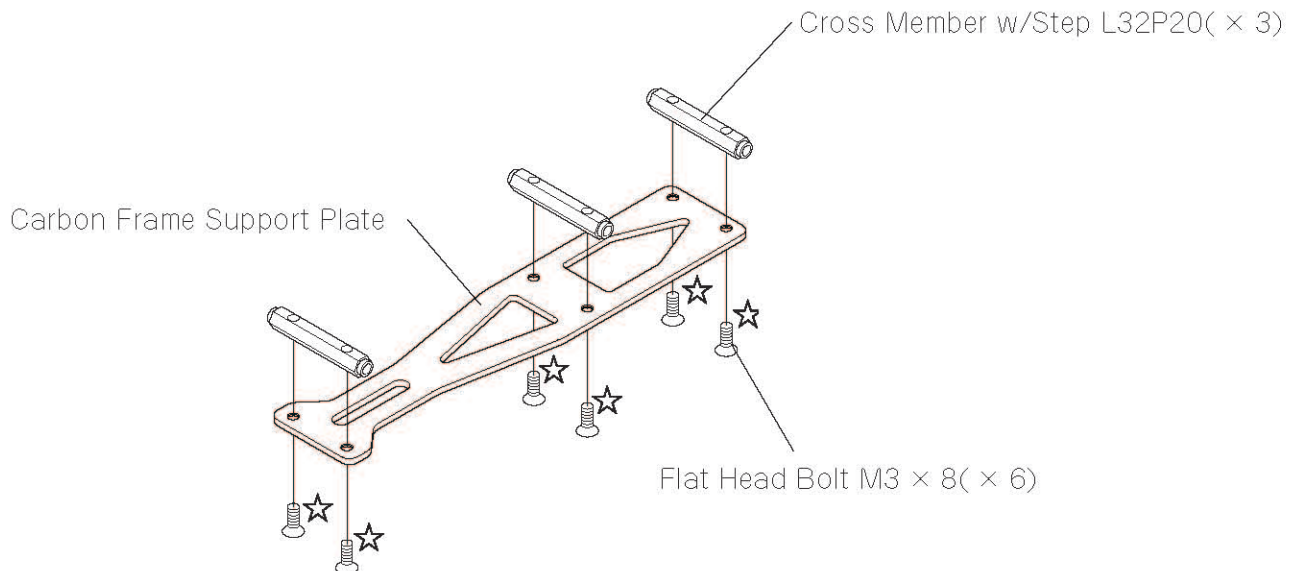
- ×1
Washer 3 × 4.5 × 0.7
- ×1
Socket Head Bolt M3 × 14





1-5 FRAME SUPPORT PLATE ASSEMBLY

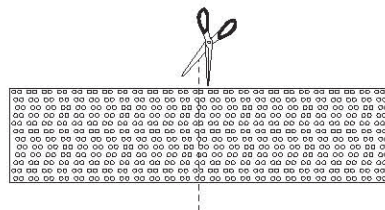
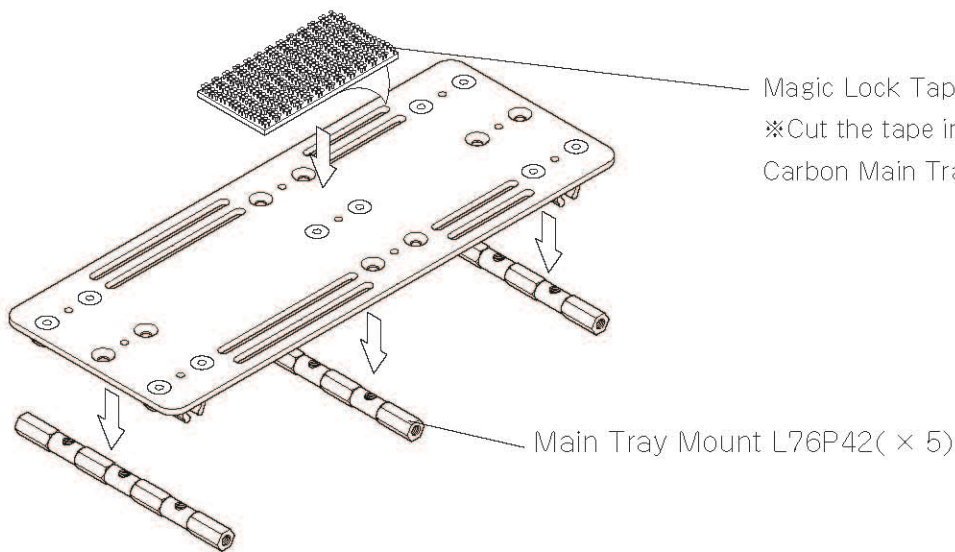
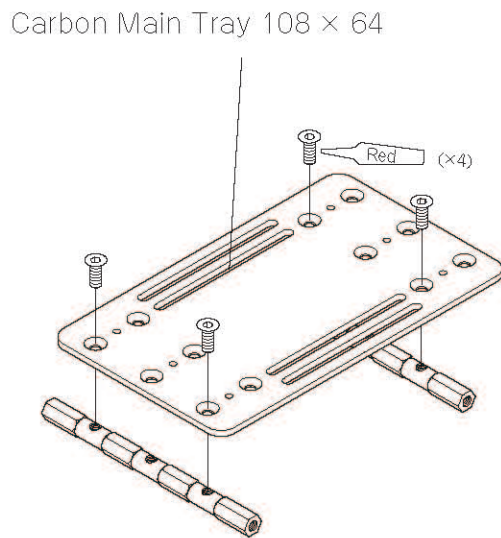
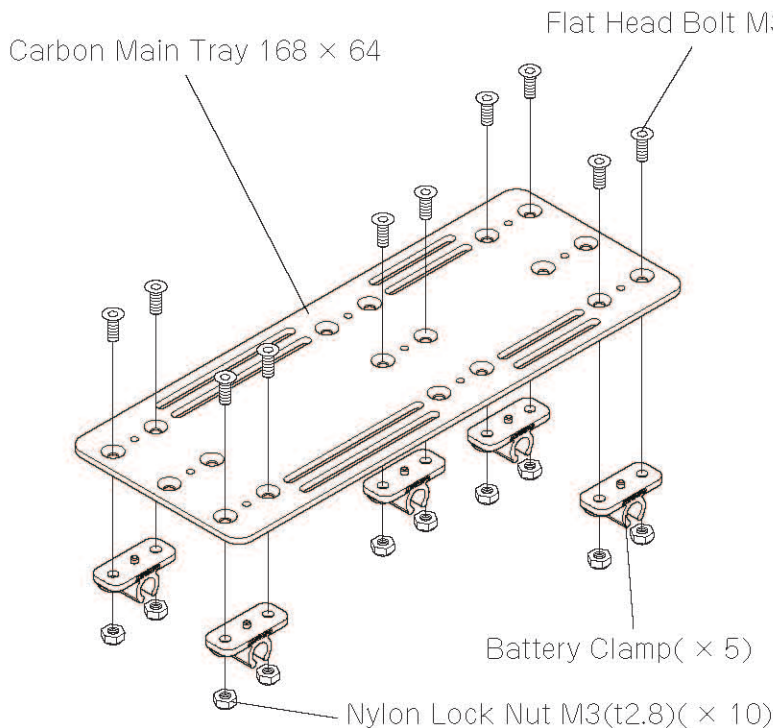
- ×6
Flat Head Bolt M3 × 8

Temporarily tighten the bolts indicated by a ☆.



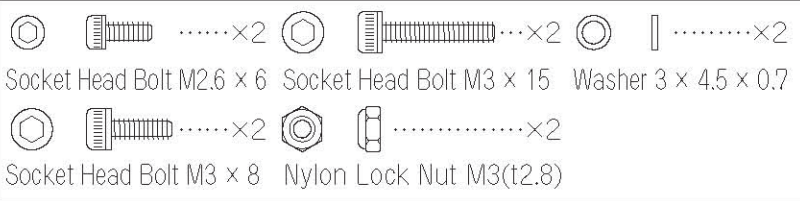
1-6 CARBON MAIN TRAY ASSEMBLY

- ×14
- Flat Head Bolt M3 × 8
- ×10
- Nylon Lock Nut M3(t2.8)



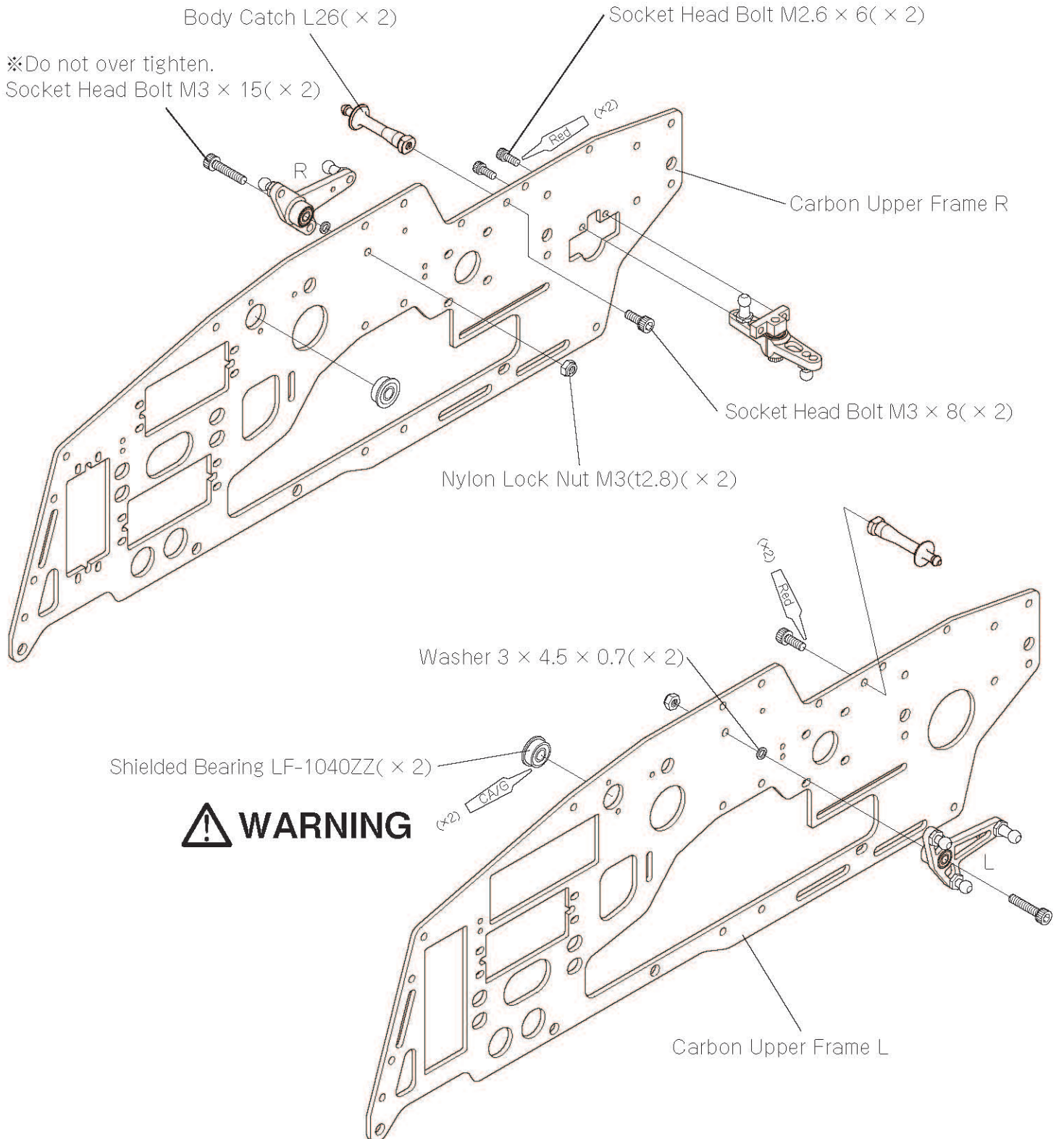
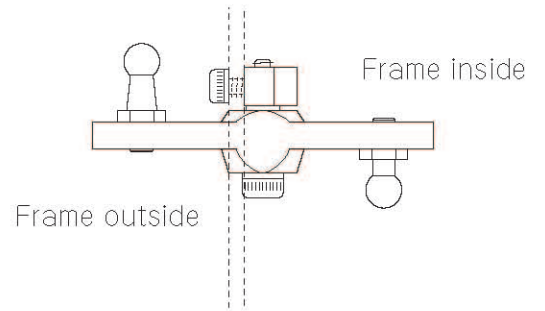
● Depending on the battery you use, the battery may touch the frame, and so cannot be installed. In that case, instead of using the Battery Clamps, install the Main Tray Mount L76P42 directly to Carbon Main Tray 168 x 64.
 (Only temporarily assemble in this step and see how it fits when you actually install your Battery)

2-1 UPPER FRAME ASSEMBLY 1



- Note the orientation of the Upper Frame L and R.
- First, install the Shielded Bearing L-1040ZZ from the inside of the frame using CA adhesive.

Control Lever installation direction


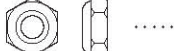


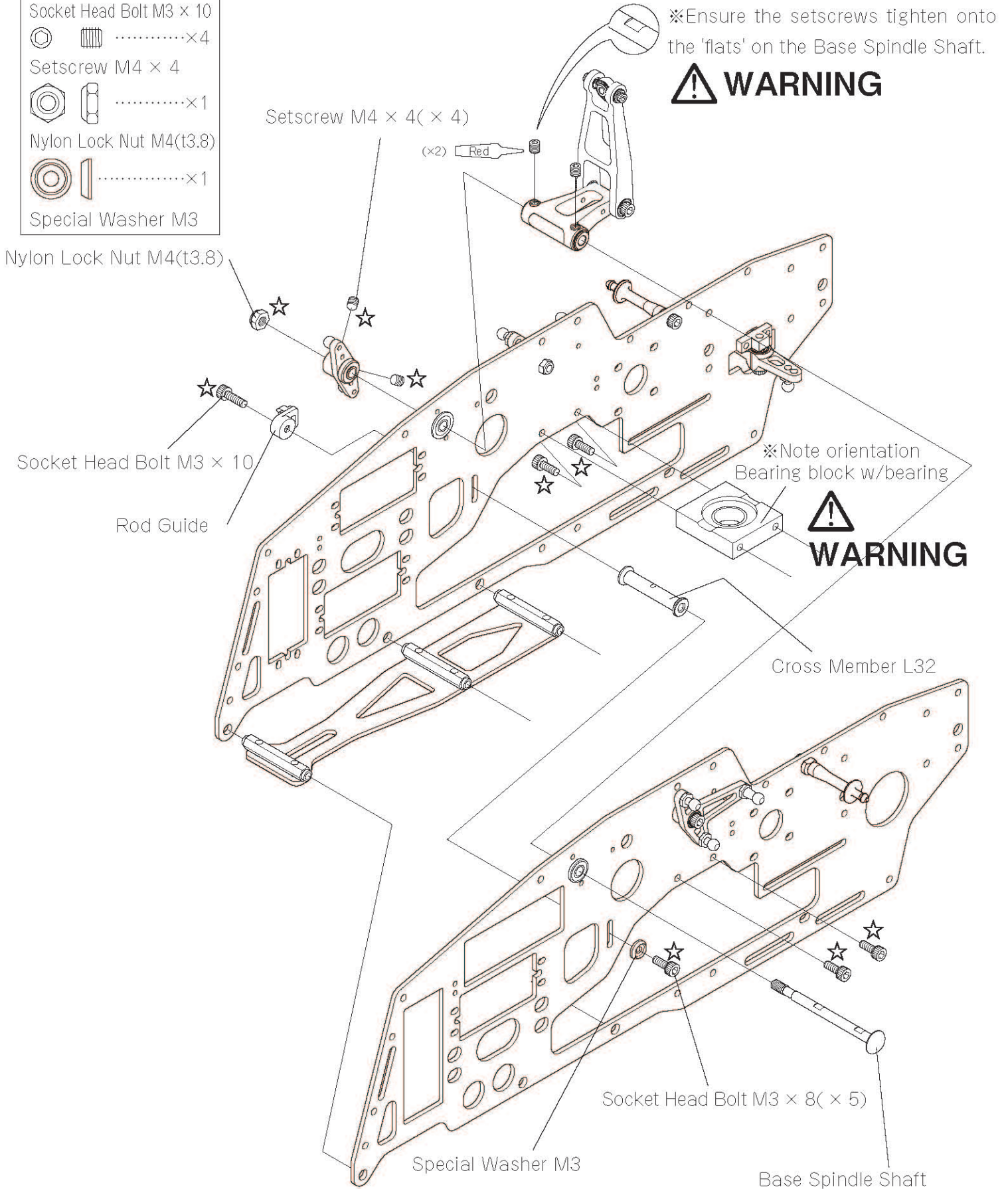
⚠ WARNING

2-2 UPPER FRAME ASSEMBLY 2

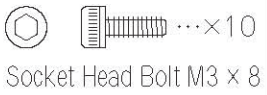
Temporarily tighten the bolts indicated by a ☆.

● After the carbon frame support plate is installed, Flat head Bolt M3 x 8 which was temporarily tightened in step 1-5 can be loctited and firmly tightened.

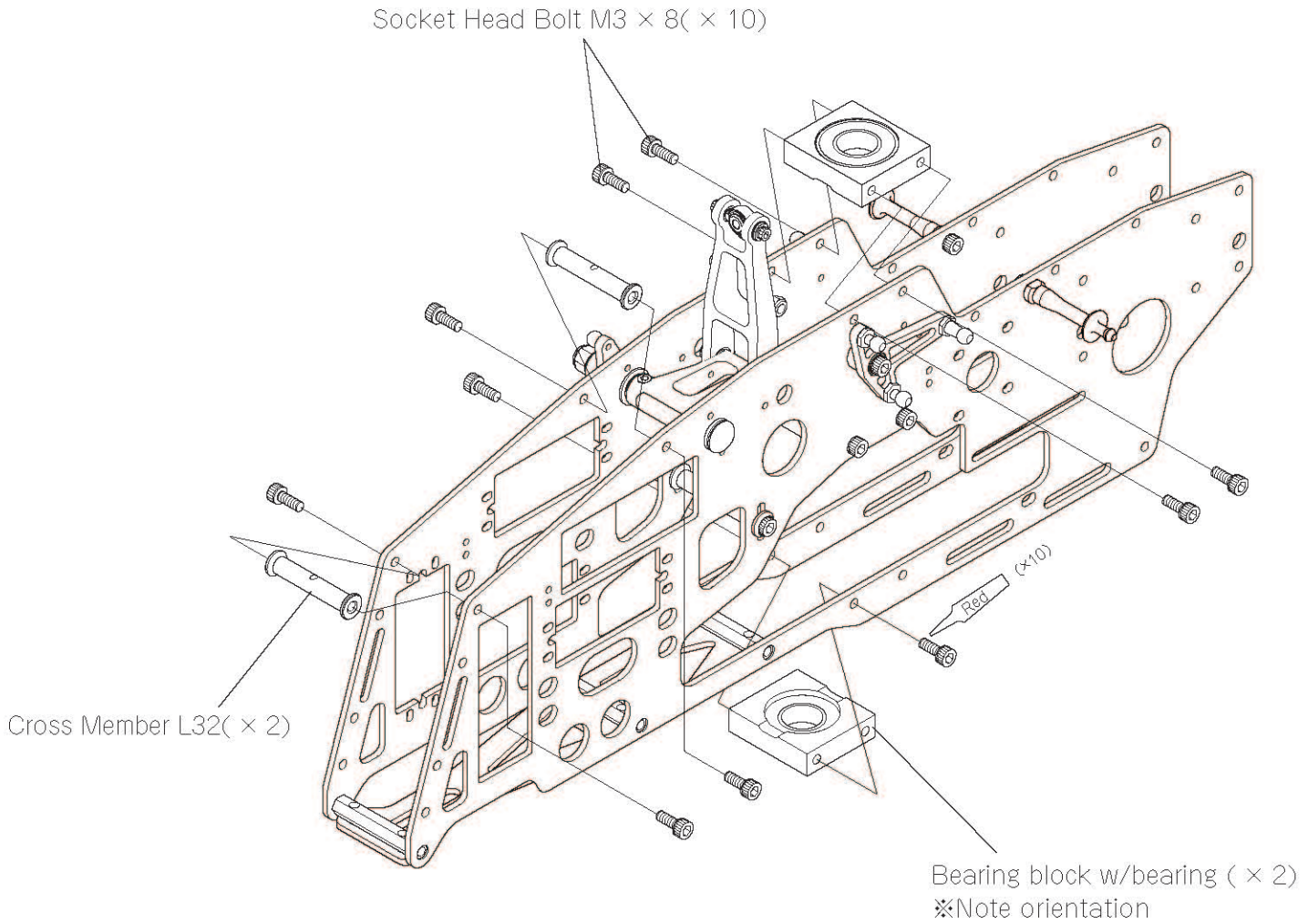
- ×5
Socket Head Bolt M3 x 8
- ×1
Socket Head Bolt M3 x 10
- ×4
Setscrew M4 x 4
- ×1
Nylon Lock Nut M4(t3.8)
- ×1
Special Washer M3



2-3 UPPER FRAME ASSEMBLY 3







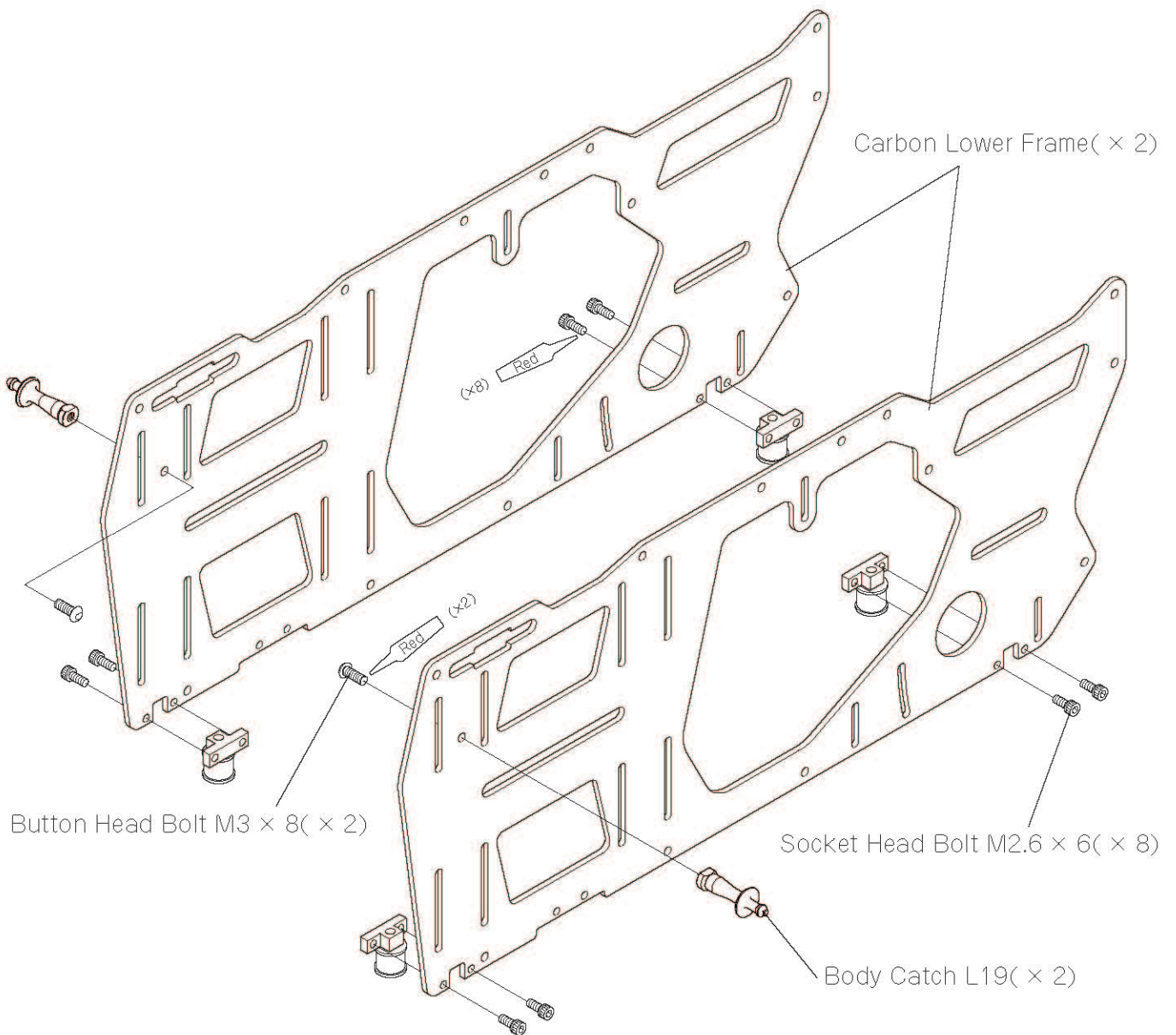
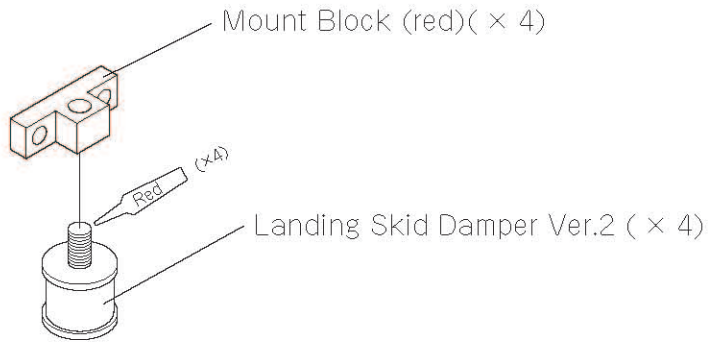
● Insert the main shaft through the bearing blocks. Adjust the bearing blocks so as the main shaft slides through them smoothly. Now loctite and firmly tighten the bolts securing the bearing blocks.







⚠ WARNING

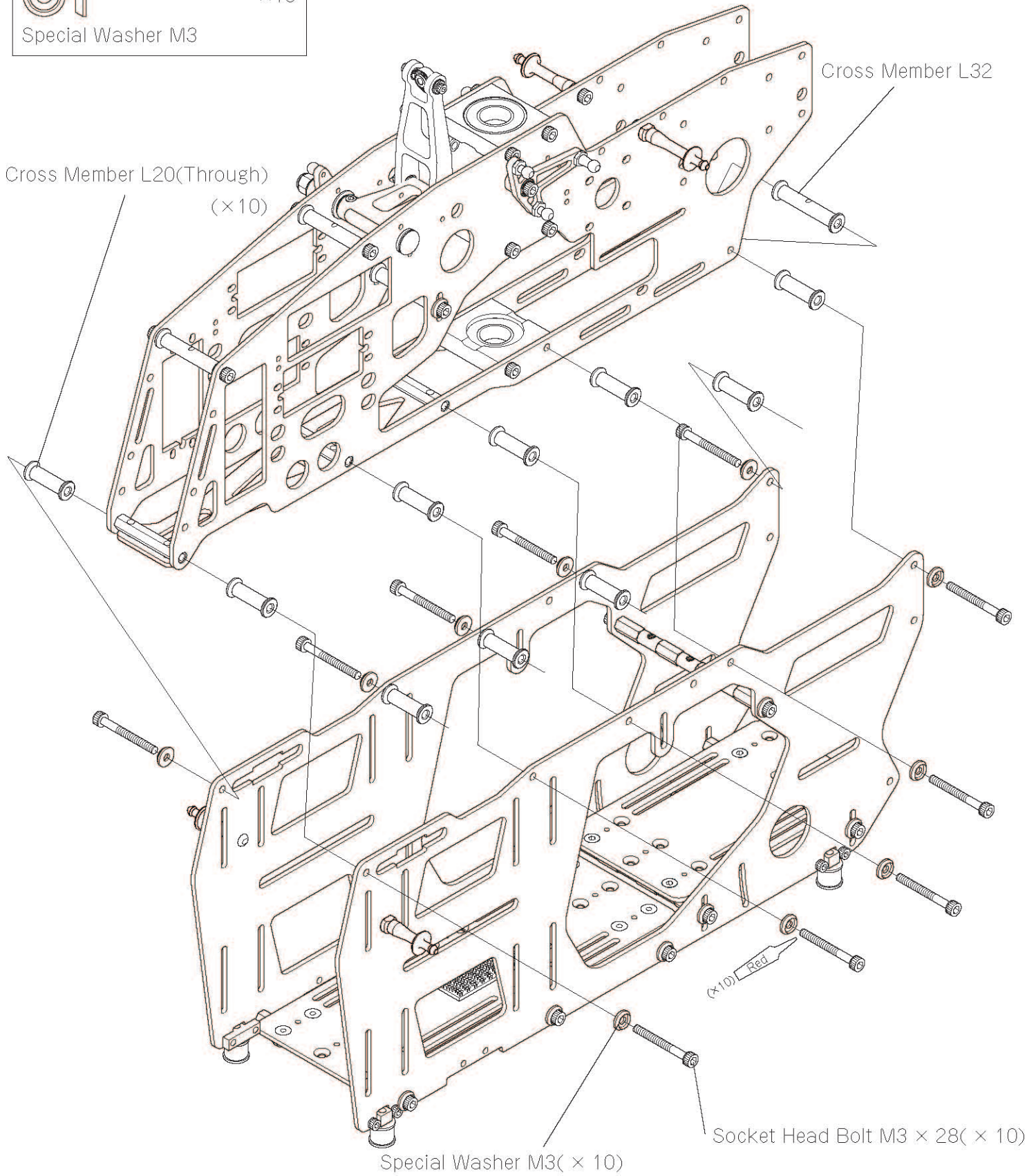
2-4 LOWER FRAME ASSEMBLY 1

		.....×8
Socket Head Bolt M2.6 × 6		
		.....×2
Button Head Bolt M3 × 8		









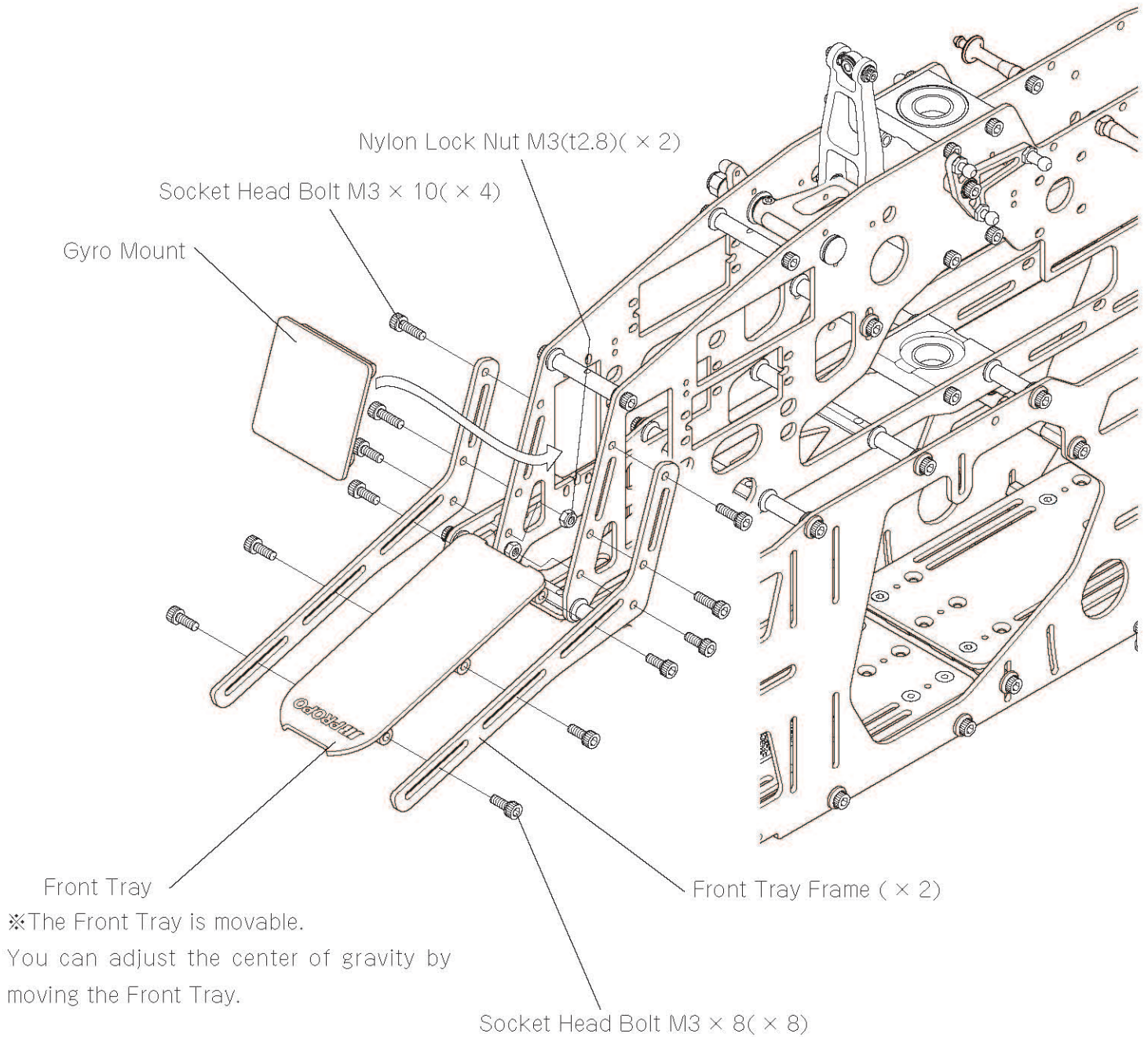
2-6 FRAME ASSEMBLY

		.....x10
Socket Head Bolt M3 x 28		
		.....x10
Special Washer M3		









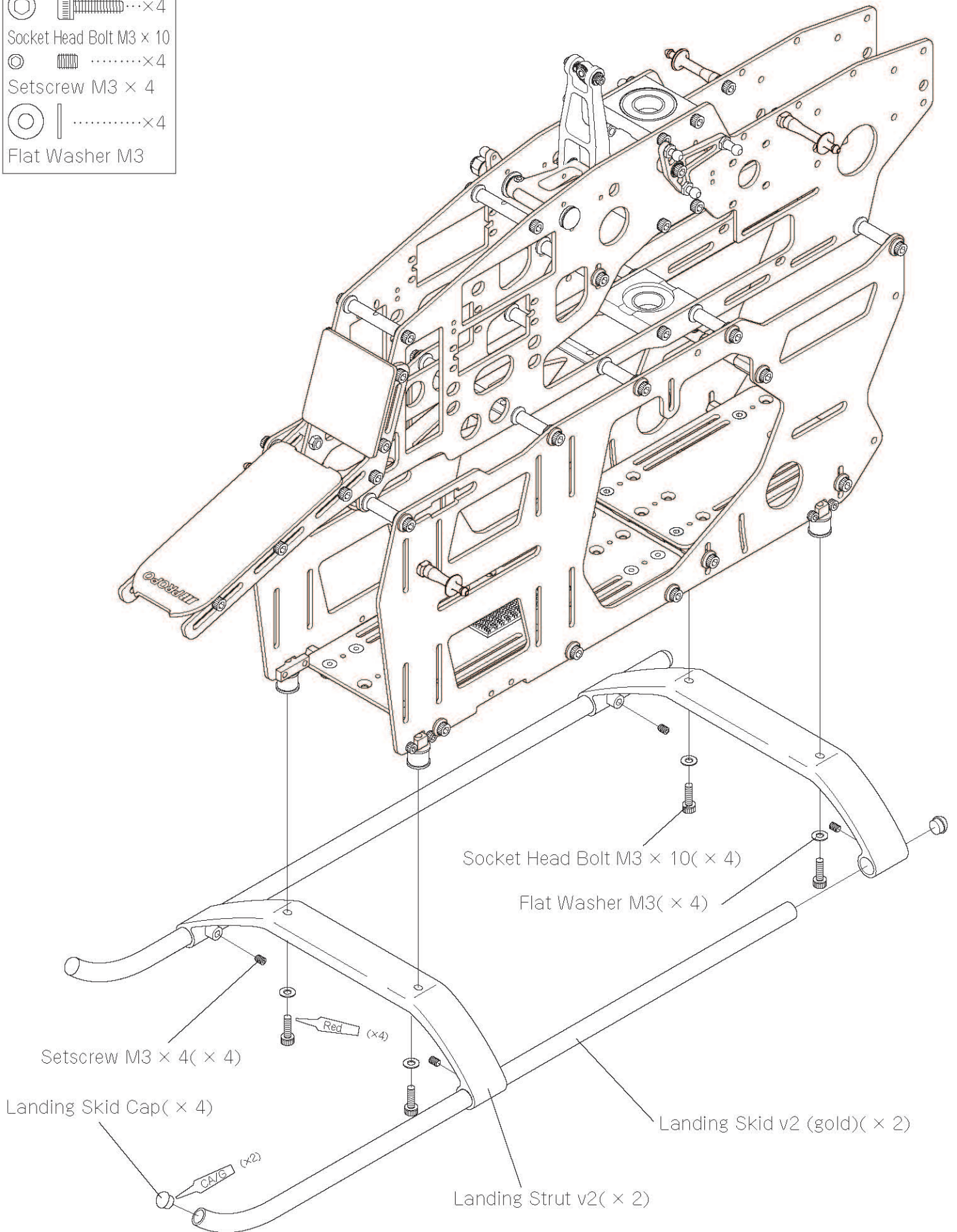
2-7 FRONT TRAY INSTALLATION

		.....×8
Socket Head Bolt M3 × 8		
		...×4
Socket Head Bolt M3 × 10		
		.....×2
Nylon Lock Nut M3(t2.8)		







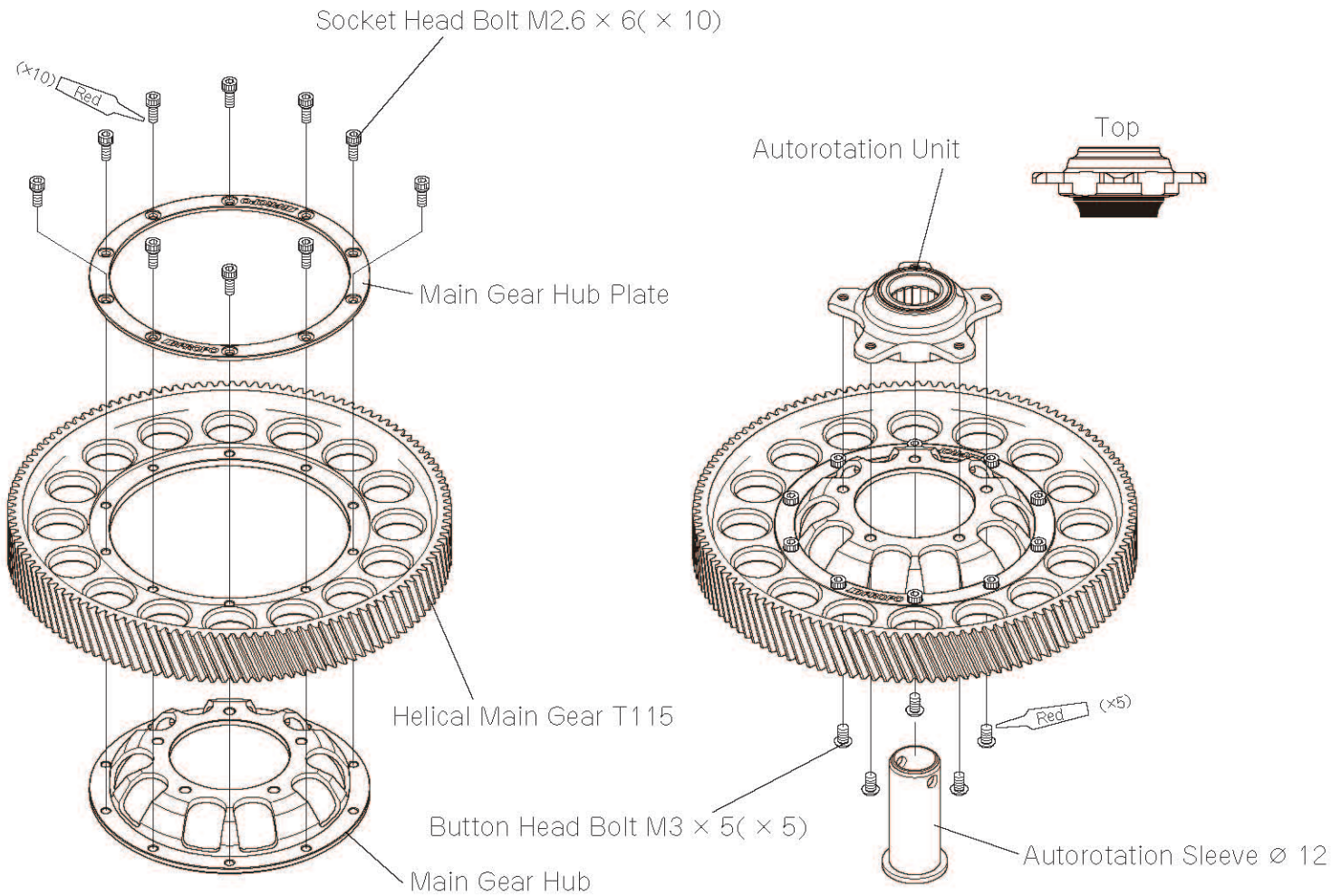
2-8 LANDING GEAR INSTALLATION

-   × 4
Socket Head Bolt M3 × 10
-   × 4
Setscrew M3 × 4
-   × 4
Flat Washer M3





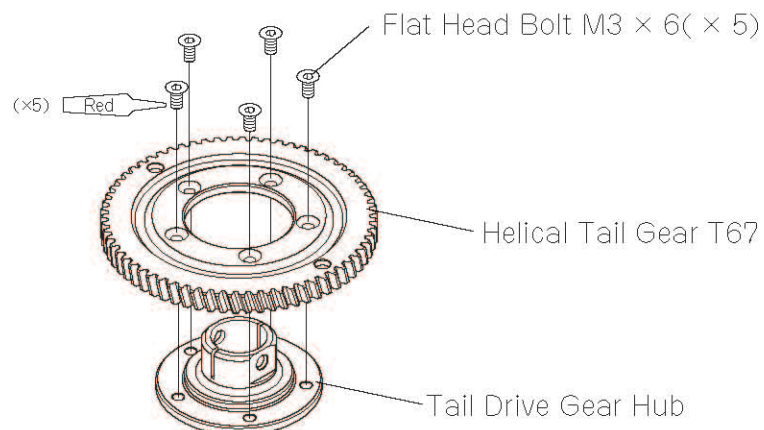
3-1 HELICAL MAIN GEAR T115 ASSEMBLY

-  ×10
Socket Head Bolt M2.6 × 6
-  ×5
Button Head Bolt M3 × 5







3-2 HELICAL TAIL GEAR T67 ASSEMBLY

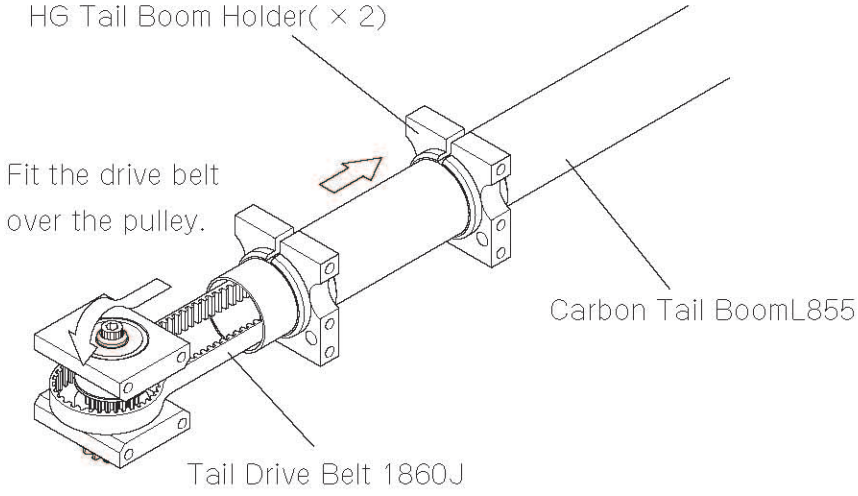
-  ×5
Flat Head Bolt M3 × 6



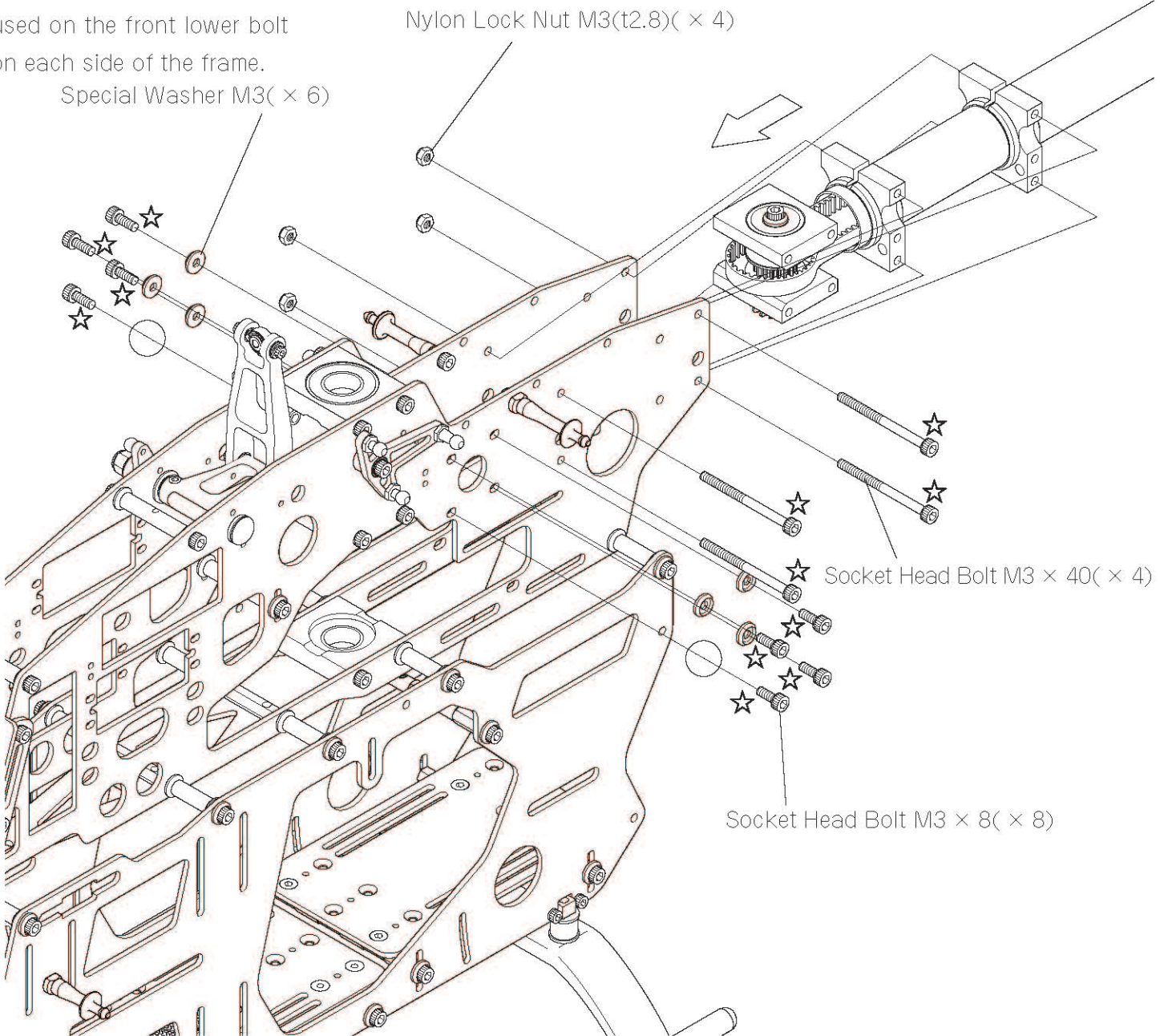
3-3 TAIL BOOM INSTALLATION

- x8
Socket Head Bolt M3 x 8
- x4
Socket Head Bolt M3 x 40
- x4
Nylon Lock Nut M3(t2.8)
- x6
Special Washer M3




● Fit the tail drive belt inside of the carbon Tail Boom and put it over the front pulley.



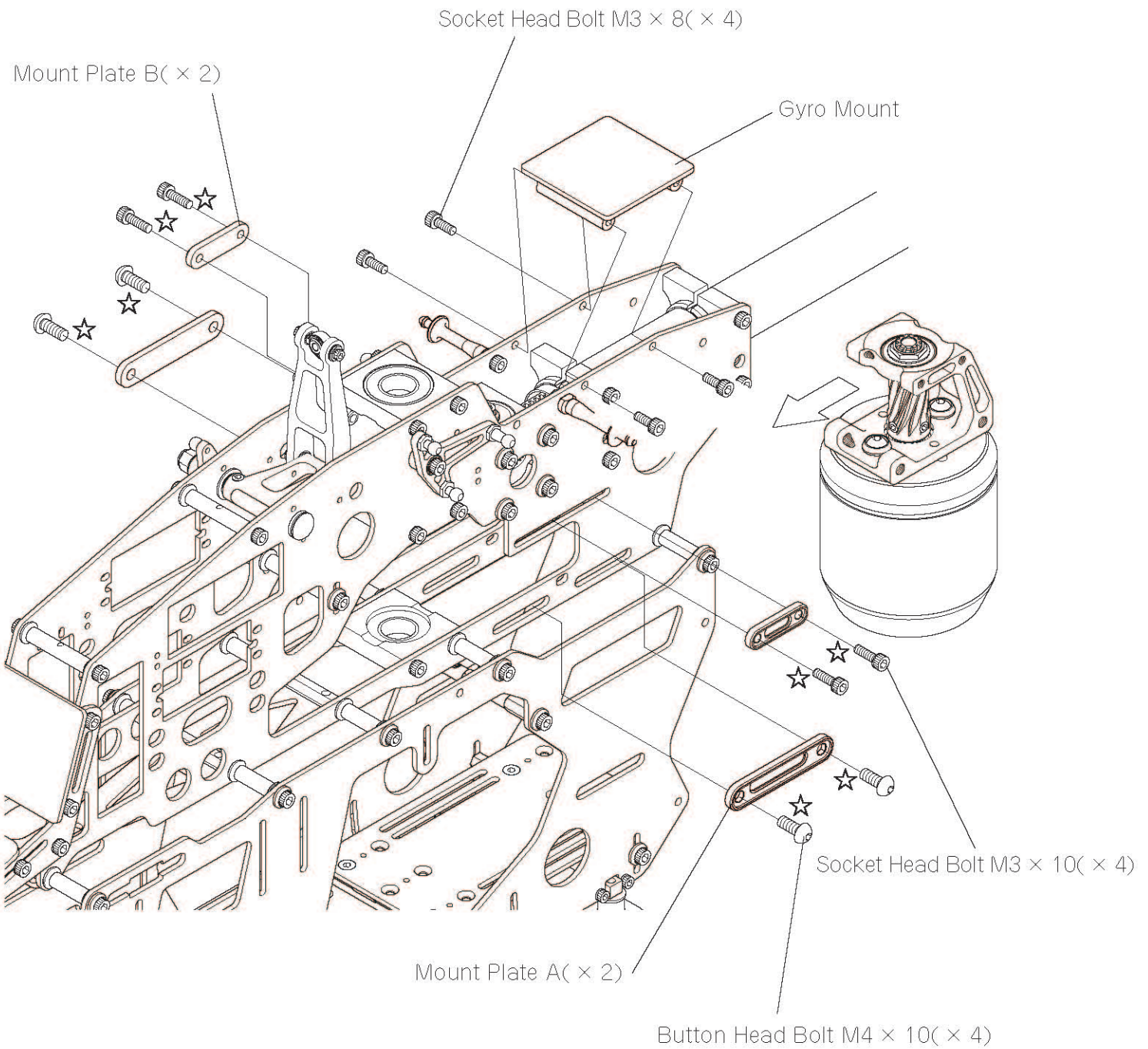
Note these washers are not used on the front lower bolt on each side of the frame.



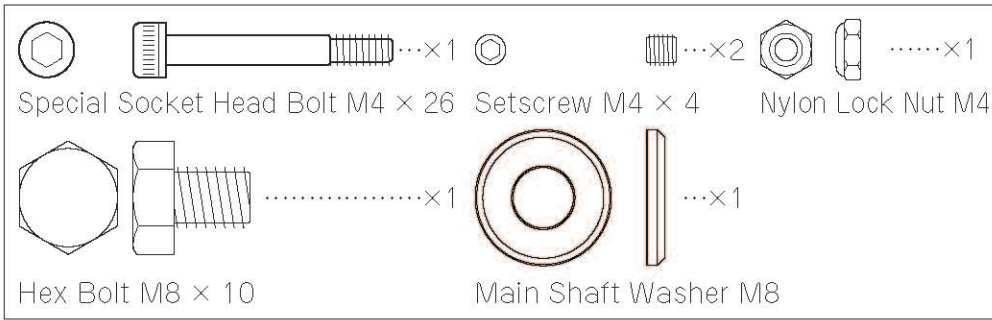
3-4 MOTOR INSTALLATION

- x4
Socket Head Bolt M3 × 8
- x4
Socket Head Bolt M3 × 10
- x4
Button Head Bolt M4 × 10

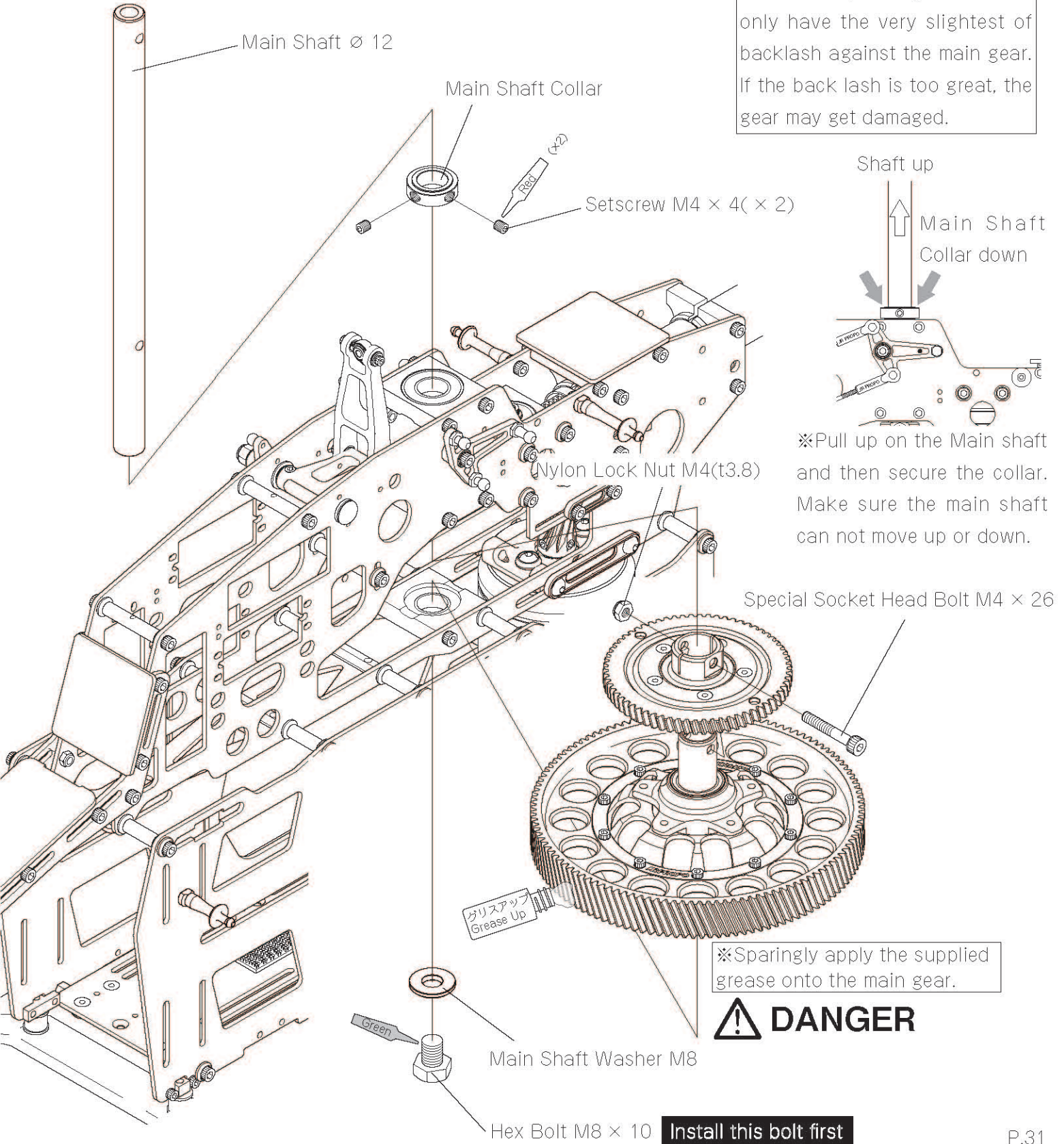
Temporarily tighten the bolts indicated by a ☆.



3-5 HELICAL GEAR INSTALLATION



● After the Helical Main Gear is installed, adjust the back lash for both the tail drive gear and motor pinion. The bolts which were temporarily tightened in Step 3-3 and 3-4 can be locktited and firmly tightened. The helical pinion gears should only have the very slightest of backlash against the main gear. If the backlash is too great, the gear may get damaged.

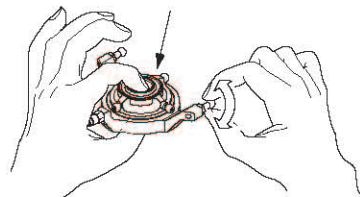


4-1 SWASH PLATE ASSEMBLY

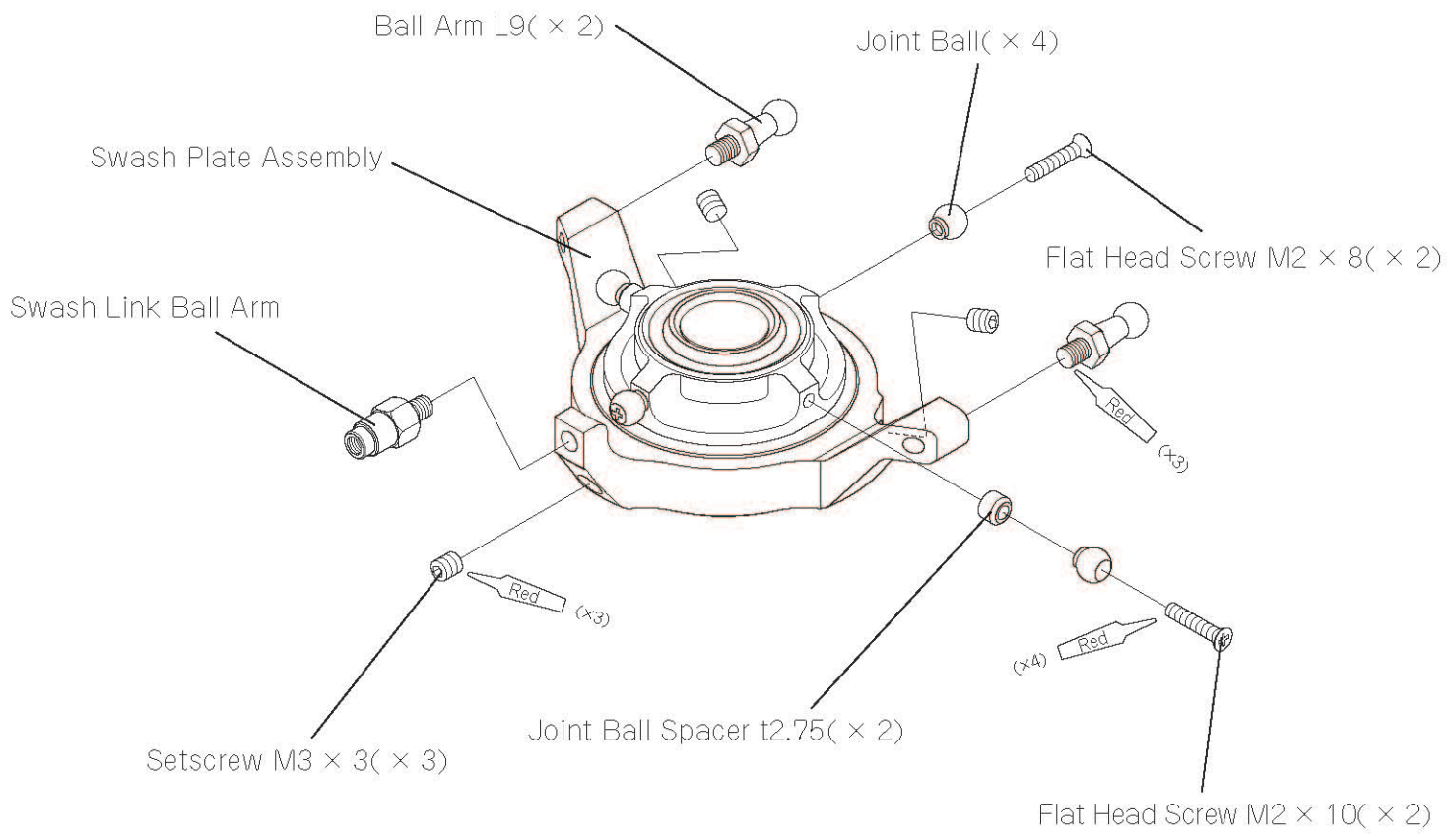
	.....x2
Flat Head Screw M2 x 8	
	.....x2
Flat Head Screw M2 x 10	
	.....x4
Joint Ball	
	.....x2
Joint Ball Spacer t2.75	
	.....x3
Setscrew M3 x 3	

● Adjust the swashplate by tightening the setscrew M3 x 3 to minimize unsteadiness (slop) of the upper plate and lower plate of swashplate. If there is such unsteadiness, tighten the setscrew M3 x 3 as shown in the figure below and adjust them to minimize the unsteadiness. Be sure to tighten them gradually. If you tighten them too much, the lower plate may be deformed or may not rotate smoothly (if you do not feel unsteadiness, you do not have to use these bolts). Note that the unsteadiness of swashplate can not be completely eliminated. Do not thghten the bolts too much.

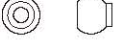
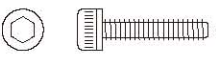

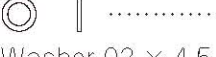
※Do not hold the ball in the center, but hold the upper part of the swashplate.

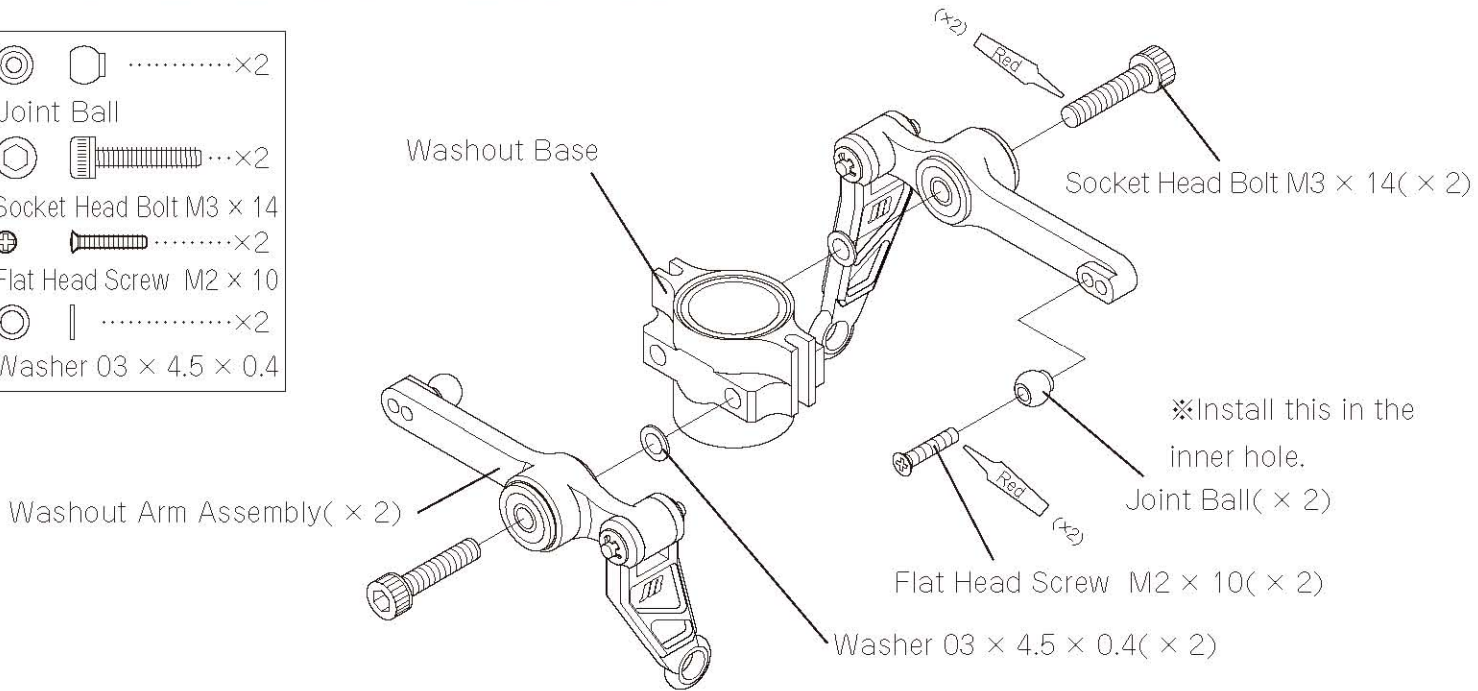


Checking the Swashplate

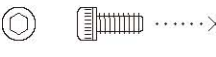


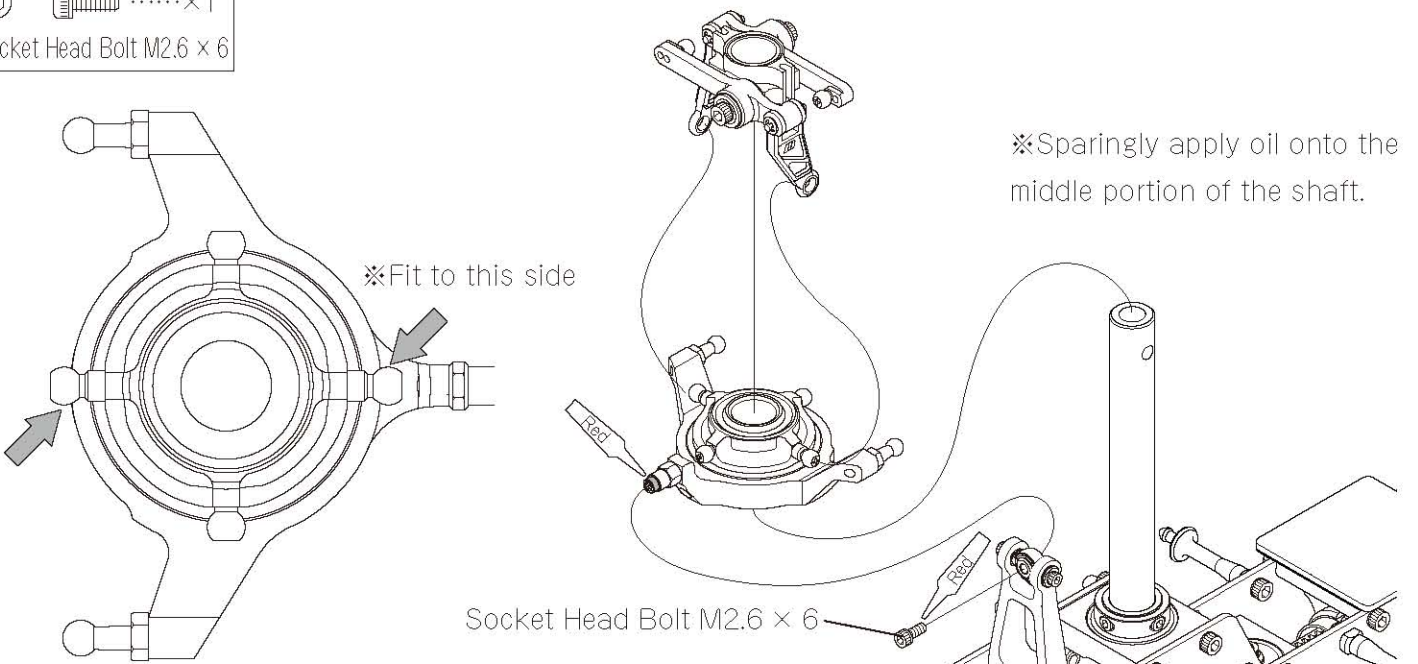
4-2 WASHOUT ASSEMBLY

	.....x2
Joint Ball	
	.....x2
Socket Head Bolt M3 x 14	
	.....x2
Flat Head Screw M2 x 10	
	.....x2
Washer 03 x 4.5 x 0.4	



4-3 SWASH PLATE / WASHOUT INSTALLATION

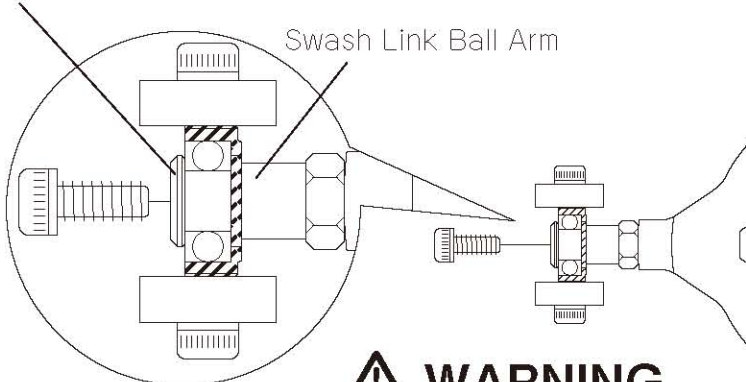
	.....x1
Socket Head Bolt M2.6 x 6	



● Secure the swash link ball arm to the HG swash link using the ball collar and socket head bolt as shown.

Swash Link Ball Collar

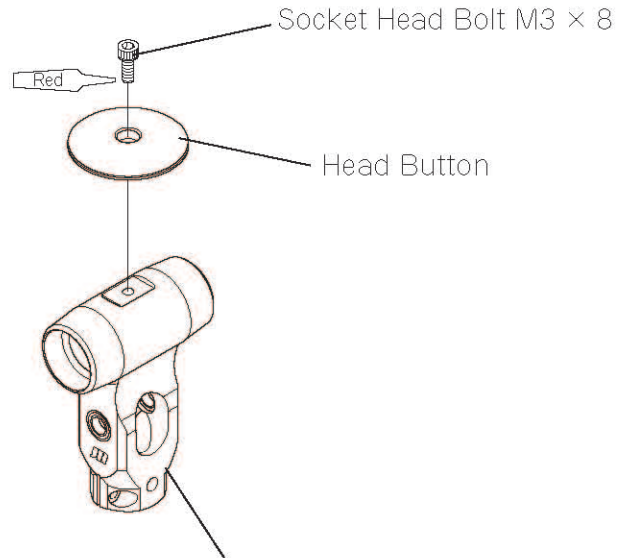
Swash Link Ball Arm



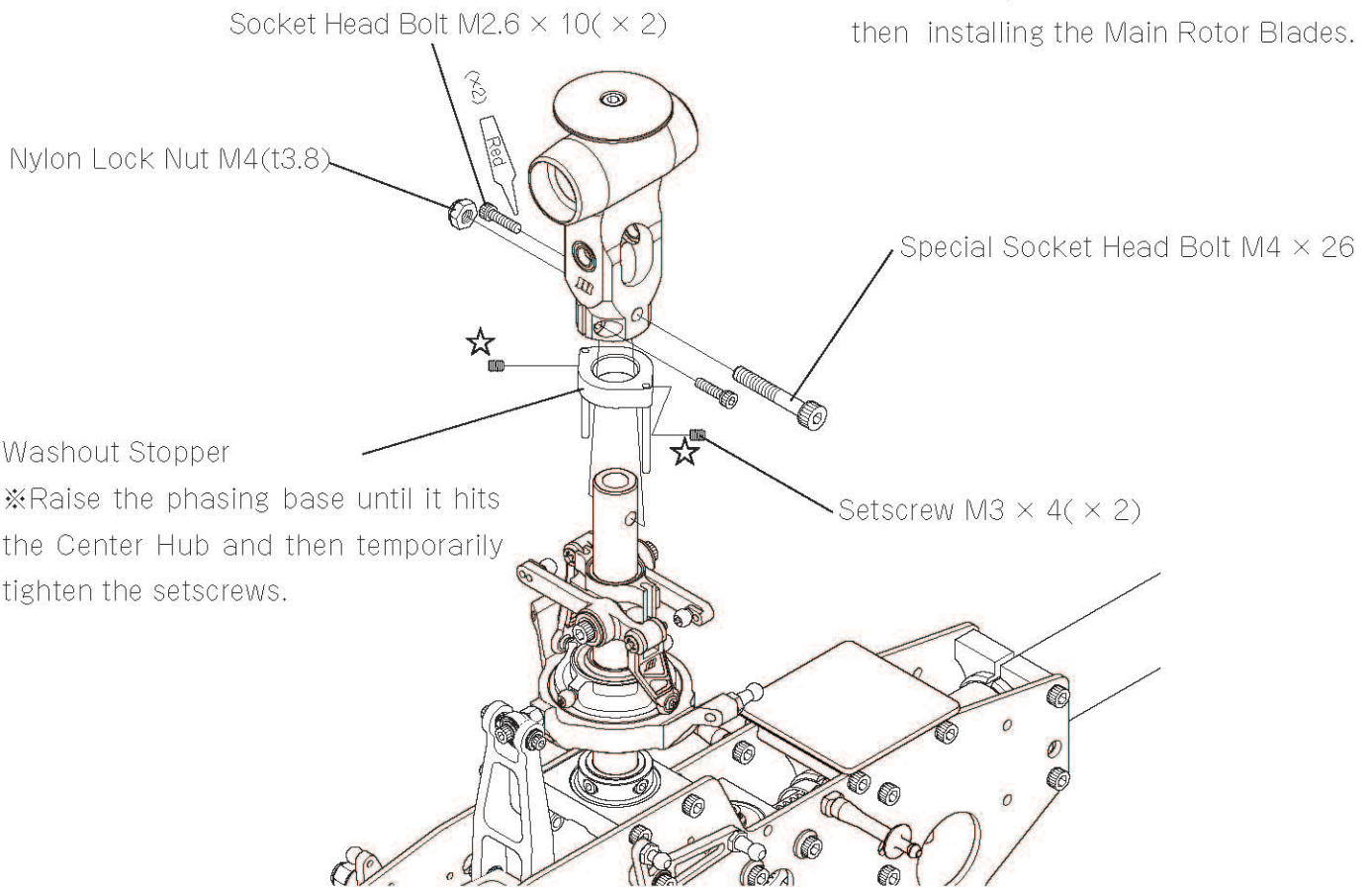
⚠ WARNING

4-4 CENTER HUB INSTALLATION

	.....x1
Special Socket Head Bolt M4 x 26	
	.....x1
Socket Head Bolt M3 x 8	
	.....x2
Socket Head Bolt M2.6 x 10	
	.....x2
Setscrew M3 x 4	
	.....x1
Nylon Lock Nut M4(t3.8)	



Center Hub Assembly
 ※The JR Logo is marked on only one side for easy identification when removing then installing the Main Rotor Blades.

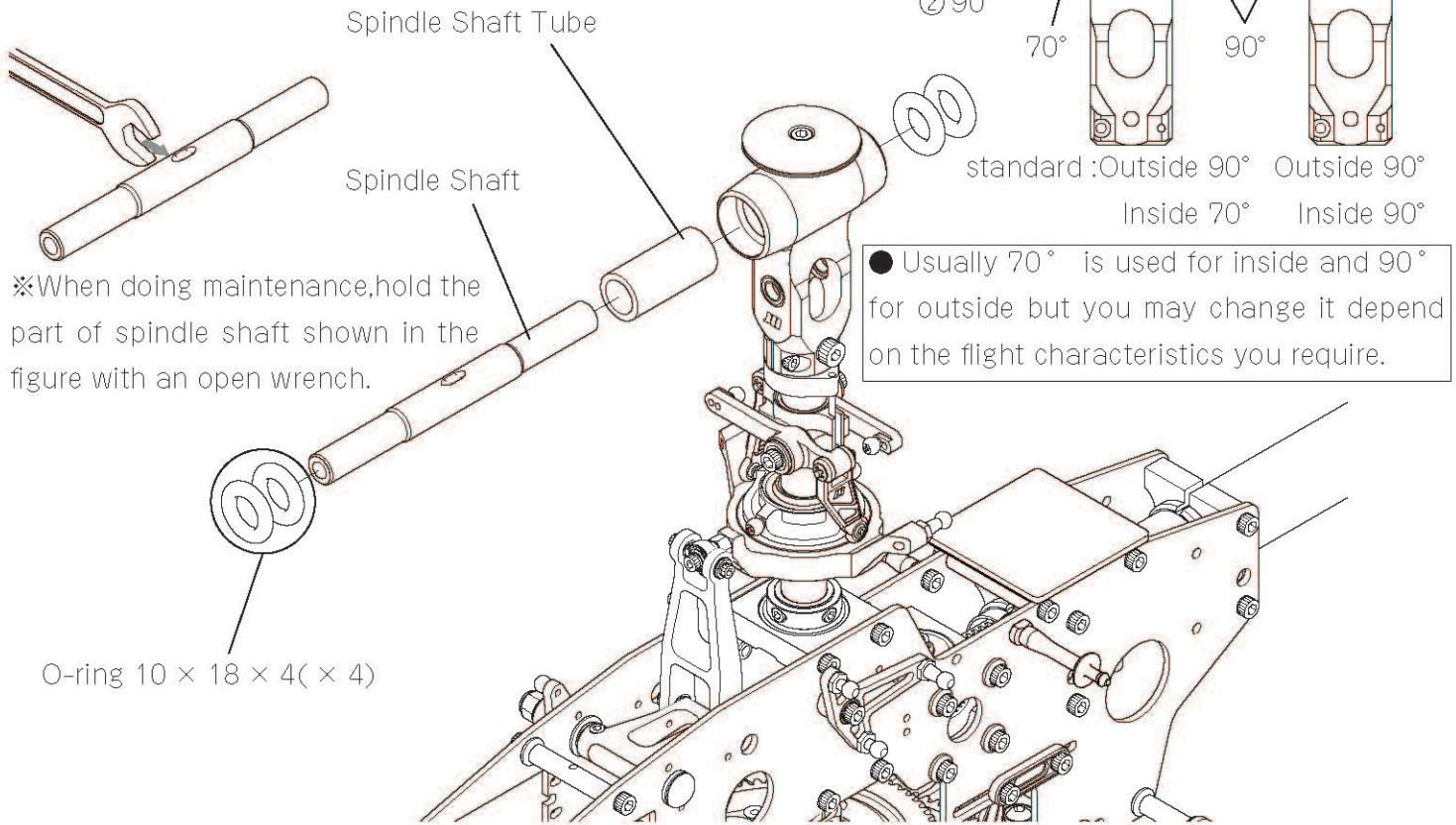


Washout Stopper
 ※Raise the phasing base until it hits the Center Hub and then temporarily tighten the setscrews.

Temporarily tighten the bolts indicated by a ☆.(will be tightened after adjusting the phasing.)

4-5 SPINDLE SHAFT INSTALLATION

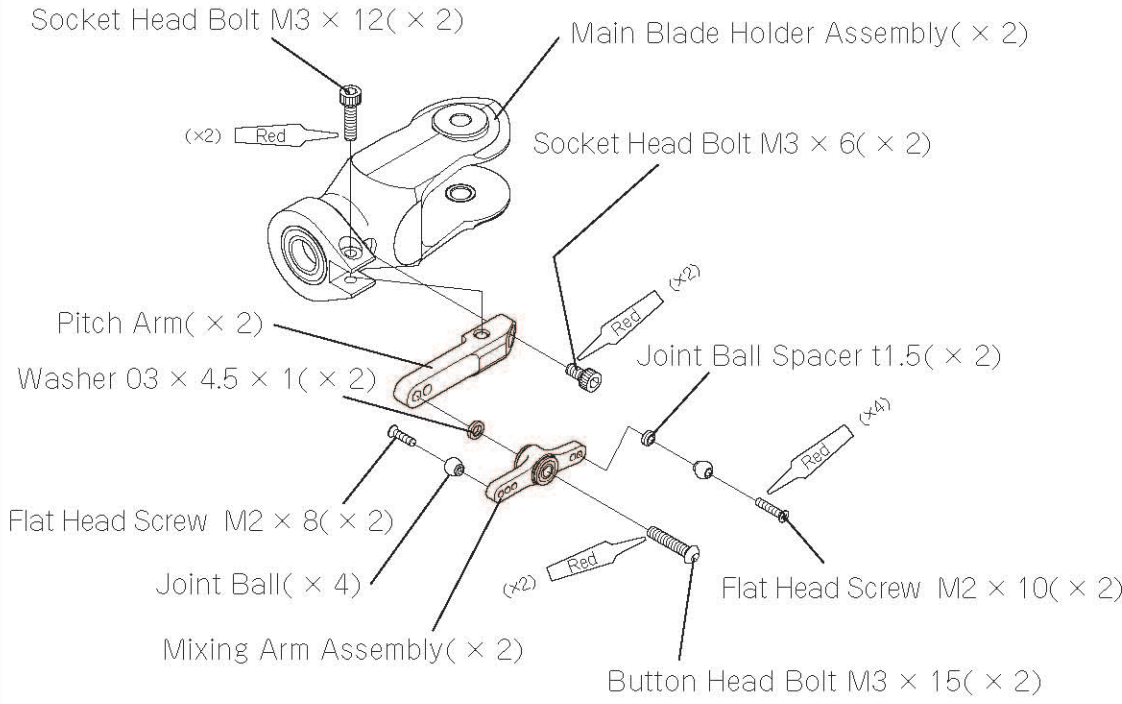
※Apply an oil spray if the spindle shaft tube and O-rings are difficult to assemble.



4-6 MAIN BLADE HOLDER ASSEMBLY

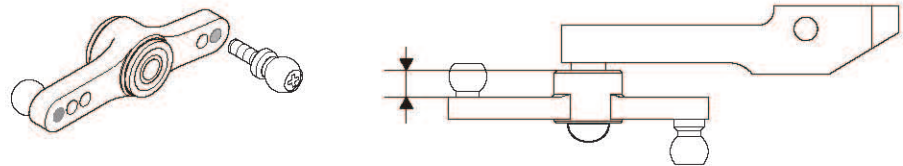
※Make two sets.

- Washer 03 × 4.5 × 1×2
- Joint Ball×4
- Joint Ball Spacer t1.5×2
- Socket Head Bolt M3 × 6×2
- Socket Head Bolt M3 × 12×2
- Button Head Bolt M3 × 15×2
- Flat Head Screw M2 × 8×2
- Flat Head Screw M2 × 10×2

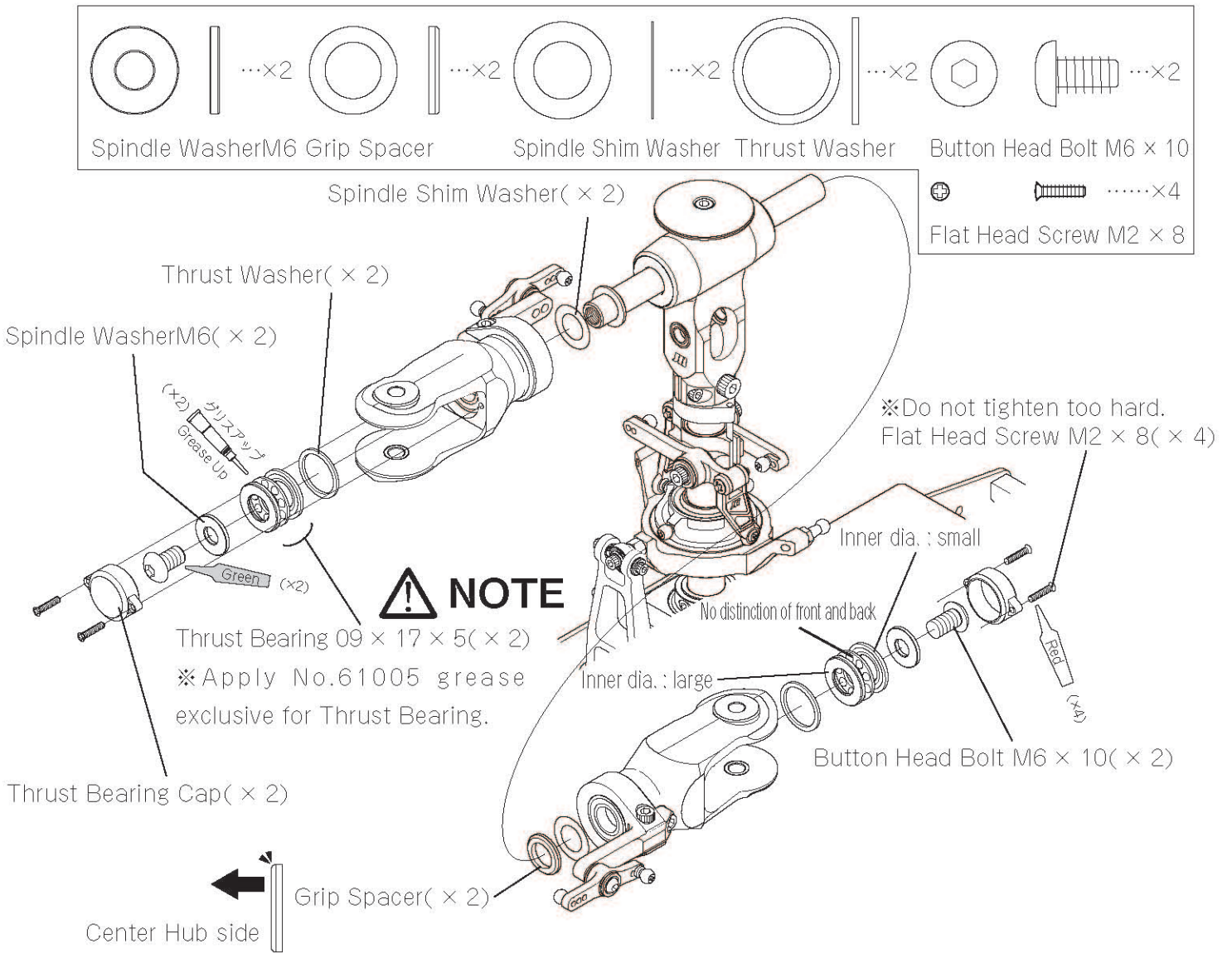


⚠ WARNING

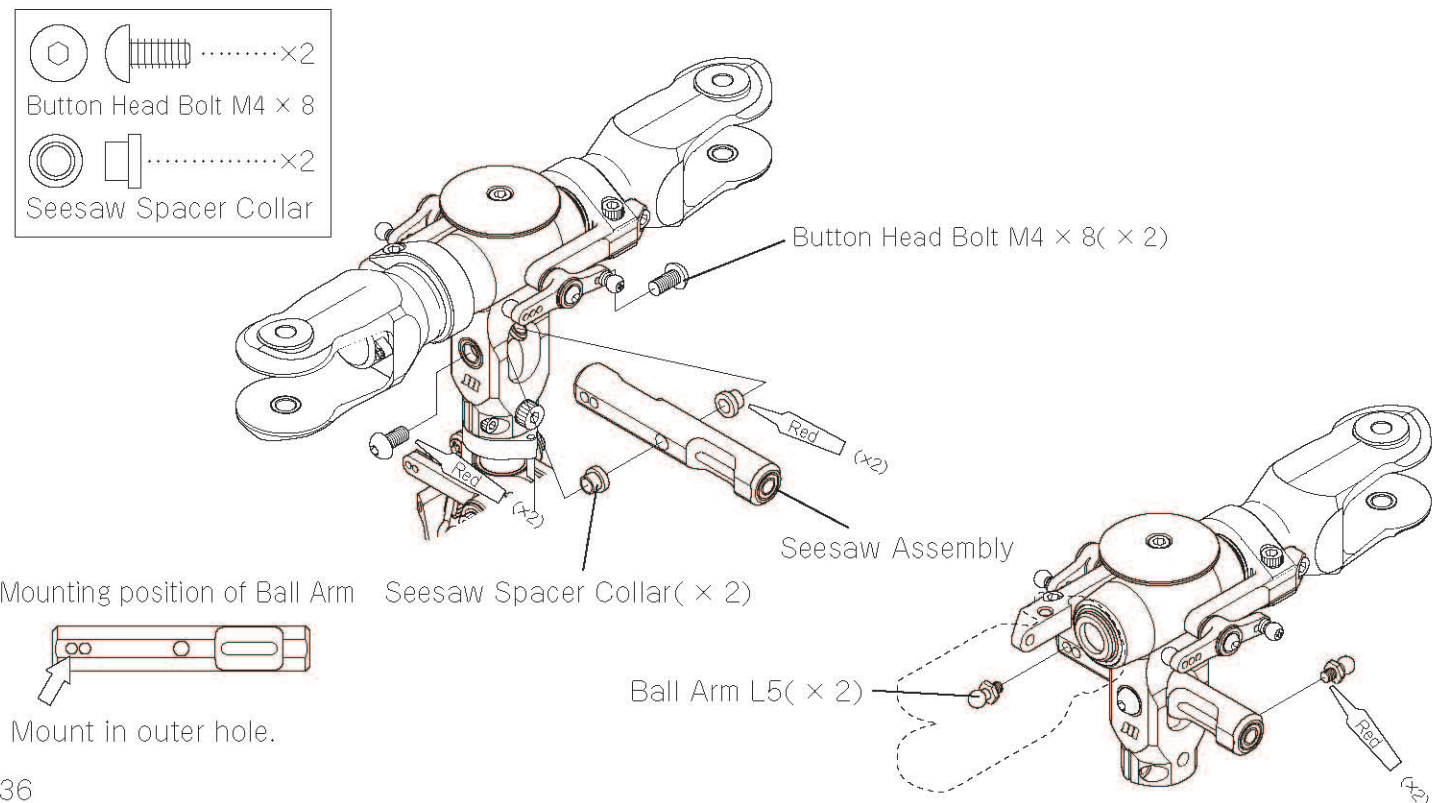
Note the direction of Mixing Arm and position of joint ball.








4-7 MAIN BLADE HOLDER INSTALLATION



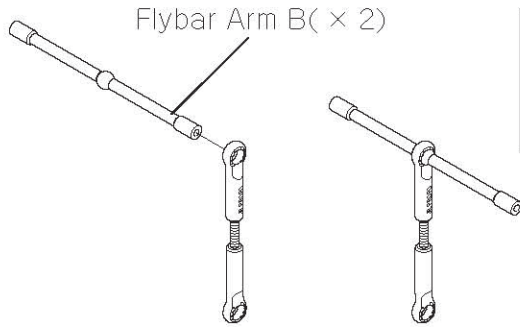
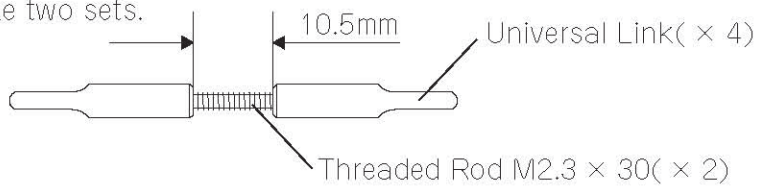
4-8 SEESAW INSTALLATION



4-9 FLYBAR ARM INSTALLATION

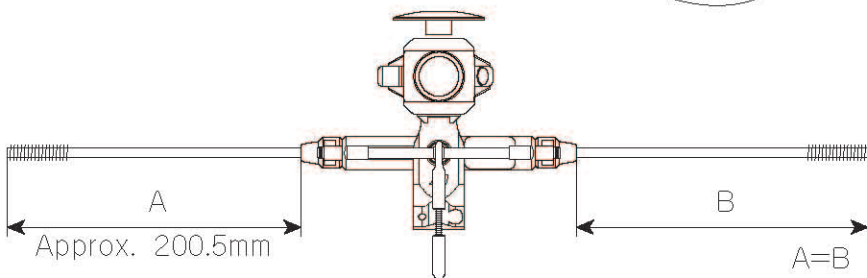
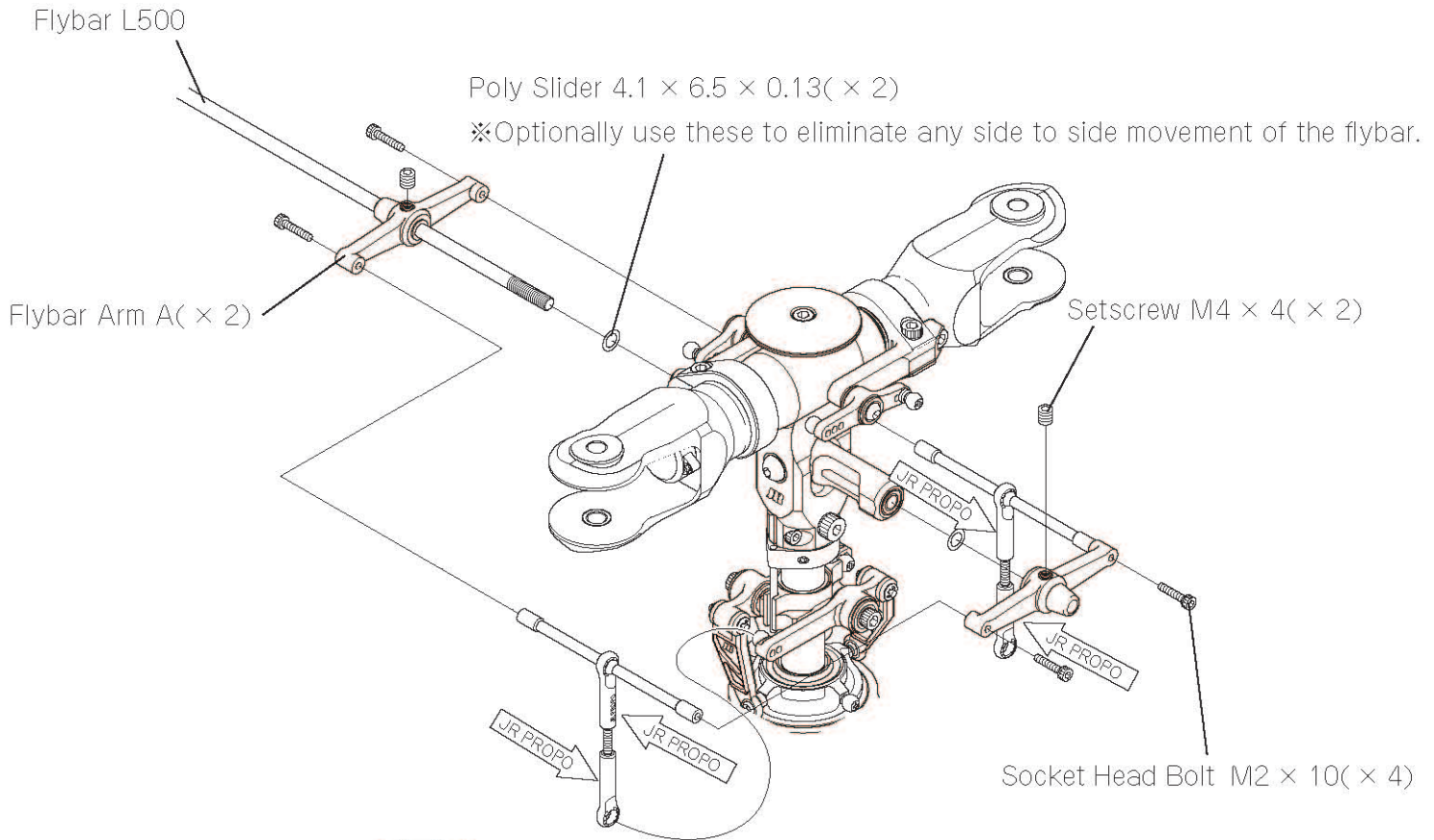
-   ...x4
Socket Head Bolt M2 x 10
-  x2
Setscrew M4 x 4
-  |x2
Poly Slider 4.1 x 6.5 x 0.13

※Make two sets.



● When mounting the Flybar Arm B, note the direction of the universal Links. If they are mounted incorrectly, the link may come off.

! WARNING

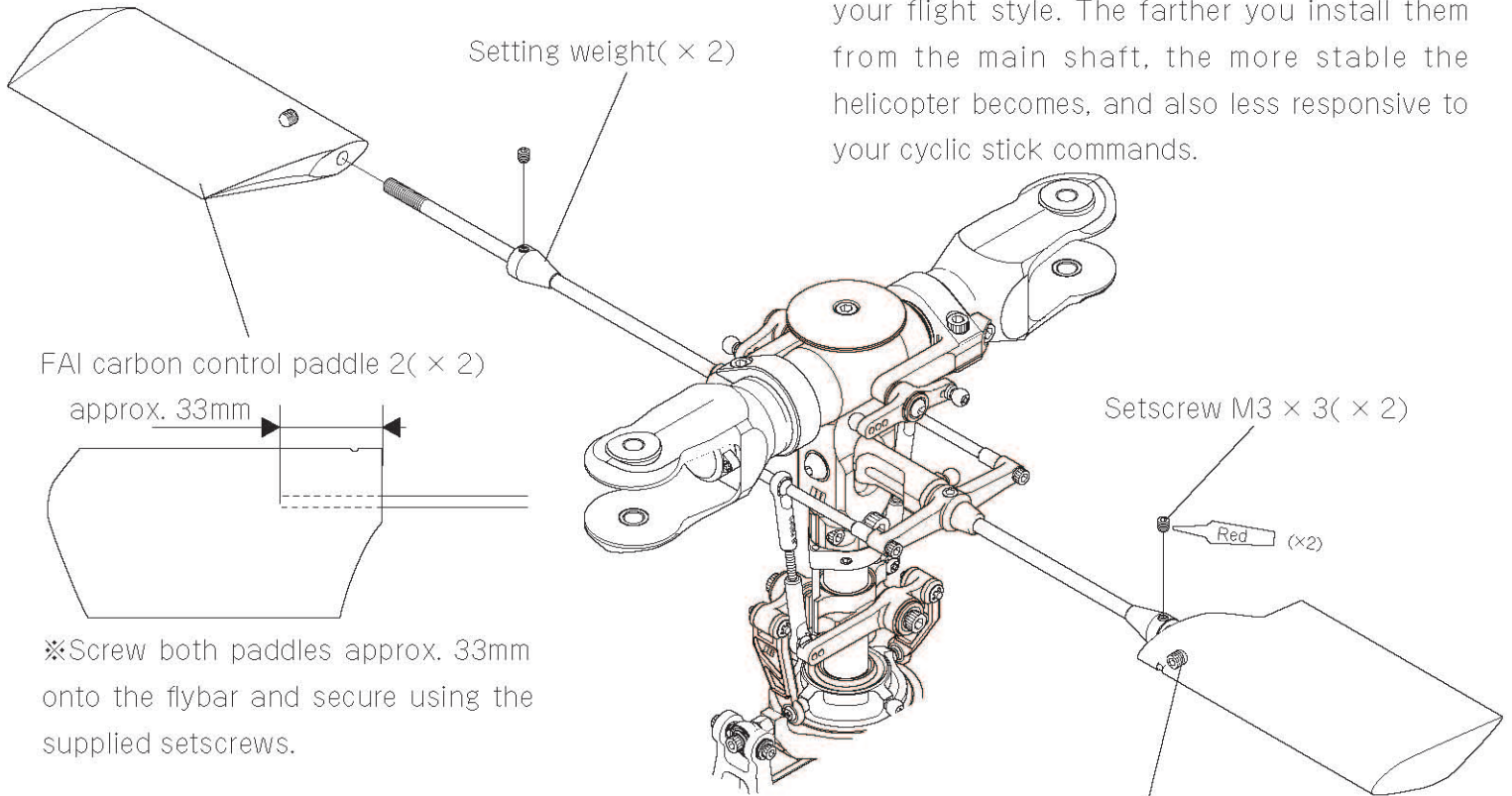


4-10 CARBON CONTROL PADDLE INSTALLATION



 ...x2
 Setscrew M3 x 3

● Be sure to install the Carbon Control Paddles in the correct orientation for flight.
 Adjust the position of the weights so as they are equally positioned on the left and right.



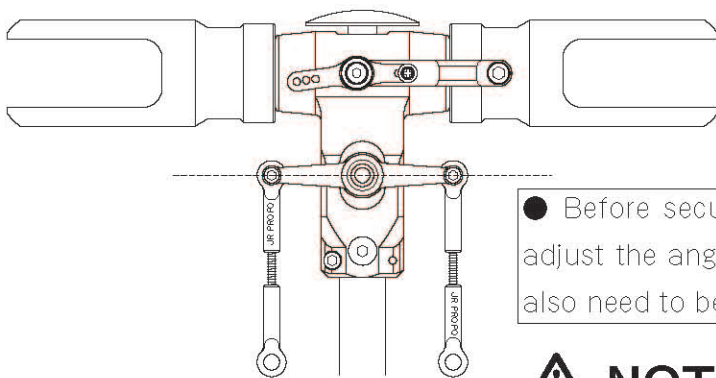
※Adjust the position of the weights to match your flight style. The farther you install them from the main shaft, the more stable the helicopter becomes, and also less responsive to your cyclic stick commands.

※Screw both paddles approx. 33mm onto the flybar and secure using the supplied setscrews.

Setscrew M4 x 4 (x 2)

※Already been installed.

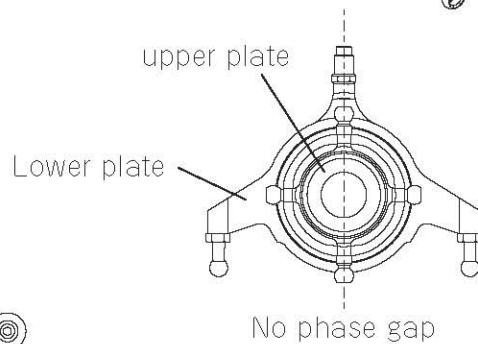
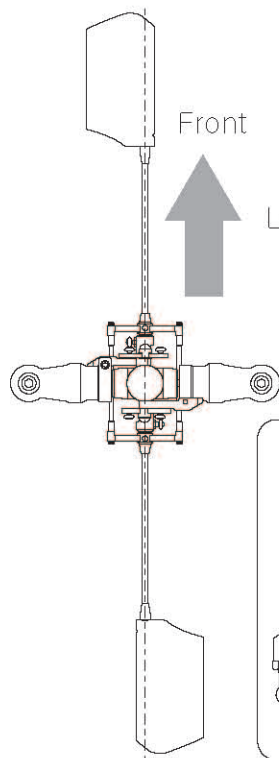
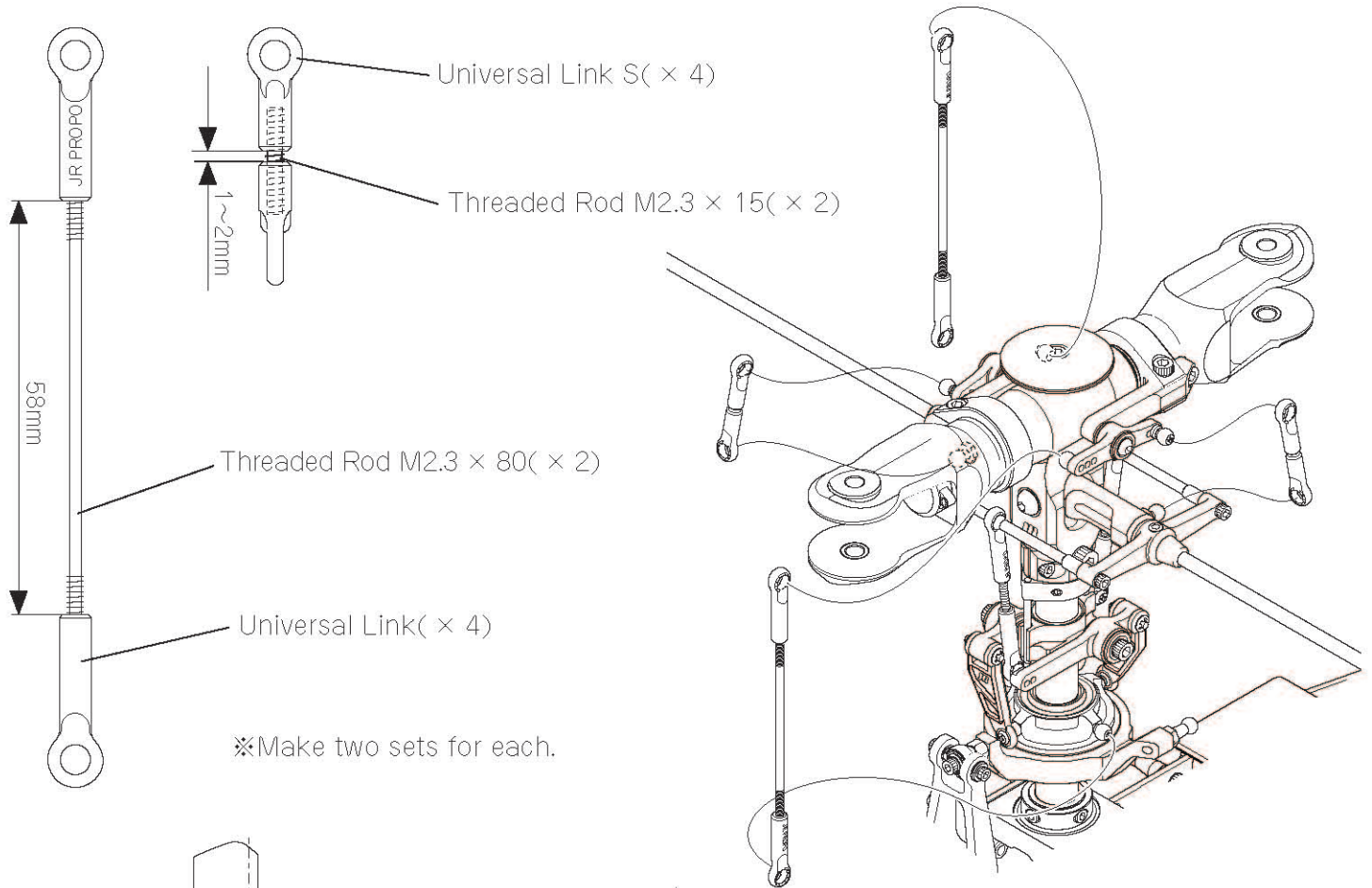
Be sure to secure properly.



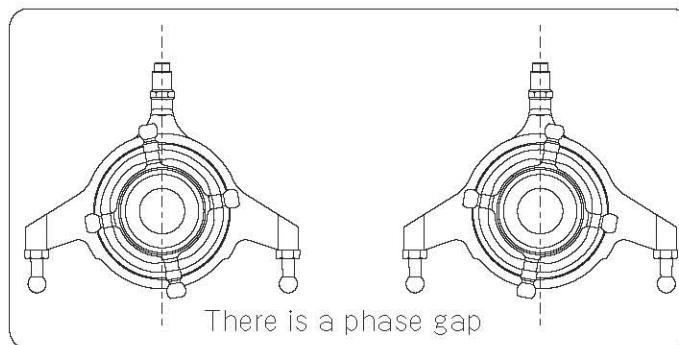
● Before securing the carbon control paddles, be sure to adjust the angle properly to be parallel to each other. They also need to be parallel to the Flybar Arm.

⚠ NOTE

4-11 UNIVERSAL LINK AND FIXING THE WASHOUT STOPPER



※Depending on the rotor you use, the best position (after flight testing) may not be the "No phase gap" position.

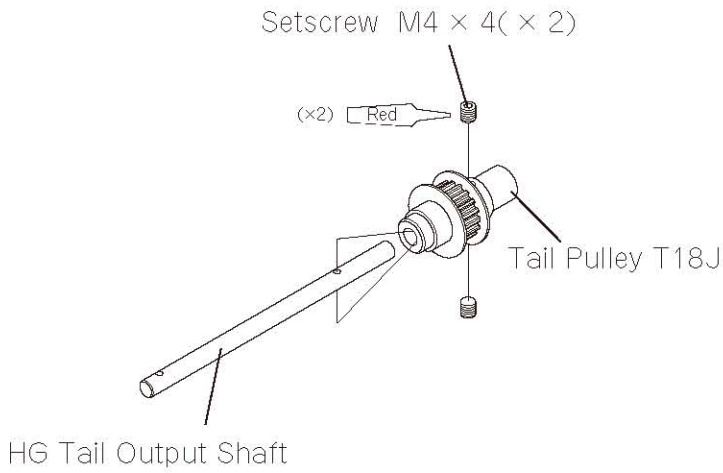


WARNING

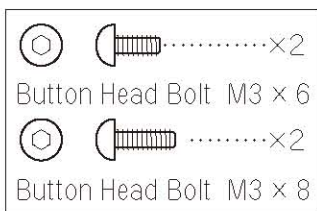
● Attaching the Washout Stopper (phase adjustment)

Phase adjustment is a very important and may directly affect operability. If this adjustment is not made properly, aileron and elevator will interfere with each other and adversely affect control of position when hovering or during flight. Make correct adjustments as described. At first, make the center line of the helicopter body and that of Flybar completely parallel. Under this condition, make sure that the angle of upper part of the swashplate matches the lower part as in the diagram. If the Joint Balls are in line, this is the reference position (no phase gap). At first, fly with this condition and then adjust the phase as required. Be sure to loctite and tighten the setscrews which were temporarily tightened in step 4-4.

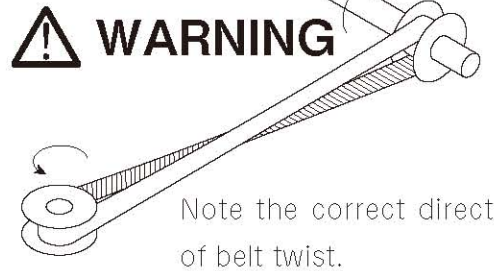
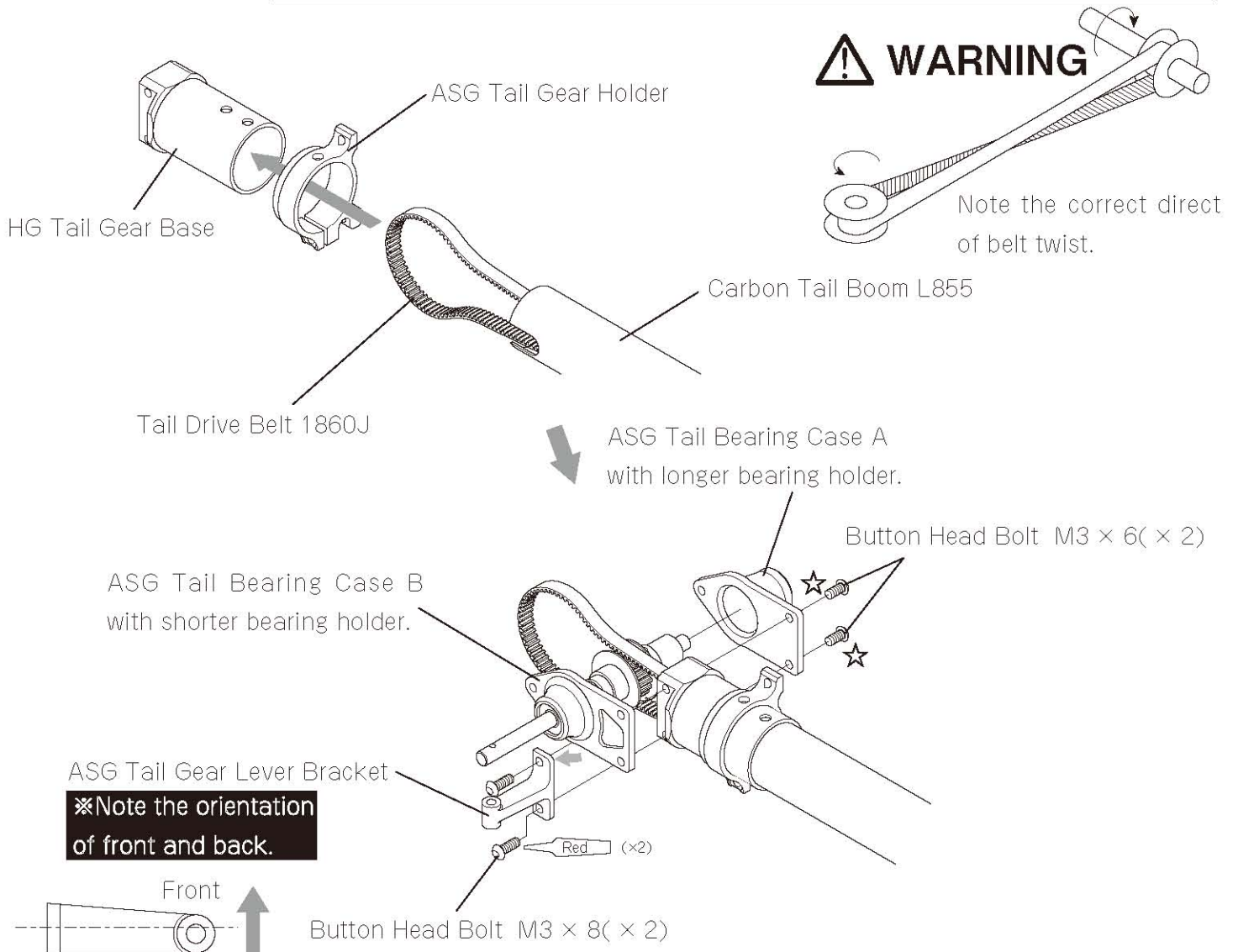
5-1 TAIL PULLEY T18 ASSEMBLY



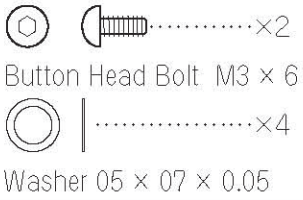
5-2 ASG TAIL GEAR CASE ASSEMBLY 1



- Insert the Tail Boom all the way to the end of HG Tail Gear Base (until the Tail boom stops).
- Pass the Tail Pulley through the belt and install the ASG Tail Bearing Case to HG Tail Gear Base.
- Be sure to check left and right of the ASG Tail Bearing Case A and B. Attach ASG Tail Bearing Case A temporarily as shown below.

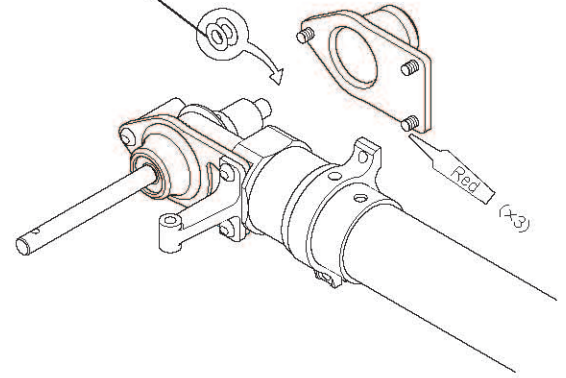
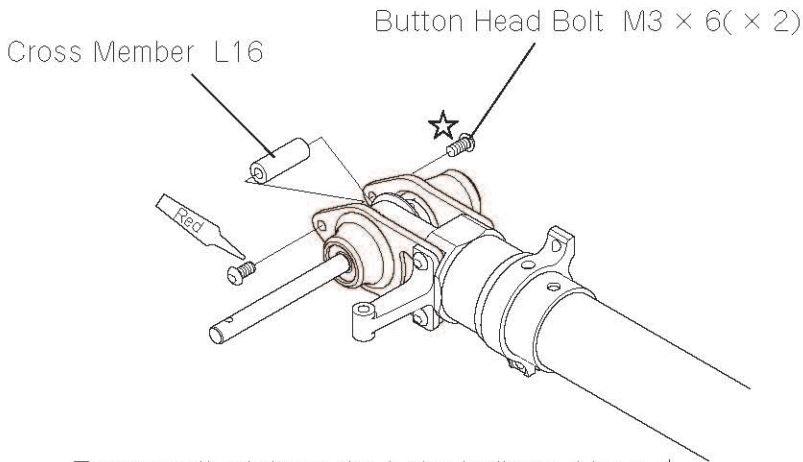


5-3 ASG TAIL GEAR CASE ASSEMBLY 2



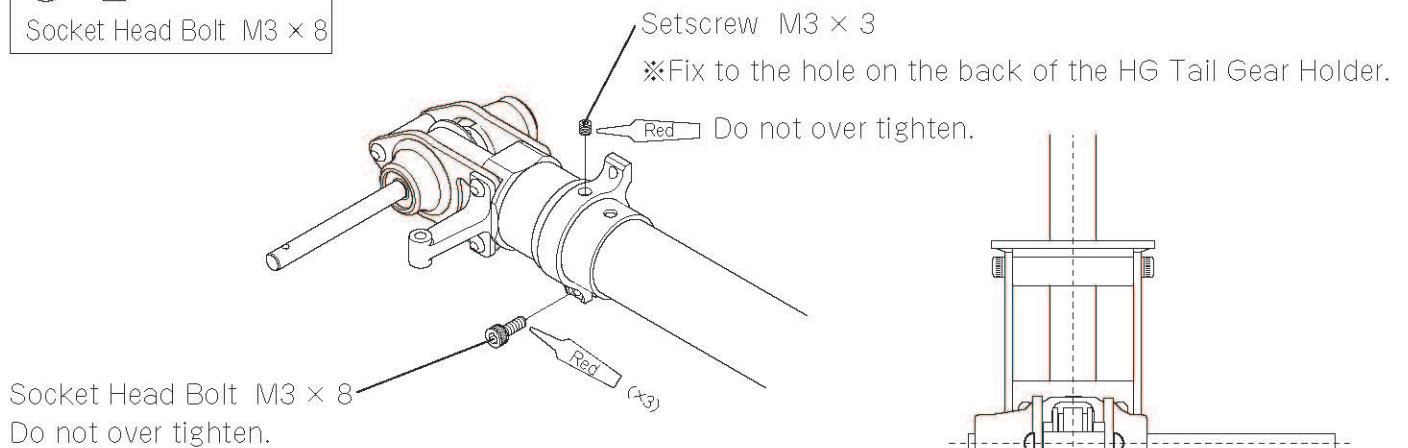
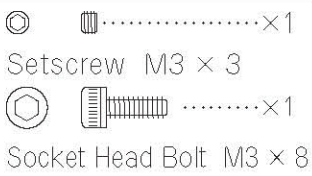
● After being temporarily assembled, check if the Tail Output Shaft has any back and forth movement in the direction of shaft. If there is movement, remove the ASG Tail Bearing Case A which was temporarily fixed, and insert Washers (5 x 7 x 0.05) as required to eliminate this movement as shown in the drawing below on the right. After adjustment, apply the thread lock to the temporarily fixed bolts and tighten firmly.

Washer 05 x 07 x 0.05 (x 4)



Temporarily tighten the bolts indicated by a ☆.

5-4 ASG TAIL GEAR CASE ASSEMBLY 3



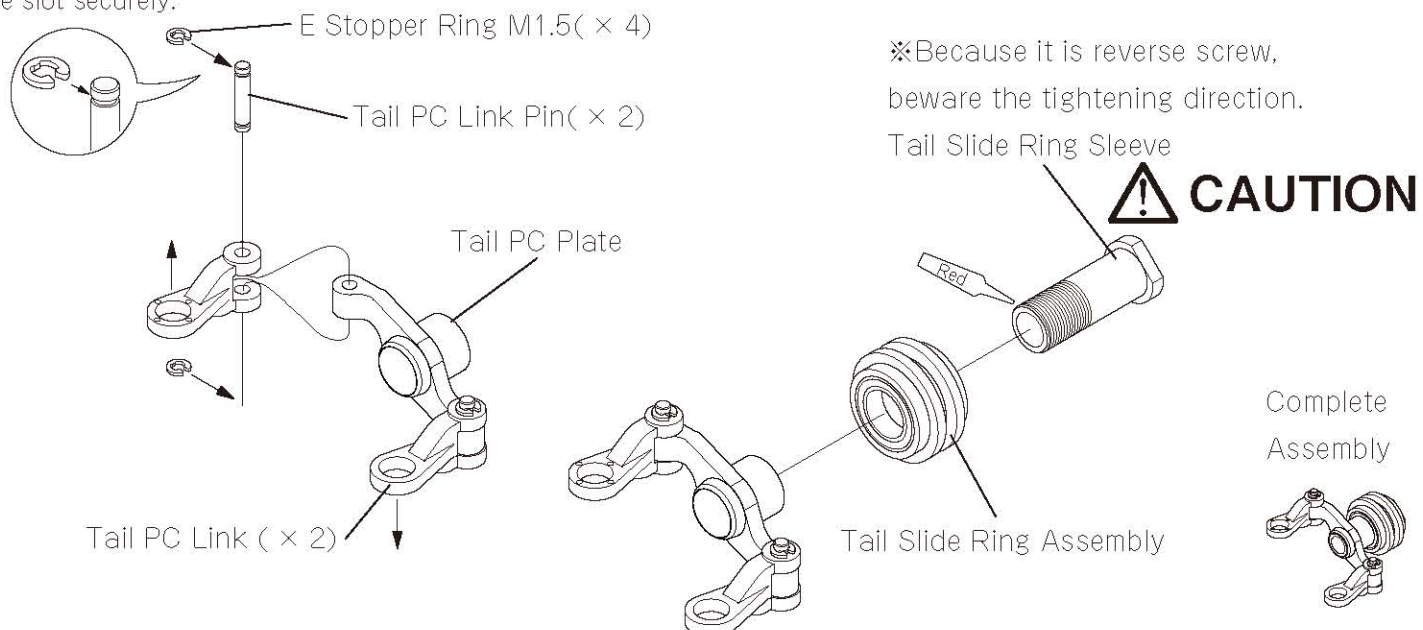
※Adjust the Tail Output Shaft and Main Shaft to be at right angles and secure them along with the bolts for the Tail Boom Holder which were temporarily tightened in step 3-3.

5-5 TAIL SLIDE RING ASSEMBLY









- x2
Tail PC Link Pin
- x5
E Stopper Ring M1.5
(including spare ones)

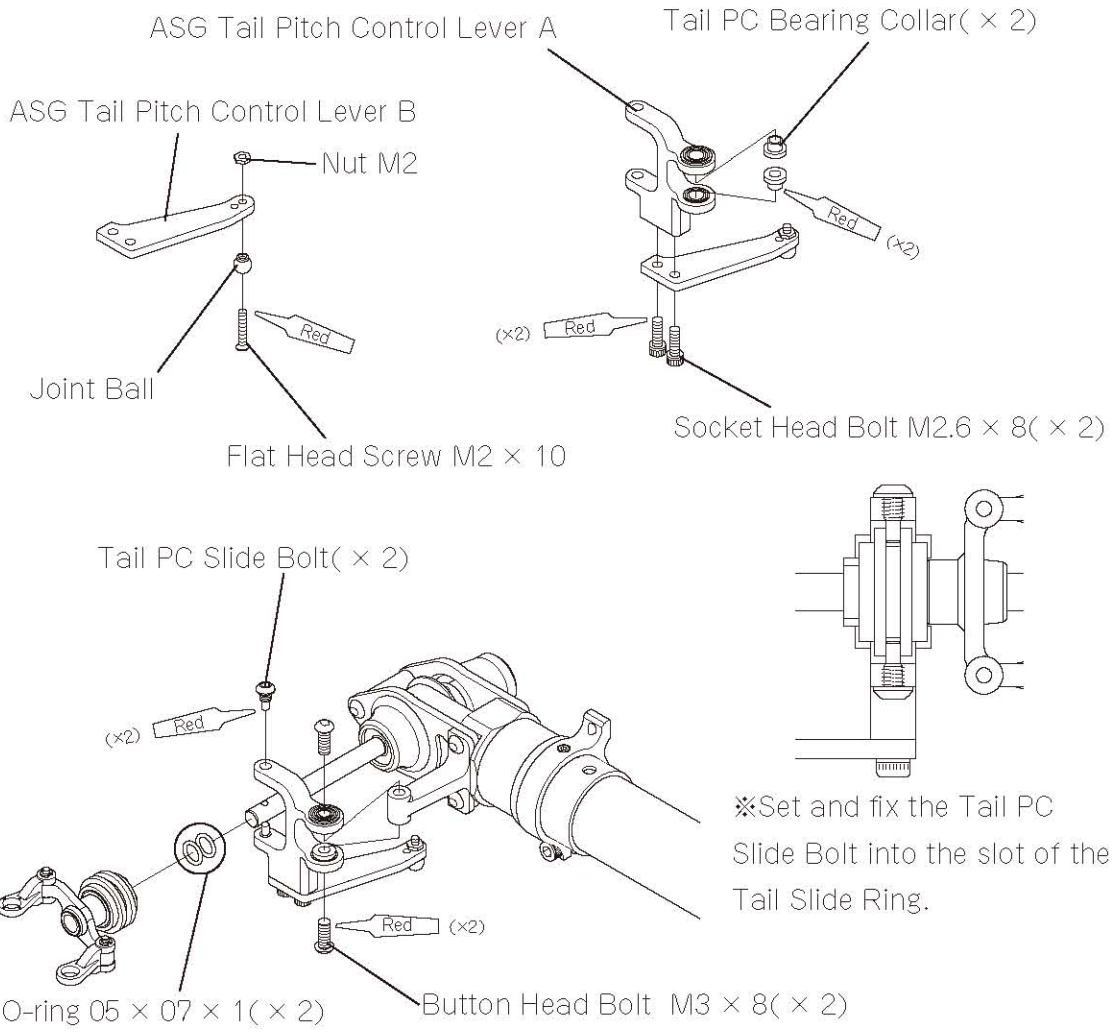
● Note the direction of the Tail PC Link. Fit the side showing four circles in the direction indicated.
The Tail Slid Ring Sleeve is reverse thread. Beware the tightening direction.

※Fit the Stopper Ring to the slot securely.



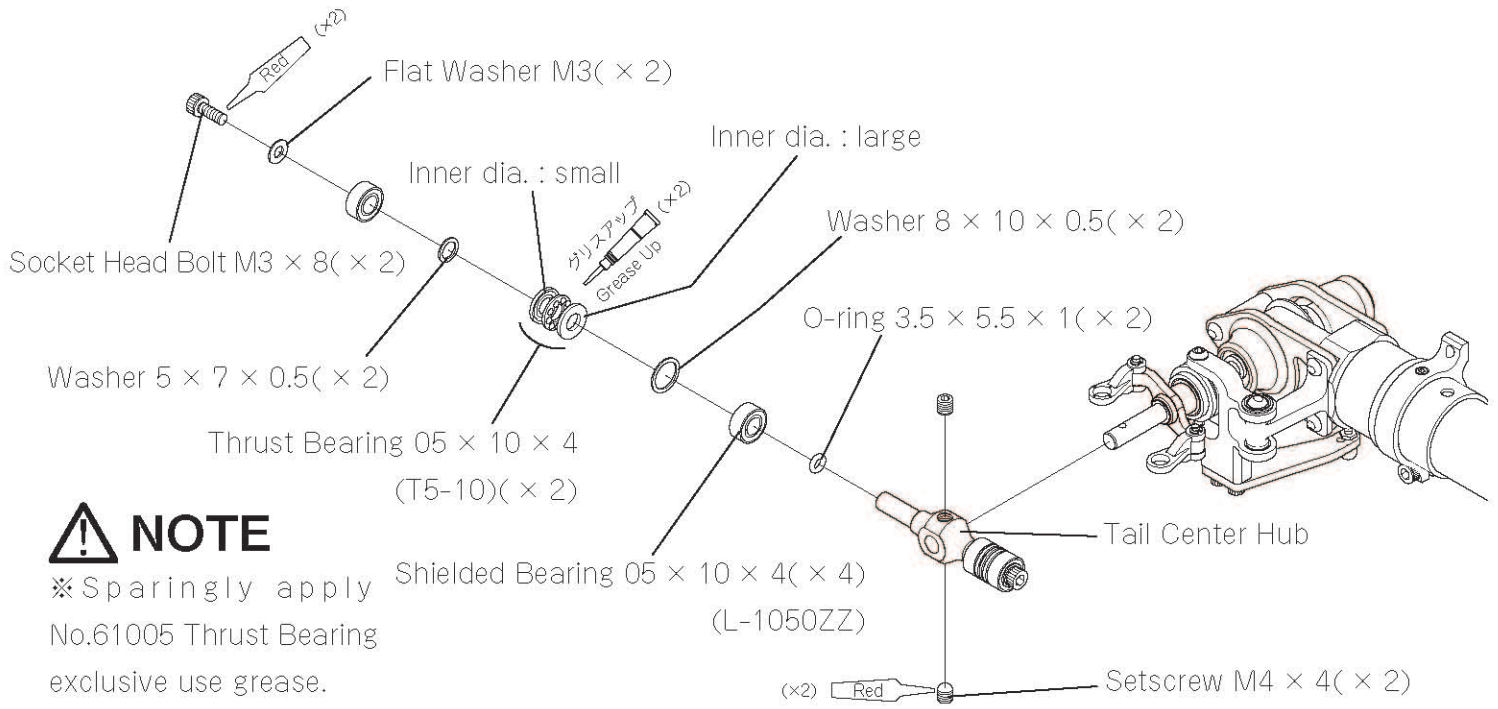
5-6 TAIL PC LEVER INSTALLATION

- x2
Tail PC Bearing Collar
- x1
Joint Ball
- x2
O-ring 05 × 07 × 1
- x2
Tail PC Slide Bolt
- x2
Socket Head Bolt M2.6 × 8
- x2
Button Head Bolt M3 × 8
- x1
Flat Head Screw M2 × 10
- x1
Nut M2



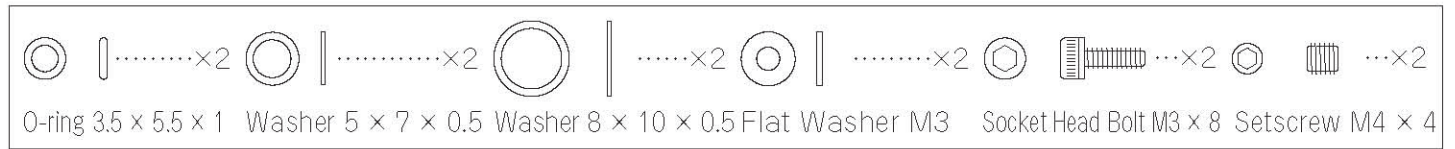
※Springly apply oil onto the movable part of the output shaft.

5-7 TAIL CENTER HUB ASSEMBLY

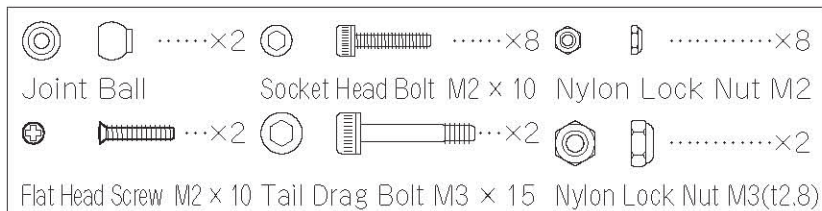
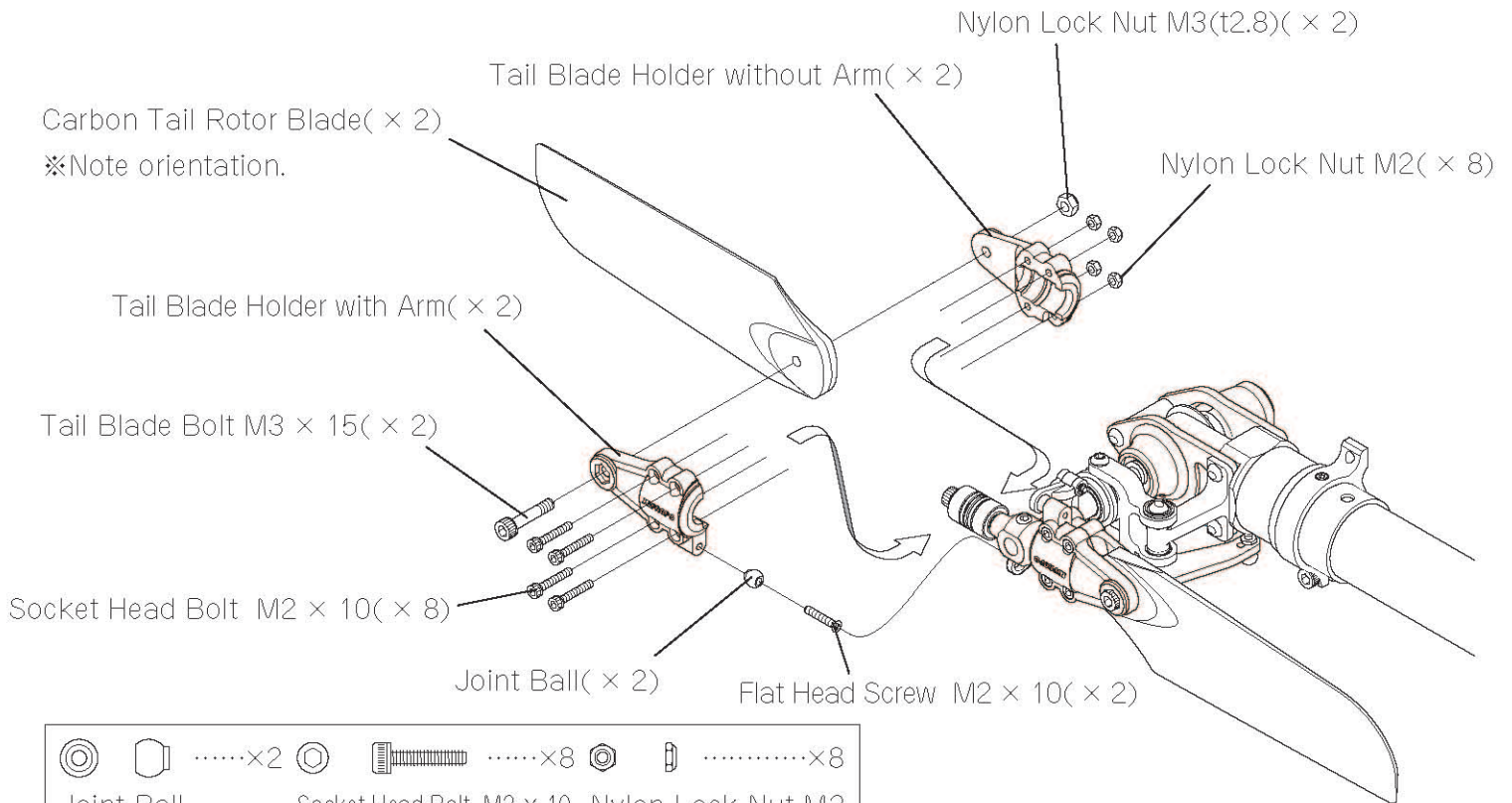


NOTE

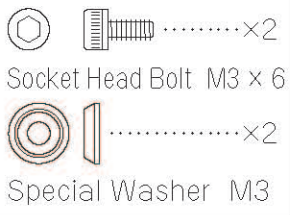
※ Sparingly apply No.61005 Thrust Bearing exclusive use grease.



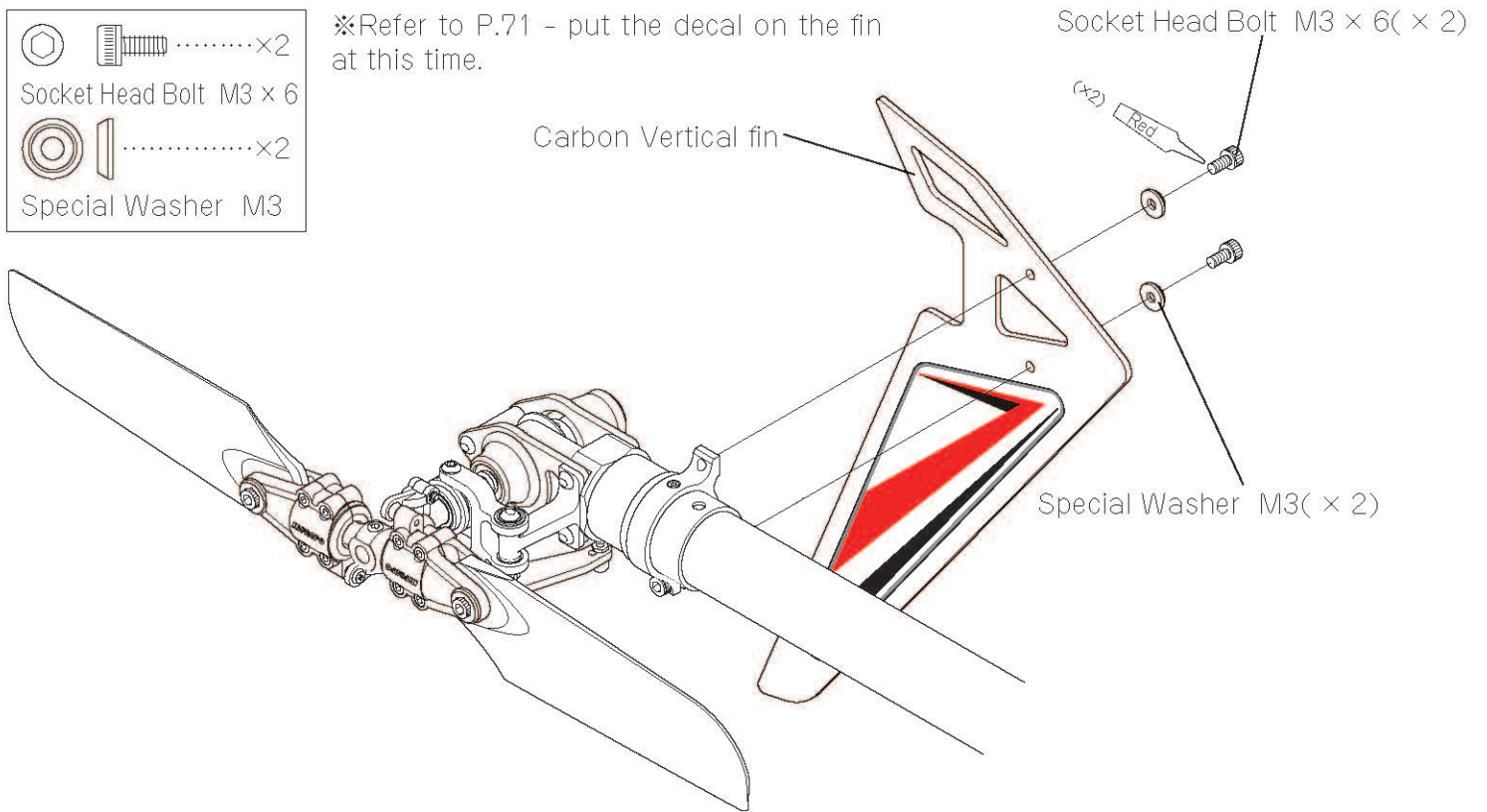
5-8 TAIL ROTOR GRIP ASSEMBLY



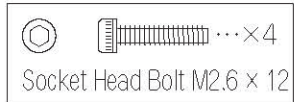
5-9 VERTICAL FIN INSTALLATION



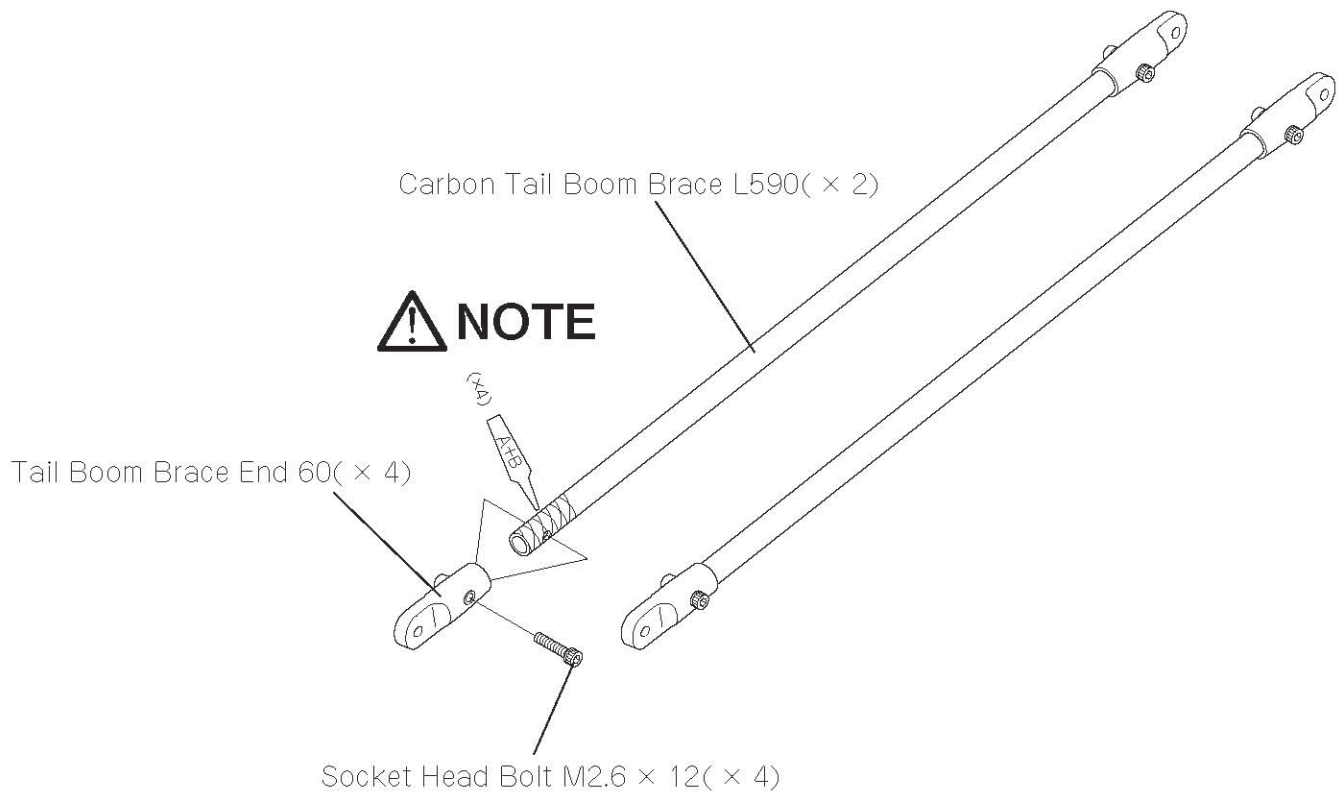
※Refer to P.71 - put the decal on the fin at this time.



6-1 TAIL BOOM BRACE ASSEMBLY



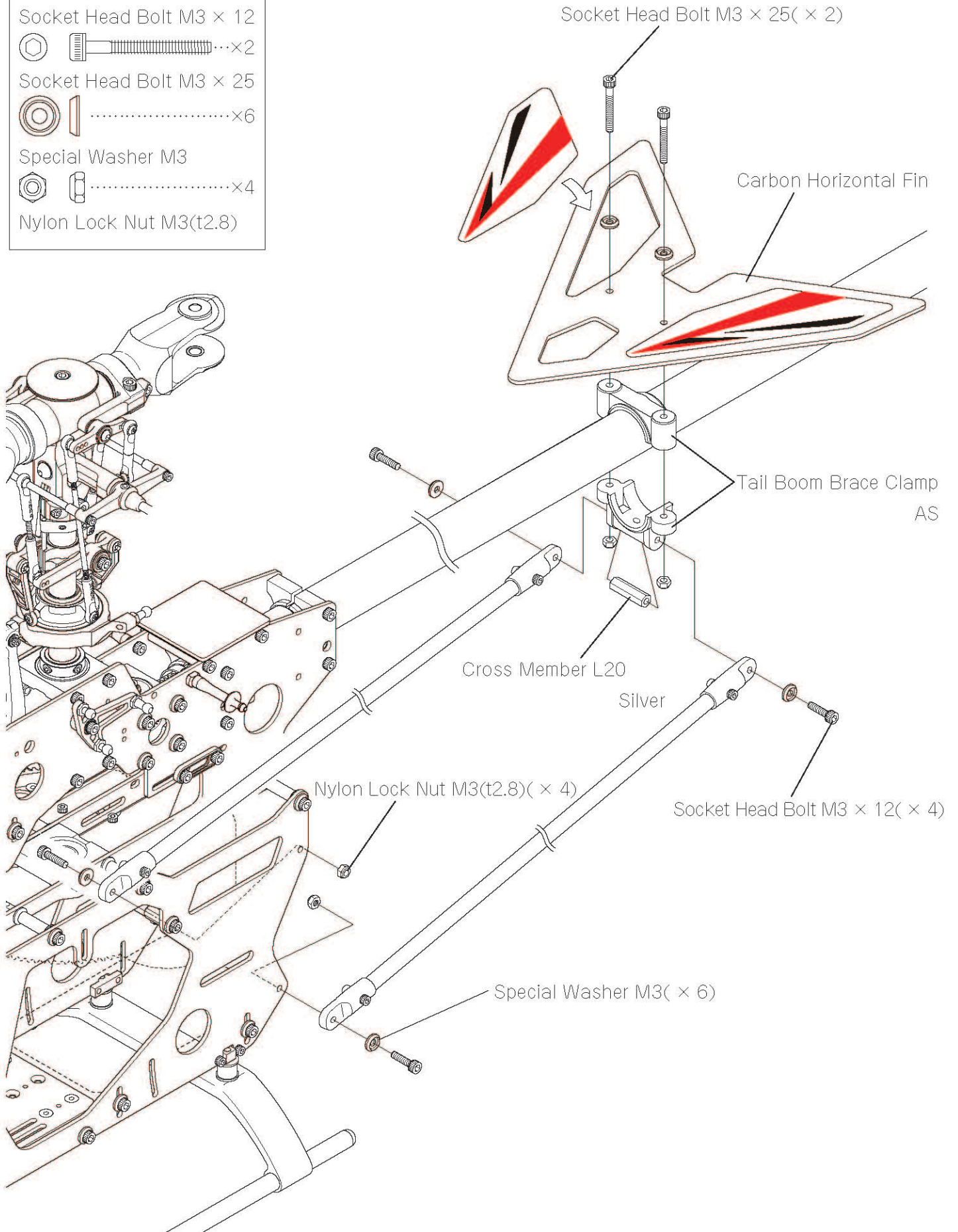
● Apply epoxy bonding agent onto both sanded ends of the Carbon Tail Boom Brace L590 and secure the tail supporter end using socket head bolts.



6-2 TAIL BOOM BRACE AND HORIZONTAL FIN INSTALLATION

- x4
Socket Head Bolt M3 × 12
- x2
Socket Head Bolt M3 × 25
- x6
Special Washer M3
- x4
Nylon Lock Nut M3(t2.8)

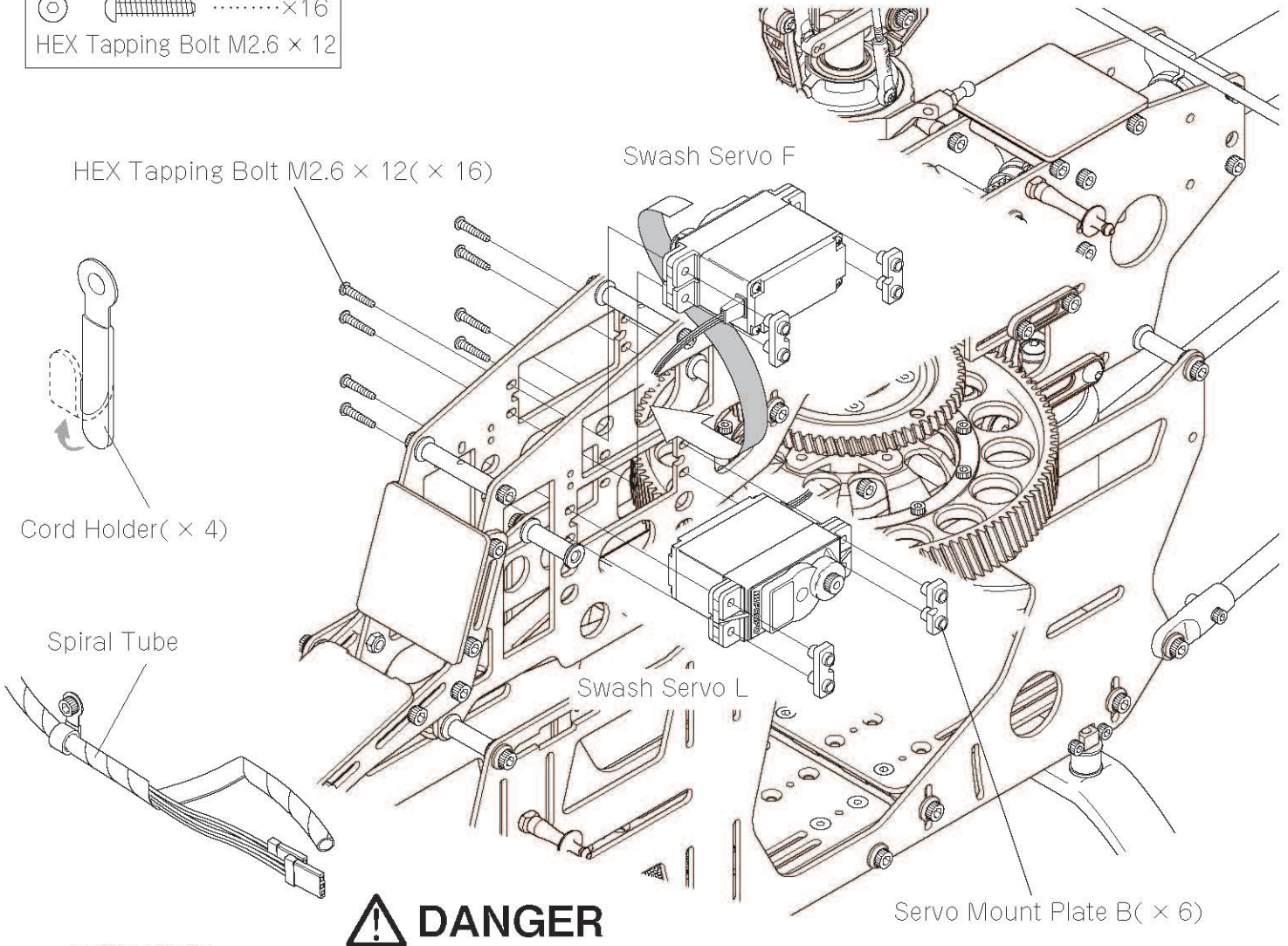
※Refer to P.71 - put the decals on the fin at this time.



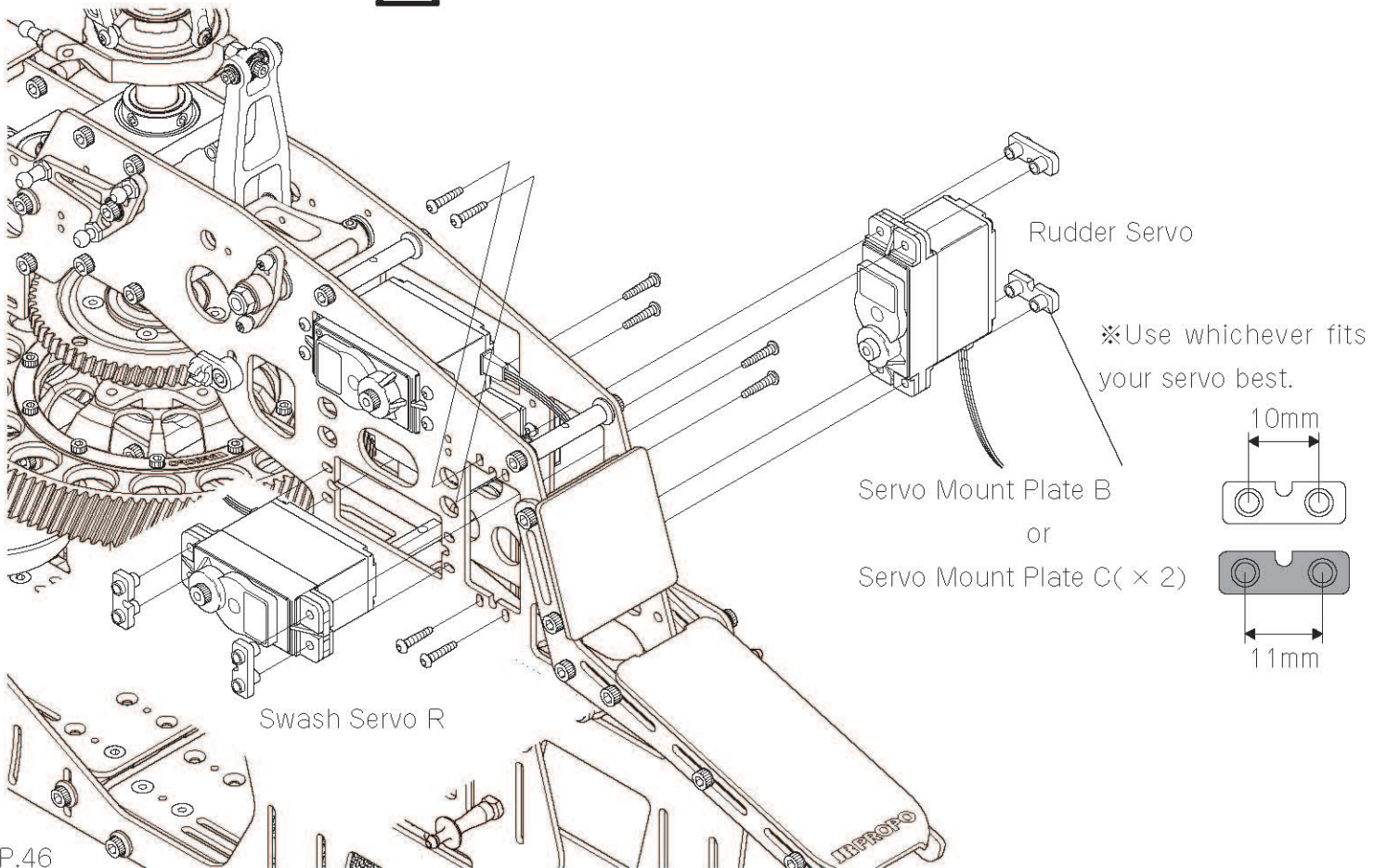
7-1 SERVO INSTALLATION



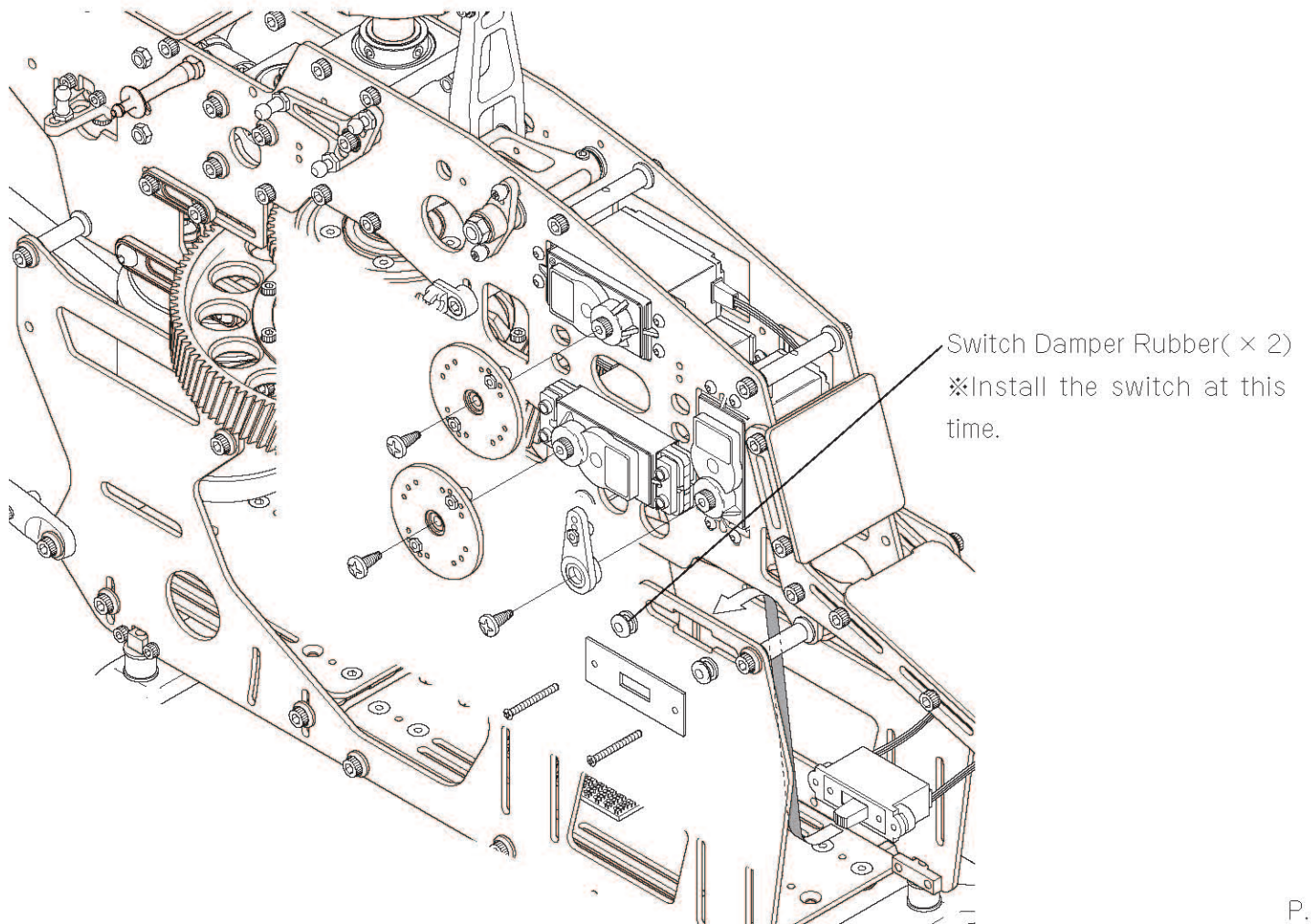
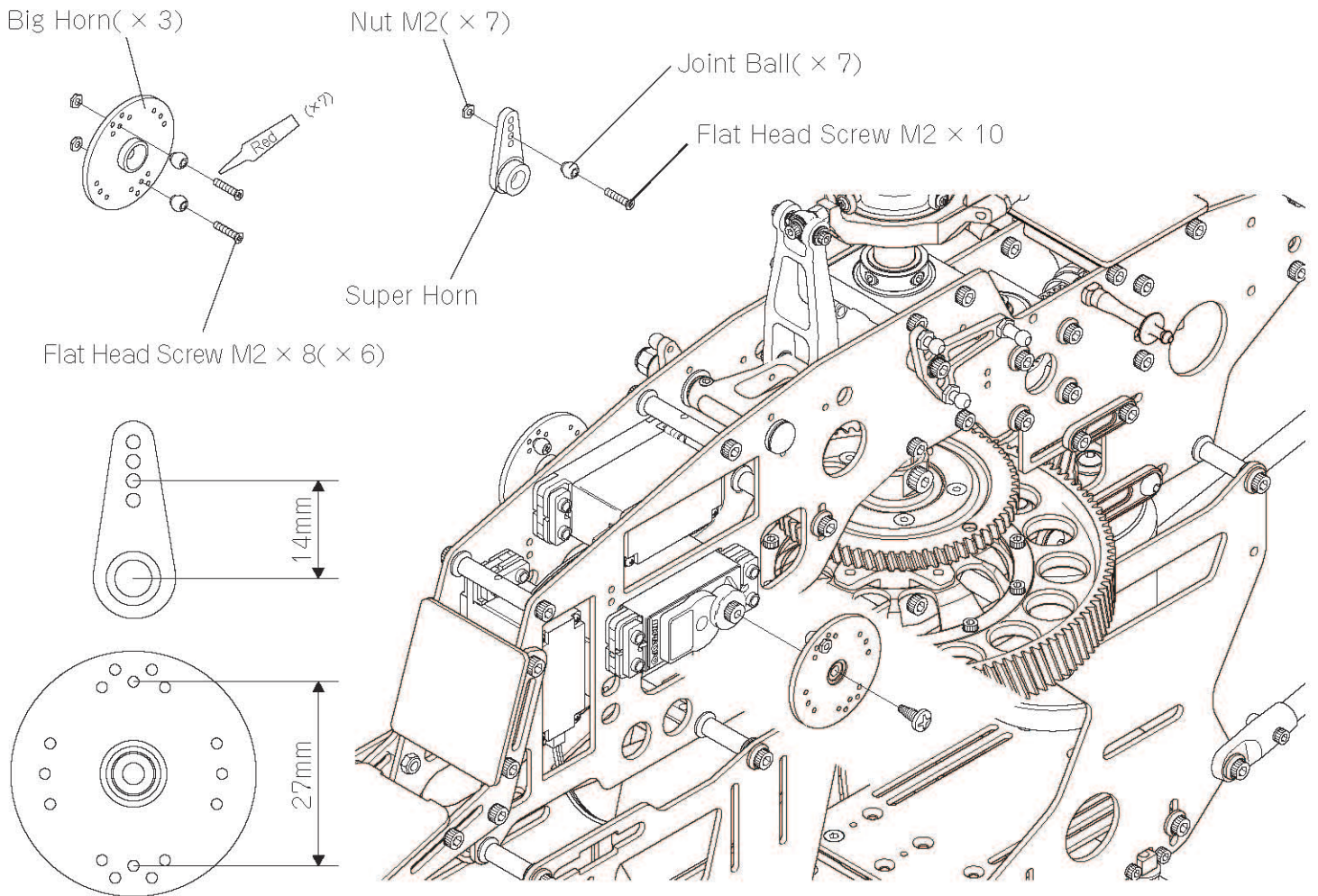
×16
 HEX Tapping Bolt M2.6 × 12



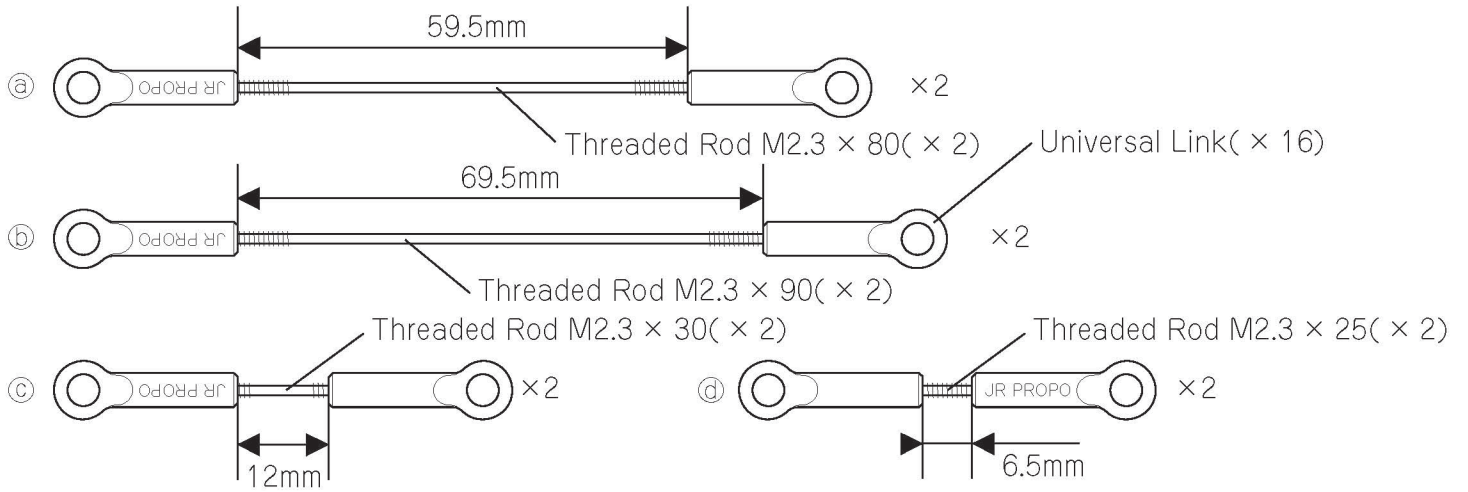
⚠ DANGER



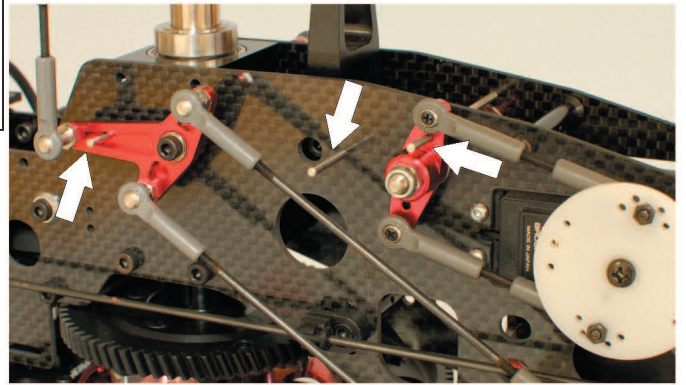
7-2 SERVO HORN INSTALLATION



7-3 LINKAGE

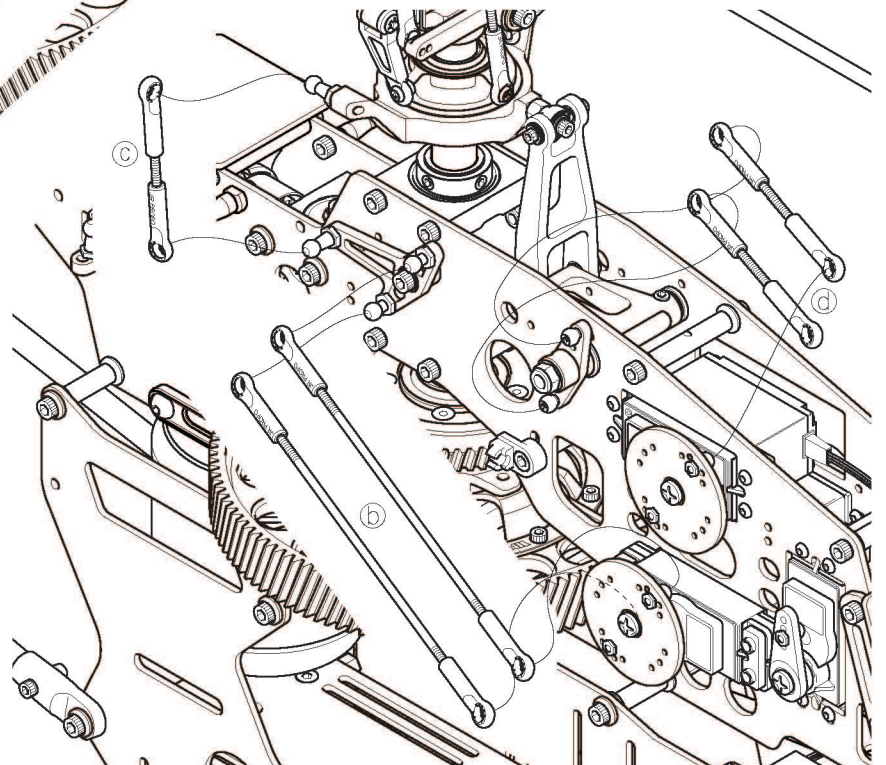
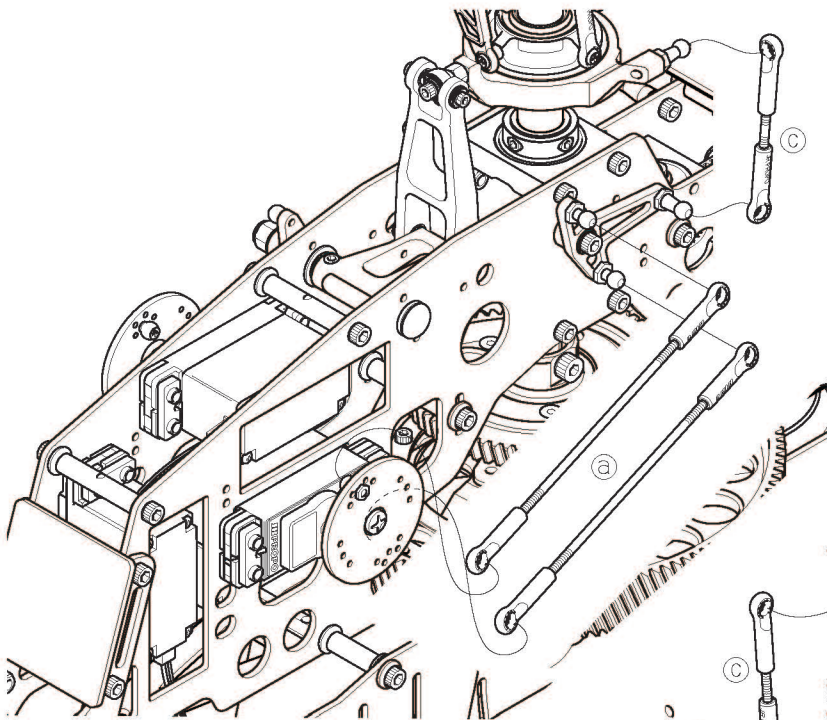


● Referring to the figure on the right, insert the supplied Lever Alignment Pins $\Phi 2$ into place as shown by the white arrows and adjust the neutral position of each linkage. These pins are also useful for adjusting the sub trim of each servo. Do not forget to remove them after adjustments are complete.



⚠ NOTE

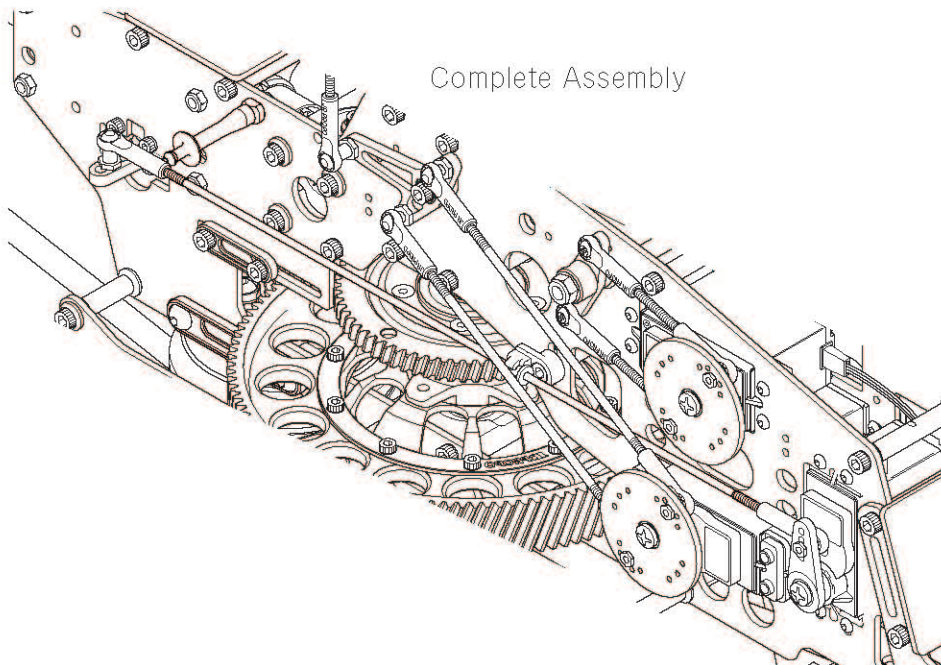
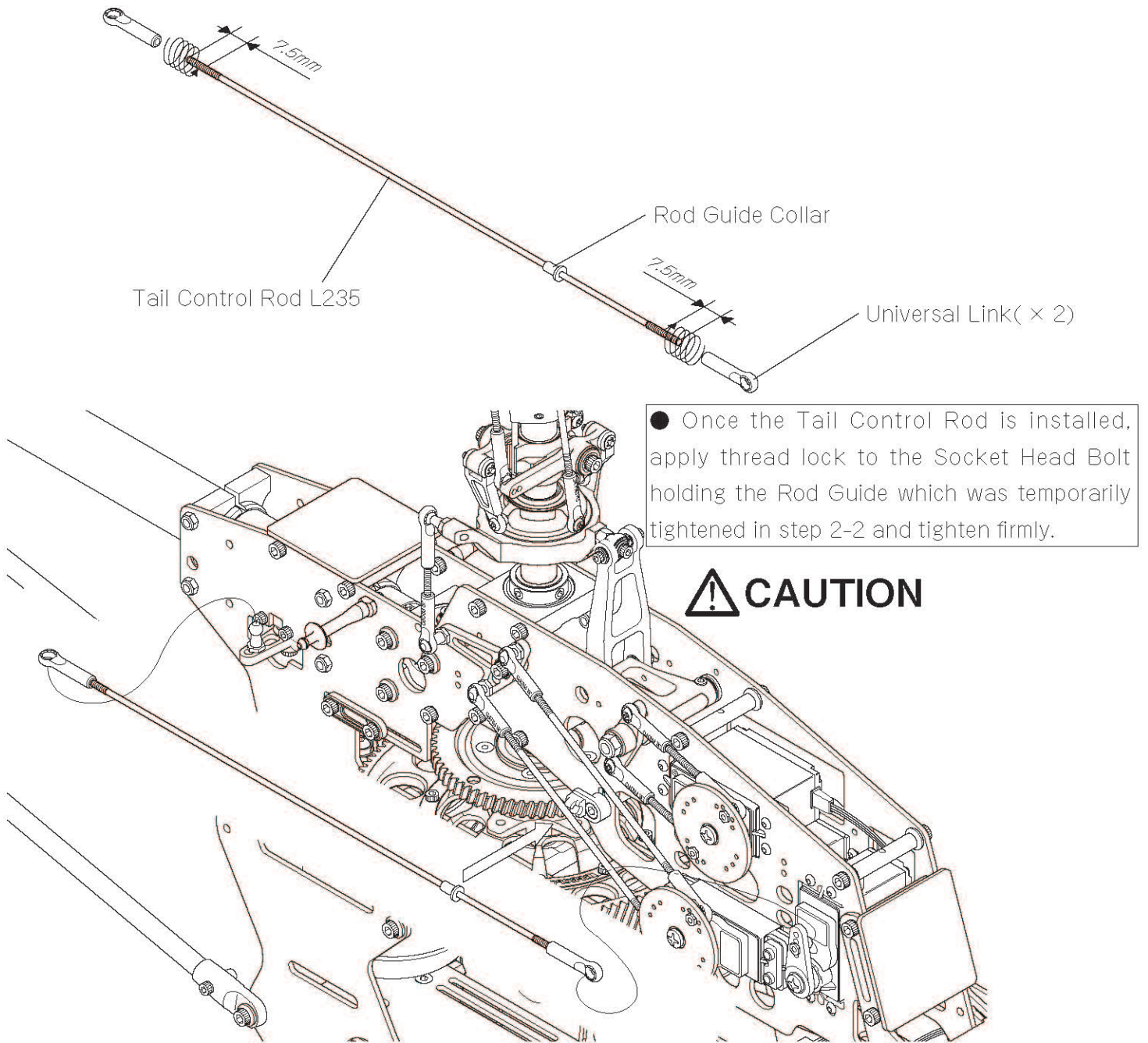
※Be careful not to lock the Servo when adjusting.



⚠ CAUTION

● Once this step is complete, the Nylon Lock Nut M4 and Setscrew M4 x 4 which were temporarily tightened in step 2-2 can now be tighten firmly. Use Thread Lock for the Setscrew.

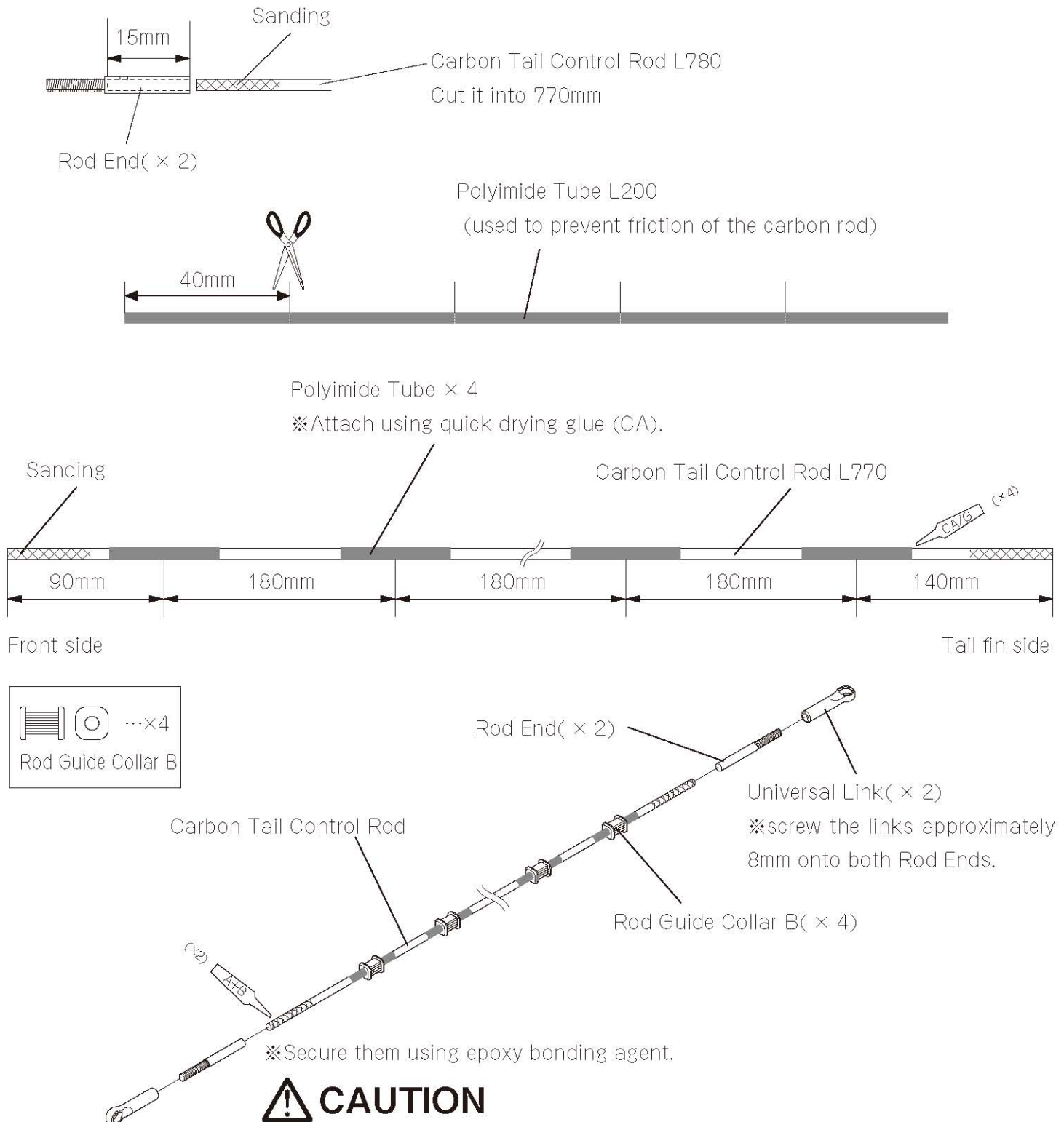
7-4 TAIL CONTROL ROD LINKAGE 1



7-5 TAIL CONTROL ROD LINKAGE 2

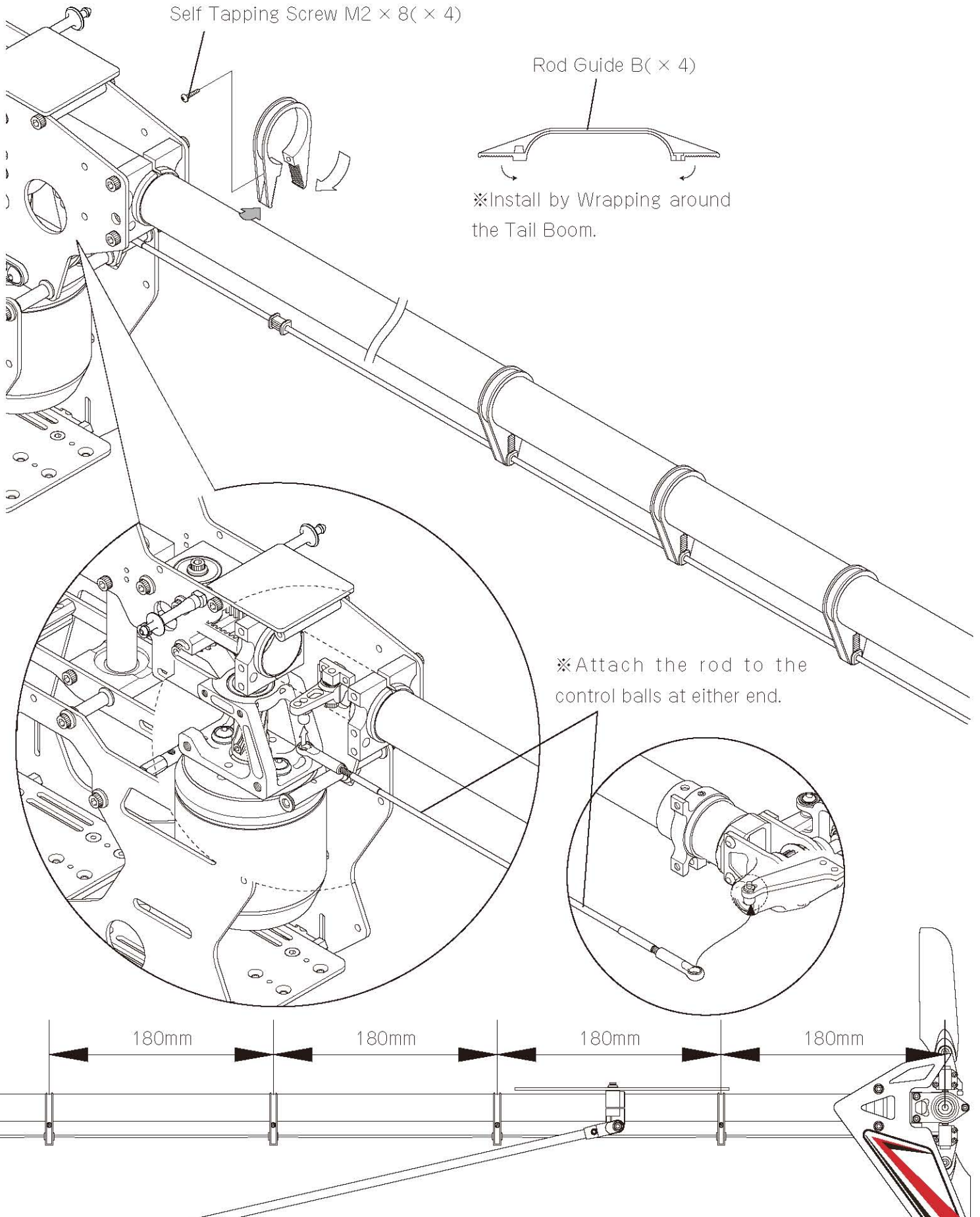
- Cut the Carbon Tail Control Rod L780 to a length of 770mm and sand both ends (15mm) in preparation for gluing on the rod ends.
- Cut the polyimide Tube into four equal lengths of approximately 40mm each. Refer to the figure below, and glue them onto the Carbon Tail Control Rod. Only a small amount of quick drying (CA) glue should be used.
- Slide the Tail Rod Guide B (× 4) onto the Carbon Tail Control Rod and then sparingly apply epoxy bonding agent onto both sanded ends to bond the Rod Ends (× 2).

※Make sure that the Rod Ends and Carbon Control Rod are bonded completely.

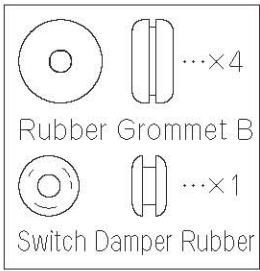


7-6 TAIL CONTROL ROD LINKAGE 3

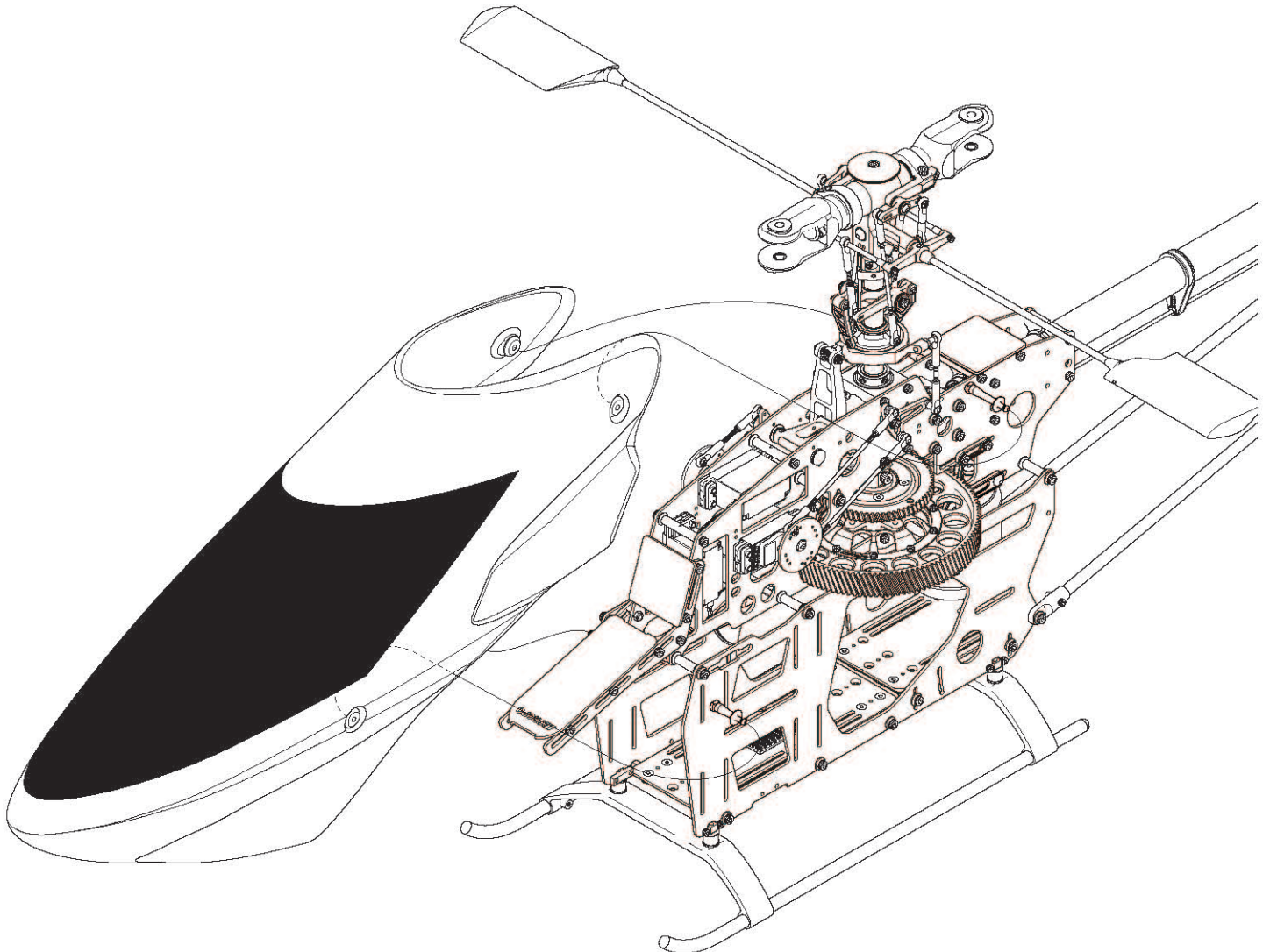
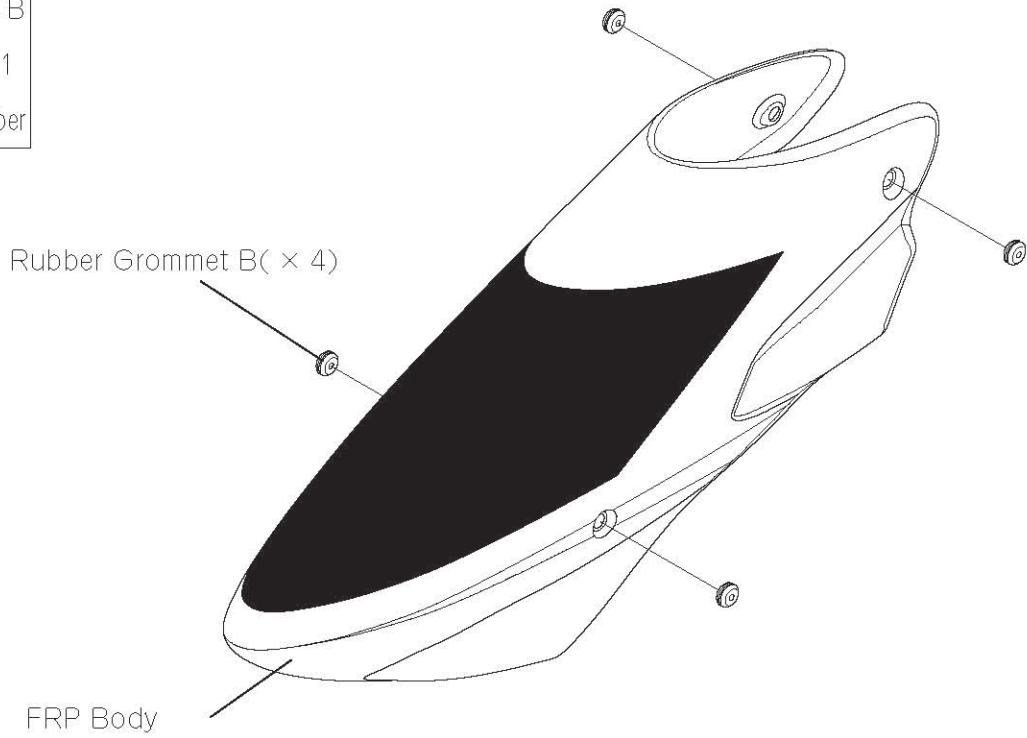
⊕ ×4
Self Tapping Screw M2 × 8



8-1 BODY ASSEMBLY AND INSTALLATION



● Make a hole of 4mm at an arbitrary place for the switch damper rubber, used to protect the antenna as it exits the canopy.
If you are using a 2.4GHz style receiver, you do not have to do this.



8-2 MAIN ROTOR BLADE INSTALLATION

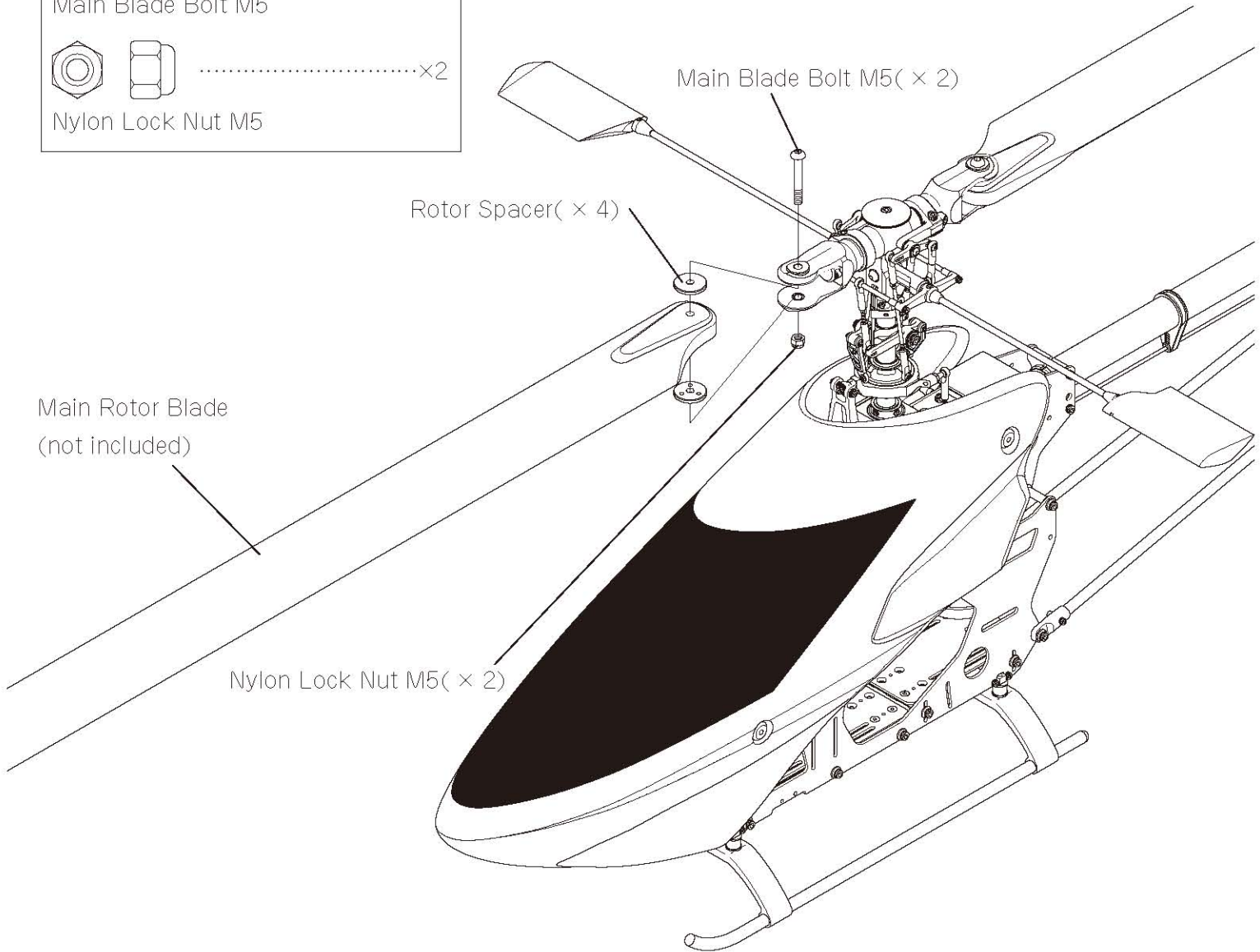


Main Blade Bolt M5



Nylon Lock Nut M5

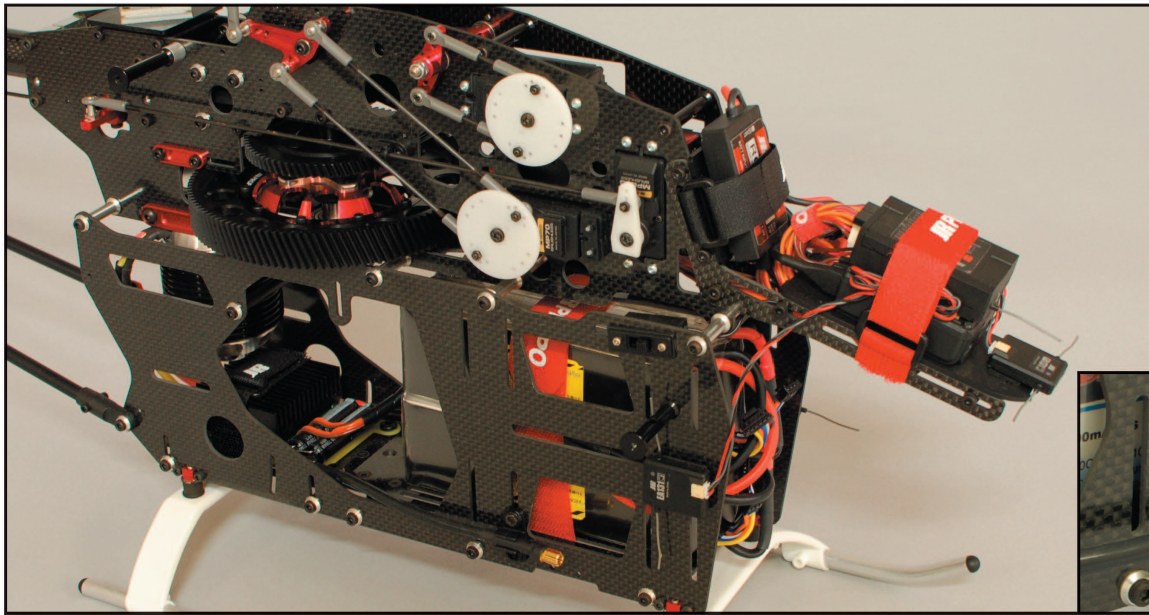
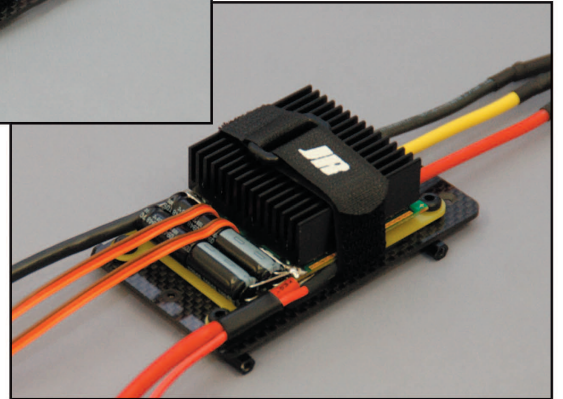
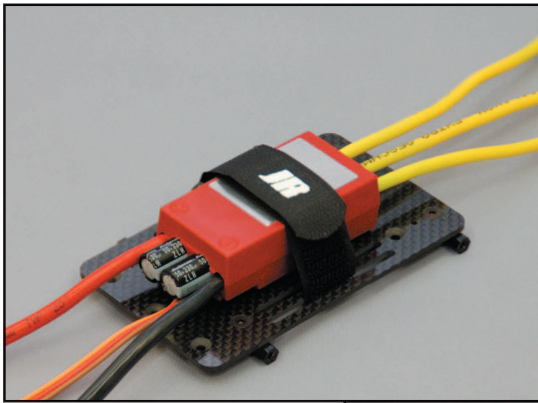
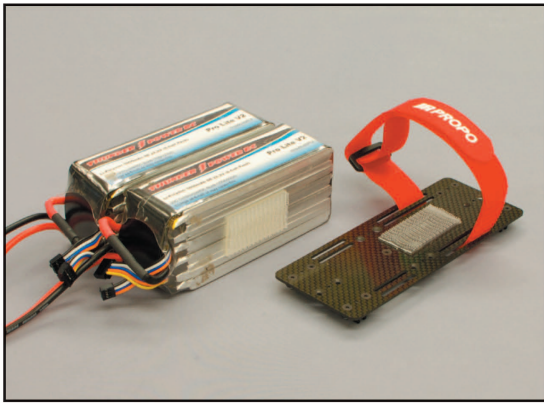
● Please use only FRP or carbon blades.
Do check the balance of the rotor blades before use.



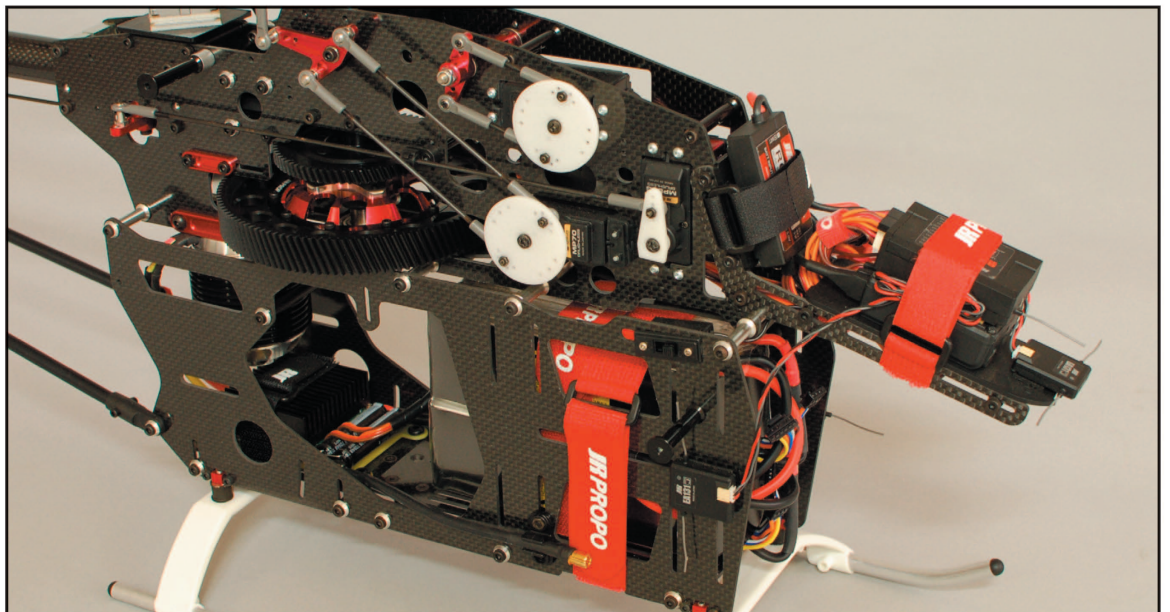
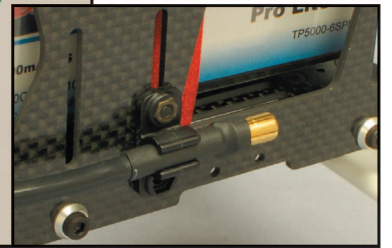
※Refer to P.71, and attach the Decals to the body at this time.

BATTERY AND ESC INSTALLATION

Referring to the following pictures, attach the batteries and ESC to the Carbon Main Trays using the supplied Hook and Loop Straps.



Handy wire securing idea using a spare Battery Clamp.



CHOOSING MOTOR, ESC AND BATTERY

※Please see below and choose the measures for motor, battery and ESC.

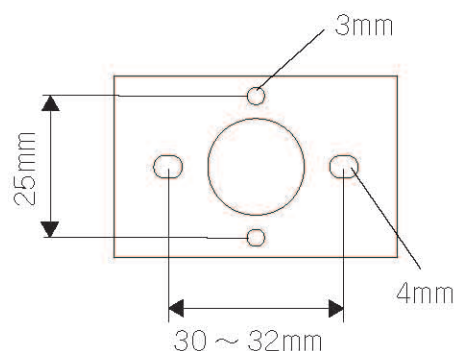
Battery	Pinion	Gear ratio pinion : main	Motor KV	Estimated flight time		Rotor rotation		Max Current
				Hovering maneuvers	Flying	Hovering	Flying	
12 Cell	T10	11.5:1	520 ~ 560	10min	5 ~ 6min	1,500rpm ∩ 1,700rpm	2,000rpm ∩ 2,200rpm	70 ∩ 100A
	T11	10.45:1	500 ~ 520					
	T12	9.58:1	450 ~ 500					
	T13	8.85:1	440 ~ 450					

● Compatible motor sizes

Output shaft diameter	6mm		
Max motor diameter	70mm		
Max motor length	No specific limitation. But depending on length, it may interfere with ESC.		
※Not including shaft			
Mounting screw size	3mm	4mm	see figure on the right
Mounting screw pitch	25mm	30mm ~ 32mm	

※If using a motor with 3mm mounting screws, please use additional cap bolts M3 × 10 and plate washers; two each.

If the motor interferes with the ESC, mount it on the side frame.



● Compatible batteries

Li-Po battery		
Cell#	Voltage/ Capacity	max size
12 Cell	22.2V 6S 5,000mAh ~ × 2	52mm × 70mm × 180mm

※Depending on the shape of your batteries, you may not be able to remove battery from battery tray. In this case, use the optional offset battery mount (No. 61599, sold separately), which lowers the battery tray 10mm. Please use the mount which fits with your battery.

● ESC specifications

※Always use an ESC with a slow start function. If the ESC does not have a slow start function, the rotor rotation speed can rises suddenly when you start the motor, and it may damage the main rotor, rotor head or fuselage.

Li-po Compatible	
12S	Above 100A

Modifications and notices will be updated on our website as required. Information and settings for the recommended ESC and motor will also be released. Please frequently check the below website.

<http://www.jrpropo.co.jp/jpn/heli/e12/>

OVERALL BASIC ADJUSTMENT AFTER ASSEMBLY

※The following information is very important and affects flight performance greatly. Please be sure these instructions are understood thoroughly.

The helicopter does not function correctly without basic setting in the transmitter and helicopter mechanics. Before test flying it is very important to establish this basic setup. The settings should initially match the recommendations in this manual. Please note the information given here is not final or necessarily the best settings for your transmitter or helicopter. The optimum settings vary with personal preference and can only be decided after your test fly the helicopter.

1. 【Initial settings for the Radio System】

Please see the "Radio System Settings Instruction Manual for JR CCPM" provided separately and the Instruction Manual of the radio system used. Please program these recommended settings into the transmitter.

2. 【Receiver Wiring】

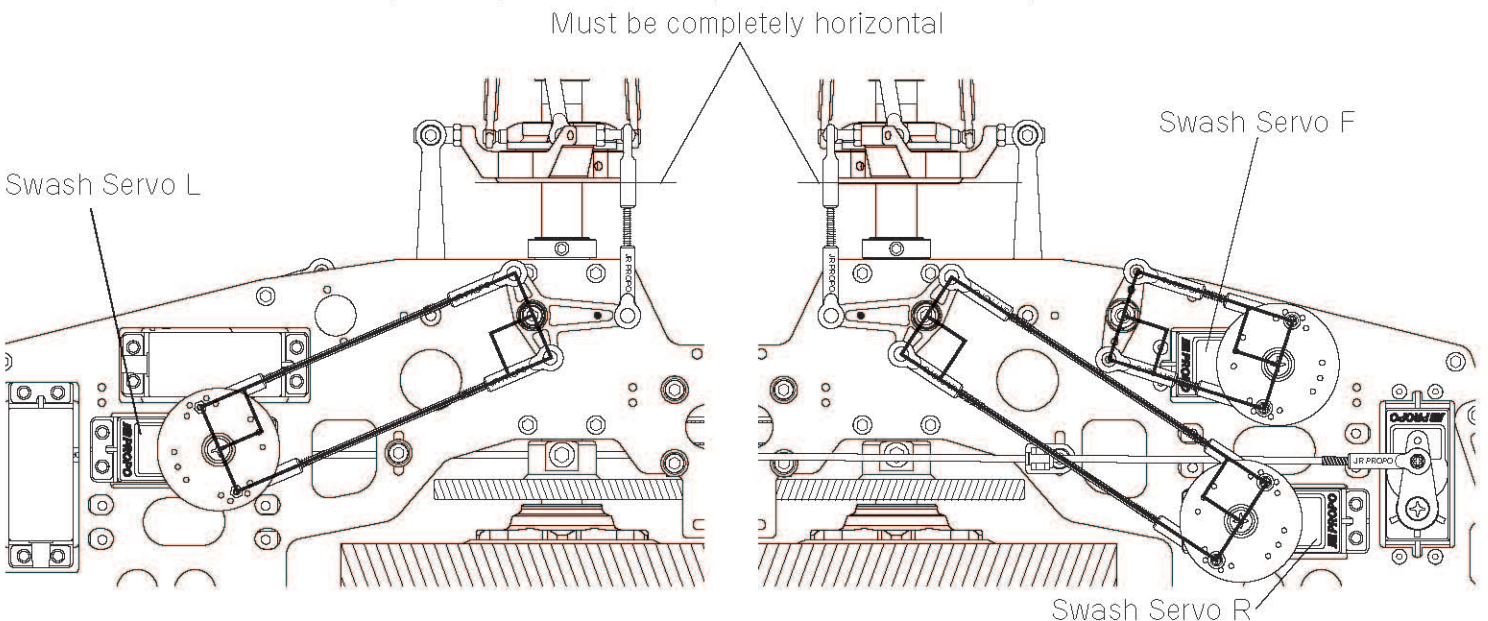
Please see the wiring diagram in the "Radio System Settings Instruction Manual for JR CCPM" and the Instruction Manual of the gyro used to connect each servo and gyro.

The three servos connected to the Swashplate (JR CCPM) are not called aileron/elevator/pitch servo as they previously were, here they are called "Swash Servo F (front)", "Swash Servo R (right)" and "Swash Servo L (left)" respectively. The "Rudder Servo" is referred to as usual. Please make sure each servo is correctly connected. If the servos are not connected correctly, you will have trouble completing the setup. The basic connections are the same for JR and Futaba servos, but please note the the channel arrangement on the receiver differs. Please do not plug in the motor batteries until you are ready to fly. It is particularly important that the motor batteries remain unplugged during the setup process.

3. 【Servo Neutral Adjustment - 1】

Turn on the transmitter and receiver (switch on the helicopter) and ensure the servos function properly. Confirm the transmitter's aileron and elevator trims are in the neutral position. If your transmitter has hovering pitch and pitch trim levers, please also set them to neutral (center).

Enter the pitch curve function of the transmitter and find the neutral position of the pitch (throttle) stick by seeing an output value in the middle of travel (an output value of "50" is the neutral position). Next, check whether the Swash Servos F, R, and L are positioned as indicated in the reference figure shown below. For the Rudder Servo, positioned the horn as shown during the assembly process. If any of the Servo Horns are not appropriately aligned, remove and reattach the Servo Horns so they are aligned as close as possible to the reference positions as shown below.

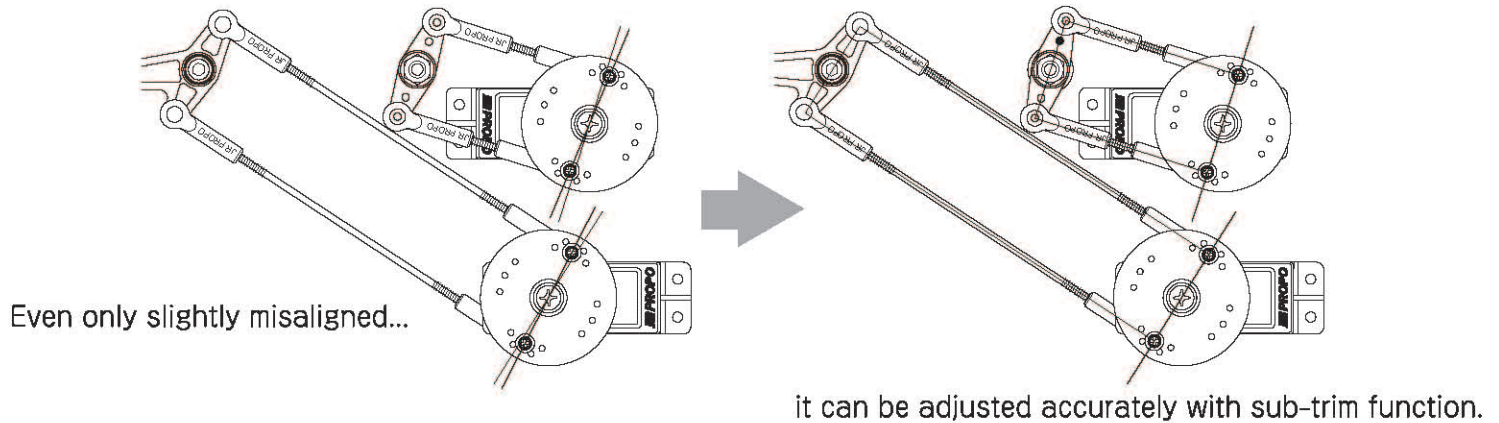


With the alignment pins inserted in each arm, set the 3 servos to the neutral positions as shown and make sure the linkages are perpendicular to each other. At the same time, please make sure the Swashplate is completely horizontal.

Please never power up the radio system with the neutral pins in place as this risks damage to the servos.

4. 【Servo Neutral Adjustment - 2】

Use the sub-trim function to adjust any slight misalignment of each servo arm (this function provides adjustment for individual servos). Please refer to the figure below. Do not use the transmitter trim knobs to achieve this.

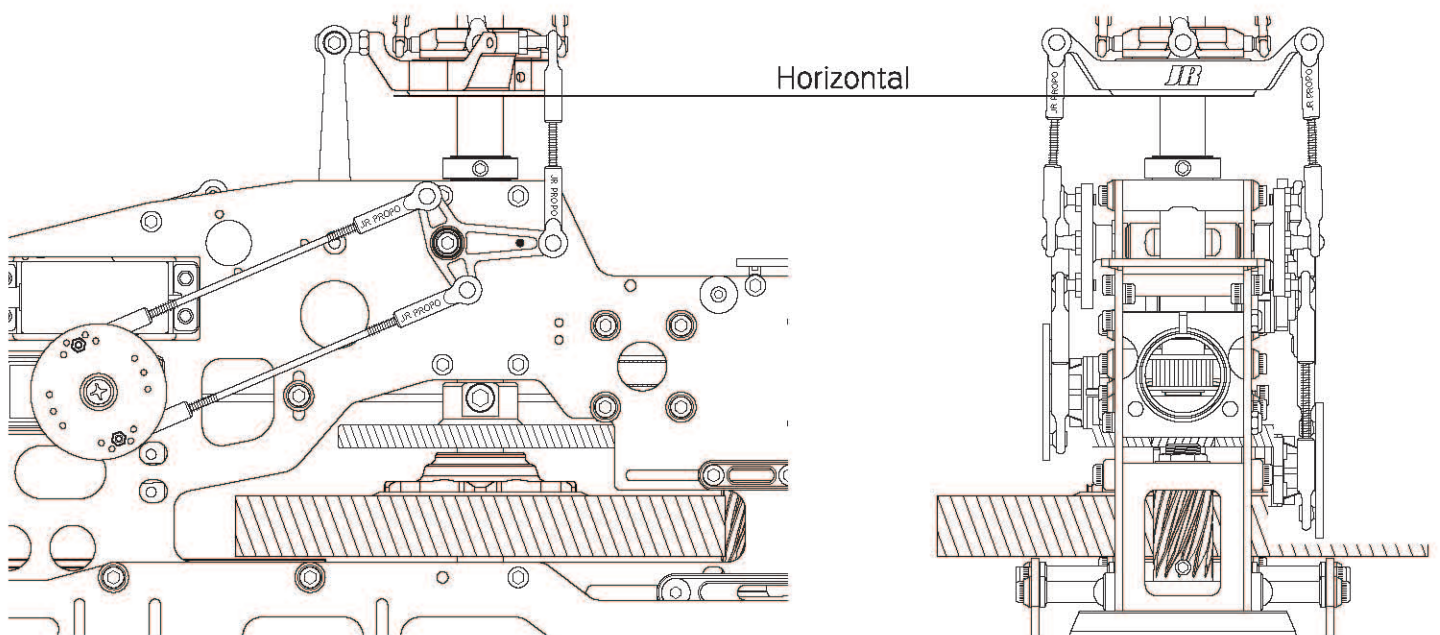


5. 【Swashplate Reference Position Check】

Please make sure the Swashplate sits perfectly horizontal (flat). If the reference positions of the Servo Horns attached to the Swash Servos F, R, and L are correct, the Swashplate should be held horizontally at the specified length of each rod (check the helicopter from front-rear and right-left directions to see whether the Swashplate is perfectly horizontal). If the Swashplate is not horizontal despite the recommended rod lengths, please go back to the basic transmitter settings, re-adjust the neutral positions of Swash Servos, confirm the positions of aileron, elevator and pitch (throttle) sticks are all neutral, and return the Servo Horns to their neutral positions.

If the Swashplate is still slightly tilted after confirming correct servo reference positions, there is probably some error in rod length. In this case, please fine-adjust the rod lengths. This adjustment should be limited to a couple of turns at most. Ideally, the rod lengths should equal the lengths specified in the manual.

Please note the sub-trim function is used only when adjusting the Servo Horn reference positions. Do not use this function to correct a tilted Swashplate.



※As shown in above figure, check whether the swashplate is horizontal when each servo horn is aligned with their reference positions (some parts are omitted in this illustration for easier understanding).

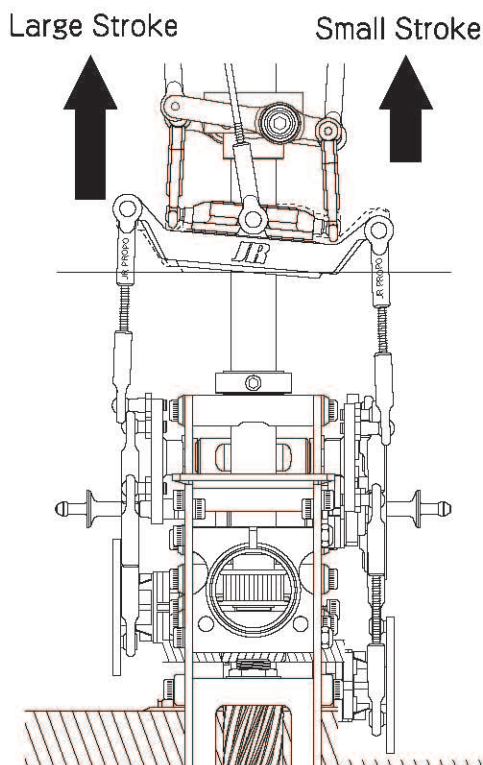
6-⑥ 【Swashplate Vertical Movement Check: Aileron Tilt at High Pitch】

Once you have confirmed the Swashplate is horizontal when the aileron, elevator, and pitch (throttle) sticks of the transmitter are in the neutral position, shift the pitch (throttle) stick to the high pitch side. The Swashplate should move up and remain horizontal (if the Swashplate tilts greatly or moves down, repeat the steps from "1. Initial Settings of the Transmitter").

Check the helicopter from front-rear and right-left directions to check whether the Swashplate remains horizontal as before. It should be horizontal in most cases. Even if it only tilts slightly, adjustment is required. If it tilts, the tilting is caused by a slight variation of the maximum movement angle of each swash servo. First, look at the Swashplate from the rear of helicopter and check for any tilt in the aileron axis.

a. Tilted to the right. As the Swashplate was horizontal when it was at the reference position (intermediate pitch), the Swash Servo L raised the left side higher than the Swash Servo R raised the right side, thus tilting the Swashplate to the right. Given this perspective, it is evident the tilted Swashplate should not be corrected with the sub-trim function. In this case, it is necessary to use the travel adjust function to align the maximum angle of the Swash Servos R and L. This involves changing the travel adjust values for the aileron channel and the pitch (Aux 1) channel. If the Swashplate is tilted to the right, increase the value in the pitch (Aux 1) channel or decrease the value in the aileron channel until the Swashplate becomes horizontal. It does not matter which one you choose to adjust.

b. Tilted to the left. Please apply these changes explained in "a" above in the opposite direction.



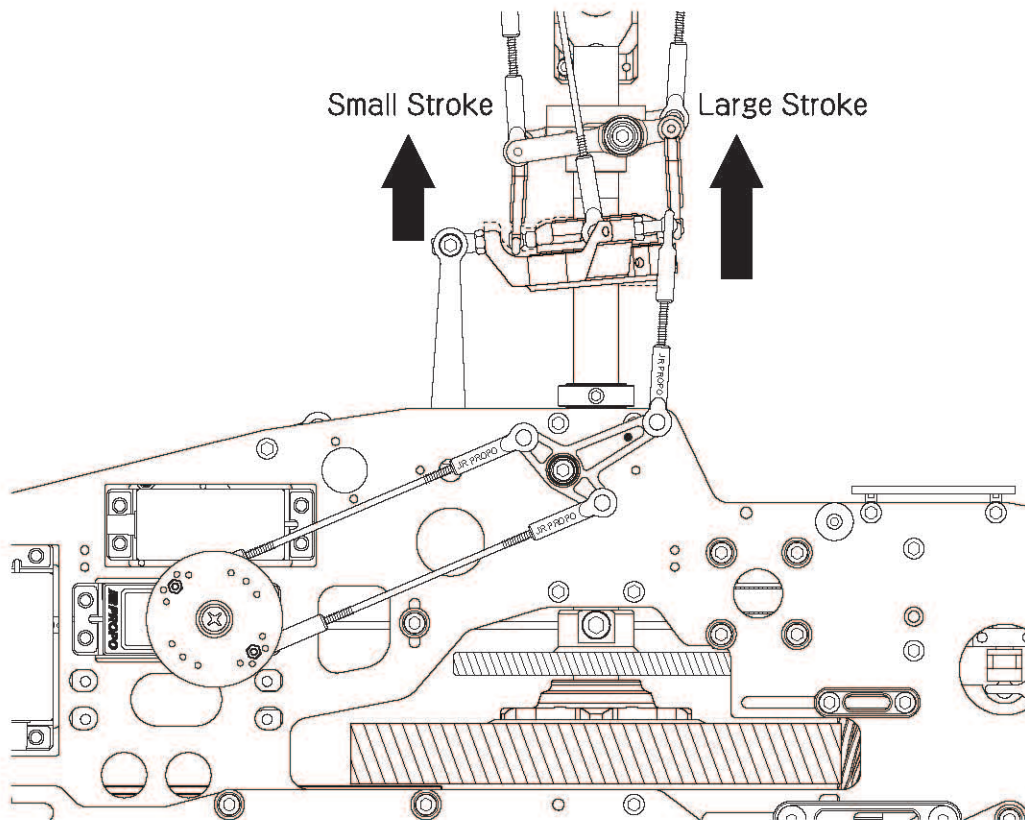
Adjustment Method

● Bring up the travel adjust setting screen on the transmitter. Adjust the travel adjust values for the aileron and pitch servos so they have the same movement range (to keep the Swashplate horizontal) when the throttle stick is shifted to the high side. Make sure the pitch (throttle) stick is set at the high position during the adjustment.

6-⑥ 【Swashplate Vertical Movement Check: Elevator Tilt at High Pitch】

After you correct the crosswise (left-right) tilt of the Swashplate, look at the helicopter side-on to check the elevator axis (front and rear) for any tilt. If moving the Swashplate up results in down elevator (forward) tilt, it means the Swash Servos R and L raised rear side higher than Swash Servo F raised the front side. In this case, you only need to correct one servo - increase the operating angle of Swash Servo F. Increase the travel adjust value for the elevator channel until the Swashplate becomes horizontal. If the Swashplate was tilted toward the rear (up elevator), please perform the adjustment in the opposite direction.

- When correcting the Swashplate tilt, be sure to begin adjustment with the aileron axis. If the elevator is adjusted first, subsequent aileron axis adjustment may disturb the elevator settings.
- The travel adjust function allows for separate adjustment of the Swashplate with both the pitch stick at the high and low positions (one channel displays two values). To make this adjustment at high pitch, move the pitch (throttle) stick up. To adjust at low pitch, move the pitch (throttle) stick down and input the value under this state.
- The below figure shows the elevator tilting forward. In this case, increase the travel adjust value for the Swash Servo F. The travel adjust function for the elevator only requires adjusting one servo, so you do not need to worry about disturbing aileron adjustment.



6-⑦ 【Swashplate Vertical Movement Check: Aileron and Elevator Tilt at Low Pitch】

After performing the two adjustments above, your Swashplate should remain horizontal at high pitch. Next, adjust it so it is also horizontal at low pitch. Move the pitch (throttle) stick toward the low pitch side, the Swashplate should move down. Check for tilting in the same manner as in the step above. Even if tilts just a small amount, correct it with the travel adjust function and align the movement of the servos. Now the Swashplate should maintain a perfect horizontal position while moving up and down.

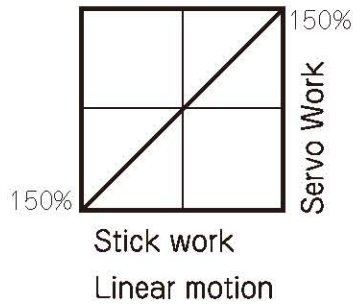
7. 【Rudder Servo Settings】

When setting up the rudder (throttle) servo, use the regular transmitter functions. A brief description of the transmitter functions are described below, but please also refer to the Instruction Manual which comes with your transmitter.

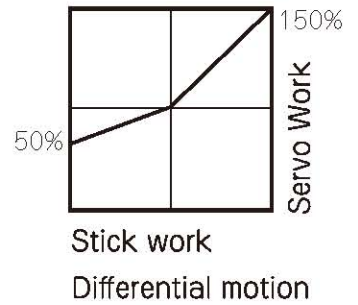
① Reverse Switch (reversing the direction of each servo): Finish settings up each channel in conjunction with JR CCPM settings and confirm each operation leads servo movement in correct direction. If it moves toward wrong direction, use the Reverse Switch in this function to correct the movement.

② Travel Adjust (left-right servo motion adjustment): This function is used to modify the maximum servo movement by operating corresponding transmitter stick in up-down and left-right motion. After setting up, it is necessary to check the actual condition of your helicopter and re-adjust. For rudder, the setting varies with the servo and gyro used. In general, the maximum movement of the servo is adjusted by movement stroke in Tail Gear. While you are able to see and move the limiter, you can adjust the maximum movement of servo so it is greater than the movement of Tail Gear's movement stroke. Please adjust if necessary.

Equal travel adjust value for left and right



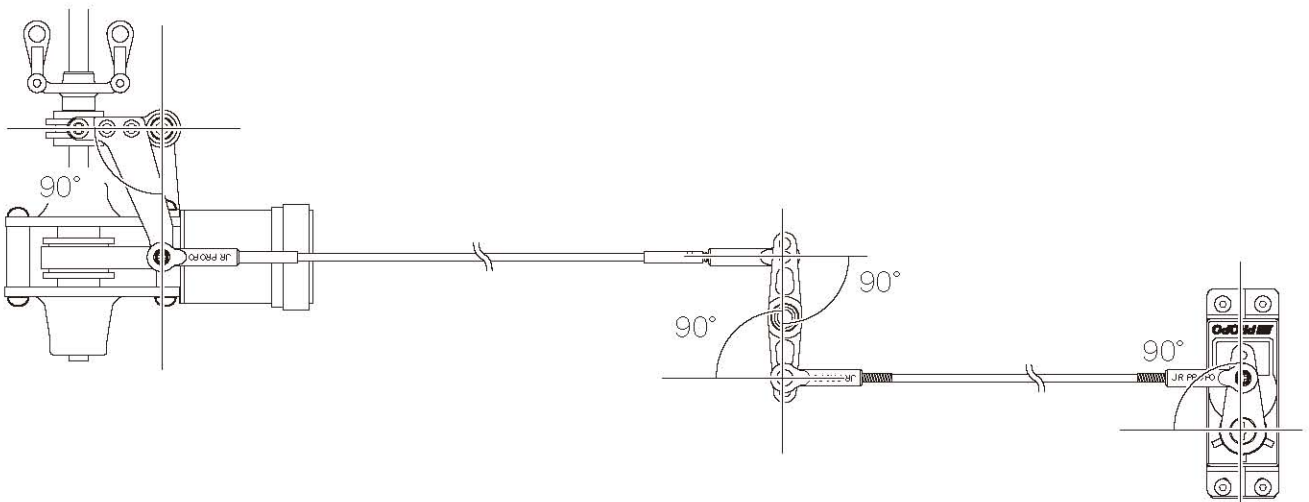
Different travel adjust value for left and right



Although the Travel Adjust settings can adjust in up-down and left-right motion individually, the amount of adjustment is not equal. If you set Travel Adjust for one side to 150 and the other side 50 (this is an extreme example), the servo travel becomes non-linear and it adversely affects helicopter maneuverability. It is very important to keep the values of Travel Adjust approximately equal for each channel. However, 10% variance is acceptable.

③ Sub-trim (internal transmitter trim adjustment): The control rod angle for the Servo Horn Arm linkage should be 90 degrees as shown below. If it is not 90 degrees, use Sub-trim to do fine adjustments. Adjust the rod length so the angle matches with lever.

※Please keep the input value in Sub-trim as small as possible.



※For easier understanding, the above diagram is stylised.

The basic transmitter settings for the helicopter are almost complete. The following information describes the setting and adjustment of the transmitter in preparation for flying the helicopter. These functions control the movement of the Swashplate and relate directly to helicopter response in flight. Pitch settings is also done at this time. Please be extra careful not to turn on the Main Rotor when applying these settings. We recommend the motor batteries remain unplugged during this time. First, adjust transmitter settings.

1、【Duel Rate (Control Responsiveness Setting)】

Two different control sensitivities may be set for aileron, elevator, and rudder. These can be changed with a switch during flight. The basic setting is as below (The switch position is indicated with "0" or "1") Set the dual rate percentages as follows. Position "0" is for hovering. Position "1" is for forward flight maneuvers.

Example Setting		
Function / Switch	0	1
Aileron	60 ~ 80%	80%
Elevator	60 ~ 80%	80%
Rudder	60 ~ 80%	80%

2、【Exponential (Control Sensitivity at Center Stick)】

This setting allows you to change the stick control feel near center so it becomes milder (insensitive) or quicker (sensitive). This is not initially used for aileron or elevator, but can be added after test flying. When using a high performance gyro, hunting is reduced and controllability is improved by inputting exponential of about +40% to +60% for the rudder. For details, please refer to your gyro Instruction Manual.

3、【Sub-trim (Transmitter Internal Trim Function)】

This function has been used for the aileron, elevator and pitch in JR CCPM adjustment. Never use this function again for these three gyros (otherwise you will have to readjust the JR CCPM). For the rudder (throttle), you can use servo neutral position adjustment. (However, it is preferred to adjust the neutral position with the servo horn). If transmitter trim lever moves off from central position after flight adjustment, you can return it to central position (if it moves off greatly, use servo horn to adjust).

4、【Throttle Hold (Transmitter Throttle Hold Function)】

The Transmitter Throttle Hold function is turned on by activating this function. During an autorotation landing, this function stops the engine and allows you to control pitch operation independently. This function can also be used to turn on or turn off the motor. Please see page 64 for more information.

5、【Revolution Mixing (Transmitter Tail Rotor Mixing Function)】

The reaction torque produced by rotation of the Main Rotor is affected by operating the pitch on the Main Rotor. In line with that change, this mixing function changes the pitch of the Tail Rotor. This can be set for each flight mode. This value needs to be changed according to the gyro used, setting, or flight style. For details, please refer to your gyro Instruction Manual.

Note : This is a right-hand rotation rotor head helicopter. Please note to specify the rotation direction when inputting the value.

6. 【Gyro Sensitivity Settings (gyro sensitivity adjustment and switching function)】

The gyro system controls the reaction torque of the rotor system. Modern gyros have a remote gain system which can be controlled from the transmitter. See the transmitter and gyro manuals for further details. Position "0" is typically used for hovering and sets the sensitivity rather high. Position "1" is for forward flight and sets the sensitivity rather low. The required gyro sensitivity differs depending on the gyro and rudder servo used. The values shown in the table are approximate - please refer to your gyro Instruction Manual and adjust as required after test flight.

The final sensitivity adjustment should be made during a series of test flights. As you gradually increase the gyro sensitivity, the tail starts hunting (moving back and forth rapidly). Once you see this symptom, decrease the sensitivity slightly to a position just before hunting occurs.

※Special Tail Rotor (rudder) Servos are available. It is recommended to use the one recommended by your gyro manufacturer.

Gyro Sensitivity Setting	
0 Position (hovering)	80%
1 Position (Stand)	60%

7. 【Gyro Output Direction Check】

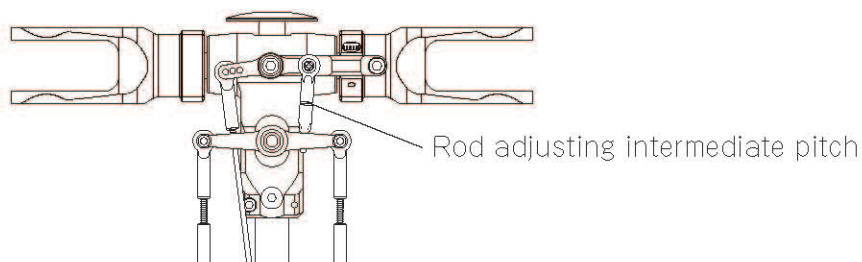
Check whether or not the gyro output direction is correct. If you hold the tail and swing it to the right (the nose is directed toward left), the Tail Rotor must change in pitch to resist this movement. If it moves toward the wrong direction, change the output direction with the reverse switch on the gyro.

8. 【Rotor Pitch Setting】

Measure the pitch of the Main Rotor Blades with the JR Universal Pitch Gauge (No. 60326, sold separately).

Pitch	Low	Intermediate	High
Reference Pitch	-9°	+1.5°	+12°
Hovering	-3.5°	+5.5 ~ 6°	+10°
Forward Flight	-9°	+3°	+9°
Auto-Rotation	-5°	+5°	+12°

Measure the entire possible pitch range. High pitch should be +12° , low pitch should be -9° , totaling 21° . The intermediate value is calculated as $12 - (21/2) = 1.5$, so with the pitch stick in intermediate position, there should be 1.5° of pitch. With the pitch stick in the middle of its travel measure and check whether the pitch is 1.5° or not. If not, adjust the rod length as shown in the figure below and set the pitch to exactly 1.5° .



Once the intermediate pitch has been adjusted to 1.5° by rod adjustment, measure the high and low pitches again. It is presumed they are almost as described in the table. If they are slightly higher or lower, use the "Swash Type (Mix)" function to adjust the pitch stroke. Increase or decrease the pitch percent value as required. In this case, the high and low pitches cannot be adjusted separately. Adjusting either the high or low pitch should automatically result into the figure seen in the table. If this is not the case, change the rod length and the pitch percent value in the Swash Mix and ignore the intermediate value, so the high and low pitches are properly adjusted.

9. 【Control Movements】

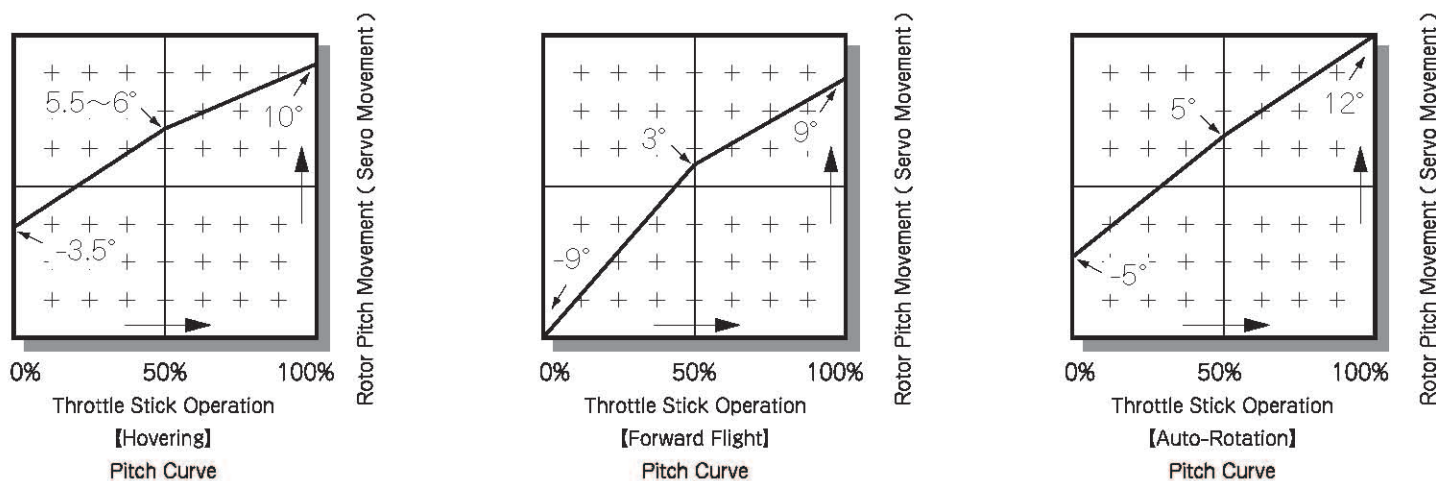
Each control movement should now be correctly set by assembly and adjustments so far. You may adjust further to your preference after test flight.

In this case, please note the following two things:

- ㊤ Use the "Swash Type (Mix)" Function for setting the total movement of aileron, elevator and pitch functions.
- ㊦ Rudder adjustment depends on the gyro used. Please refer to your gyro Instruction Manual.

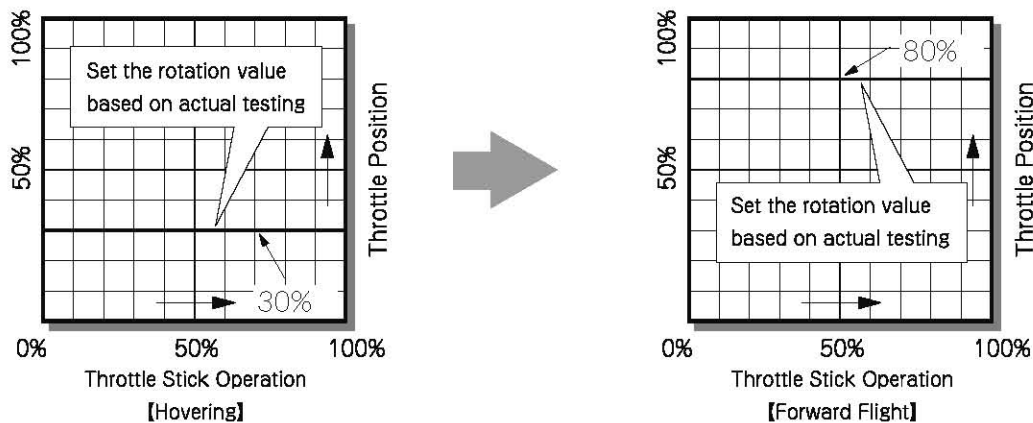
10. 【Pitch Curve (Transmitter pitch curve adjustment)】

This function allows you to make adjustments freely between specific points as to how much Main Rotor Blade pitch should be set at a particular pitch (throttle) stick position. This is one of the most basic and the most important adjustments of the helicopter. This adjustment depends on the Main Rotor Blades used and their interaction with the throttle curve. To begin with, make adjustment as shown in the following figure. Please also refer to the table in the previous section.

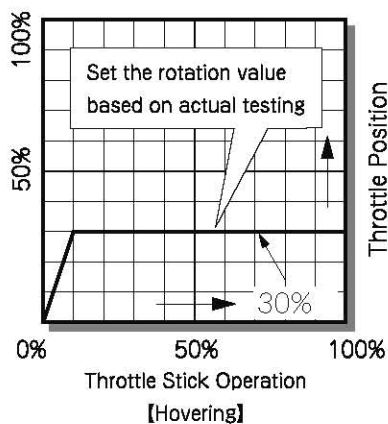


11. 【Throttle Curve (Transmitter adjustable output function)】

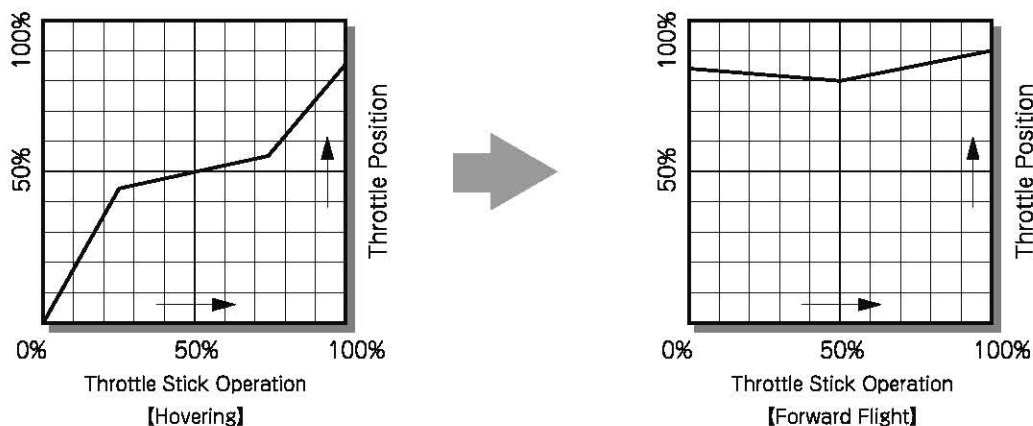
Depending on the ESC settings, adjust the throttle curve so the rotor rotation reaches the range as shown in the table on P.55. If ESC governor mode is used, the adjustment is completely different. No matter where the throttle stick position is, adjust the output value so it becomes constant. Reach the objective rotor rotation by adjusting this value. Because the output value is not 0% even when throttle stick is in the slowest position, this adjustment uses the transmitter throttle hold function to turn the motor on and off. When you connect the Li-Po battery before turning the receiver on, set the throttle hold switch to ON. When you turn on the motor, set this switch to OFF; when you turn off the motor, set this switch to ON.



As an alternative method, you can also adjust according to the figure below. If this adjustment is used, the motor can be started by operating the throttle stick. If you stop the motor by using this function to slowest during flight, the motor will slow start again. Please note whether the slow start function is on regardless the helicopter is flying or not. In this case, avoid turning the motor off in flight.



If the ESC governor function is not used, set the throttle curve in a similar manner to that for a nitro engine, and fine tune based on actual rotor speed achieved during flight.



Please refer to your transmitter Instruction Manual and adjust to these values. Please be extra careful not to turn on the motor carelessly. The throttle values here are just examples. In order to prevent over-speed of the main rotor, please start adjustment on the slower side.

12. 【Rotor Rotation Speed and Pitch】

- ㊦ Before the helicopter takes off, please wait until the rotor rotation reaches sufficient speed.
- ㊦ For hovering, a rotation speed of 1500rpm or above is recommended. If the rotation speed is too low, it will cause the ESC to overheat. In the worst case, this will damage the ESC.
- ㊦ Do not change the hovering rotation speed with abrupt pitch operation or ascending the helicopter suddenly. At that time, the ESC load will rise sharply. In the worst case, this will damage the ESC.
- ㊦ Because there is no clutch system, power is supplied directly to the rotor head. If sudden changes in load exceed the tolerable range, it may damage the gear or stop the motor. Because this tolerable range varies greatly with flight style and the setup, please proceed with caution. With regard to the maximum pitch, please start with a low pitch setting and adjust based on performance. With regards to the engine, you must not fly while letting go of the clutch.

13. 【Backlash and Grease-up】

If the helicopter is installed in a full-body, the motor may heat up to near 80°C. The motor heat will be conducted to the pinion gear and then the Main Gear, causing the gear to increase in size and reduce the amount of backlash. Under this situation, with the addition of frictional heat, the temperature may become very high and damage the gear. Please set more backlash than you might with a nitro engine. Additionally, it is mandatory to grease the main gear and pinion.

14. 【Flight Time】

- ㊦ Flight time is affected by the batteries used. If using a battery with recommended capacity, under F3C standards, please set the flight time to 10min for hovering only, and to 5min for flying only. In order to extend battery life, it is recommended to leave at least 15% battery remaining after flight.
- ㊦ Please do not fly consecutively. After each flight, please do not start the next flight until the motor, ESC and other parts have cooled down. If you fly consecutively, the motor, ESC and other parts may get damaged from overheating.

15. 【Connector】

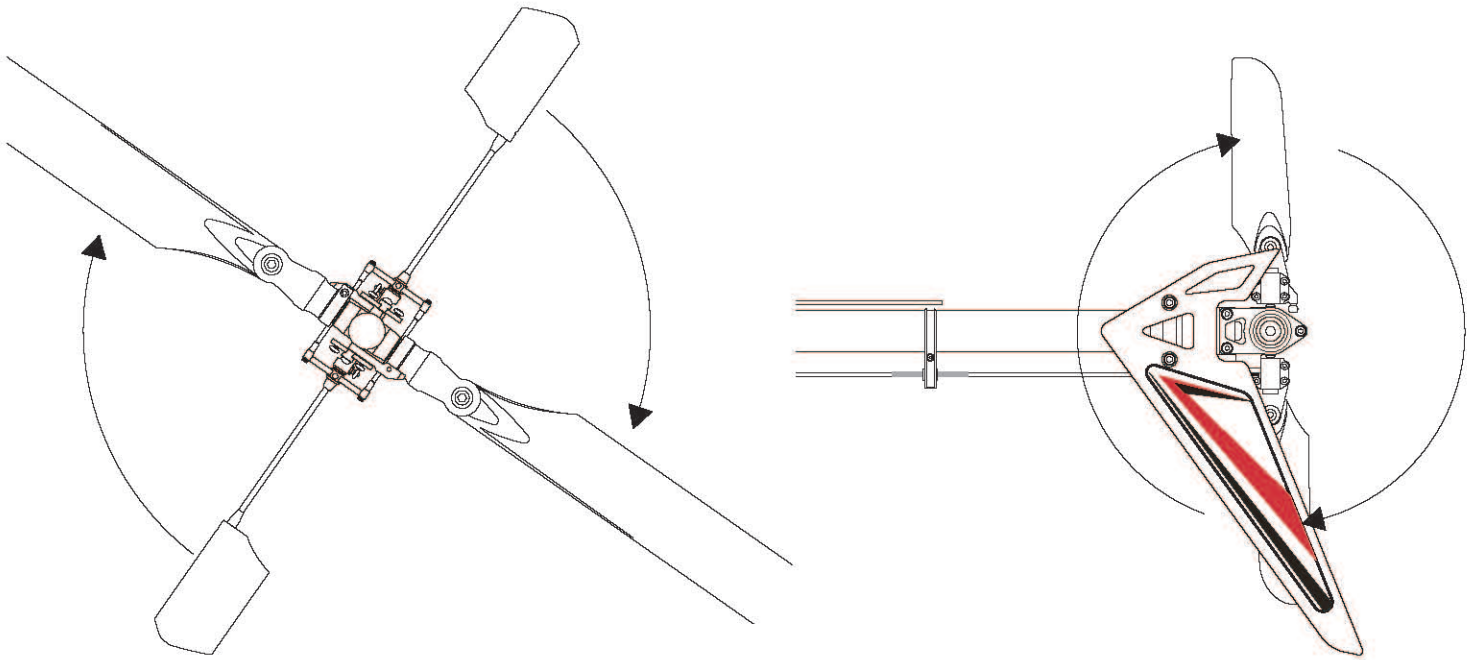
The battery and ESC connectors shown on page 54 are commonly used. It is recommended to use connectors rated for 100A and above. Mistakes in confusing plus (+) and minus (-) are very dangerous and may lead to catastrophic accidents. To prevent connection mistakes, please confirm the connecting method and the color of the wires is correct.

FINAL CHECK PRIOR TO FLIGHT

Although some items need to be readjusted after test flights, it is possible to do a final check prior to flight. Please recheck as following:

① Look through all steps in the Instruction Manual and make sure all bolts are firmly tightened. In particular, check the bolts used for mounting the balls to the levers, and bolts which were tightened after backlash adjustment of the gear mesh was completed.

② Check the rotation direction of the Tail Rotor. When turning the Tail Rotor in direction of the arrows as shown in figure below, confirm that the Main Rotor Blades rotates in the direction indicated by the arrows. If not, check the direction of the belt twist.



③ Confirm all servos function smoothly and their direction of operation is correct. Also check if the servo horn screws are firmly tightened.

④ Make sure the gyro control direction is correct.

⑤ Make sure the transmitter battery and receiver battery (in the helicopter) are fully charged.

⑥ Check if the receiver, gyro, and battery are firmly secured.

⑦ Make sure that the main rotor blades and the tail rotor blades are attached in the correct orientation.

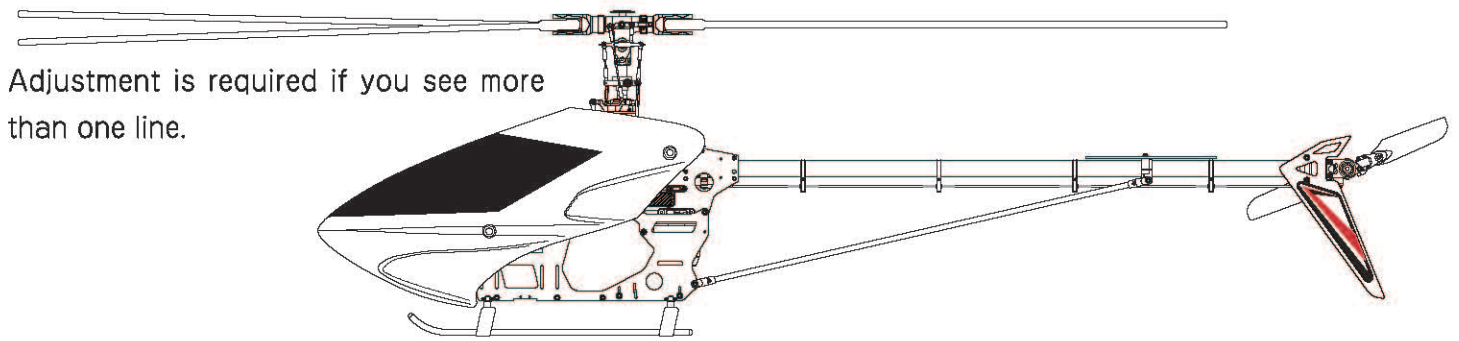
If no problem has been found after checking all of above, test fly several times and fine-adjust. If possible, it is recommended to test fly under the guidance of an experienced operator.

CHANGES FOLLOWING THE TEST FLIGHT

【Items to Be Changed Following the Test Flight】

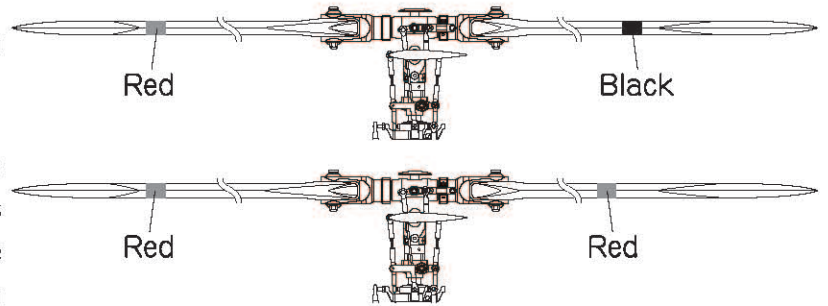
Tracking Adjustment

This is to adjust both Main Rotor blades to the same pitch. If they are not uniform, it will lead to horizontal vibration, and Main Rotor Blades' trajectory will not be a straight line as shown in the figure below.



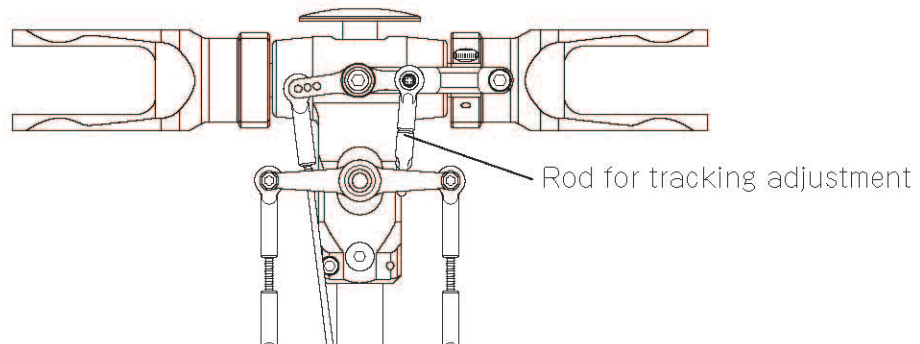
To adjust the tracking, it is necessary to know which Main Rotor Blade is higher or lower. For this purpose, mark the Main Rotor Blades with color tapes.

There are two methods to mark by tape. The top figure shows wrapping tapes of different colors around the end of each blade. The bottom figure shows wrapping tapes of same color around each end of blades in different positions. It is easier to distinguish if bright color tapes are used.



⚠ WARNING - Tracking adjustment is dangerous.
Stay at least 5m away from the helicopter at all times.

Before the helicopter is about to leave the ground, observe the Main Rotor Blades' rotation plane from the side. No adjustment is required if the trajectory of the Main Rotor Blades is seen as one line. If the trajectory is vertically misaligned, pitch adjustment on one blade is required. On either the higher or the lower blade, adjust the Universal Link of the rod shown in the following figure to decrease or increase the blade pitch.



This is the settings for the aileron, elevator and pitch, throttle, and rudder servos controlled by JR CCPM. This setting is not for Swash Servo; rather it is for Swash Blade and other rudder movements. With regards to the Swash Blades, one item in this setting affects the mixing of three servos. These settings directly relate to the properties of flight.

1、【Trim Lever】

These levers are used to correct trim (direction) in flight. This can be used regardless of CCPM settings. By operating the aileron or elevator, two servos are simultaneously activated for aileron trim, and three for elevator trim. Transmitters with a pitch trim lever (or pitch trim knob), these functions can be used as well.

2、【Pitch Curve Function】

This function is capable of setting the Main Rotor Blade pitch corresponding to the transmitter stick position. This function is the most important in the helicopter adjustments. The set pitch curve is reflected in the movement of the three Swash Servos.

3、【Hovering Pitch Knob】

This function is used to change the Main Rotor Blade pitch in the hovering area, within a certain range. While hovering, the pitch can be finely adjusted without accessing the pitch curve function. Adjustment with this knob is reflected on the three Swash Servos.

4、【Swash Type】

This is a basic function to control the JR CCPM. While performing the "Initial Settings of the Radio", this function has already been set to 120° - a setting to activate the three Swash Servos. Furthermore, this function allows you to make adjustments corresponding to conventional settings for aileron, elevator and pitch servo movements and reversing. (Setting the JR CCPM can make the settings different for conventional ones.)

㊸、Control Angle Adjustment (Similar to conventional travel adjust function)

This function is to increase/decrease control movement of the aileron, elevator and pitch functions. Different settings are possible for aileron, elevator and pitch functions - their control movements can be adjusted by changing the corresponding values of the swash mix percentage. Regardless of a plus (+) or a minus (-) sign, the control angle changes in proportion to the magnitude of the set value. It is generally found that the initial settings pose no problem for flight, but values can be changed as necessary. Raising the percentage above necessary may cause the servos to over-travel and jam, so please check carefully while changing settings.

㊹、Control Reversing Function (similar to conventional reverse switch)

The control motion adjust function above is to increase/decrease the control throws. If the control throw value is continuously decreased, it will reach 0% and be prefixed with a minus sign (-) if further decreased. If originally a negative value, a plus (+) sign will appear as it is increased. If reversing control movement is desired, please change the plus/minus of the values. When this is done, the control movement will be reversed.

BE SURE TO READ PRIOR TO FLIGHT

This helicopter is not a toy. It is intended for those having had prior experience, knowledge, and skills flying a radio control helicopter. It could crash due to assembly failure, operation mistake, service failure (loose bolts, etc.), and radio interference and so on. Always keep in mind a radio control helicopter, which is controlled by a weak radio signal, may get out of control for some reason. For safety, the operator should pay attention to himself/herself and the surroundings at all times. Even an advanced operator experienced in radio control helicopters may forget the safety precautions. Please refresh your memory by reading the following. Fly the helicopter in a manner commensurate with the operator's skills and avoid unnecessary risks during flight. For maneuvers demonstrated in competition, imitate them after fully understanding and mastering the operating methods and skills. When flying the helicopter, not just for beginners and intermediate operators, but even the advance operators should never fly alone. Listen to explanations from an assistant or an instructor with expertise and fly under their guidance.

Be sure to buy a "radio control insurance" policy as a precaution (please contact our distributor or nearby radio control model shop for details.).

1. 【Precautions after Assembly】

- Ⓐ Check all bolts are fully tightened. Tighten loose ones if there is any.
- Ⓑ Follow all instructions in the Instruction Manual, be sure to use screw locking agent when tighten all bolts. While doing this, degrease the bolts and nuts completely.
- Ⓒ Check if the rotating parts (Main Rotor Blades, Tail Rotor) and their bolts are fully tightened. But for Drag Bolts securing the main and tail rotor blades, it is necessary to leave some space so the blades can move slightly back and forth.
- Ⓓ Always first turn on the transmitter, which has been fully charged, and the throttle stick set to the slowest position. Then turn on the receiver (on the helicopter). Always turn on these switches in this order. Operate the sticks (for throttle/pitch, aileron, elevator and rudder) to confirm correct function. Connect the connectors for the battery powering the helicopter last.
- Ⓔ Never cut or bundle the antenna wire. Put it in the antenna tube so it will not be caught by the rotor or the main gear. If a 2.4Ghz transmitter set is used, please adjust the antenna to proper direction.
- Ⓕ Hold the helicopter securely with both hands while moving it. Because there are sharp parts, be very careful not to get injured during movement.

2. 【Precautions Prior to Flight】

- Ⓐ Make sure the Main Rotor Blades and Tail Rotor are free from any cracks or damage. If they are damaged even just a little, do not use them.
- Ⓑ With the throttle stick at the slowest position, turn on the transmitter and check if movements are correct.
- Ⓒ Be careful not to get your clothes caught on the transmitter stick while moving the helicopter. Moving the helicopter to the take-off position should take two people at least, one holding the helicopter body with both hands, and others carrying the items required for flight, such as the transmitter.
- Ⓓ Be sure to check the remaining capacity of all batteries prior to flight.
- Ⓔ Conduct a distance (range) test of the transmitter. With the transmitter antenna collapsed, move away from the helicopter 15m or more. Move all the sticks and confirm if the servos movements follow the stick movements. Do not use if they are not moving properly. Determine the cause and repair if necessary.
- Ⓕ If two or more Radios are used simultaneously on the same frequency, you should not fly because of interference. If someone else is using the same frequency, wait until he or she has finished the operation. If there is interference even when no one is using the same frequency, interference from external sources may exist. Never fly until the interference has been cleared.
- Ⓖ While connecting the batteries powering the helicopter, make sure the throttle stick is at the slowest position and the throttle hold switch is on.

3. 【Precautions during the Flight】

- ㊤ Never fly near houses, high voltage power lines, or heavy-traffic roads.
- ㊦ Never fly above people, houses behind you, or from distances too far away for radio signals. If the helicopter crashes or comes into contact with the human body, it could cause serious injury.
- ㊧ Always keep your eyes on the helicopter during the flight. If you look away even just for a short period of time, it may change position or you may lose sight of it thus lose control.
- ㊨ Do not fly (hovering, etc) with the Main Rotor Blades at the eye level because it is dangerous. Always make sure the Main Rotor Blades are higher than eye level.
- ㊩ Be careful not to exhaust the battery power. Use the timer function on the transmitter, keep the remaining battery power under check.
- ㊪ While stopping the Main Rotor Blades, never touch the Main Rotor Blades or the Flybar when they are still rotating. Wait for them to stop naturally.
- ㊫ If you notice any abnormality during flight, land the helicopter immediately and check for loose bolts, etc. Do not fly again until the causes of abnormality have been completely eliminated.
- ㊬ In a crash parts like the Li-Po battery or the ESC in the helicopter could catch fire. Keep a fire extinguisher near during flight for safety and fire prevention.
- ㊭ Other adjustments and notices will be updated at any time on the following website. Introduction and setting methods for recommended ESCs and Motors are also on this website. Please check it for more information.

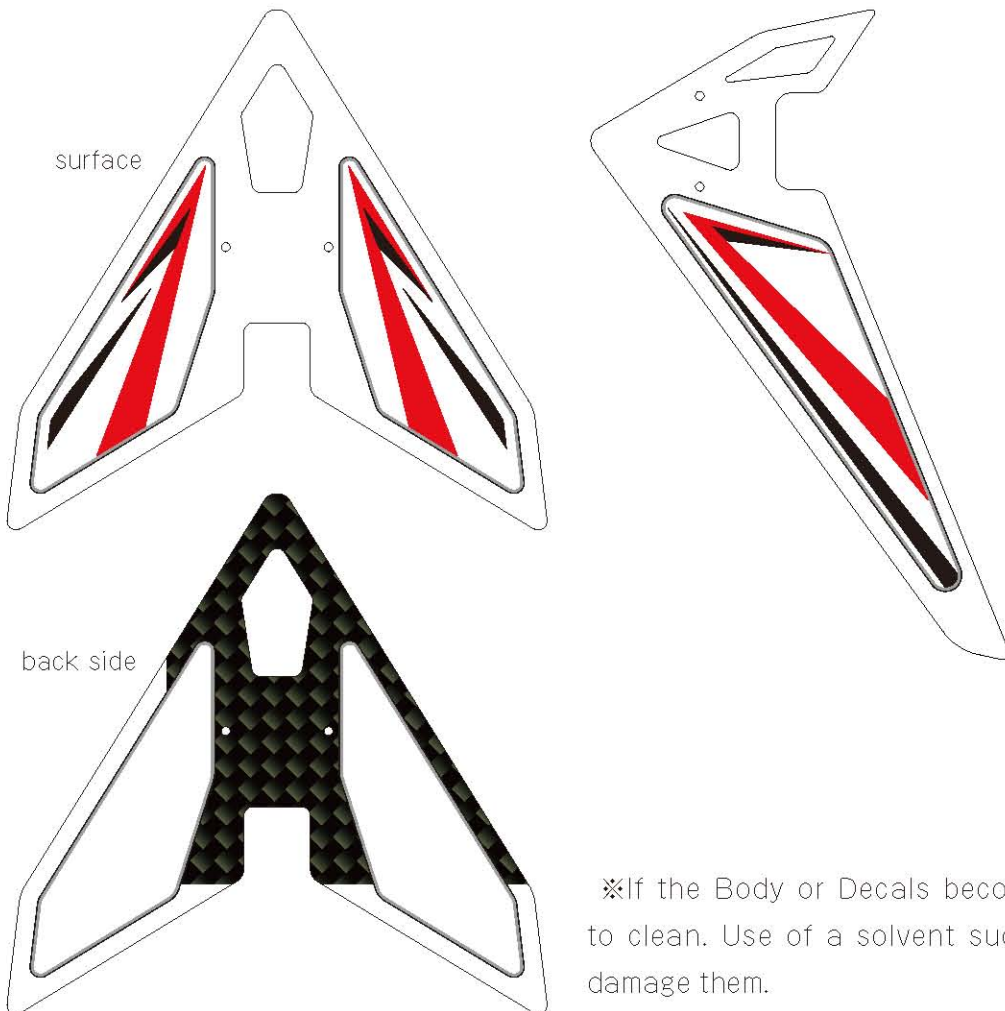
<http://www.jrpropo.co.jp/jpn/heli/e12/>

4. 【Precautions After Flight】

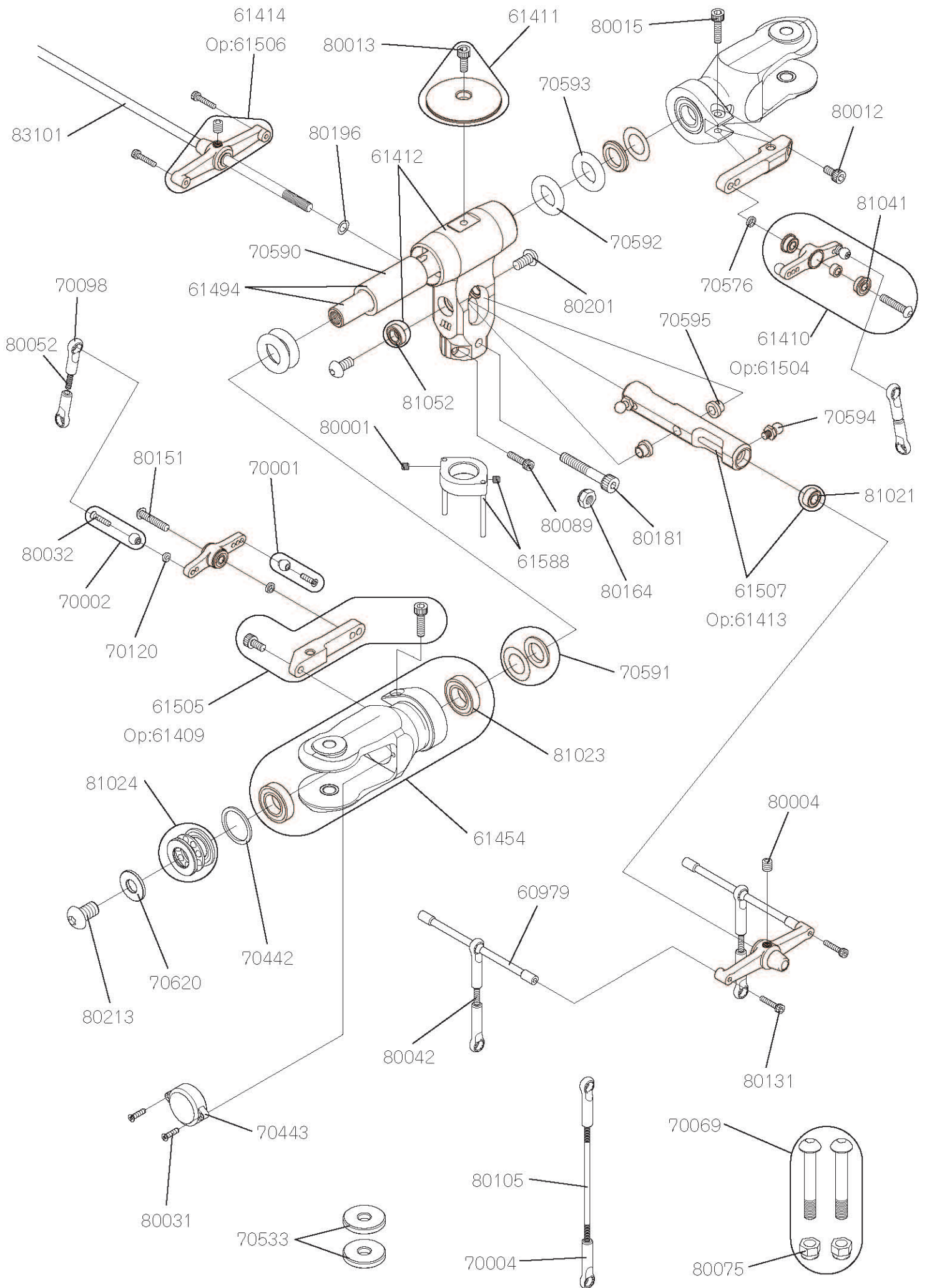
- ㊮ Check for any loose bolts or shaky parts. If there is any abnormality, repair it before the next flight.
- ㊯ If the Main Rotor Blades or any other parts come into contact with the ground during flight, do not use those parts even if they appear to be faultless. Replace them with new ones.
- ㊰ Check whether the battery, receiver, gyro, and other parts are firmly secured.
- ㊱ Check the antenna wires from time to time because its core may have been snapped, and snapping may not be apparent if it is inside the coating. Refer to the manufacturer for periodic checks.

DECAL PLACEMENT

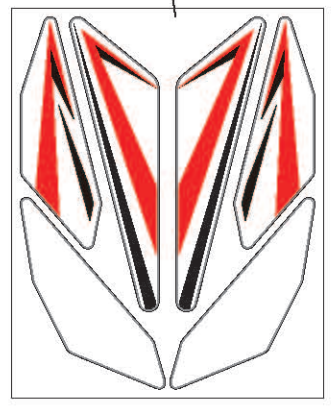
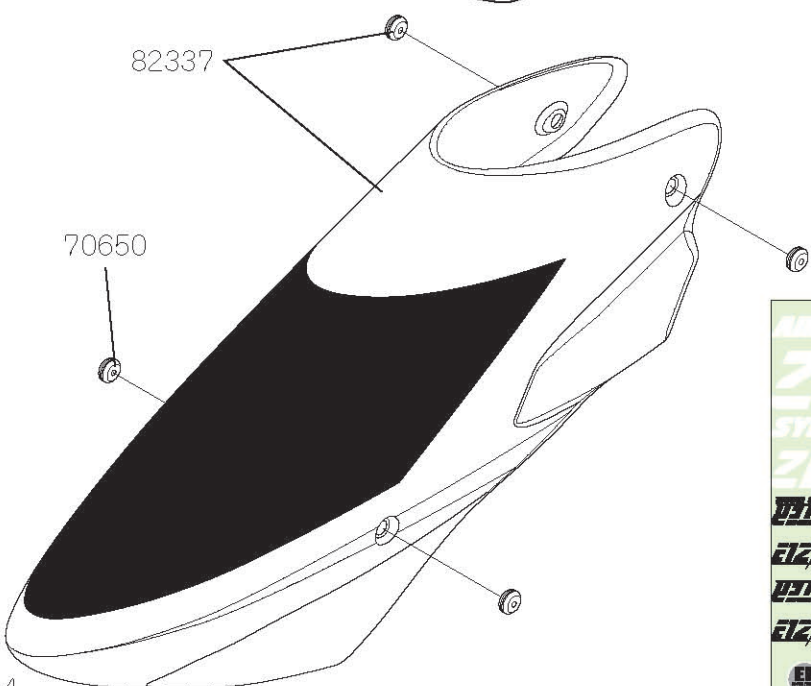
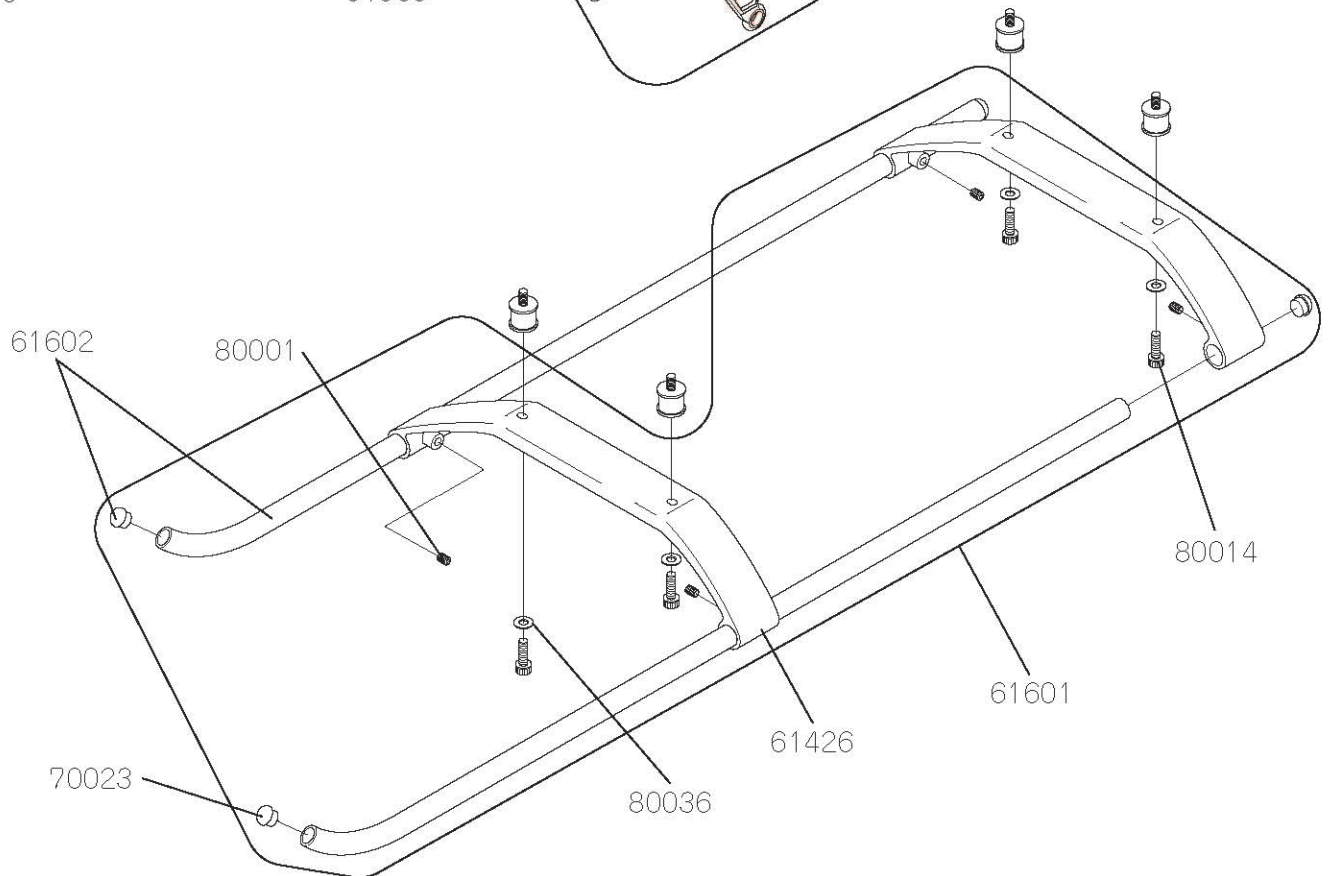
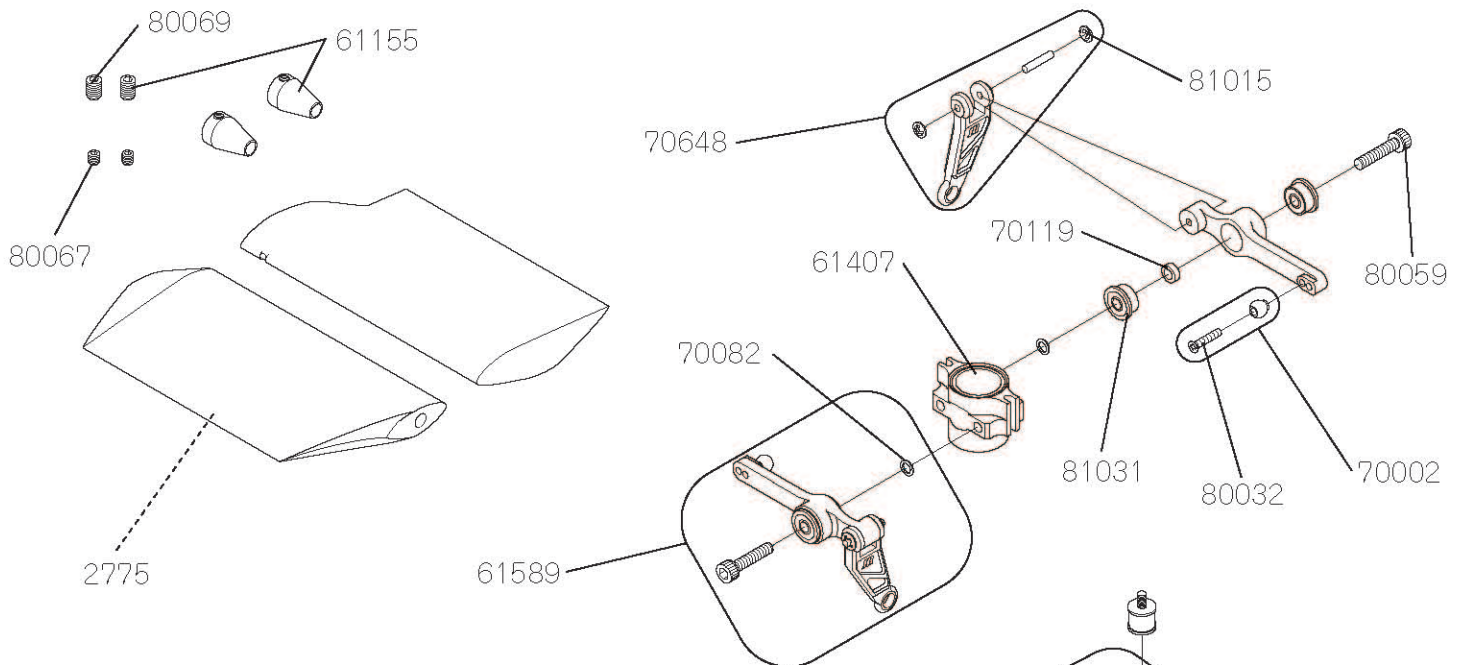
- Affix the Decals to the body as shown in the figure below.
- Before affixing the decals, degrease the surface of the body with alcohol, etc.
- Before affixing, spray diluted soapy water (water mixed with a small amount of neutral Kitchen detergent) onto the body. This allows you to slide the Decals into position. Affix them little by little so as not to trap air underneath.
- If air is trapped, do not remove the Decals by force. Make a tiny hole in the air-bubble area and push out the air.



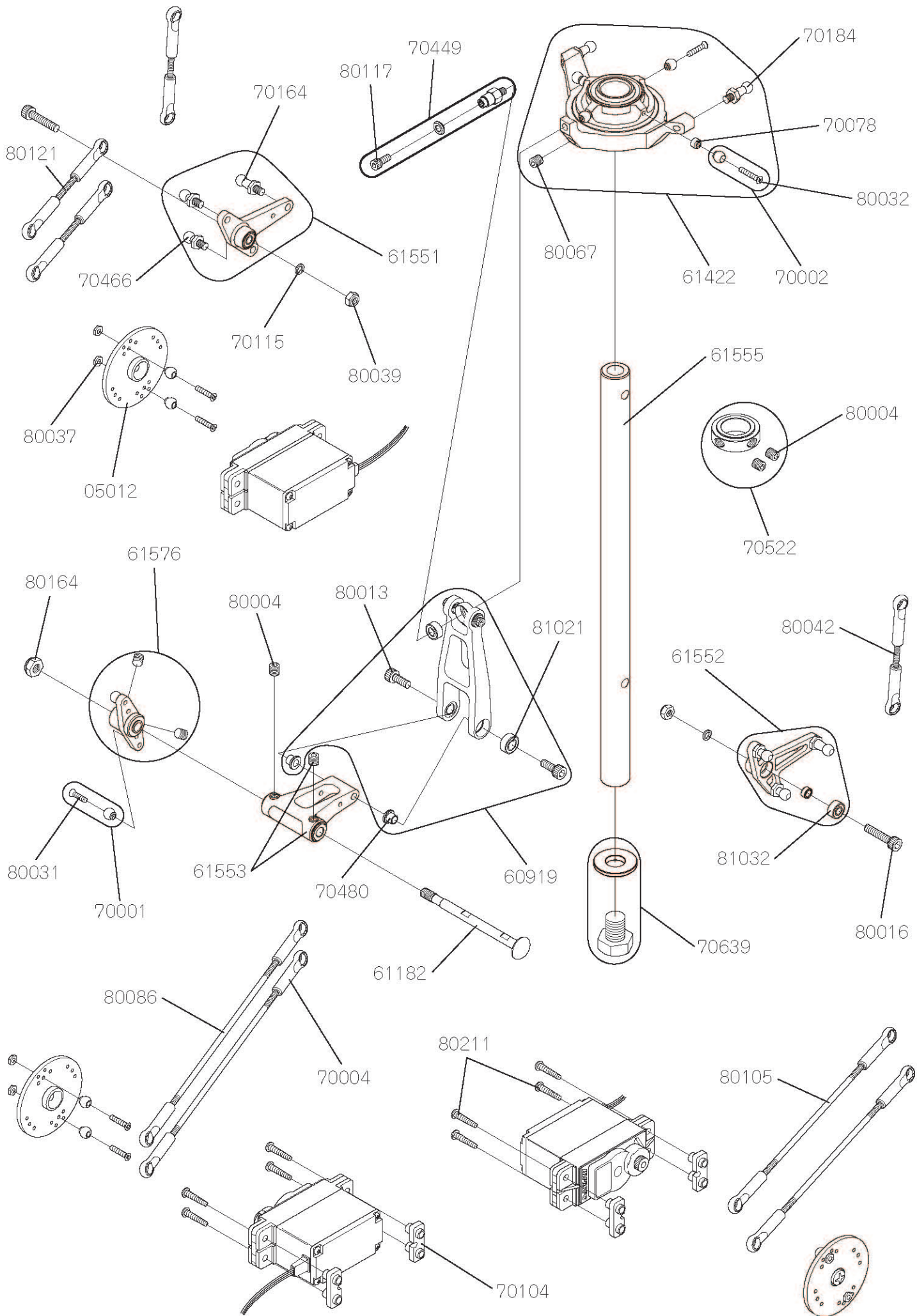
※If the Body or Decals become dirty, use neutral detergent to clean. Use of a solvent such as thinner may discolor and damage them.



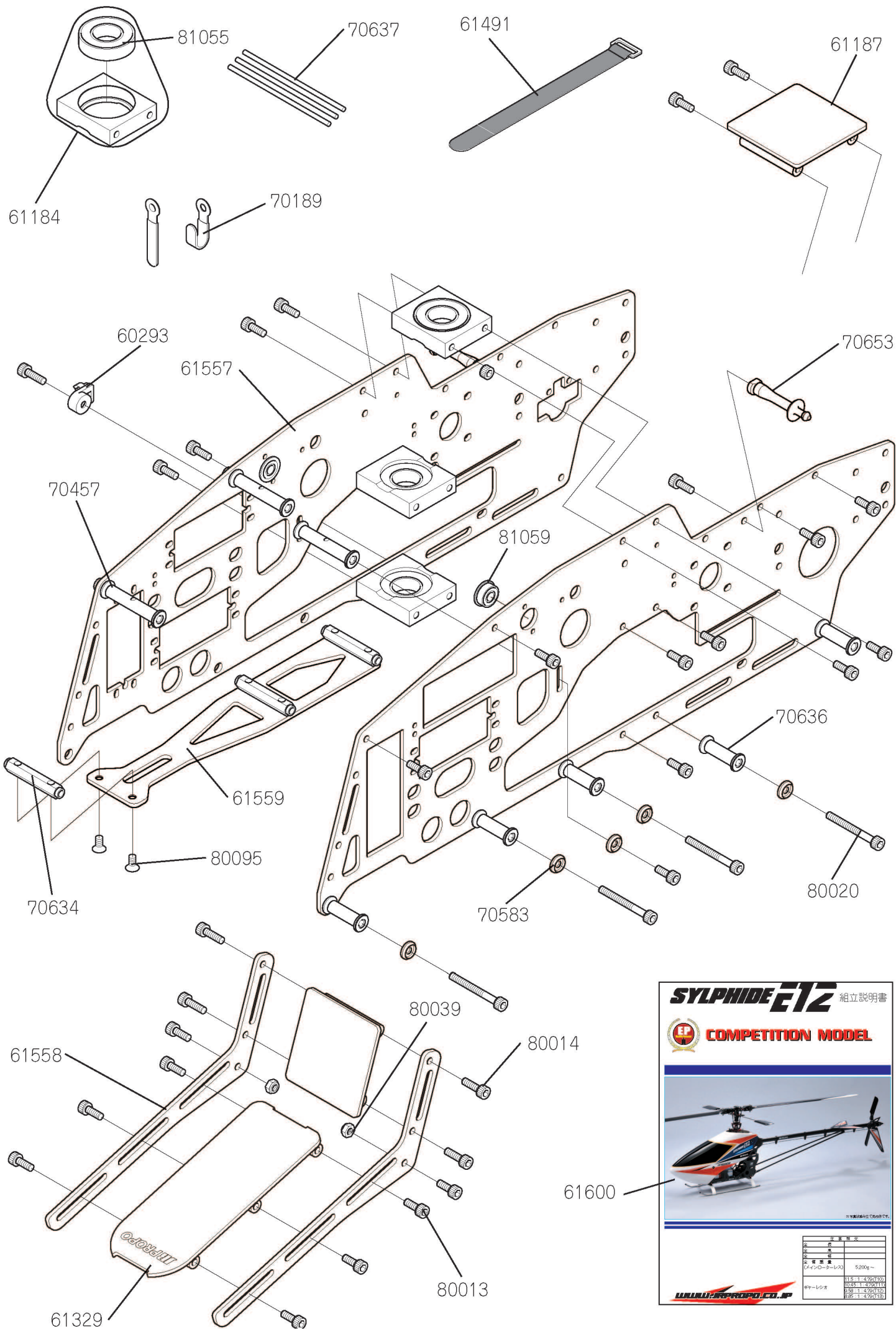
ITEM #	DESCRIPTION	QTY/BAG	NOTE
60979	Flybar Arm B	× 2	
61409	Pitch Arm (black)	× 1	w/Socket Head Bolt M3 × 12 · M3 × 6
61410	Mixing Arm Assembly (black)	× 1	w/LF-730ZZ Bearing · Joint Ball
61411	Head Button(Dome)	× 1	w/Socket Head Bolt M3 × 8
61412	Center Hub Assembly	× 1	L-950ZZ Bearing already assembled
61413	Seesaw Assembly (black)	× 1	L-840ZZ Bearing already assembled
61414	Flybar Arm A (black)	× 2	w/Setscrew M4 × 4
61454	Main Blade Holder Assembly	× 1	L-1790ZZ Bearing already assembled
61494	Spindle Shaft(∅ 10)	× 1	w/Spindle Shaft Tube · bolts · Washer
61504	Mixing Arm Assembly (red)	× 1	w/LF-730ZZ Bearing · Joint Ball
61505	Pitch Arm (red)	× 1	w/Socket Head Bolt M3 × 12 · M3 × 6
61506	Flybar Arm A (red)	× 2	w/Setscrew M4 × 4
61507	Seesaw Assembly (red)	× 1	L-840ZZ Bearing already assembled
61588	Washout Stopper (red)	× 1	w/Pins
70001	Joint Ball A	× 10	w/Flat Head Screw M2 × 8
70002	Joint Ball B	× 10	w/Flat Head Screw M2 × 10
70004	Universal Link	× 10	
70069	Main Blade Bolt Set M5	× 1	M5 × 30 · Nylon Lock Nut M5 for 1 Kit
70098	Universal Link S	× 5	
70120	Joint Ball Spacer t1.5	× 2	
70442	Thrust Washer	× 2	
70443	Thrust Bearing Cap	× 2	
70533	Rotor Spacer t3	× 4	
70576	Washer 03 × 4.5 × 1	× 2	
70590	Spindle Shaft Tube	× 1	
70591	Grip Spacer Set	× 2	w/Spindle Shim Washer
70592	Damper O-ring 10 × 18 × 4	× 4	hardness : 70°
70593	Damper O-ring 10 × 18 × 4	× 4	hardness : 90°
70594	Ball Arm L5	× 2	
70595	Seesaw Spacer Collar	× 2	
70620	Spindle Washer M6	× 2	
80001	Setscrew M3 × 4	× 10	
80004	Setscrew M4 × 4	× 10	
80012	Socket Head Bolt M3 × 6	× 10	
80013	Socket Head Bolt M3 × 8	× 10	
80015	Socket Head Bolt M3 × 12	× 10	
80031	Flat Head Screw M2 × 8	× 10	
80032	Flat Head Screw M2 × 10	× 10	
80042	Threaded Rod M2.3 × 30	× 2	
80052	Threaded Rod M2.3 × 15	× 2	
80075	Nylon Lock Nut M5	× 10	
80089	Socket Head Bolt M2.6 × 10	× 10	
80105	Threaded Rod M2.3 × 80	× 2	
80131	Socket Head Bolt M2 × 10	× 10	
80151	Button Head Bolt M3 × 15	× 10	
80196	Poly Slider 4.1 × 6.5 × 0.13	× 5	
80164	Nylon Lock Nut M4(t3.8)	× 10	
80181	Special Socket Head Bolt M4 × 26	× 2	
80201	Button Head Bolt M4 × 8	× 10	
80213	Button Head Bolt M6 × 10	× 10	
81021	Shielded Bearing 04 × 08 × 3	× 2	L-840ZZ
81023	Shielded Bearing 09 × 17 × 5	× 2	L-1790ZZ
81024	Thrust Bearing 09 × 17 × 5	× 2	SST-1790DSG
81041	Shielded Bearing F03 × 07 × 3	× 2	LF-730ZZ
81052	Shielded Bearing 05 × 09 × 3	× 2	L-950ZZ
83101	Flybar L500	× 2	



ITEM #	DESCRIPTION	QTY/BAG	NOTE
61155	Setting weight	× 2	
61407	Washout Base	× 1	For AS 90
61426	Low Profile Landing Strut v2	× 2	for 1 Kit · w/Setscrew
61586	Logo Sticker	× 1	For E12
61587	Decal for Tail Fin	× 1	For tail fin B
61589	Washout Arm Assembly	× 1	w/RF-830ZZ · Socket Head Bolt M3 × 14
61601	Low Profile Landing Gear Set v2(90)Gold	× 1	
61602	Landing Skid Gold	× 2	w/skid cap
70002	Joint Ball B	× 10	w/Flat Head Screw M2 × 10
70023	Landing Skid Cap	× 4	
70082	Washer 03 × 4.5 × 0.4	× 10	
70119	Spacer 03 × 05 × 1.8	× 2	
70648	Washout Link C	× 2	w/Pins
70650	Rubber Grommet B	× 6	
80001	Setscrew M3 × 4	× 10	
80014	Socket Head Bolt M3 × 10	× 10	
80036	Flat Washer M3	× 10	
80032	Flat Head Screw M2 × 10	× 10	
80059	Socket Head Bolt M3 × 14	× 10	
80067	Setscrew M3 × 3	× 10	
80069	Setscrew M4 × 6	× 10	
81015	CA Stopper Ring M2	× 10	
81031	Shielded Bearing F03 × 08 × 4	× 2	RF-830ZZ
82337	FRP Canopy SY-E12	× 1	w/Logo Sticker · Grommet
K&S Part			
2775	FAI Carbon Control Paddle 2	× 2	Please purchase from K&S



ITEM #	DESCRIPTION	QTY/BAG	NOTE
05012	Big Horn Set	× 1	
60919	Swash Link Assembly	× 1	W/Swash Link Collar · Bearing already assembled
61182	Base Spindle (AS)	× 1	
61422	ASG Swash Plate 90 (red)	× 1	w/Joint Ball · Ball Arm
61551	Swash Control Arm R Assembly	× 1	w/Bearing already assembled · Ball Arm
61552	Swash Control Arm L Assembly	× 1	w/Bearing already assembled · Ball Arm
61553	Swash Control Base	× 1	w/Setscrew M4 × 4
61555	Main Shaft ø 12	× 1	
61576	Swash Control Lever B	× 1	Color : Red w/Joint Ball · Setscrew
70001	Joint Ball A	× 10	w/Flat Head Screw M2 × 8
70002	Joint Ball B	× 10	w/Flat Head Screw M2 × 10
70004	Universal Link	× 10	
70078	Joint Ball Spacer t2.75	× 2	
70104	Servo Mount Plate B	× 10	
70115	Washer 03 × 4.5 × 0.7	× 10	
70164	Ball Arm L8	× 1	
70184	Ball Arm L9	× 1	
70480	Swash Link Collar	× 2	
70449	Swash Link Ball Arm	× 1	w/Swash Link Ball Collor B · bolts
70466	Ball Arm L5.5	× 1	
70522	Main Shaft Collar	× 1	w/Setscrew M4 × 4
70639	Main Shaft Washer · Bolt set ø 12	× 1	
80004	Setscrew M4 × 4	× 10	
80013	Socket Head Bolt M3 × 8	× 10	
80016	Socket Head Bolt M3 × 15	× 10	
80031	Flat Head Screw M2 × 8	× 10	
80032	Flat Head Screw M2 × 10	× 10	
80037	Nut M2	× 10	
80039	Nylon Lock Nut M3(t2.8)	× 10	
80042	Threaded Rod M2.3 × 30	× 2	
80067	Setscrew M3 × 3	× 10	
80086	Threaded Rod M2.3 × 90	× 2	
80105	Threaded Rod M2.3 × 80	× 2	
80117	Socket Head Bolt M2.6 × 6	× 10	
80121	Threaded Rod M2.3 × 25	× 2	
80164	Nylon Lock Nut M4(t3.8)	× 10	
80211	HEX Tapping Bolt M2.6 × 12	× 10	
81021	Shielded Bearing 04 × 08 × 3	× 2	L-840ZZ
81032	Shielded Bearing 03 × 07 × 3	× 2	L-730ZZ



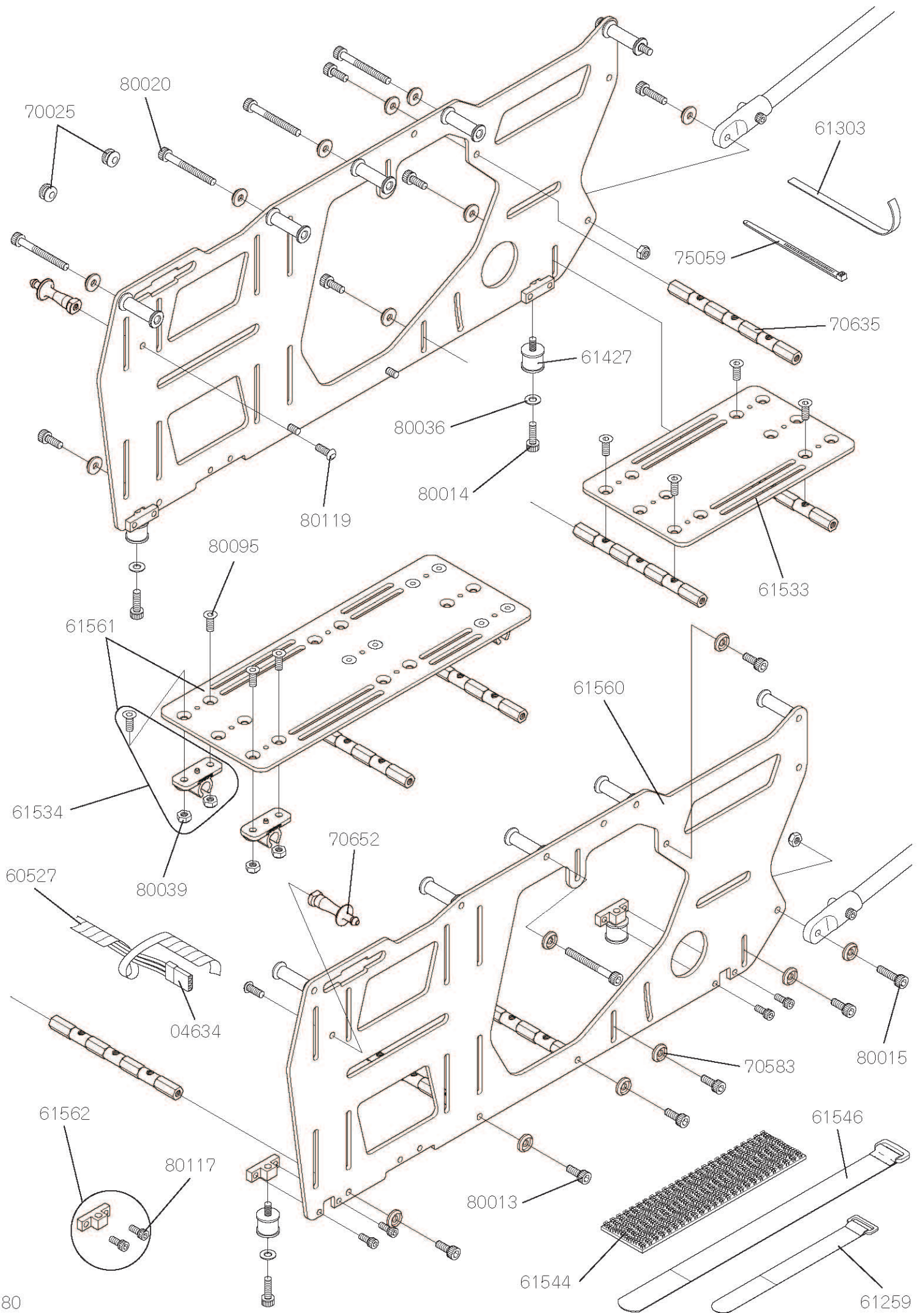
SYLPHIDE E1Z 組立説明書
COMPETITION MODEL

61600

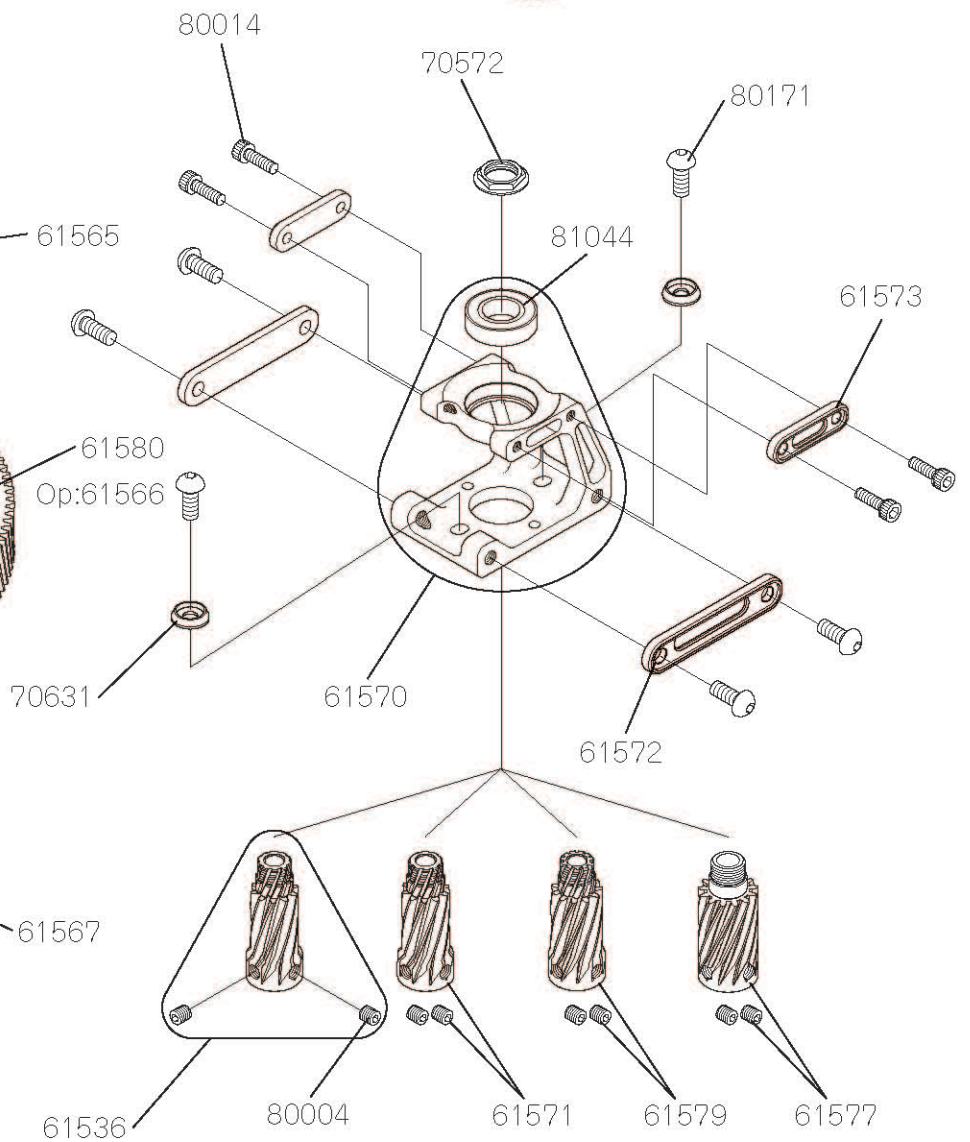
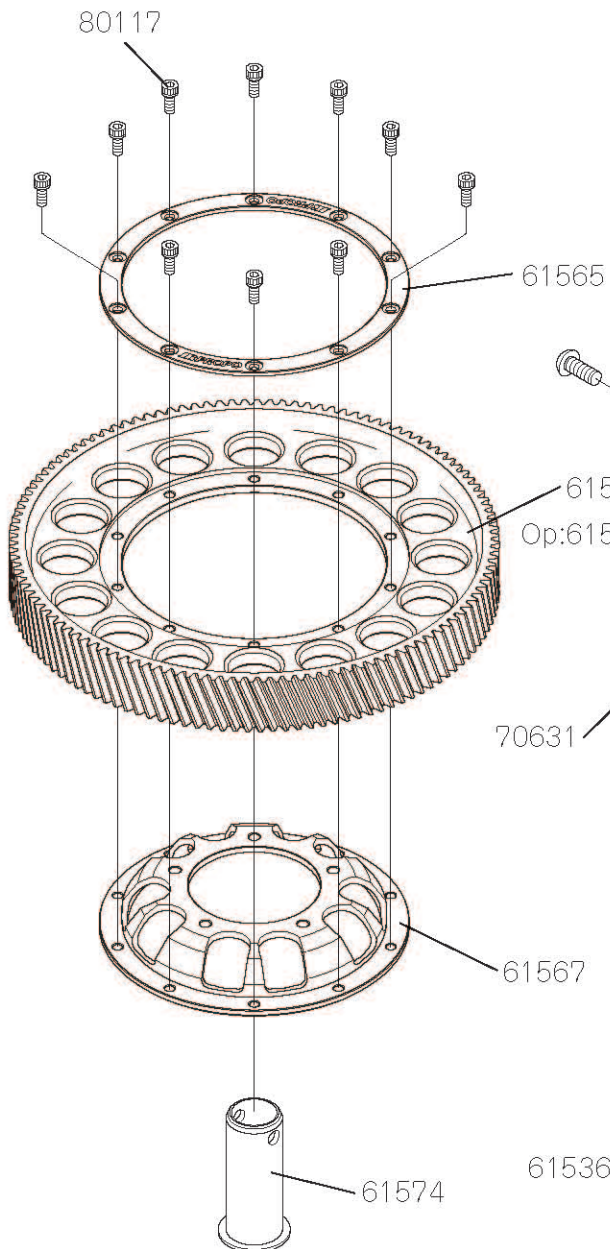
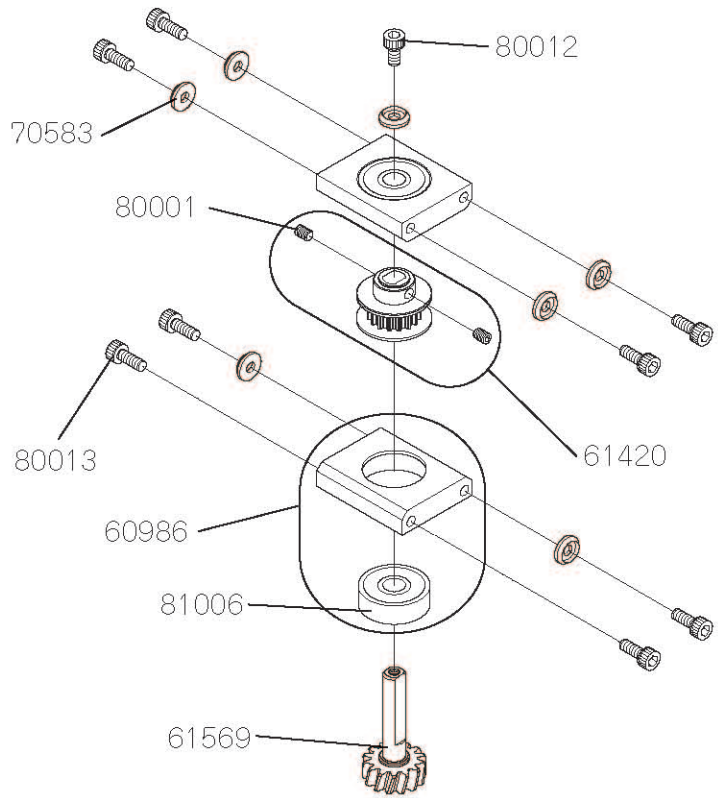
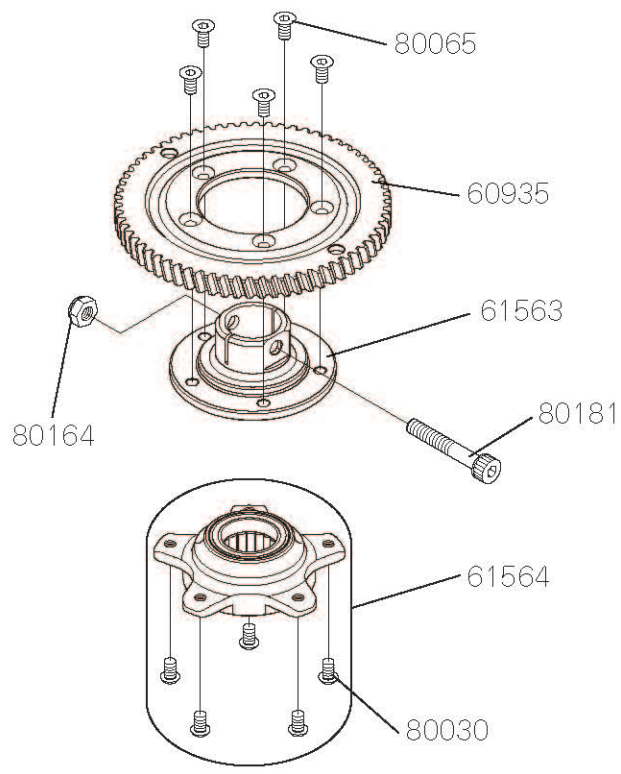
主要仕様	
全長	115
全高	105
全幅	115
全重量 (ブレード含まず)	520g
モーター	11.5 - 14.5V (10)
バッテリー	0035 - 14.5V (10)
サーボ	0035 - 14.5V (10)
ギア	0035 - 14.5V (10)

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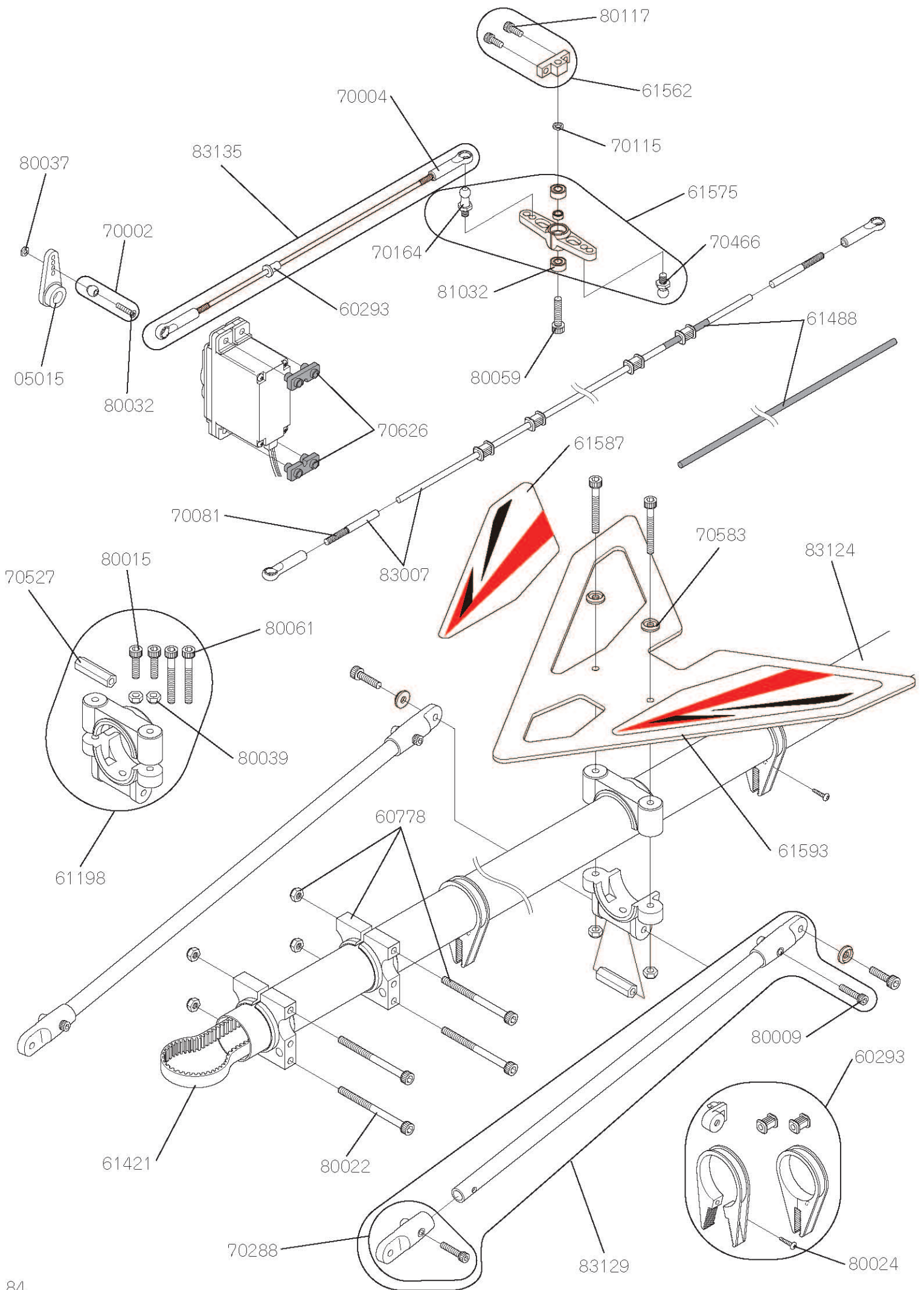
ITEM #	DESCRIPTION	QTY/BAG	NOTE
60293	Tail Rod Guide B Set	× 1	Rod Guide Collar B etc whole set
61184	Bearing block w/bearing	× 1	6901ZZ Bearing already assembled
61187	Gyro Mount	× 1	
61329	Front Tray	× 1	w/Socket Head Bolt M3 × 8
61491	Hook and Loop Strap Black	× 2	L : 200
61557	Carbon Upper Frame E	× 1	L/R each · w/LF-1040ZZ Bearing
61558	Carbon Front Tray Frame	× 2	
61559	Carbon Frame Support Plate	× 1	
61600	Assembly Manual (SY-E12)	× 1	
70189	Cord Holder	× 10	w/Flat Washer M3
70457	Cross Member L32	× 2	
70583	Special Washer M3	× 10	
70634	Cross Member w/Step L32P20	× 2	
70636	Cross Member L20(Through)	× 4	
70637	Lever Alignment Pin ø 2	× 3	
70653	Body Catch L26	× 2	
80013	Socket Head Bolt M3 × 8	× 10	
80014	Socket Head Bolt M3 × 10	× 10	
80017	Socket Head Bolt M3 × 16	× 10	
80020	Socket Head Bolt M3 × 28	× 10	
80022	Socket Head Bolt M3 × 40	× 10	
80039	Nylon Lock Nut M3(t2.8)	× 10	
80095	Flat Head Bolt M3 × 8	× 10	
81055	Shielded Bearing 12 × 24 × 6	× 1	6901ZZ
81059	Shielded Bearing F04 × 10 × 4	× 2	LF-1040ZZ



ITEM #	DESCRIPTION	QTY/BAG	NOTE
04634	Lead harness 150LG	× 1	L : 150
60527	Spiral Wire Protector(1m)	× 1	
61259	Hook and Loop Strap L(Red)	× 2	L : 270
61303	Hook and Loop Strap S	× 2	L : 200
61427	Landing Skid Damper v.2	× 4	
61533	Carbon Main Tray 108 × 64	× 1	
61534	Battery Clamp	× 4	w/Flat Head Bolt · Nylon Lock Nut
61544	Magic Lock Tape(L100)	× 2	
61546	Hook and Loop Strap XL(Red)	× 2	L : 420
61560	Carbon Lower Frame E	× 2	
61561	Carbon Main Tray 168 × 64	× 1	w/Battery Clamp · bolts
61562	Mount Block (Red)	× 2	w/Socket Head Bolt M2.6 × 6
70025	Switch Damper Rubber	× 4	
70583	Special Washer M3	× 10	
75059	Nylon Strap S	× 10	
70635	Main Tray Mount L76P42	× 2	
70652	Body Catch L19	× 2	
80013	Socket Head Bolt M3 × 8	× 10	
80014	Socket Head Bolt M3 × 10	× 10	
80015	Socket Head Bolt M3 × 12	× 10	
80020	Socket Head Bolt M3 × 28	× 10	
80036	Flat Washer M3	× 10	
80039	Nylon Lock Nut M3(t2.8)	× 10	
80095	Flat Head Bolt M3 × 8	× 10	
80117	Socket Head Bolt M2.6 × 6	× 10	
80119	Button Head Bolt M3 × 8	× 10	



ITEM #	DESCRIPTION	QTY/BAG	NOTE
60935	Helical Tail Drive Gear T67	× 1	w/Flat Head Bolt M3 × 6
60986	Tail Pinion Bearing Block Assembly	× 1	
61420	Front Pulley T18J	× 1	w/Setscrew M3 × 4
61536	Helical Pinion Gear T10	× 1	w/Setscrew M4 × 4
61563	Tail Drive Gear Hub	× 1	
61564	Autorotation Unit	× 1	Bearing already assembled · w/Button Head Bolt
61565	Main Gear Hub Plate	× 1	
61566	Helical Main Gear T120	× 1	
61567	Main Gear Hub	× 1	
61569	Helical Tail Pinion Gear T14	× 1	
61570	Motor Mount Block	× 1	Bearing already assembled
61571	Helical Pinion Gear T11	× 1	w/Setscrew M4 × 4
61572	Mount Plate A	× 2	Color : Red
61573	Mount Plate B	× 2	Color : Red
61574	Autorotation Sleeve ø 12	× 1	
61577	Helical Pinion Gear T13	× 1	w/Setscrew M4 × 4
61579	Helical Pinion Gear T12	× 1	w/Setscrew M4 × 4
61580	Helical Main Gear T115	× 1	
70572	Pinion Nut M9	× 1	
70583	Special Washer M3	× 10	
70631	Special Washer M4	× 10	
80001	Setscrew M3 × 4	× 10	
80004	Setscrew M4 × 4	× 10	
80012	Socket Head Bolt M3 × 6	× 10	
80013	Socket Head Bolt M3 × 8	× 10	
80014	Socket Head Bolt M3 × 10	× 10	
80030	Button Head Bolt M3 × 5	× 10	
80065	Flat Head Bolt M3 × 6	× 10	
80117	Socket Head Bolt M2.6 × 6	× 10	
80171	Button Head Bolt M4 × 10	× 10	
80181	Special Socket Head Bolt M4 × 26	× 2	
80164	Nylon Lock Nut M4(t3.8)	× 10	
81006	Shielded Bearing 06 × 19 × 6	× 2	R-1960ZZ
81044	Shielded Bearing 10 × 19 × 5	× 2	6800ZZ



ITEM #	DESCRIPTION	QTY/BAG	NOTE
05015	Super Horn Set	× 1	5pc sets
60293	Tail Rod Guide B Set	× 1	Rod Guide Collar B etc whole set
60778	HG Tail Pipe Holder	× 2	w/Socket Head Bolt · Nylon Lock Nut
61198	Tail Boom Brace Clamp (AS)	× 1	
61421	Tail Drive Belt 1860J	× 1	
61488	Polyimide Tube (200mm)	× 1	
61562	Mount Block (Red)	× 1	w/Socket Head Bolt M2.6 × 6
61575	Control Lever (Red)	× 1	Bearing already assembled · w/Ball Arm
61587	Decal for tail fin	× 1	Horizontal / Vertical
61593	Carbon Horizontal Fin B	× 1	
70002	Joint Ball B	× 10	w/Flat Head Screw M2 × 10
70004	Universal Link	× 10	
70081	Rod End	× 4	
70115	Washer 03 × 4.5 × 0.7	× 10	
70164	Ball Arm L8	× 1	
70288	Tail Boom Brace End(60)	× 4	
70466	Ball Arm L5.5	× 1	
70527	Cross Member L20	× 2	
70583	Special Washer M3	× 10	
70626	Servo Mount Plate C	× 10	
80009	Socket Head Bolt M2.6 × 12	× 10	
80013	Socket Head Bolt M3 × 8	× 10	
80015	Socket Head Bolt M3 × 12	× 10	
80022	Socket Head Bolt M3 × 40	× 10	
80024	Self Tapping Screw M2 × 8	× 10	
80032	Flat Head Screw M2 × 10	× 10	
80037	Nut M2	× 10	
80039	Nylon Lock Nut M3(t2.8)	× 10	
80059	Socket Head Bolt M3 × 14	× 10	
80061	Socket Head Bolt M3 × 25	× 10	
83007	Carbon Tail Control Rod	× 1	
80117	Socket Head Bolt M2.6 × 6	× 10	
81032	Shielded Bearing 03 × 07 × 3	× 2	L-730ZZ
83124	Carbon Tail Boom L855	× 1	
83129	Carbon Tail Boom Brace Set L590	× 1	for 1 Kit · w/Tail Boom Brace End(60)
83135	Tail Control Rod L235	× 1	w/Universal Link · Rod Guide Collar

ITEM #	DESCRIPTION	QTY/BAG	NOTE
60359	HG Tail Gear Base	× 1	
60360	HG Tail Gear Holder	× 1	Color : Black
60556	Tail PC Link B	× 2	
61150	Carbon Tail Rotor Blades	× 2	
61201	Tail Slide Ring	× 1	L-1170ZZ already assembled
61294	ASG Tail Gear Lever Bracket	× 1	Color : Black
61373	ASG Tail Pitch Control Lever Set	× 1	1set
61419	Tail Pulley T18 J	× 1	w/Setscrew M4 × 4
61421	Tail Drive Belt 1860 J	× 1	
61423	Tail Center Hub	× 1	w/Setscrew M4 × 4
61424	Tail Blade Holder	× 1	for 1 Kit
61433	HG Tail Center Hub Set	× 1	for 1 Kit
61550	Carbon Vertical Fin	× 1	
61587	Decal for tail fin	× 1	Horizontal / Vertical
61590	ASG Tail Gear Holder (Red)	× 1	w/Socket Head Bolt · Setscrew
61591	ASGTail Gear Bearing Block A	× 1	R-1350ZZ already assembled
61592	ASGTail Gear Bearing Block B	× 1	R-1350ZZ already assembled
61594	ASG Tail PC Plate	× 1	w/PC link
61595	ASG Tail Gear Case v2	× 1	whole set
61596	ASG Tail Gear Lever Bracket (Red)	× 1	
70002	Joint Ball B	× 10	w/Flat Head Screw M2 × 10
70137	HG Tail Output Shaft	× 1	
70150	O-ring 05 × 07 × 1	× 2	
70152	Washer 05 × 07 × 0.05	× 2	
70163	O-ring 3.5 × 5.5 × 1	× 2	
70293	HG Tail PC Link Pin	× 2	
70528	Tail Slide Ring Sleeve	× 1	
70529	Tail PC Bearing Collar	× 1	
70530	Tail PC Slide Bolt	× 2	
70583	Special Washer M3	× 10	
70545	Washer 08 × 10 × 0.5	× 2	
70577	Washer 05 × 07 × 0.5	× 2	
70649	Tail Plate Cross Member L16 (Red)	× 1	w/Button Head Bolt M3 × 6
80004	Setscrew M4 × 4	× 10	
80012	Socket Head Bolt M3 × 6	× 10	
80013	Socket Head Bolt M3 × 8	× 10	
80032	Flat Head Screw M2 × 10	× 10	
80036	Flat Washer M3	× 10	
80037	Nut M2	× 10	
80039	Nylon Lock Nut M3(t2.8)	× 10	
80091	Button Head Bolt M3 × 6	× 10	
80119	Button Head Bolt M3 × 8	× 10	
81038	Shielded Bearing F04 × 07 × 2.5	× 2	LF-740ZZ
80067	Setscrew M3 × 3	× 10	
80115	Socket Head Bolt M2.6 × 8	× 10	
80128	Nylon Lock Nut M2	× 10	
80131	Socket Head Bolt M2 × 10	× 10	
80200	Tail Blade Bolt	× 2	M3 × 15 · w/Nylon Lock Nut
81016	E Stopper Ring M1.5	× 10	
81028	Shielded Bearing 05 × 10 × 4	× 2	L-1050ZZ
81029	Thrust Bearing 05 × 10 × 4	× 2	T5-10
81065	Shielded Bearing 07 × 11 × 3	× 2	L-1170ZZ



LOT NO.

2011.03

SY E12Assembly Instructions Version 1

The product and the contents of these instructions are subject to change
without notice due to improvement.