



DFA EDITION

ASSEMBLY MANUAL



Specifications

Length	1,332mm	Main rotor blades	710mm	Tail output shaft dia.	Ø 6	Gear ratio 10.18 : 1 : 4.72	
Height	356mm	Main shaft dia.	Ø 12	Tail rotor dia.	288mm	Li-po battery 6 cell × 2	
Width	210mm	Main rotor dia.	1,599mm	Control system	120° CCPM	Tail drive system : Shaft drive	
Gross weight	3,500g ~	* not including ba	ttery				

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Introduction

Thank you for purchasing this JR product.

The FORZA 700 is an electric helicopter perfect for advanced and 3D flyers.

Please be sure to understand the instructions in this manual before commencing assembly.

Be sure to observe these safety precautions

Do not assemble or fly this helicopter without seeking expert assistance. Be sure to receive guidance from our dealer or an advanced pilot. An instructor helping you is requested to fully observe not only the instructions and precautions in this manual but also the rules and guidelines for flight.

In order to prevent fire or injury, always observe the stated safety precautions each time you go flying.

The manual describes warnings, dangers and cautions for safe assembly and flying. They are very important.

The following symbols are used to indicate the precautions for preventing accidents due to erroneous handling of this product. Please be sure to follow these instructions.



Neglect of this precautionary notice is very likely to result in death or serious injury to the



WARNING Neglect of this precautionary notice is likely to result in death, serious injury or damage to property.



Neglect of this precautionary notice is not likely to result in death or serious injury but may result in injury or damage to property.

Take guidance from our dealer or advanced pilot

This helicopter is not a toy.

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

Because many parts are already assembled, it may look simple and easy to operate. However, it actually requires extremely delicate assembly, adjustment and operation.

Take appropriate guidance from our dealer or an advanced pilot so that you can enjoy flying this model and experience its full performance.

If you cannot complete the assembly by yourself, it is recommended you take guidance from our dealer or an advanced pilot. When you first fly the model, be sure to ask for assistance. Flying the helicopter alone may involve great danger to yourself or others, as well as damaging the helicopter. Getting proper guidance helps prevent accidents and damage. Also, please pay close attention to the use and care of peripheral equipment including the battery, charger, etc.

Buy a radio control insurance policy

Please be sure to purchase a "radio control insurance policy".

For details, please inquire with our distributors or an insurance agent.

Be careful when handling parts such as the battery or charger

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 an 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.

Precautions for handling

- Immediately after flight, the motor, speed control and battery are very hot. Be careful to avoid a fire or burn.
- Accessories such as the battery and electrical parts should be handled with care. If the insulation 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 flame or in a hot environment.
- Unnecessary disassembly or modification of any components are strictly prohibited.
 Neglect of this could result in a fault and /or accident.
- Stop and unplug the motor before doing the following actions:
- ① When you make adjustments to the helicopter or the control sysytem.
- 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 parts only within their service limits, if indicated.
- In order to realize a pleasant flight, try to keep appropriate gear backlash, movable parts moving smoothly, bolts tightened, and parts lubricated or replaced as required.

Precautions for safe flight

The model could 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 environment at all times for safe flying.

- © 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 pilot and operate under their instructions.
- O 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 can not 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 can be defined as the distance where it can receive the radio frequency signal from the transmitter. However its true range is limited to where you can confirm the behavior 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.
- ® 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.

Precautions for the operator

The following items are precautions for the operator flying this R/C helicopter.

Be sure to observe them.

- ① The following persons or those in the following states should never operate this helicopter:
 - 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 judgments 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.
 - 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.

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• 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 in an unstable or slippery position.
 - 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.

Precautions for starting

- ① Make sure the bolts for the blades (main rotor, tail rotor) are properly tightened there should be some movement possible. Check all other screws to confirm they are properly tightened. Retighten any loose screws.
- ② Make sure that no tool used for assembly or adjustment has been left in the helicopter body, and that all parts affecting 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).
- Make sure that the batteries in the transmitter and the receiver are fully charged.
- ⑤ Always turn on the transmitter first.
- ⑥ Conduct a distance (range) test of the transmitter. Follow the directions of your transmitter manufacture.
 Move the controls and confirm movement of the helicopter servos. If they do not move properly, check the cause and have it repaired, if necessary.
- ② a. Extend the transmitter's antenna to its full length. Put the receiver's antenna through an antenna tube and make sure that it can easily receive the radio signal, ensuring it cannot be caught by moving parts (do not bend or bundle the antenna).
 - b. When using a 2.4GHz transmitter, please adjust the antenna as directed in the manual supplied with the transmitter.

Starting

- ① When moving to a take-off site, note that if your clothes contact the transmitter sticks, the rotor may suddenly start running. Please proceed with caution.
- 2) When starting the motor, make sure that there is no person, animal or obstacle around the helicopter, which may be caught by the rotors.
- ③ 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 using the slow start function of the 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.
- When lifting the helicopter into the air, be sure to remain at least 10m or more away from it.
- (5) Land before adjusting the transmitter or helicopter. Do not allow part of your body or clothes to contact the transmitter sticks 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, and causing the helicopter to suddenly leap into the air, endangering yourself or others.
- (6) Do not put your hand or any objects into the movable parts while they are running.
- ① 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-supply batteries, and switch off the receiver. Turn the transmitter off last.

PRECAUTIONS DURING FLIGHT

- ① If you note an abnormality such as unusual noise, vibration, etc. during flight, swiftly land the helicopter in a safe place 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 blade holder, 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 loose 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 each flight inspect the following:

Check screws for tightness and parts for wear, deterioration and damage.

Wipe 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, 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 or children.
 - If there is damage or other problems, repair or replace components as necessary 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 become broken. This may not be immediately apparent, so have it checked periodically by the manufacturer.
- ① Once your flying session is over, be sure to remove the battery from the helicopter.

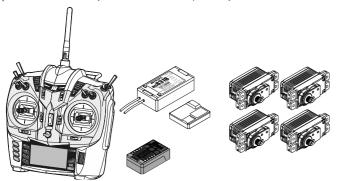
Replacement parts

When replacing parts, use our specified original or our authorized optional parts. Do not modify these parts.

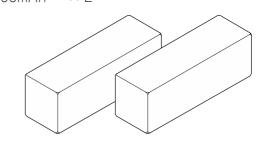
Our product warranty does not cover any troubles resulting from use of non-original parts. Do not use out-of-standard parts, because they may cause an accident or a problem exposing you to great danger.

Additional items required

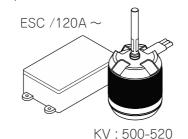
1 Transmitter (120 CCPM capable)



2 Lithium-polymer battery (Li-Po) 6 cell 22 2V 4 500mAh \sim × 2

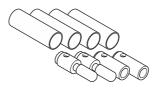


3 Battery charger



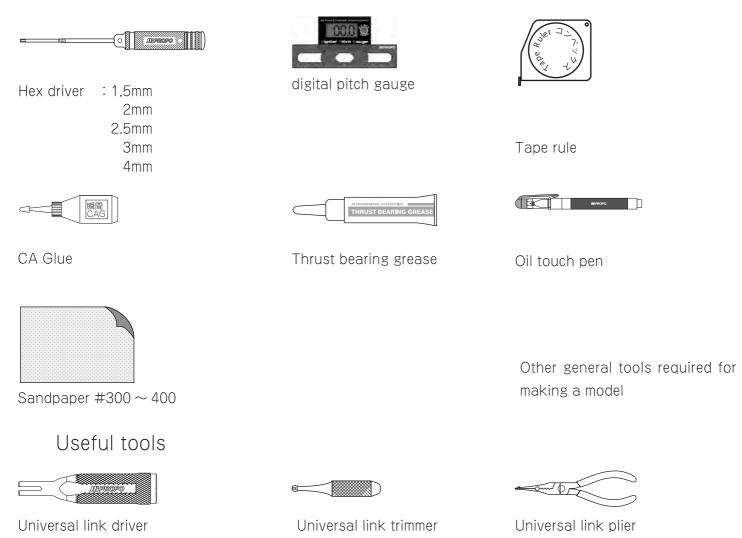
4 Brushless motor & ESC

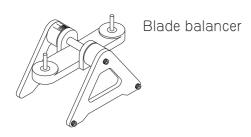
5 Battery connector set



* Please see p.33 for details.

Tools required for assembly

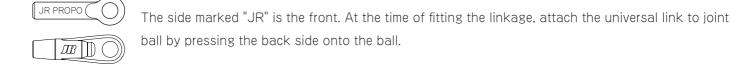




Universal links

The Universal links have a front and back and are 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 attention to the direction of each universal link during assembly.



Indication of temporary fixation

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



Bolt and nut types

The following illustrates the bolts used for FORZA 700.

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

© () Button head bolt		Socket head bolt	Special socket head bolt	Nylon lock nut
O (mm) Hex tapping screw	Flat head bolt	© IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	O Threaded rod	Special washer
	Flat washer			

Prevention of loosened bolts



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 the 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. If multiple pieces of the same part are used, the symbols including those for their bolts may be omitted. There are two kinds of screw locking agents. 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 required, the mark required, the mark required is used.

After assembly, if you want to remove the bolts, etc. secured with the screw locking agent, weaken the thread lock agent by adequately heating the bolt 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 heating to loosen the screw locking agent, care should be taken not to deform the surrounding resin parts.

Tightening bolts

The bolts used for R/C Helicopter are rather small. If they are over tightened, the thread may be damaged. Please be especially careful when tightening the tapping screws into plastic parts.

Grease



Apply thrust bearing grease to the relevant parts marked with this symbol.

Instant adhesive agent

Bond the relevant parts marked with the following symbol, using an instant adhesive agent. (CA glue)

As with the screw locking agent, a number "(x 2)" next to the symbol denotes the number of parts required to be adhered.



Sanding



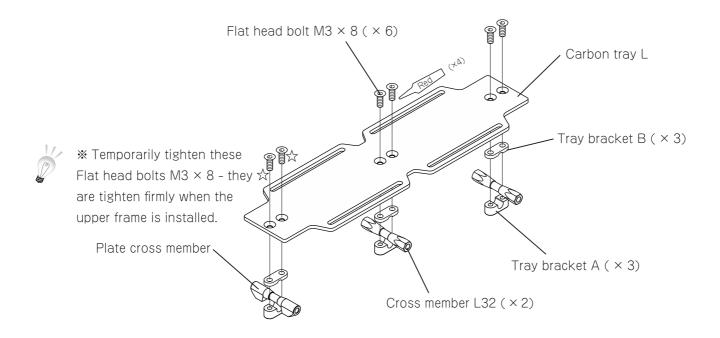
Sand the parts where indicated with this symbol.

Assembly hint

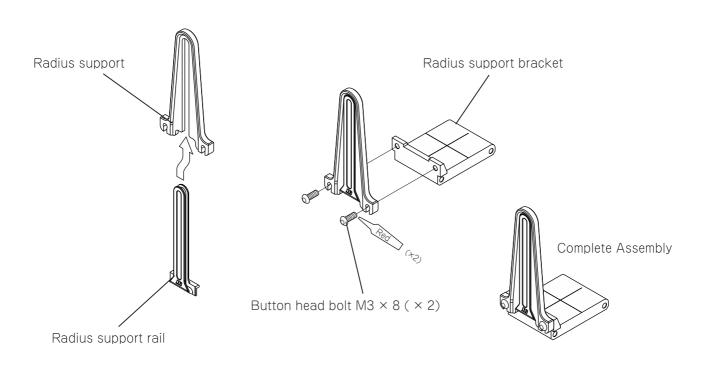


There is a hint for assembly marked with this symbol.

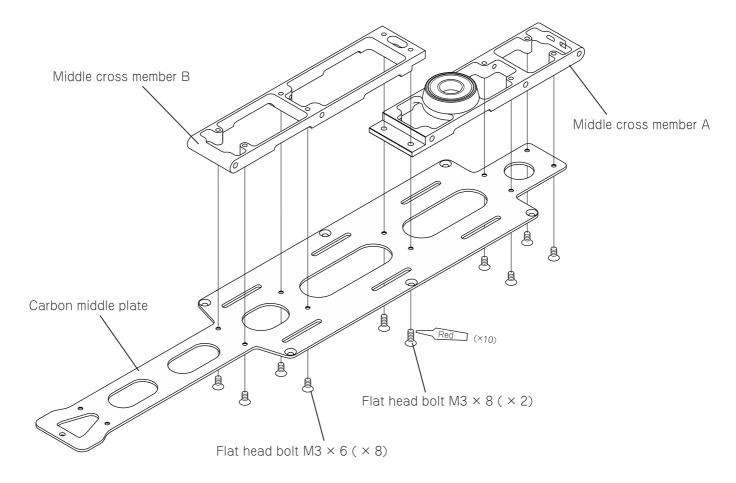
1-1 CARBON TRAY L ASSEMBLY



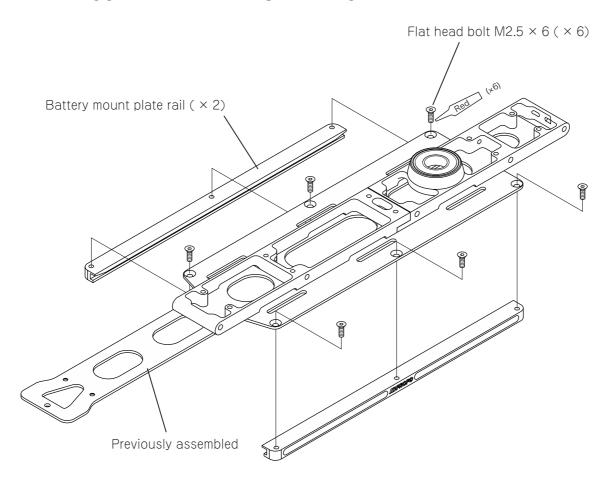
1-2 RADIUS SUPPORT ASSEMBLY



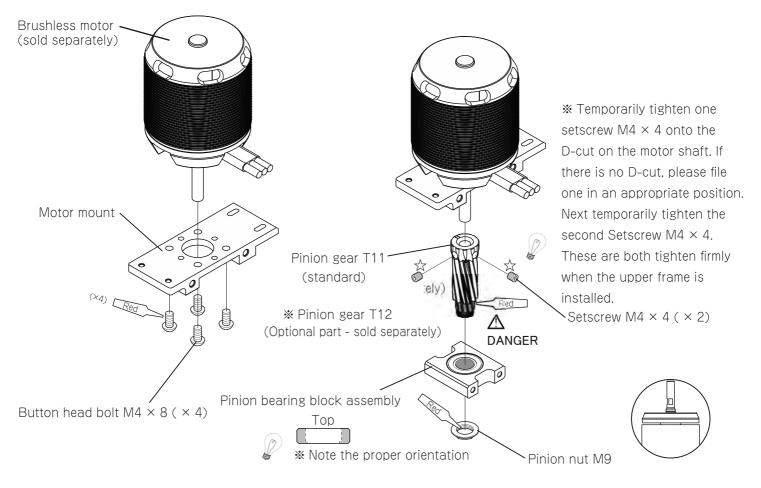
1-3 MIDDLE CROSS MEMBER ASSEMBLY



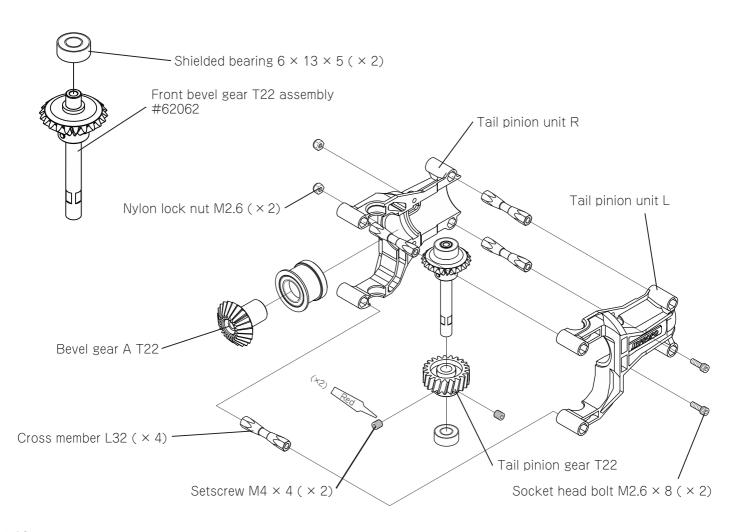
1-4 BATTERY MOUNT PLATE RAIL INSTALLATION



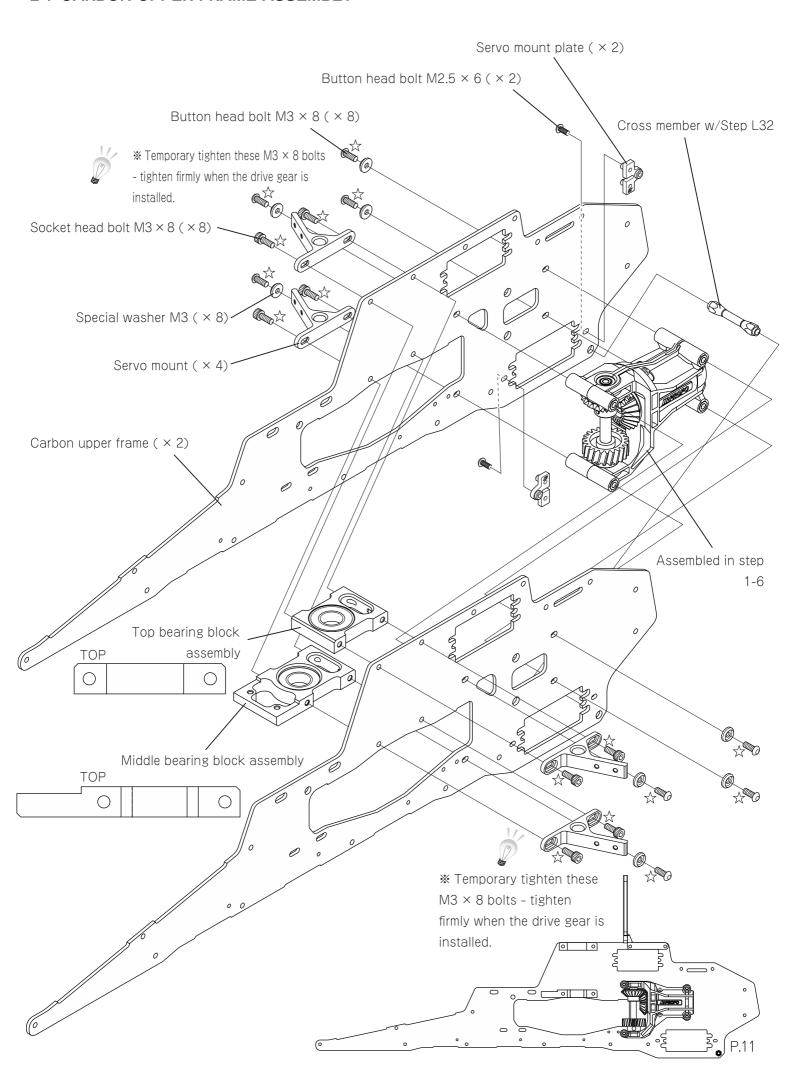
1-5 MOTOR MOUNT ASSEMBLY



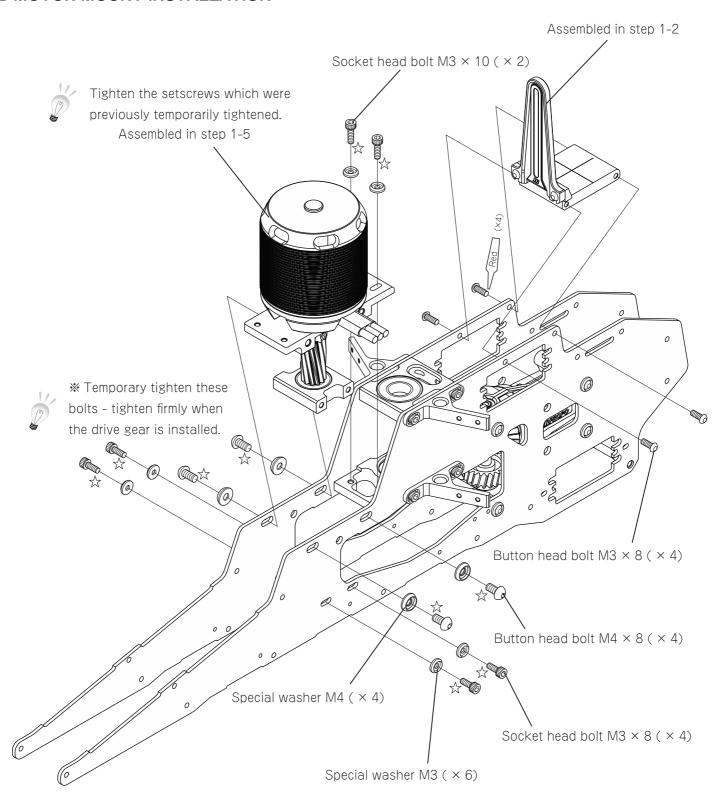
1-6 TAIL PINION UNIT ASSEMBLY



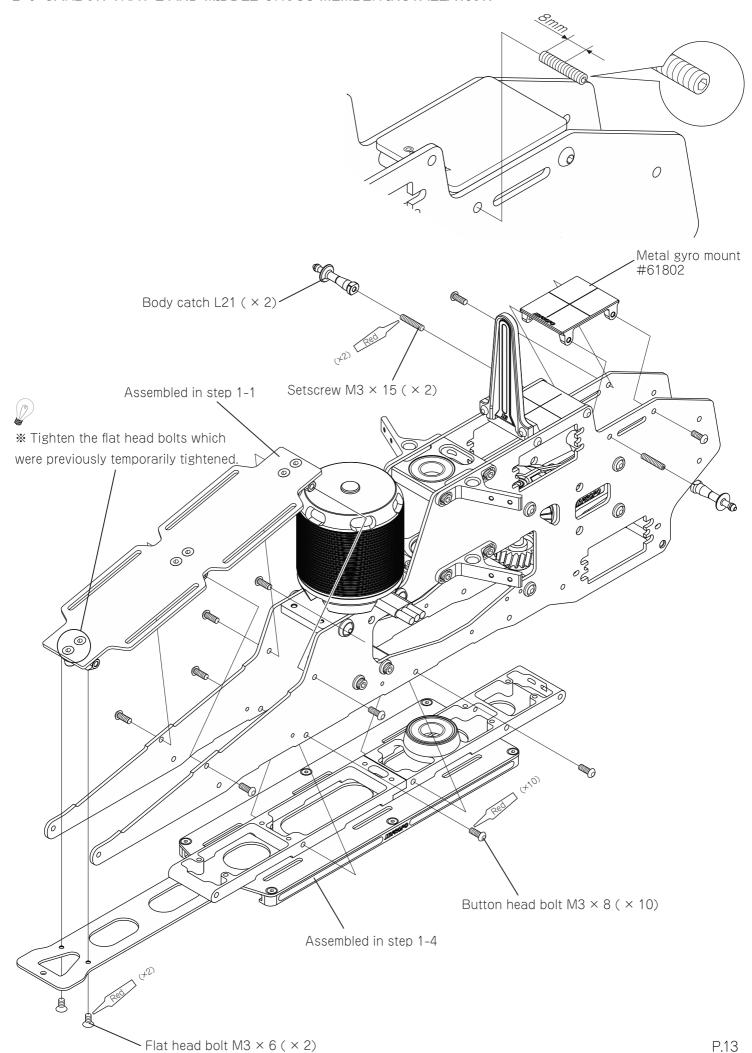
2-1 CARBON UPPER FRAME ASSEMBLY



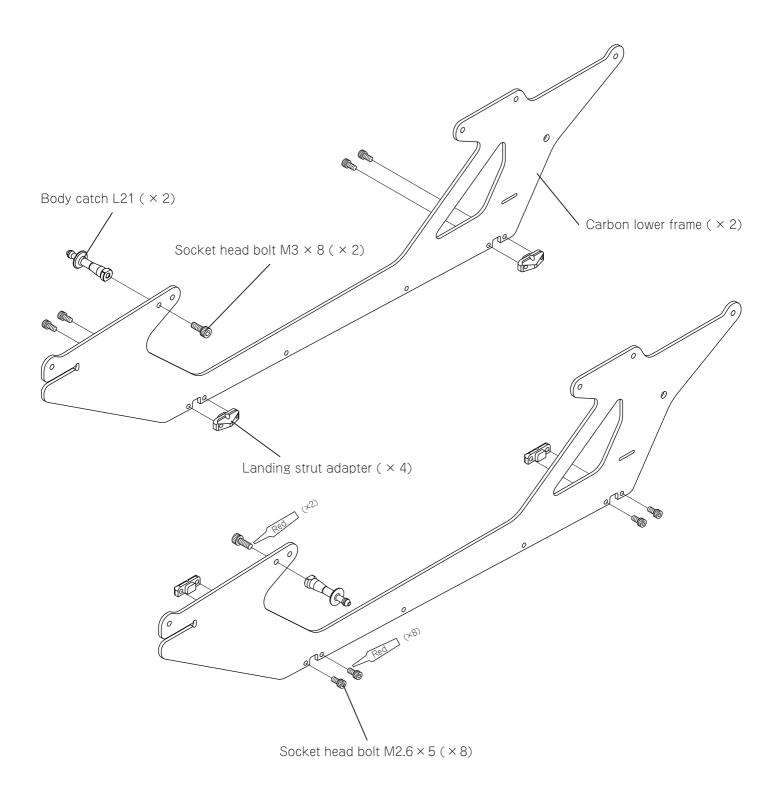
2-2 MOTOR MOUNT INSTALLATION

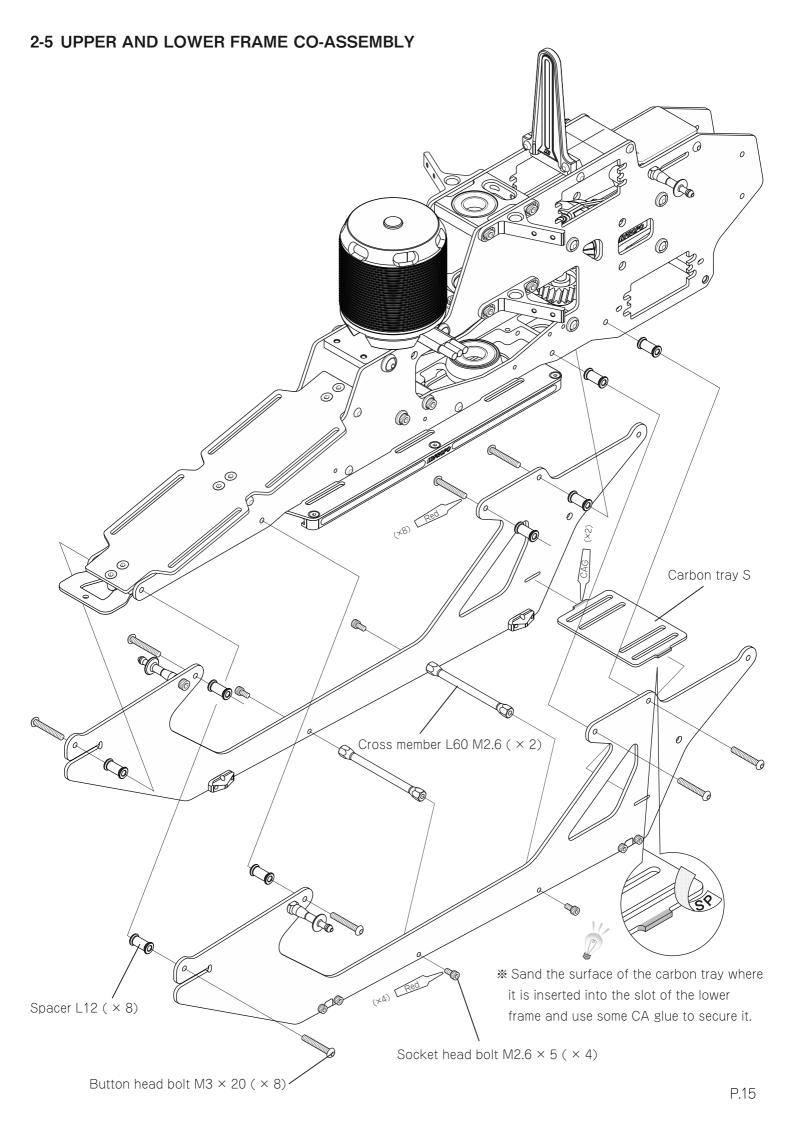


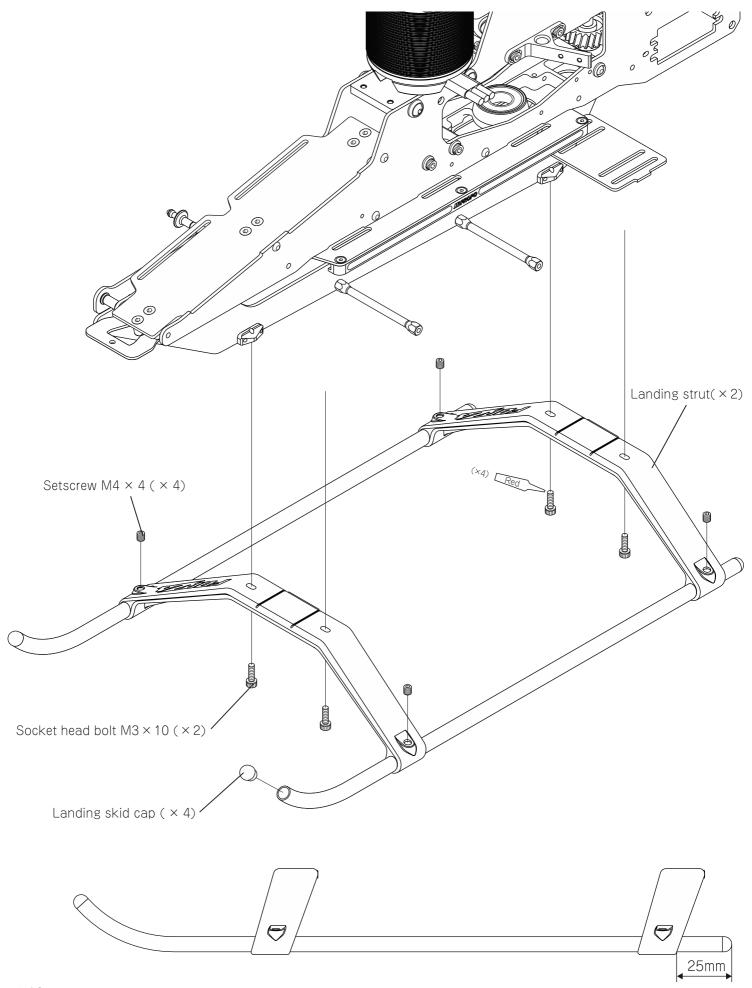
2-3 CARBON TRAY L AND MIDDLE CROSS MEMBER INSTALLATION



2-4 CARBON LOWER FRAME ASSEMBLY

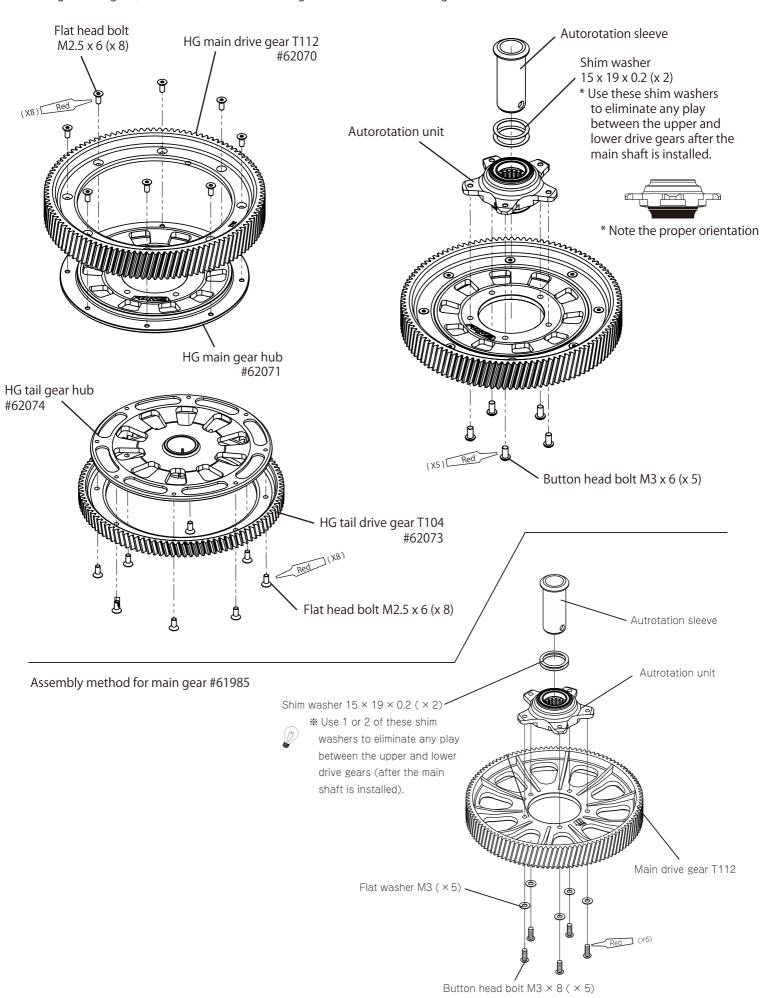




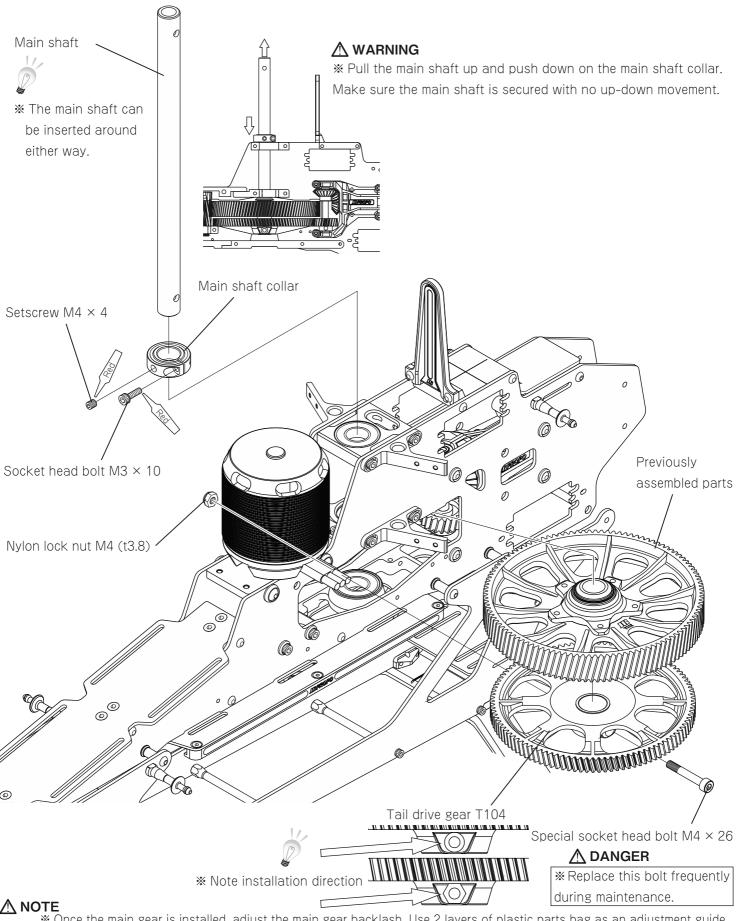


3-1 MAIN DRIVE GEAR ASSEMBLY

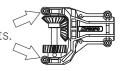
Referring to the figure, assemble the HG main drive gear and the HG tail drive gear.



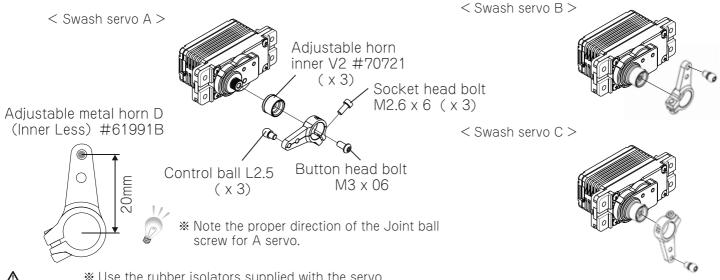
3-2 MAIN DRIVE GEAR, TAIL DRIVE GEAR, MAIN SHAFT COLLAR INSTALLATION



*Once the main gear is installed, adjust the main gear backlash. Use 2 layers of plastic parts bag as an adjustment guide. After the backlash adjustment is complete, tighten firmly the front 4 bolts of the tail pinion unit which were temporarily tightened in step 2-1, and the motor mount which was temporarily tightened in step 2-2.



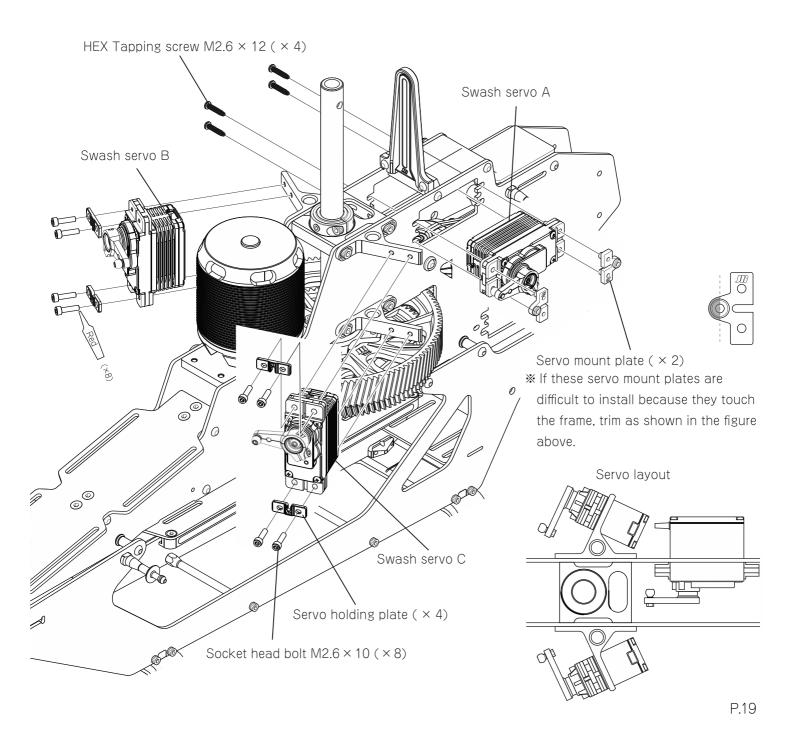
4-1 SWASH SERVO INSTALLATION



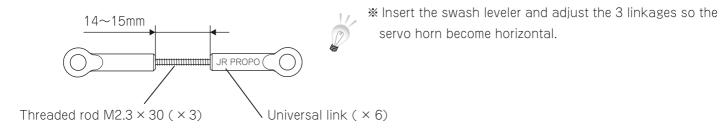
<u>∧</u> Warning

* Use the rubber isolators supplied with the servo.

When tightening the bolts, the rubber grommets should be slightly compressed. Do not use the metal grommet inserts.

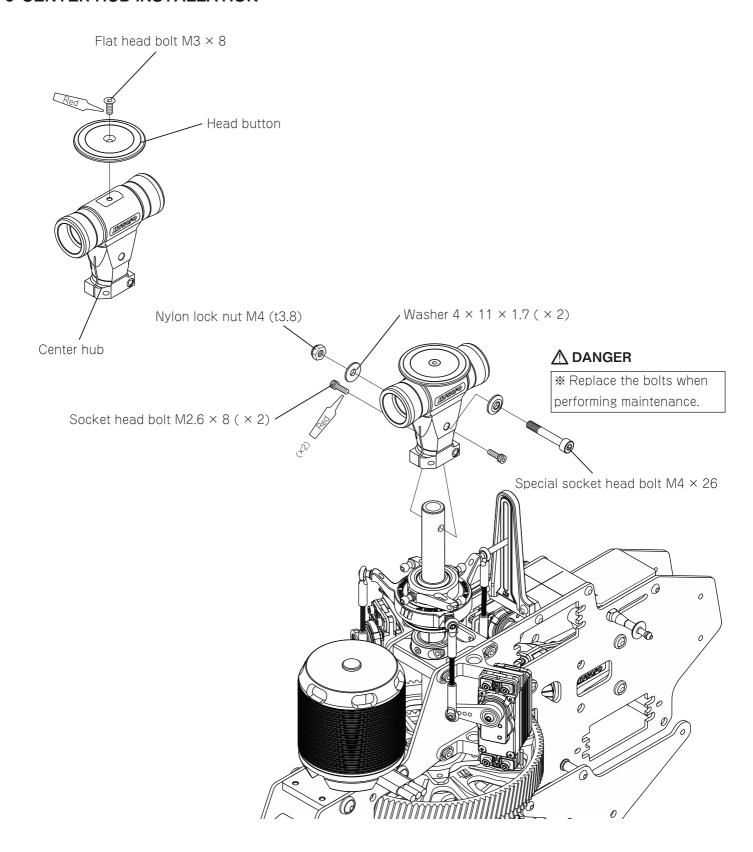


4-2 SWASH PLATE INSTALLATION

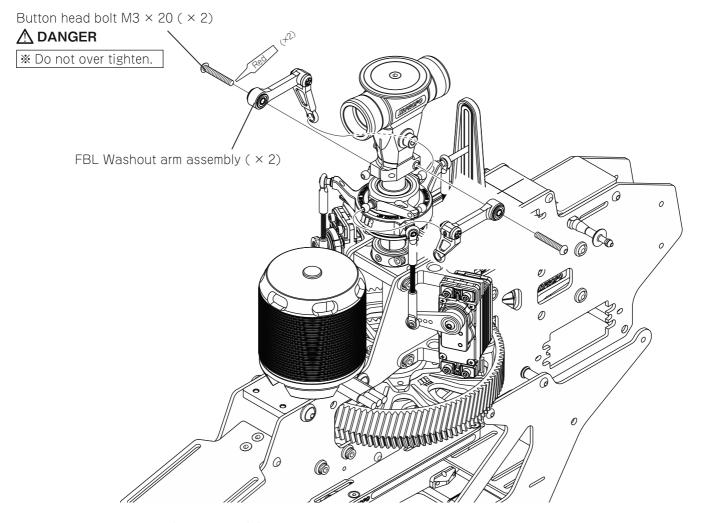


Swash plate assembly Joint ball shaft Control ball L5.5 (\times 6) Swash gauge * Once the linkage rods are installed, adjust the servos position and tighten the servo mounts which were previously temporarily tightened in step 2-1

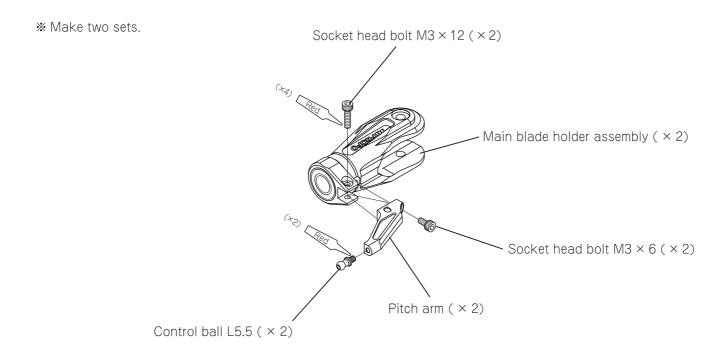
4-3 CENTER HUB INSTALLATION

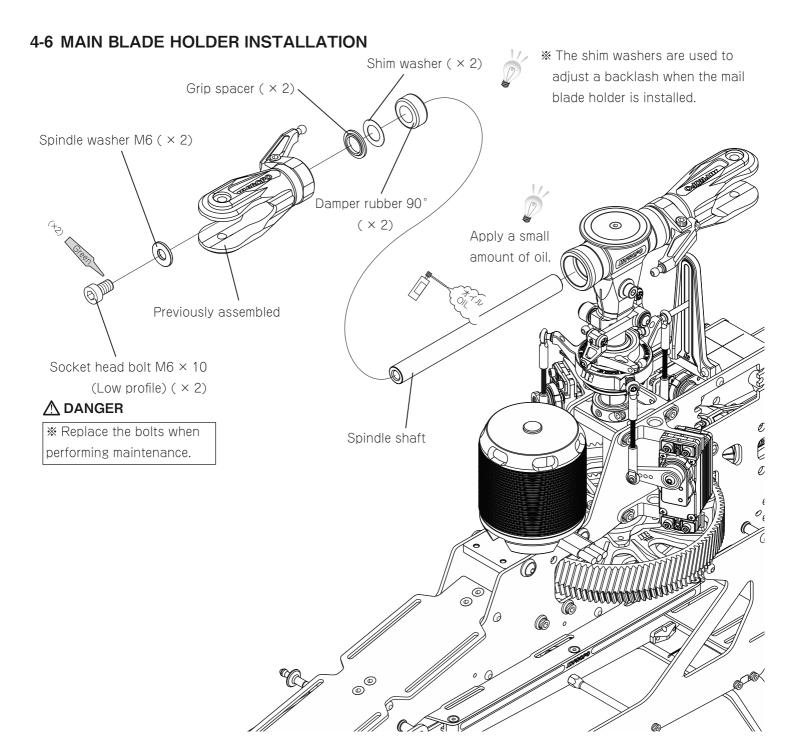


4-4 FBL WASHOUT ARM ASSEMBLY INSTALLATION



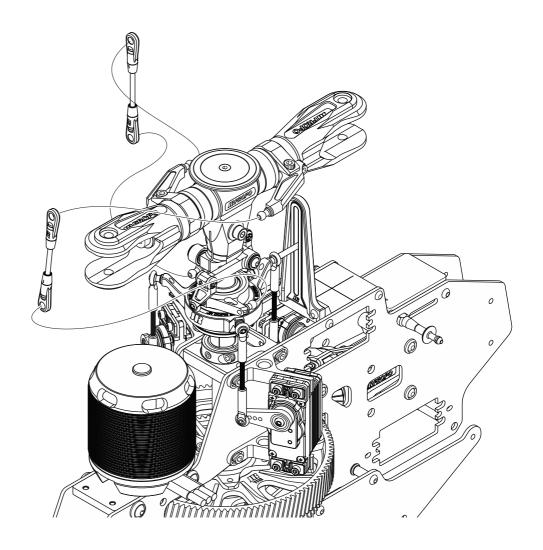
4-5 MAIN BLADE HOLDER ASSEMBLY



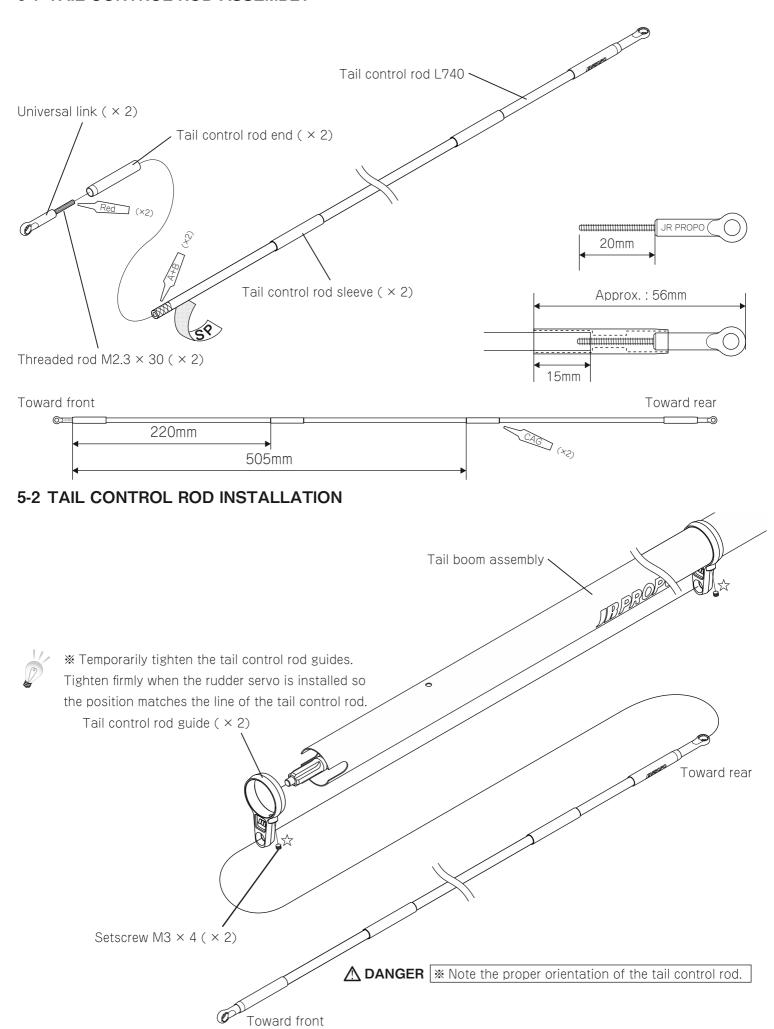


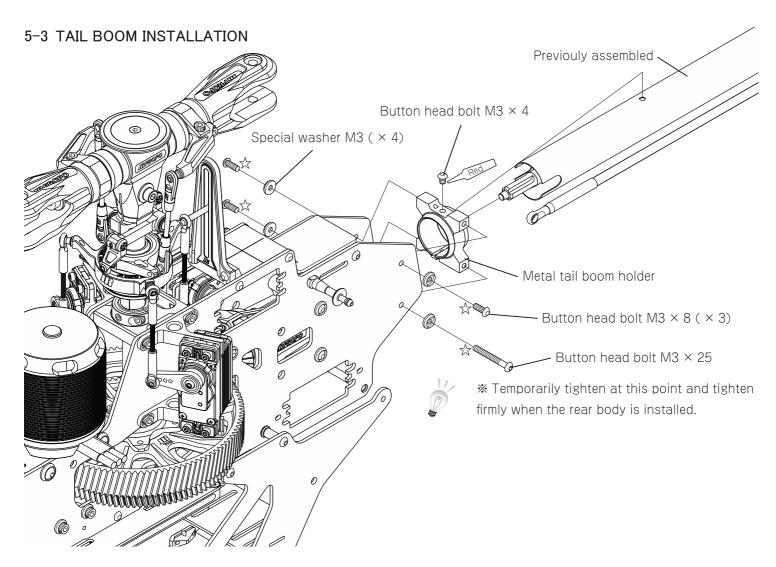
4-7 ROTOR HEAD LINKAGES





5-1 TAIL CONTROL ROD ASSEMBLY



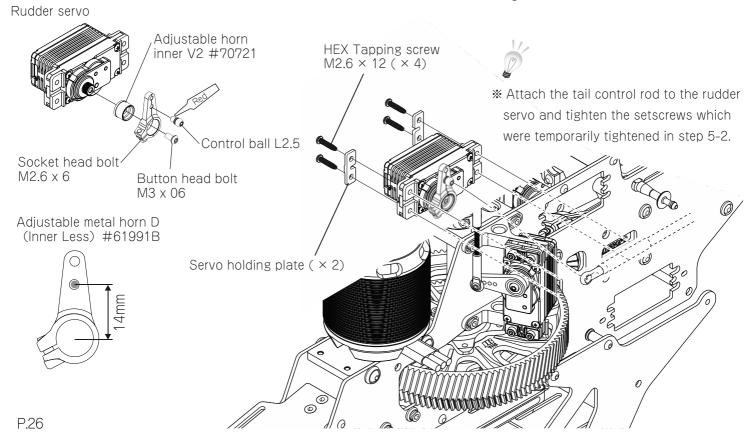


5-4 RUDDER SERVO INSTALLATION

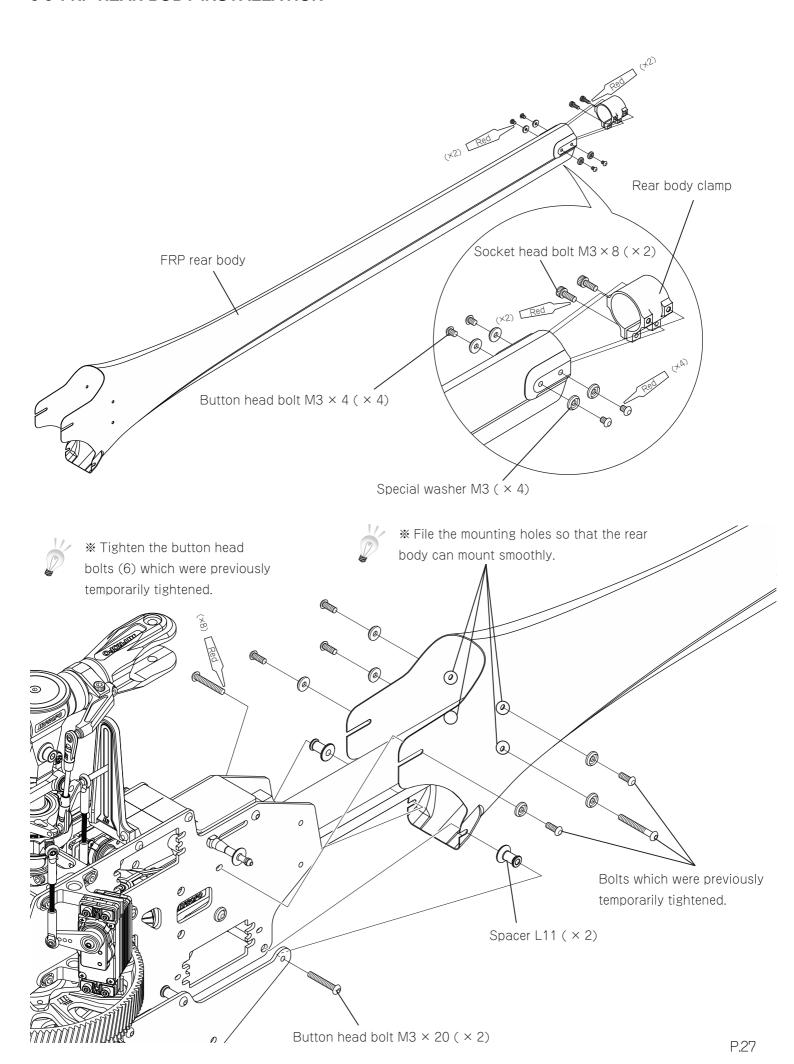
∧ NOTE * Use the rubber isolators supplied with the servo.

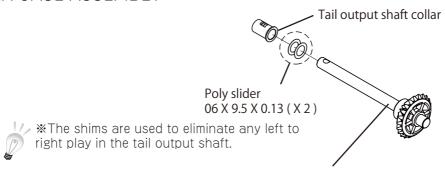
When tightening the bolts, the rubber grommets should be slightly compressed.

Do not use the metal grommet inserts.



5-5 FRP REAR BODY INSTALLATION

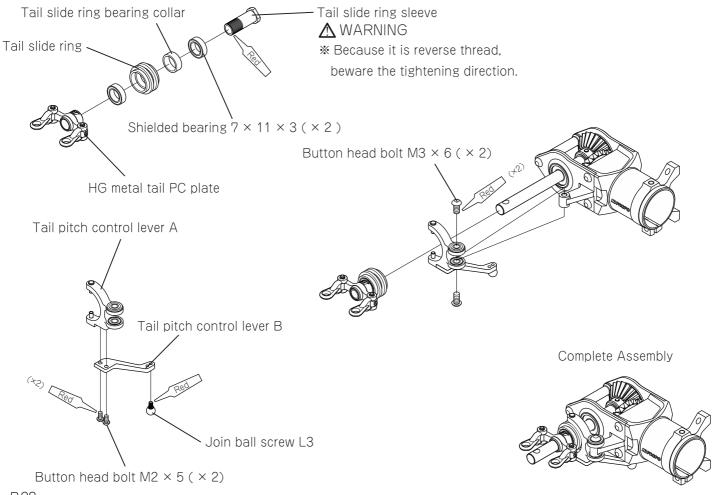




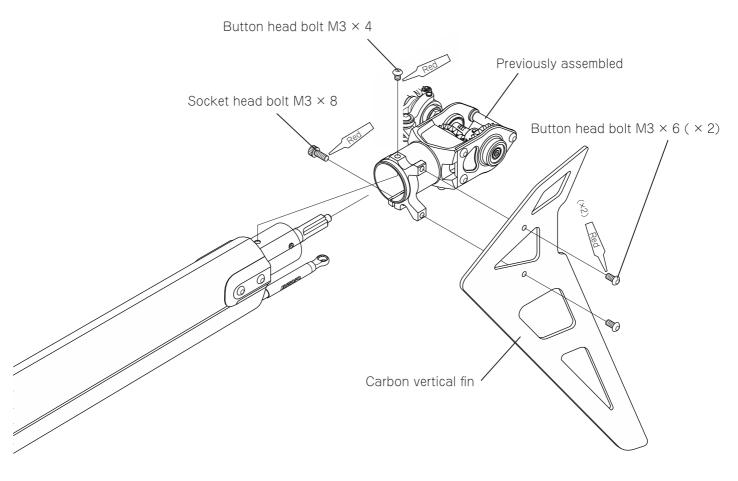
Tail gear case cross member Bevel gear A T22 Complete Assembly Tail gear case plate L Tail gear case plate R Tail gear case assembly Button head bolt M3 \times 6 (\times 6)

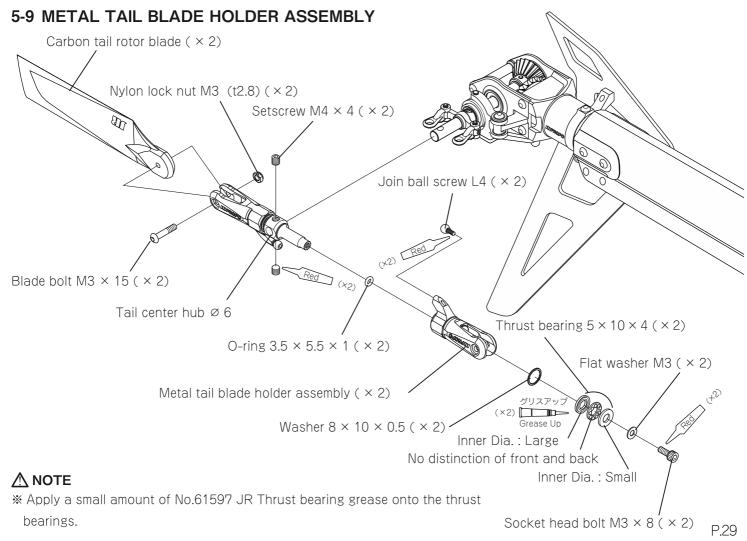
Rear tail bevel gear T22 Ass'y #62063

5-7 TAIL PITCH CONTROL LEVER ASSEMBLY

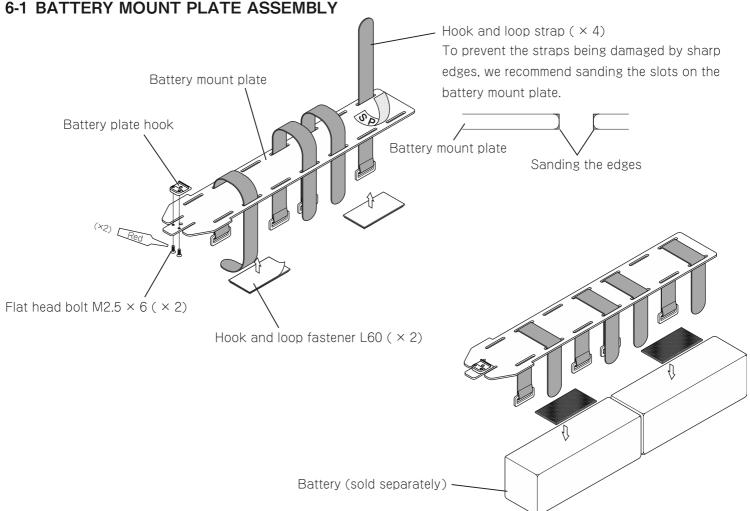


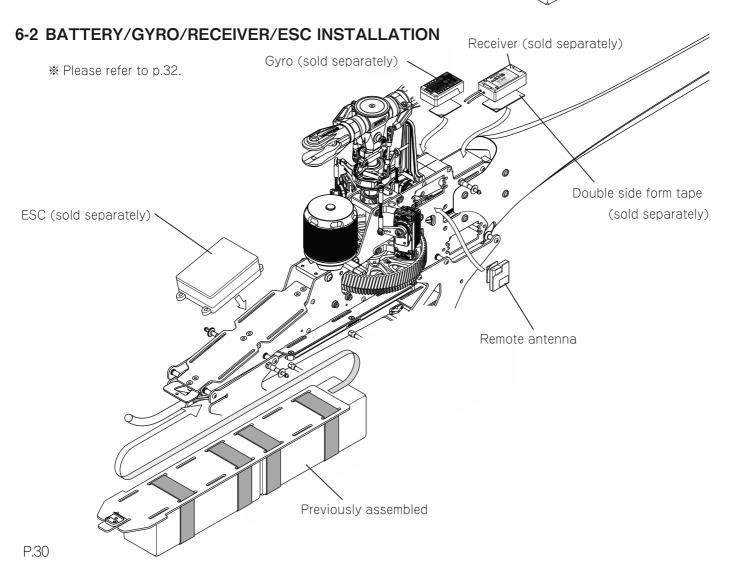
5-8 TAIL GEAR CASE, CARBON VERTICAL FIN INSTALLATION



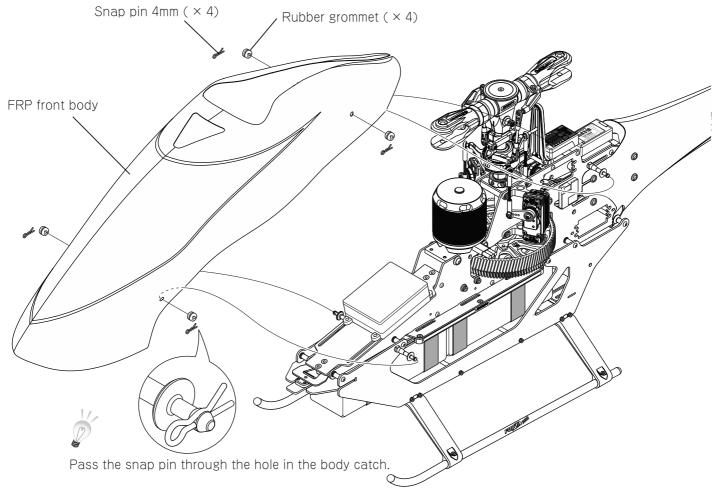


6-1 BATTERY MOUNT PLATE ASSEMBLY

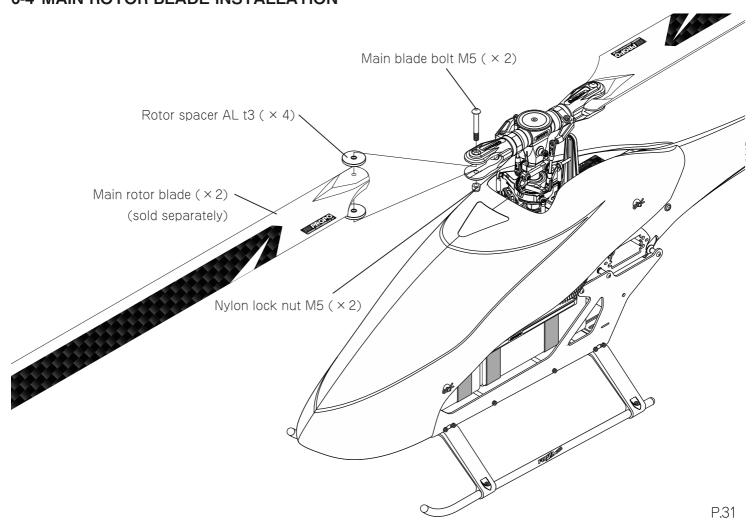




6-3 FRP FRONT BODY INSTALLATION



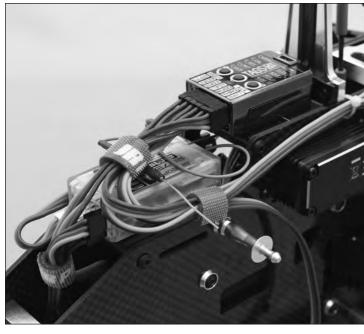
6-4 MAIN ROTOR BLADE INSTALLATION



INSTALLATION EXAMPLES FOR BATTERY AND ESC







GEAR RATIO AND ROTOR RPM SETUP

Battery	Pinion	Gear Ratio	Motor	Approximate flight time (when using 5,000mAh	
		Pinion : Main	KV value	1,500 ~ 1,600rpm	2,000 ~ 2,300rpm
12 cell	T11	10.18 : 1	520	approx. 8-10 mins	approx. 3-4 mins
12 0011	T12	9.33:1 ** T12 - sold separately			

Rotor RPM					
Hovering	Flying	3D			
1,500rpm ~ 1,600rpm	2,000rpm ~ 2,200rpm	2,100rpm ~ 2,300rpm			

^{*} In order to extend battery life, it is recommended to leave at least 15% battery capacity remaining after each flight.

Battery Guide

Li-Po Battery				
Cell Voltage / Capacity				
6 Cell × 2	22.2V 4,500mAh \sim × 2			

lacktriangle Battery size $\mbox{\em \%}$ Refer to a figure on the right, choose where to mount the battery A or B.

	W	L	Н	
Α	55mm	330mm	50mm	(mayimum)
В	5511111	280mm	62mm	(maximum)



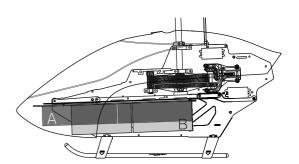
After each flight, please do not start the next flight until the motor, ESC and other parts have cooled down. If you fly consecutively, the motor, ESC and other parts may get damaged from overheating.

Connectors

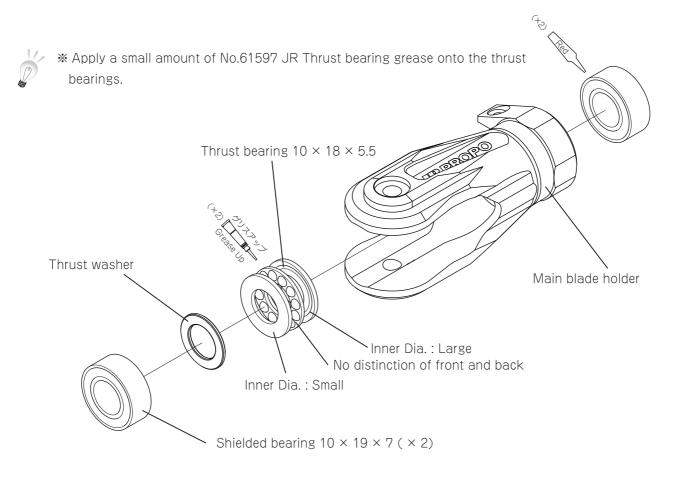
Connectors rated for 120A or above are recommended.

Mistakes in confusing plus (+) and minus (-) are very dangerous and may lead to catastrophic accidents.

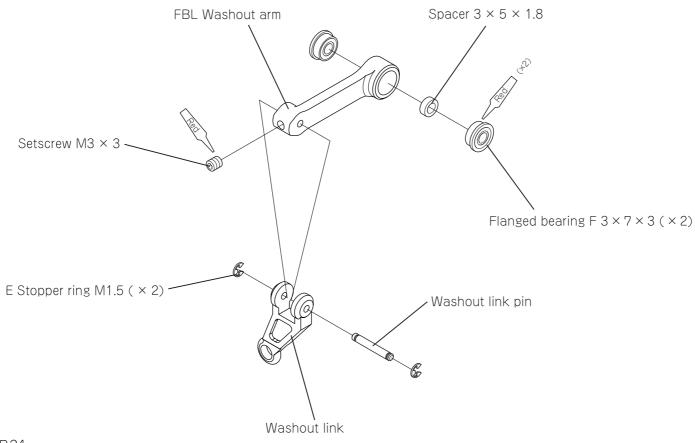
To prevent connection mistakes, please confirm the connecting method and the color of the wires are correct.

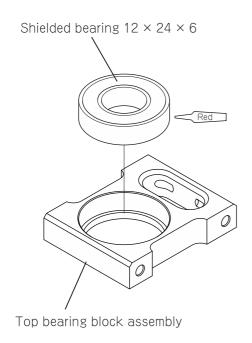


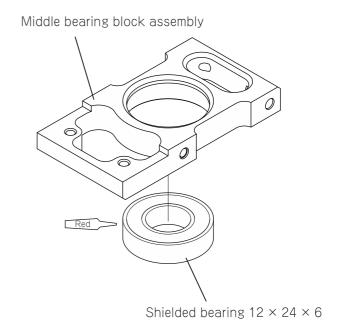
When repair is necessary - MAIN BLADE HOLDER



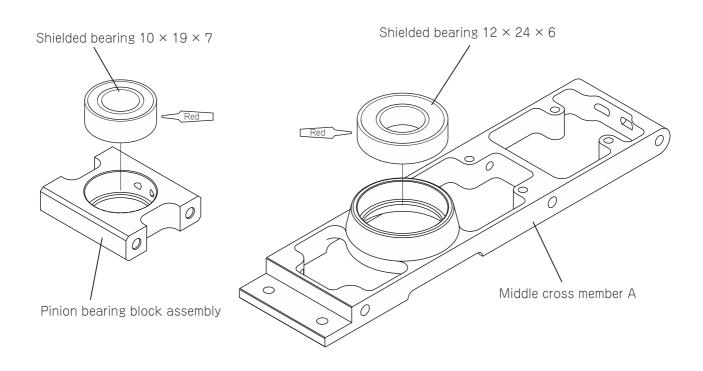
When repair is necessary - FBL WASHOUT ARM ASSEMBLY



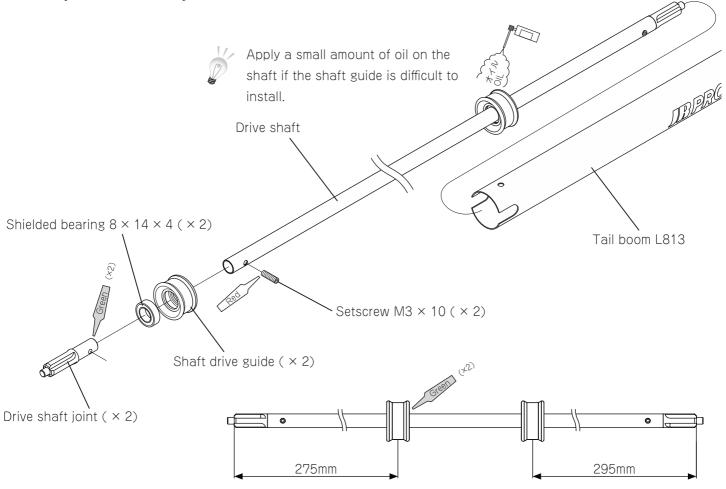




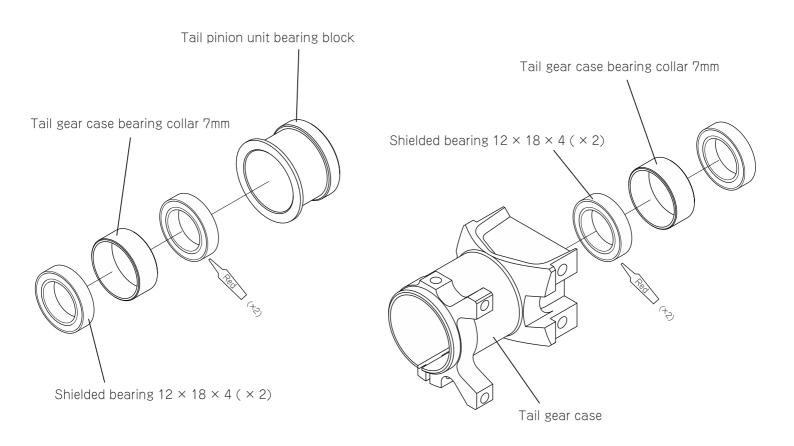
When repair is necessary - PINION BEARING BLOCK ASSEMBLY / MIDDLE CROSS MEMBER A



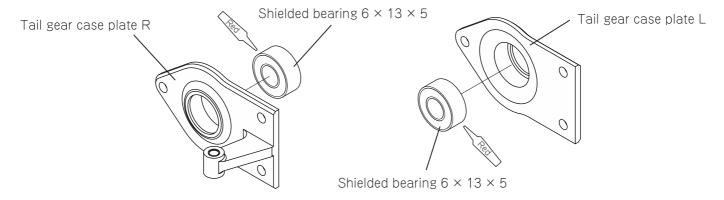
When repair is necessary - TAIL BOOM ASSEMBLY



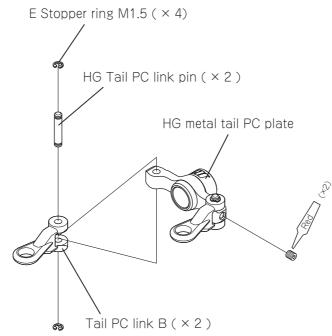
When repair is necessary - TAIL PINION UNIT BEARING BLOCK ASSEMBLY / TAIL GEAR CASE ASSEMBLY



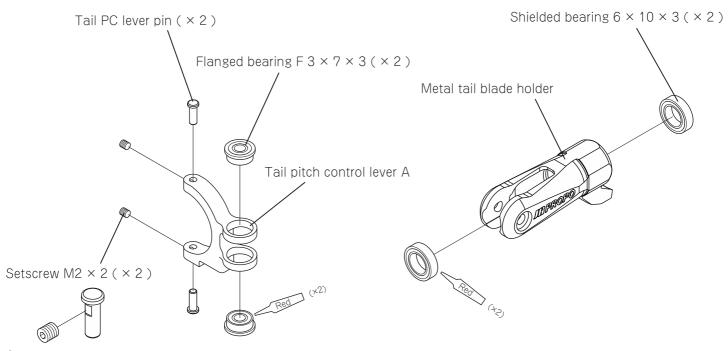
When repair is necessary - TAIL GEAR CASE PLATE L / TAIL GEAR CASE PLATE R



When repair is necessary - HG METAL TAIL PC PLATE



When repair is necessary - TAIL PITCH CONTROL LEVER A / TAIL BLADE HOLDER



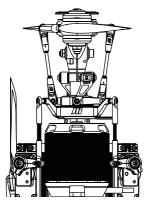


Tighten the setscrew on the recess of the tail PC lever pin.

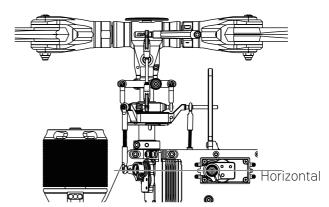
SERVO NEUTRAL ADJUSTMENT

The servo horns should so far only be temporarily tightened.

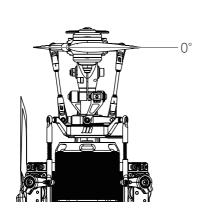
- ① Disconnect the motor wires before making any adjustments. Turn on the transmitter first then turn on the receiver (helicopter).
- ② Confirm the transmitter sticks and trims are in the neutral position. If your transmitter has pitch trim levers, set these to neutral as well



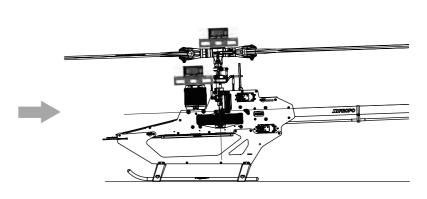
③ Push down on the swash plate so it touches the swash leveler.



With the swash leveler installed, adjust the thread rod M2.3 x 30 so the servo horns become horizontal.



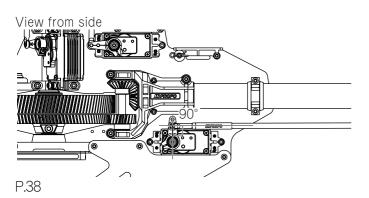
 $\mbox{(5)}$ Adjust the FBL thread rod L45 so the main rotor pitch angle is 0 $^{\circ}$.



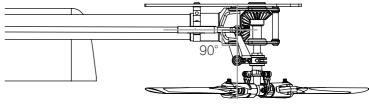
Note for zeroing your pitch gauge: Because this helicopter has a front sloping main shaft, zero the pitch gauge as shown in this figure (on the head button, motor, carbon middle plate etc.)

6 Rudder adjustment

Confirm the tail control rod is positioned at 90 degrees. If it is not, adjust the length of the tail control rod and the servo horn angle.



View from below



SETTING AND ADJUSTMENT OF THE TRANSMITTER

1. [Rotor pitch setting]

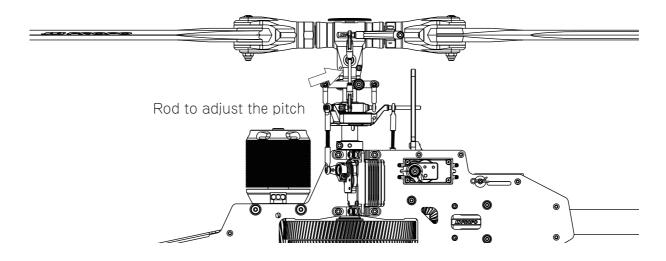
* Please refer to the instructions supplied with your FBL control unit.

Measure the pitch of the Main Rotor Blades using the JR digital pitch gauge (No.61796, sold separately).

The intermediate (middle) value should be set to 0° - with the pitch stick in its middle position the pitch reading should be 0° . If it is not, adjust the length of the rods shown in the following figure to accurately set the pitch to 0° . Once the intermediate pitch has been adjusted to 0° by rod adjustment, measure the high and low pitch values. It is presumed that 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 (swash pitch mix %). Increase or decrease the pitch percent value as required. In this case, the high and low pitches cannot be separately adjusted. If the above-mentioned intermediate pitch has been correctly adjusted, adjusting either the high or low pitch should automatically result in the figures seen in the table. If this

is not the case, change the rod length and the pitch percent value in the swash mix, ignoring the intermediate value, so

	Low pitch	Intermediate pitch	High pitch	\divideontimes When confirming or adjusting the reference pitch
Reference pitch	-12°	0°	+12°	range, the pitch curve should be at default values.
Hovering	-5°	+4°	+12°	
Stunt	-8°	+3°	+10°	
3D	-12°	O°	+12°	7

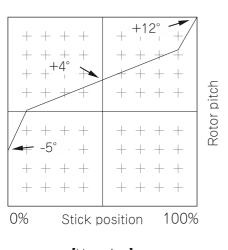


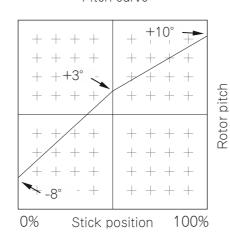
2. [Pitch Curve (Transmitter pitch curve adjustment)]

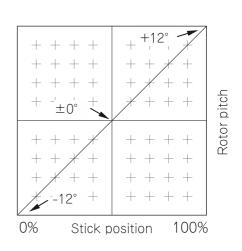
that the high and low pitches are properly adjusted.

This function allows you to make adjustment 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 basic important adjustments of the helicopter. This adjustment depends on the Main Rotor Blades used and interaction with the throttle curve. To begin with make adjustment as shown in the following figure, referring also to the table in the previous section. Make fine adjustments after test flying.

Pitch curve







[3D] (Stunt)

3. [Throttle curve (Transmitter Throttle Curve Function)]

Adjust the throttle curve so the rotor rpm is as per the table on page 33

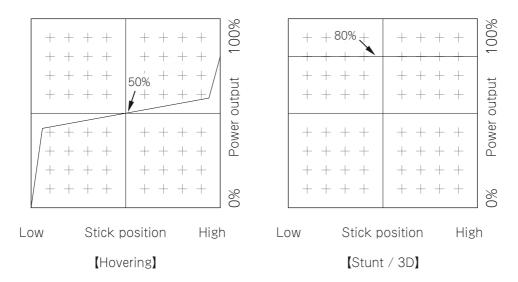
For details, please refer to your transmitter Instruction Manual and adjust the values accordingly.

Please be extra careful not to turn on the motor.

The throttle values here are just examples. In order to prevent over-speed of the main rotor, please adjust carefully after test flying the helicopter.

* If your radio has a Throttle delay function, we recommend you to use this to prevent sudden changes in rotor speed when changing flight modes.

Throttle curve



FINAL CHEKS PRIOR TO FLIGHT

Although some items can only be adjusted after test flights, it is possible to do some final check prior to flight. Please recheck the following:

- ① Look through all the steps in the Instruction Manual again and make sure that all bolts are firmly tightened. Check in particular the bolts used for mounting the balls to the levers, and each bolt which was tightened after backlash adjustment of the gear mesh was completed.
- ② Confirm all servos function smoothly and their direction of operation is correct.

 Also check that the servo horn screws are firmly tightened.
- ③ Make sure the gyro control direction is correct.
- (4) Make sure that the battery in the transmitter and that powering the receiver (in the helicopter) is fully charged.
- ⑤ Check that the receiver, gyro, ESC and battery are firmly secured.
- (6) Make sure that the Main Rotor Blades and the Tail Rotor Blades are attached in the correct orientation.

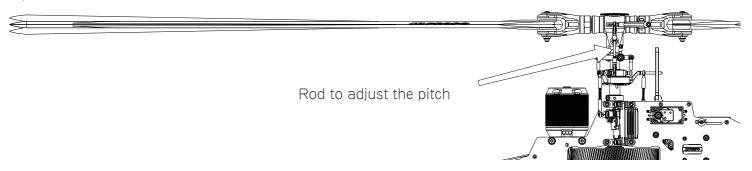
If no issues have been found after checking all of the above, test fly the helicopter and make adjustments as necessary. If possible, the helicopter should be test flown under the guidance of an experienced operator.

FINE ADJUSTMENT FOLLOWING TEST FLIGHT

[Items which need to be readjusted after the test flight]

Tracking Adjustment

This is to adjust both Main Rotor Blades to the same pitch, so each produces the same amount of lift. If they are not uniform, their trajectory is not seen as an identical line as shown in the figure below. This leads to vibrations and a helicopter which does not fly well. When the helicopter is about to leave the ground, look at the plane of rotation of the Main Rotor Blades from the side. No adjustment is required if the trajectory of the Main Rotor Blades is seen as an identical line. If vertically misaligned, pitch adjustment on one blade is required. On either the 'high' or 'low' blade adjust the Universal Link of the rod shown in the following figure in such a manner that the blade pitch is increased or decreased as required.



Tracking adjustment is dangerous. Remain at least 5m or more from the helicopter at all times.

BE SURE TO READ PRIOR TO FLIGHT

This helicopter is not a toy. It is intended for those having had prior experience flying a radio control helicopter, with appropriate knowledge and skills.

Even an advanced operator well-versed in radio control helicopters may forget some safety precautions. Refresh your memory by reading the following.

Fly the helicopter in a manner suitable for the operator's skills, avoiding any unnecessary risk during flight. For maneuvers demonstrated in a competition, emulate them after fully understanding and mastering the operating methods and skills required. When flying the helicopter, not only a beginner or intermediate operator, but an advanced operator should never fly alone. Listen to explanations from an assistant or an instructor having expertise, and fly under their instruction.

1. (Precautions after Assembly)

- ⓐ Check all bolts are fully tightened. Tighten any loose ones.
- (b) Be sure to use screw locking agent when tighten all bolts, if so instructed in the Instruction Manual. When doing this, degrease the bolts and nuts completely.
- © Check the rotating parts (Main Rotor Blades, Tail Rotor) and that their bolts are fully tightened.

However it is necessary that the blades can be moved slightly back and forth.

@ Set the throttle stick to the slowest position, then turn on the transmitter (ensure it is fully charged).

Next, turn on the helicopter by plugging in the main battery. Always turn on in this order.

Operate the sticks (throttle/pitch, aileron, elevator and rudder) to confirm correct function.

Always have the motor unplugged so that the motor will not turn on.

- Never cut or bundle the antenna wire. Put it in the antenna tube so that 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 the correct orientation as recommended in the radio
- ① Securely hold the helicopter with both hands when moving it. The helicopter has sharp parts (such as machined metal) pay attention to avoid injury.

2. (Precautions Prior to Flight)

- ⓐ Make sure that 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.
- (b) With the stick at the slowest position, turn on the transmitter then receiver and check for correct control movements.
- © Care should be taken not to catch your cloths on the transmitter sticks when moving the helicopter. Move the helicopter to the takeoff position using two or more persons one holding the helicopter with both hands and the other carrying 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 15m or more from the helicopter. Move all the sticks and confirm the movement of the helicopter servos follow the sticks. If they do not move properly determine the cause and correct before flight. Ask for repair if it is needed.
- ① If two or more Radios are used simultaneously on the same frequency you cannot fly the radio control helicopter because of interference. If someone else is using the same frequency, wait until he or she has finished operation. If there is interference despite no one using the same frequency, it is conceivably an external interference source exists. Never fly until that interference source 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.

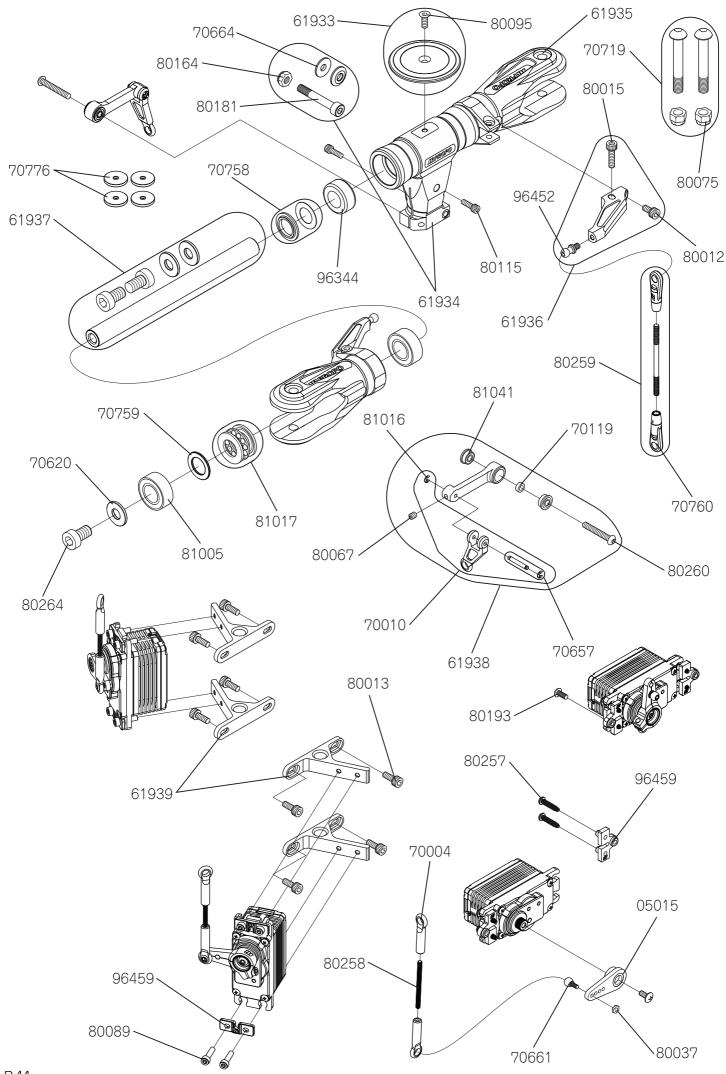
3. (Precautions during flight)

- Never fly the Helicopter near houses, high-tension lines or a heavy-traffic road.
- ® Never fly it above people, houses, behind you or to far away. If the helicopter crashes or comes into contact with the human body, it could cause serious injury or death.

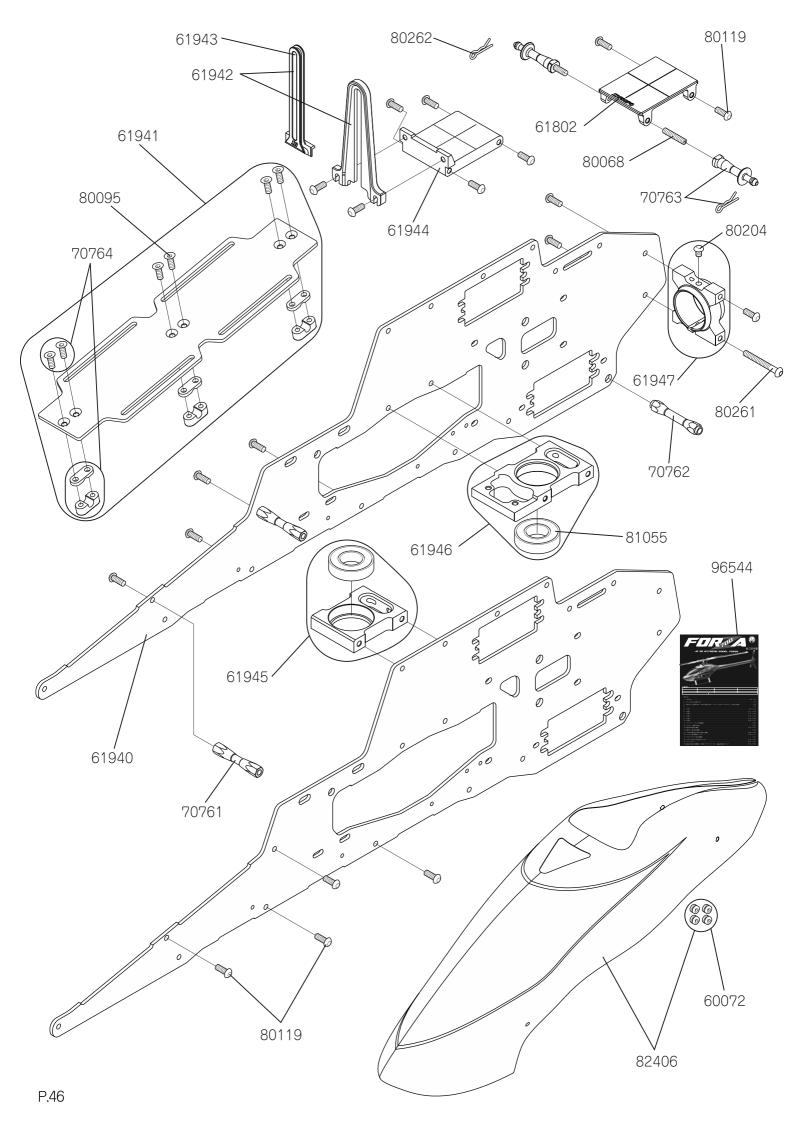
- © Keep your eyes on the helicopter during flight. If you look away even for a short period of time, it may change its position or you may lose sight of it and loose control.
- @ Do not fly (or hover) with the Main Rotor Blades at eye level because it is dangerous. Always ensure that the Main Rotor 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.
- ① When stopping the Main Rotor Blades never touch them. Wait for them to stop naturally.
- ® If you notice an abnormality during flight, land the helicopter immediately and check for any loose bolts, etc. Do not fly it again until the cause has been completely eliminated.
- (h) 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.

4. (Precautions after flight)

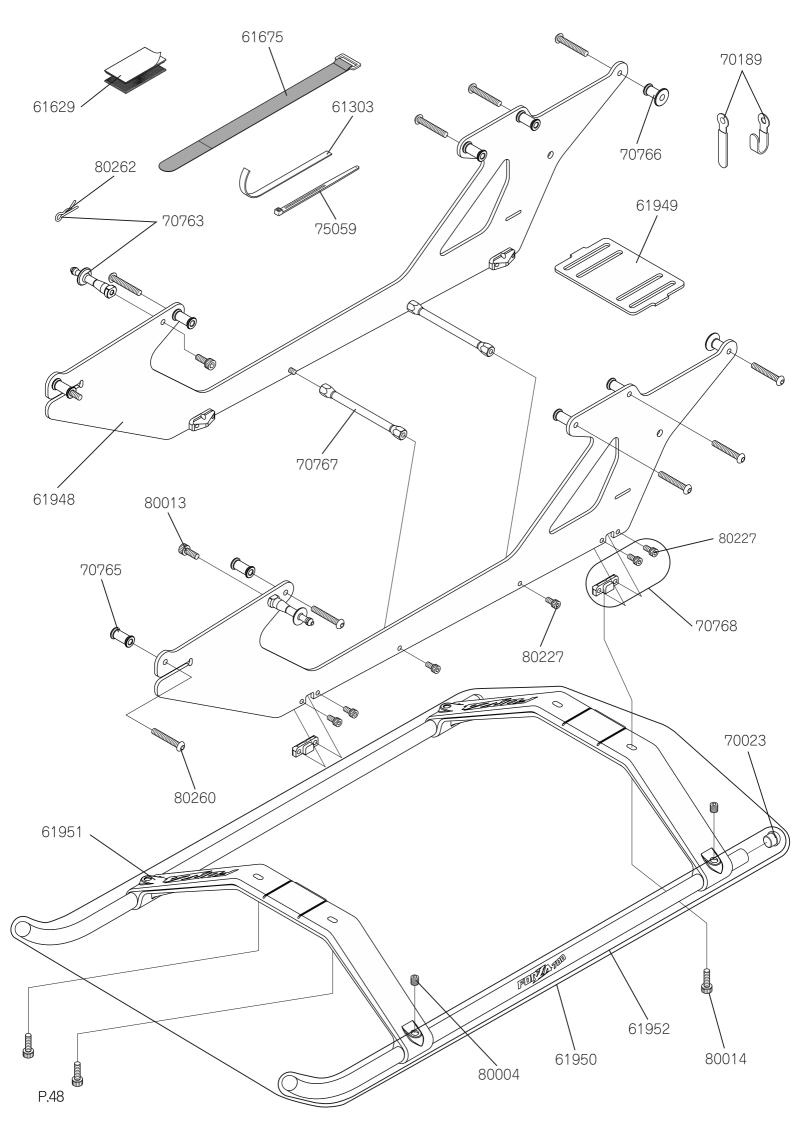
- (a) Check for any loose bolts or shaky parts. If there is any abnormality, repair them before the next flight.
- (b) If the Main Rotor Blades or any other part come into contact with the ground during flight, do not use those parts even if their appearance looks faultless. Replace them with new ones.
- © Check whether or not the battery, receiver, gyro, etc. are firmed secured.
- d Check the antenna wire from time to time because its core may have been broken. If broken within the coating, it may not be immediately apparent. Refer to the manufacturer periodically for servicing.



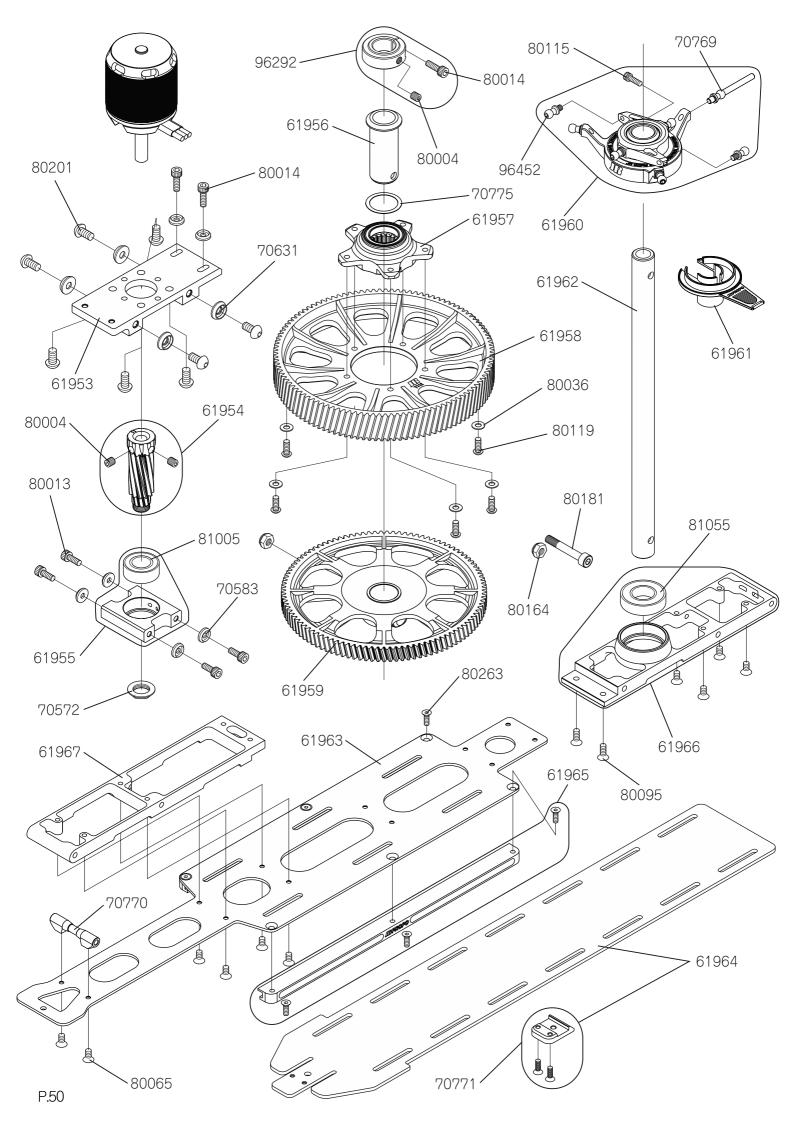
Item #	Description	Quantity	y Note
05015	Super horn	5	
61933	Head button	1	w/Flat head bolt M3 \times 8
61934	Center hub	1	w/Special socket head bolt, Socket head bolt, Washer, Nylon lock nut
61935	Main blade holder assembly	1	L-1910ZZ, SST-1810DSG already installed
61936	Pitch arm	1	w/Control ball L5.5, Socket head bolt
61937	Spindle shaft	1	w/Bolt, Washer
61938	FBL Washout arm assembly	1	LF-730ZZ already installed
61939	Servo mount	2	
70004	Universal link	10	
70010	Washout link	2	w/Washout link pin
70119	Spacer $3 \times 5 \times 1.8$	2	
70620	Spindle washer M6	2	
70657	Washout link pin	2	w/E ring, For 1 kit
70661	Join ball screw L4	5	
70664	Washer $4 \times 11 \times 1.7$	2	
70719	HG Main blade bolt set M5	2	Silver, w/Nylon lock nut
70758	Grip spacer	2	w/Shim washer
70759	Thrust washer	2	
70760	FBL universal link	4	
70776	Rotor spacer AL t3	4	Color: Silver
80012	Socket head bolt M3 \times 6	10	
80013	Socket head bolt M3 \times 8	10	
80015	Socket head bolt M3 \times 12	10	
80037	Nut M2	10	
80067	Setscrew M3 × 3	10	
80075	Nylon lock nut M5	10	
80089	Socket head bolt M2.6 × 10	10	
80095	Flat head bolt M3 \times 8	10	
80115	Socket head bolt M2.6 × 8	10	
80164	Nylon lock nut M4 (t3.8)	10	
80181	Special socket head bolt M4 × 26	2	
80193	Button head bolt M2.5 × 6	2	
80257	HEX Tapping screw M2.6 × 12	10	
80258	Threaded rod M2.3 × 30	2	
80259	FBL threaded rod L45	2	w/FBL universal link
80260	Button head bolt M3 × 20	10	
80264	Socket head bolt M6 × 10 (Low profile)	5	
81005	Shielded bearing 10 × 19 × 7	2	L-1910ZZ
81016	E Stopper ring M1.5	10	
81017	Thrust bearing $10 \times 18 \times 5.5$	1	SST-1810DSG
81041	Flanged bearing F $3 \times 7 \times 3$	2	LF-730ZZ
96344	Damper rubber 90 (10 Ø)	2	
96452	Control ball L5.5	1	
96459	Servo mount plate set	1	Servo holding plate, Servo mount plate For 1 kit



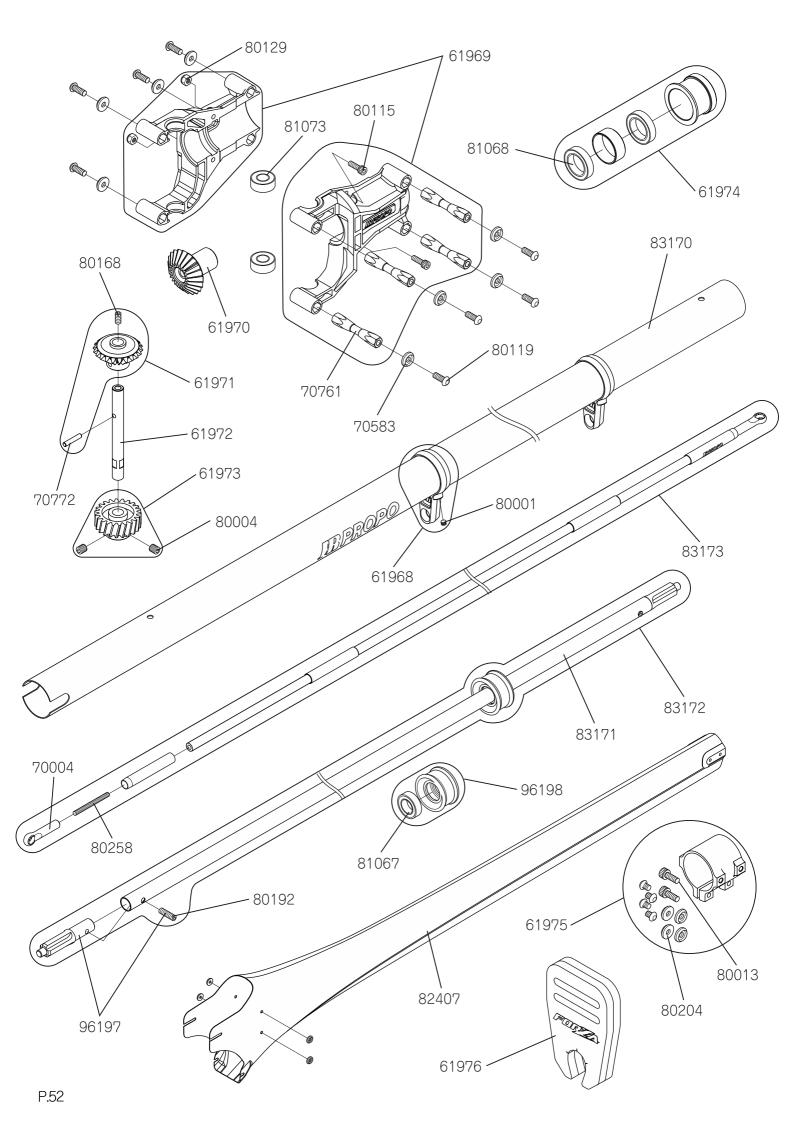
Item #	Description	Quantity	Note
60072	Rubber grommet	4	
61802	Metal gyro mount	1	
61940	Carbon upper frame	1	
61941	Carbon tray L	1	w/Tray bracket A/B, Flat head bolt M3 $ imes$ 8
61942	Radius support	1	w/Radius support rail
61943	Radius support rail	1	
61944	Radius support bracket	1	
61945	Top bearing block assembly	1	6901ZZ already installed
61946	Middle bearing block assembly	1	6901ZZ already installed
61947	Metal tail boom holder	1	
70761	Cross member L32	2	
70762	Cross member w/Step L32	2	
70763	Body catch L21	2	w/Snap pin 4mm
70764	Tray bracket set	2	A/B w/Flat head bolt M3 \times 8
80068	Setscrew M3 × 15	10	
80095	Flat head bolt M3 \times 8	10	
80119	Button head bolt M3 \times 8	10	
80204	Button head bolt M3 \times 4	10	
80241	HEX Tapping screw (black) M3 \times 8	10	
80261	Button head bolt M3 \times 25	10	
80262	Snap pin 4mm	10	
81055	Shielded bearing $12 \times 24 \times 6$	1	6901ZZ
82406	FRP front body	1	w/Rubber grommet
96544	Assembly manual	1	



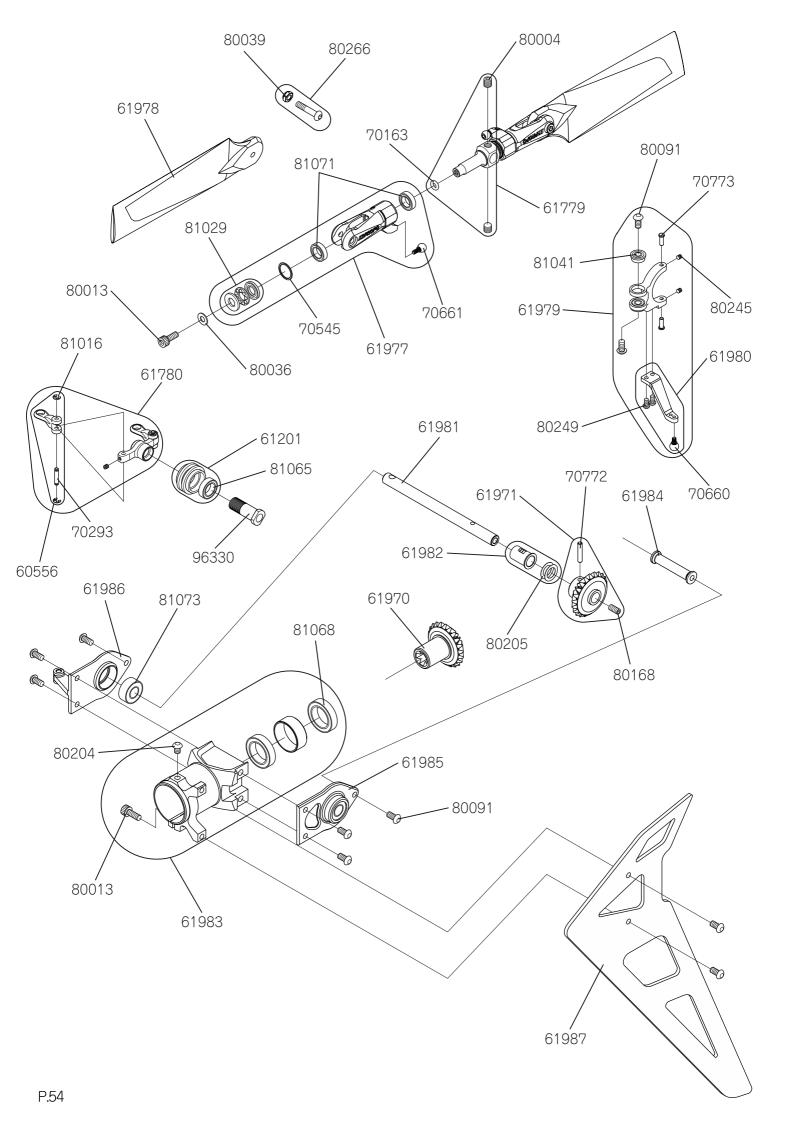
Item #	Description	Quantit	y Note
61303	Hook and loop strap S	2	L:200
61629	Hook and loop Fastener L60	2	
61675	Hook and loop strap	2	Black L:260
61948	Carbon lower frame	1	
61949	Carbon tray S	1	
61950	Landing strut set	1	One set
61951	Landing strut	2	w/Setscrew M4 × 4
61952	Landing skid	2	w/Landing skid cap
70023	Landing skid cap	4	
70189	Cord holder	10	w/Flat washer M3
75059	Nylon strap S	10	
70763	Body catch L21	2	w/Snap pin 4mm
70765	Spacer L12	2	
70766	Spacer L11	2	
70767	Cross member L60 M2.6	2	
70768	Landing strut adapter	2	w/Socket head bolt M2.6 \times 5
80004	Setscrew M4 × 4	10	
80013	Socket head bolt M3 \times 8	10	
80014	Socket head bolt M3 × 10	10	
80227	Socket head bolt M2.6 × 5	10	
80260	Button head bolt M3 × 20	10	
80262	Snap pin 4mm	10	



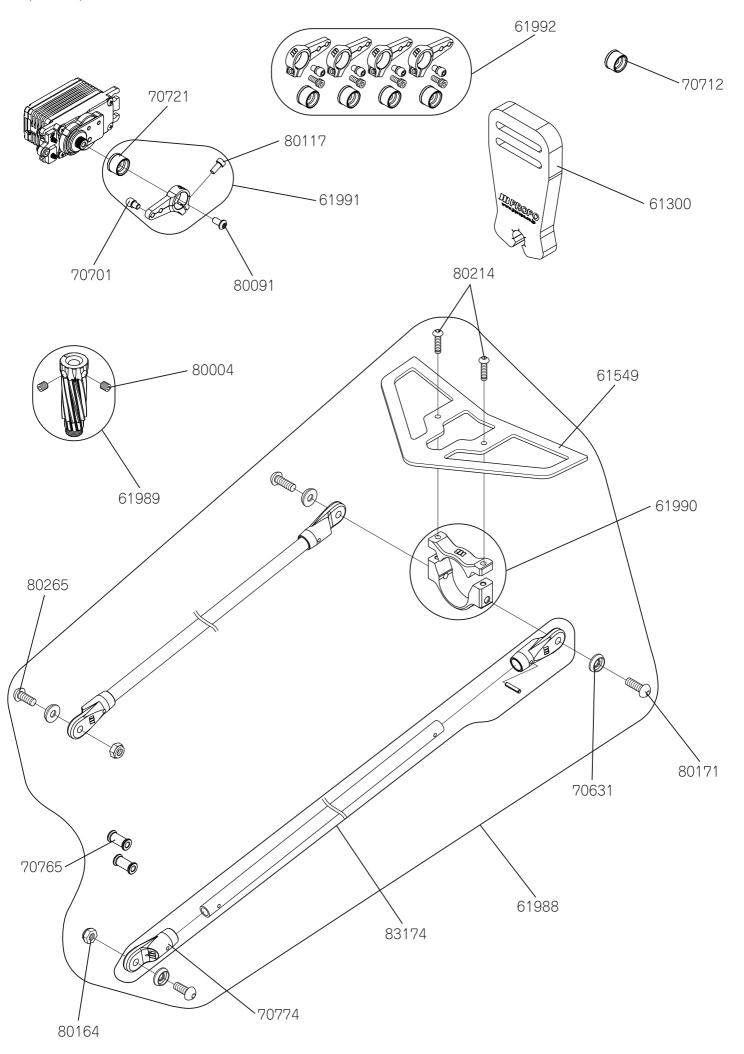
Item #	Description	Quantit	y Note
61953	Motor mount	1	
61954	Pinion gear T11	1	w/Setscrew M4 × 4
61955	Pinion bearing block assembly	1	L-1910ZZ already installed
61956	Autrotation sleeve	1	
61957	Autrotation unit	1	Bearing already installed
61958	Main drive gear T112	1	
61959	Tail drive gear T104	1	
61960	Swash plate assembly	1	w/Control ball L5.5, Joint ball shaft
61961	Swash gauge	1	
61962	Main shaft	1	
61963	Carbon middle plate	1	
61964	Battery mount plate	1	w/hook
61965	Battery mount plate rail	2	w/Flat head bolt M2.5 $ imes$ 6
61966	Middle cross member A	1	6901ZZ already installed
61967	Middle cross member B	1	
70572	Pinion nut M9	1	
70583	Special washer M3	10	
70631	Special washer M4	10	
70769	Joint ball shaft	1	
70770	Plate cross member	1	L32P20
70771	Battery plate hook	1	
70775	Shim washer $15 \times 19 \times 0.2$	2	
80004	Setscrew M4 × 4	10	
80013	Socket head bolt M3 × 8	10	
80014	Socket head bolt M3 × 10	10	
80036	Flat washer M3	10	
80065	Flat head bolt M3 $ imes$ 6	10	
80095	Flat head bolt M3 \times 8	10	
80115	Socket head bolt M2.6 × 8	10	
80119	Button head bolt M3 \times 8	10	
80164	Nylon lock nut M4 (t3.8)	10	
80181	Special socket head bolt M4 × 26	2	
80201	Button head bolt M4 × 8	10	
80263	Flat head bolt M2.5 × 6	10	
81005	Shielded bearing $10 \times 19 \times 7$	2	L-1910ZZ
81055	Shielded bearing $12 \times 24 \times 6$	1	6901ZZ
96292	Main shaft collar	1	w/Socket head bolt, Setscrew
96452	Control ball L5.5	1	



Item #	Description	Quantit	y Note
61968	Tail control rod guide set	2	w/Setscrew M3 × 4
61969	Tail pinion unit set	1	One set
61970	Bevel gear A T22	2	
61971	Bevel gear B T22	2	w/Bevel gear pin, Setscrew M3 × 6
61972	Tail pinion shaft	1	
61973	Tail pinion gear T22	1	w/Setscrew M4 × 4
61974	Tail pinion unit bearing block assembly	1	Bearing already installed
61975	Rear body clamp	1	w/Socket head bolt, Button head bolt, Special washer
61976	Blade holder	1	for rear body
70004	Universal link	10	
70583	Special washer M3	10	
70761	Cross member L32	2	
70772	Bevel gear pin Ø 2.3	2	
80001	Setscrew M3 × 4	10	
80004	Setscrew M4 × 4	10	
80013	Socket head bolt M3 \times 8	10	
80115	Socket head bolt M2.6 \times 8	10	
80119	Button head bolt M3 \times 8	10	
80129	Nylon lock nut M2.6	10	
80168	Setscrew M3 × 6	10	
80192	Setscrew M3 × 10	10	
80204	Button head bolt M3 \times 4	10	
80258	Threaded rod M2.3 \times 30	2	
81067	Shielded bearing $8 \times 14 \times 4$	2	L-1480ZZ
81068	Shielded bearing $12 \times 18 \times 4$	1	6701ZZ
81073	Shielded bearing $6 \times 13 \times 5$	2	L-1360ZZ
82407	FRP rear body	1	
83170	Tail boom L813	1	
83171	Drive shaft	1	
83172	Drive shaft set	1	w/Shaft drive guide, Drive shaft joint
83173	Tail control rod L740	1	One set
96197	Drive shaft joint	2	w/Setscrew M3 × 10
96198	Shaft drive guide	1	w/L-1480ZZ



Item #	Description	Quantit	y Note
60556	Tail PC link B	2	w/Link pin, E stopper ring M1.5
61201	Tail slide ring	1	w/L-1170ZZ
61779	Tail center hub Ø 6	1	w/Setscrew M4 × 4,O-ring
61780	HG metal tail PC plate	1	w/Setscrew M2 × 2,Link, Pin
61970	Bevel gear A T22	2	
61971	Bevel gear B T22	2	w/Bevel gear pin, Setscrew M3 × 6
61977	Metal tail blade holder assembly	1	Bearing already installed
61978	Carbon tail rotor blade	2	
61979	Tail pitch control lever set	1	A/B, Bearing already installed
61980	Tail pitch control lever	1	w/Joint ball screw L3
61981	Tail output shaft	1	
61982	Tail output shaft collar	1	w/Poly slider
61983	Tail gear case assembly	1	Bearing already installed
61984	Tail gear case cross member	1	Color: Silver
61985	Tail gear case plate L	1	L-1360ZZ already installed
61986	Tail gear case plate R	1	L-1360ZZ already installed
61987	Carbon vertical fin	1	
70163	O-ring 3.5 × 5.5 × 1	2	
70293	HG Tail PC link pin	2	
70545	Washer $8 \times 10 \times 0.5$	2	
70660	Join ball screw L3	5	
70661	Join ball screw L4	5	
70772	Bevel gear pin Ø 2.3	2	
70773	Tail PC lever pin	2	
80004	Setscrew M4 × 4	10	
80013	Socket head bolt M3 × 8	10	
80036	Flat washer M3	10	
80039	Nylon lock nut M3 (t2.8)	10	
80091	Button head bolt M3 × 6	10	
80168	Setscrew M3 × 6	10	
80204	Button head bolt M3 × 4	10	
80205	Poly slider $6 \times 9.5 \times 0.13$	10	
80245	Setscrew M2 × 2	5	w/HEX wrench 0.89
80249	Button head bolt M2 × 5	10	
80266	Blade bolt set M3 × 15 (Silver)	1	Bolt × 2, Nylon lock nut × 2
81016	E Stopper ring M1.5	10	
81029	Thrust bearing $5 \times 10 \times 4$	2	T5-10
81041	Flanged bearing F $3 \times 7 \times 3$	2	LF-730ZZ
81065	Shielded bearing 7 × 11 × 3	2	L-1170ZZ
81068	Shielded bearing 12 × 18 × 4	1	6701ZZ
81071	Shielded bearing $6 \times 10 \times 3$	2	L-1060ZZ
81073	Shielded bearing $6 \times 13 \times 5$	2	L-1360ZZ
96330	Tail slide ring sleeve	1	



Item #	Description	Quantity	y Note
61300	Blade holder	1	
61549	Carbon horizontal fin B	1	
61988	Standard boom brace set	1	One set
61989	Pinion gear T12	1	w/Setscrew M4 × 4
61990	Tail boom brace clamp	1	
61991	Adjustable metal horn D	1	w/Servo horn inner,Control ball
61992	Adjustable metal horn D $ imes$ 4	1	w/Servo horn inner,Control ball 4pcs each
70631	Special washer M4	10	
70701	Control ball L2.5	1	
70712	Adjustable metal horn inner (Futaba type)	1	
70721	Adjustable metal horn inner V2	1	
70765	SpacerL12	2	
70774	Tail boom brace end	4	Spring pin M2 × 9
80004	Setscrew M4 × 4	10	
80091	Button head bolt M3 \times 6	10	-
80117	Socket head bolt M2.6 × 6	10	-
80164	Nylon lock nut M4 (t3.8)	10	
80171	Button head bolt M4 × 10	10	
80214	Button head bolt M3 × 12	10	
80265	Button head bolt M4 × 12	10	
83174	Carbon tail boom brace	2	w/Tail boom brace end

PRODUCT WARRANTY AND LIABILITY INDEMNITY

PRODUCT WARRANTY

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 TRANSFER OF PRODUCT

REPAIR

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 all 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.

