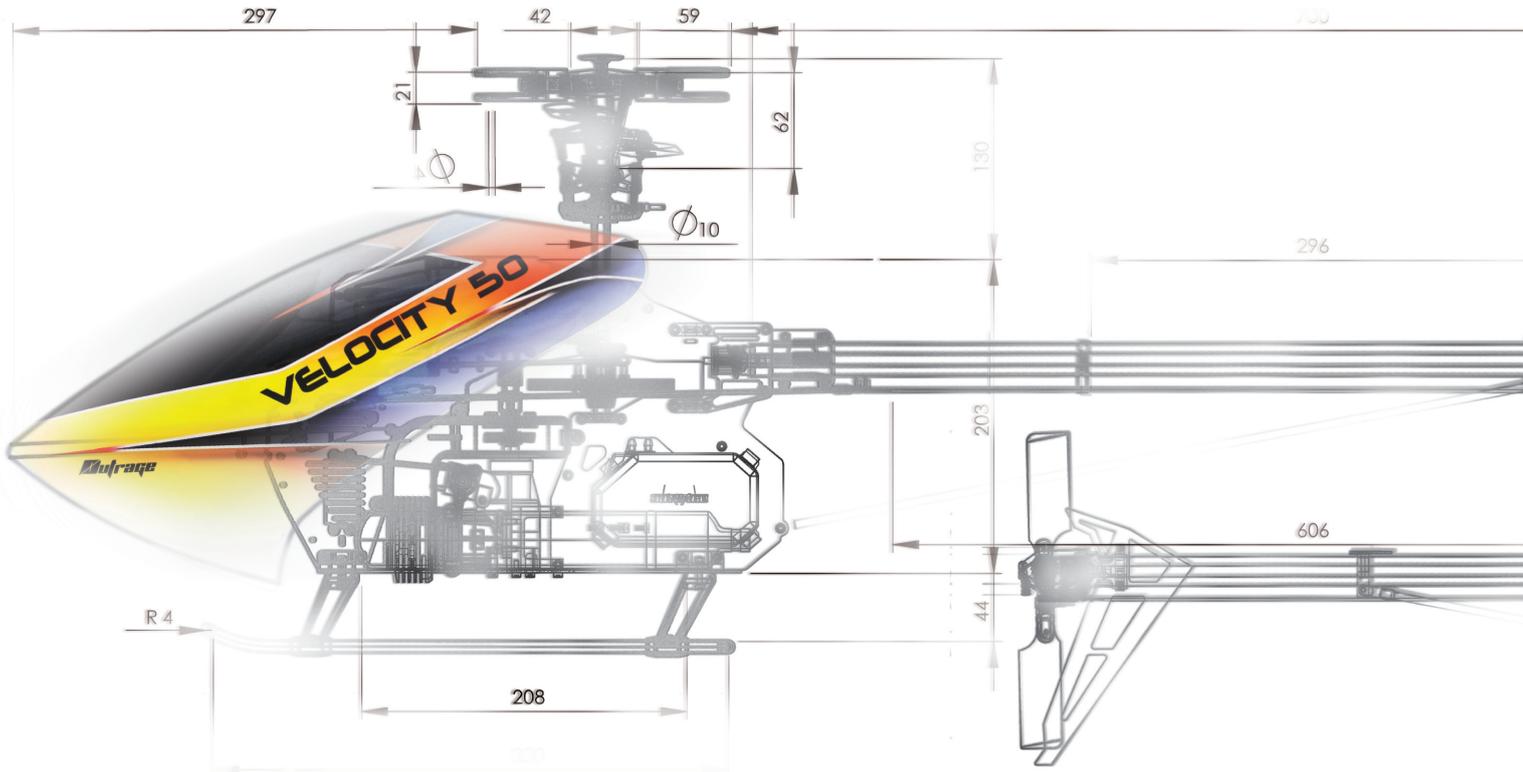




VELOCITY 50

User Manual



Ultra Compact Frame TECHNOLOGY

Features of the Velocity 50

- Extended boom length for improved forward flight tracking and superior tail authority in extreme 3D conditions.
- Fully adjustable head allowing multiple setups from high stability to maximum agility making it perfect for the beginner to advanced pilot.
- Aerodynamically formed canopy shape for enhanced flight characteristics.
- 16 Ball bearing tail pitch control system for smooth precise control.
- Extra long washout base for increased lever stability.
- Dual ball raced 120/140 CCPM swash plate.
- Achievable pitch range of +15/-15 degrees of pitch.
- One piece dampers.
- Torque tube design for efficiency.
- Adjustable drive train for optional 8.8:1 gear ratio.
- Dual ball raced seesaw support in center hub.
- Dual ball raced radius arms for precision control.
- Ultra large clutch design to maximize engine output.
- Ultra compact frame technology for superior frame rigidity.
- Adjustable servo mounts for various size and brand servos.

Length	Height	Width
: 1220mm	: 378mm	: 203mm
• Main Rotor Blade Size 600-630mm • Main Rotor Diameter: 1355mm -1415mm	• Tail Blade Length: 95mm • Tail Rotor Diameter: 250mm	
• Main Gear ratio: 8.6:1 (8.8:1 Optional) • Tail Rotor Ratio 4.58:1 • Approximate Flying Weight with Fuel: 3.6kg / 7.936 Lbs. (depends on equipment used)		

Introduction

Read before assembly

Thank you for purchasing Outrage RC products. The Velocity 50N radio controlled helicopter is designed with easy to use features that are capable of a multitude of flight characteristics and styles - from beginner, basic, to advanced 3D aerobatic rotary flight. In order to use this product safely, please read and understand this manual before flying the helicopter. Please fly the helicopter safely, observing all rules and instructions after having fully understood the flight precautions, the unit's capabilities, and the best way to fly the helicopter. Be sure to retain this manual for future reference, routine maintenance, and tuning.

Meaning of symbols

(!) caution:	Mishandling due to failure to follow these instructions may result in serious harm.
(!) Warning:	Mishandling due to failure to follow these instructions may result in severe injury or death.
⊘ Forbidden:	Do not attempt under any circumstances.

This radio controlled helicopter is not a Toy!

Radio controlled helicopters use various high tech electronic technologies and products. Improper use of this product can result in serious injury, or even death. Please read this manual carefully before flying the Velocity 50N, and make sure to be conscious of your own personal safety and the safety of others. Be conscious of your surroundings and environment when operating Outrage products. Outrage RC, affiliated groups, and seller assume no liability for the operation or use of this product. The user/purchaser is responsible for common knowledge and implantation of one's personal safety, and the safety of others, that may be affected by the use of the product, be they a participant or spectator. This radio controlled helicopter is intended for use only by adults with experience flying radio controlled helicopters at a legal flying field. After the sale of this product, we cannot maintain any control over its operation or usage. We recommend that you obtain assistance from an experienced pilot before attempting to fly our products, and to help verify proper assembly, setup, and flight of your model for the first time. Outrage helicopter is a consumer item that requires a certain degree of skill to operate. Any damage or dissatisfaction as a result of accidents or modifications are not covered by any warrantee, and cannot be returned for repair or replacement. For issues with your Outrage helicopter or product, please contact us for technical assistance.

Safety notes:

Choose a legal flying field

- Verify air field to have ample space, flat, and smooth ground
- Clear airfield from debris and obstacles

Do not operate

- In strong winds, night, or rain.
- If model has been in contact with rain, moisture, or contaminants.
- In cold climate conditions - plastics are very susceptible to damage due to cold climates.
- If model has been in contact with fire or high heat - plastics are very susceptible to damage or deformation due to heat.
- In crowded areas.
- Near homes, schools, or hospitals.
- Near roads, railways, or power lines.
- Near another radio controlled unit that uses same frequency.
- Do not allow children to operate.
- If tired, sick, or under the influence of drugs or alcohol.
- If beginner or individual(s) planning to operate a borrowed helicopter without being familiar with model or safety instructions.

Inspect All Parts

- Before each flight, check for damaged parts and verify all parts operate normally with all functions in order.
- Adjust the positioning of movable parts and check that all nuts, bolts, screws are fastened correctly in accordance to this instruction manual.
- Verify all parts are installed correctly.
- Verify that there are no abnormalities that would adversely affect the flight of the helicopter.
- Verify all batteries on board helicopter and transmitter are to a sufficient level of charge.
- Exchange or repair damaged or worn parts using only parts shown in this instruction manual, or via the Outrage catalog.
- Verify there is no introduction or exposure to water or moisture in any form.

During operation of helicopter

- Always be aware of your surroundings.
- Maintain safe distances from aircraft and rotating main/tail rotor blades.
- Be conscious of your actions.
- Wear appropriate clothing that does not interfere with transmitter or helicopter.
- Never leave your model unattended.
- Maintain eye contact during all aspects of flight.

R50N904-SS

R50N902-SS

Main Bag 1

Ball Bearing 3x6x2.5mm



.....x2

Double Linkage Ball 4.75x11mm



.....x2

Cap Screw M2.5x8mm



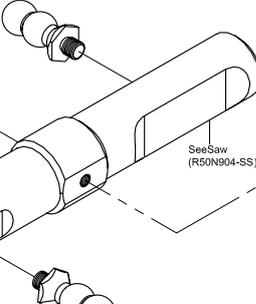
.....x2

Ball Bearing 4x7x2.5mm

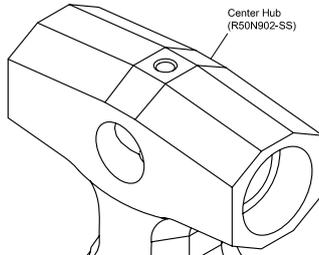


.....x4

Double Linkage Ball 4.75x11mm (R50N904-SS)



SeeSaw (R50N904-SS)



Center Hub (R50N902-SS)

Ball Bearing 4x7x2.5mm (R50N902-SS)

Already assembled by factory

Bearing Sleeve Brass (R50N902-SS)

Cap Screw M2.5x8mm

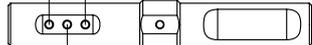
(!) Caution:

Use medium strength thread lock compound on all screws



Very Stable

Less Stable (Advanced)



Start here first SeeSaw

Note: Refer to page 6 for detailed settings on linkage ball placements and rod lengths

Ball Bearing 3x6x2.5mm (R50N904-SS)

Already assembled by factory

Double Linkage Ball 4.75x11mm (R50N904-SS)

Phasing Pin (R50N902-SS)

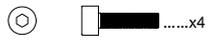
Already assembled by factory

Main Bag 1, 9

R50N901-SS

R50N903-SS

Cap Screw M2x8mm



.....x4

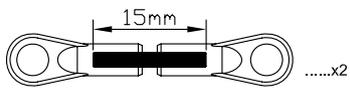
Set screw M4x4mm



.....x2

Linkage Rod (B)

Note: Drawing Not To Scale



.....x2

Note: Refer to page 6 for detailed settings on linkage ball placements and rod lengths

Flybar Rod 400mm (R50N931-SS)

Set Screw M4x4mm

Cap Screw M2x8mm

Flybar Carriage Base (R50N903-SS)

Flybar Control Rod (R50N903-SS)

Plastic Ball Link

Linkage Rod M2x15mm

(!) Caution:

Use medium strength thread lock compound on all screws



Slower Less Sensitive Reaction



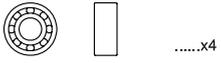
Faster Sensitive Reaction (Advanced) Flybar Carriage Base

Note: Refer to page 6 for detailed settings on linkage ball placements and rod lengths

Main bag 2

R50N906-SS

Ball Bearing 3x7x3mm



Ball Bearing 2 x5x2.3mm Flanged



Brass Bearing Spacer



R50N907-SS

Cap Screw M2x6mm



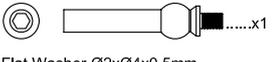
Button Head Cap Screw M2x3mm



Linkage ball 4.75 x5mm



Elevator Ball 4.75mm



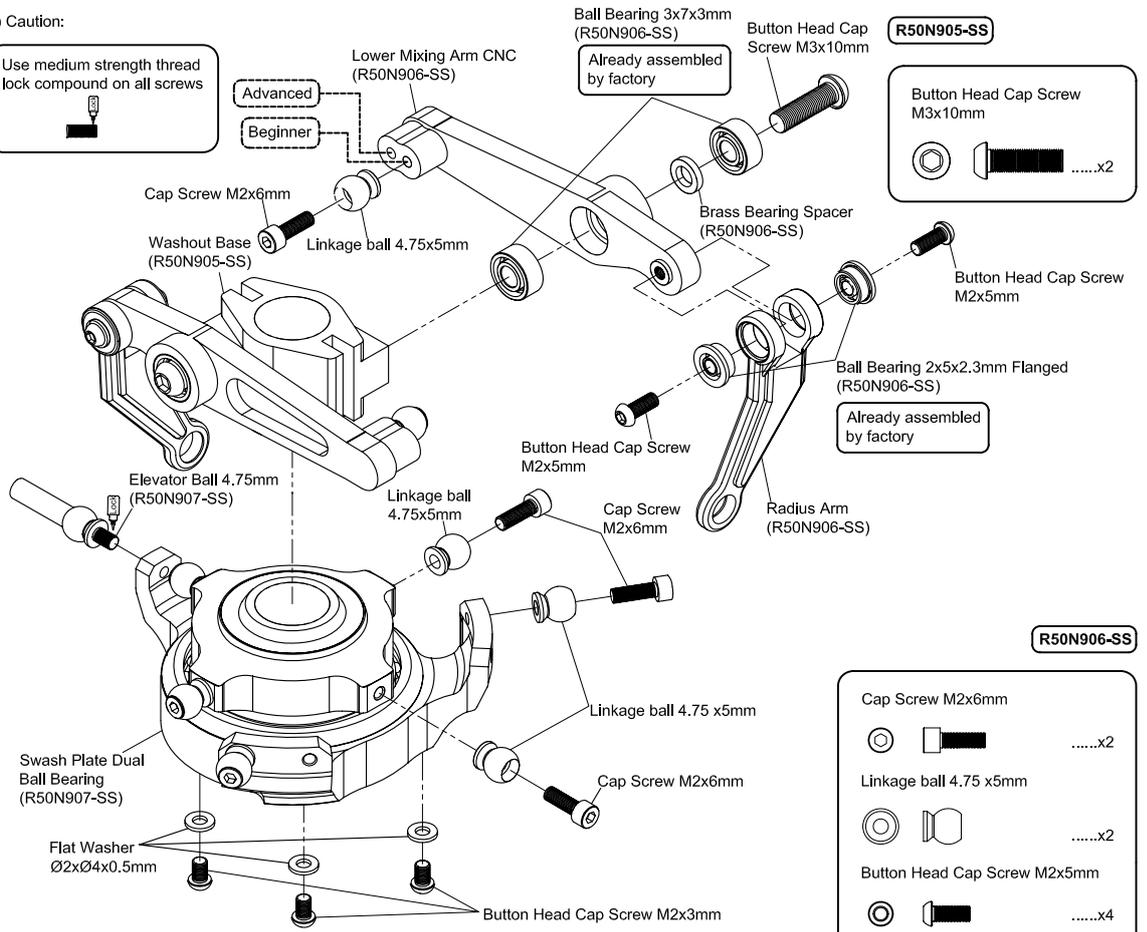
Flat Washer Ø2xØ4x0.5mm



(!) Caution:

Use medium strength thread lock compound on all screws

Advanced
Beginner



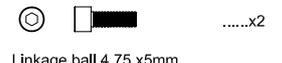
R50N905-SS

Button Head Cap Screw M3x10mm



R50N906-SS

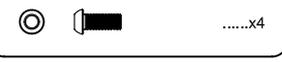
Cap Screw M2x6mm



Linkage ball 4.75 x5mm



Button Head Cap Screw M2x5mm



Main bag 1, 2

R50N902-SS

Cap Screw M3x20mm shouldered

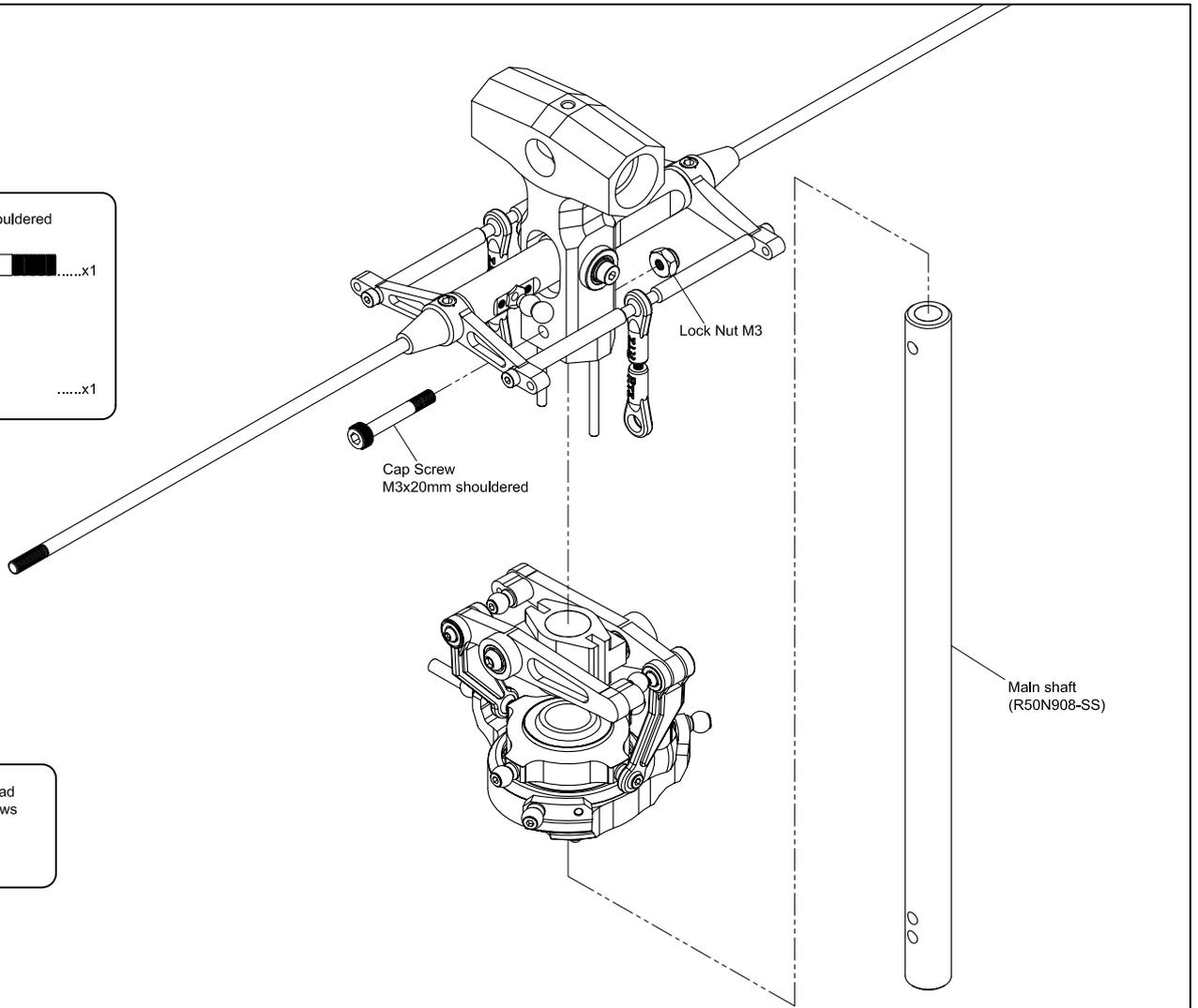


Lock Nut M3

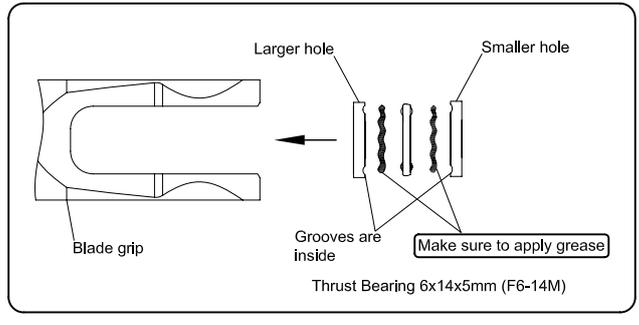


(!) Caution:

Use medium strength thread lock compound on all screws



(!) Caution:



R50N913-SS

Damper $\varnothing 8 \times 13 \times 6.5 \text{mm}$ x2

Damper Spacer $\varnothing 8 \times \varnothing 11.5 \times 1.3 \text{mm}$ x2

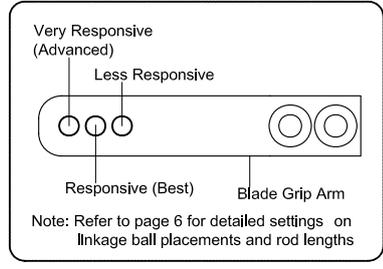
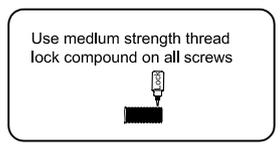
R50N909-SS

Ball Bearing 8x14x4mmx4

Thrust bearing 6x14x5mm

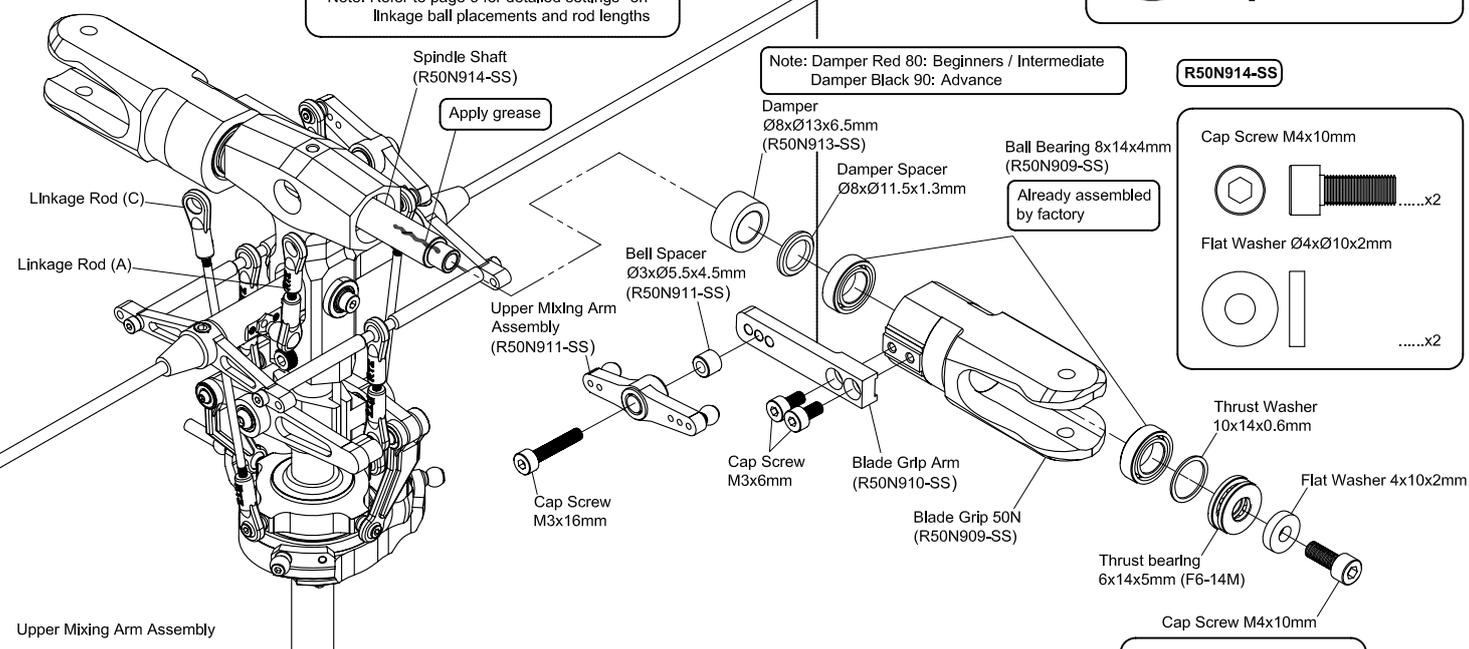
Thrust Washer 10x14x0.6mmx2

(!) Caution:



R50N910-SS

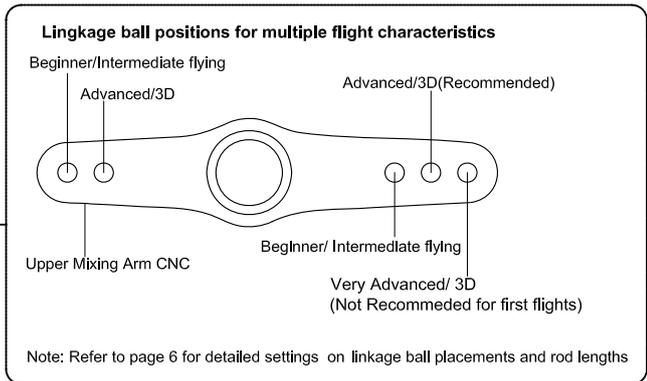
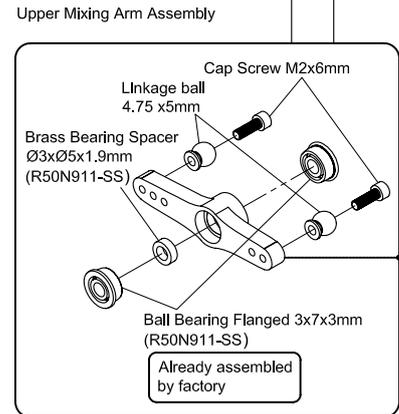
Cap Screw M3x6mmx4



R50N914-SS

Cap Screw M4x10mmx2

Flat Washer $\varnothing 4 \times \varnothing 10 \times 2 \text{mm}$ x2



R50N911-SS

Cap Screw M3x16mmx2

Cap Screw M2x6mmx4

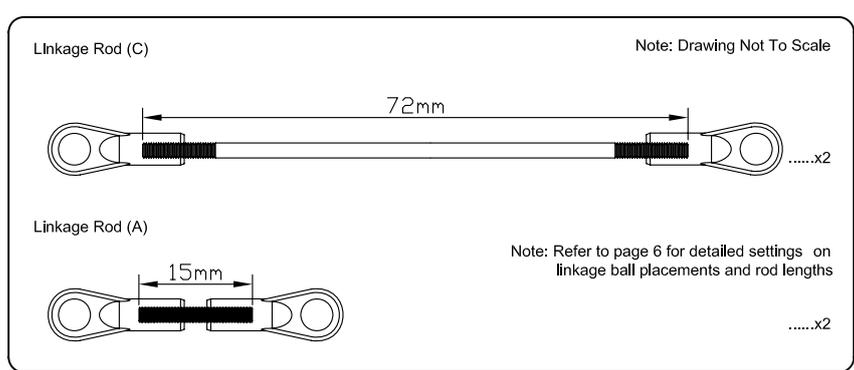
Linkage ball 4.75 x 5mmx4

Bell Spacer $\varnothing 3 \times \varnothing 5.5 \times 4.5 \text{mm}$ x2

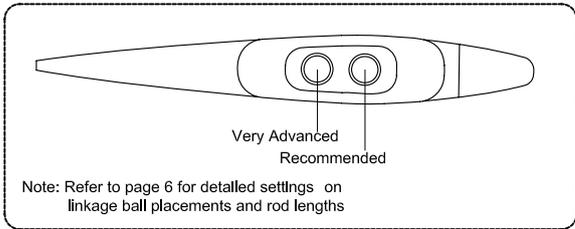
Brass Bearing Spacer $\varnothing 3 \times \varnothing 5 \times 1.9 \text{mm}$ x2

Ball Bearing Flanged 3x7x3mmx4

R50N901-SS



Main bag 1, 3

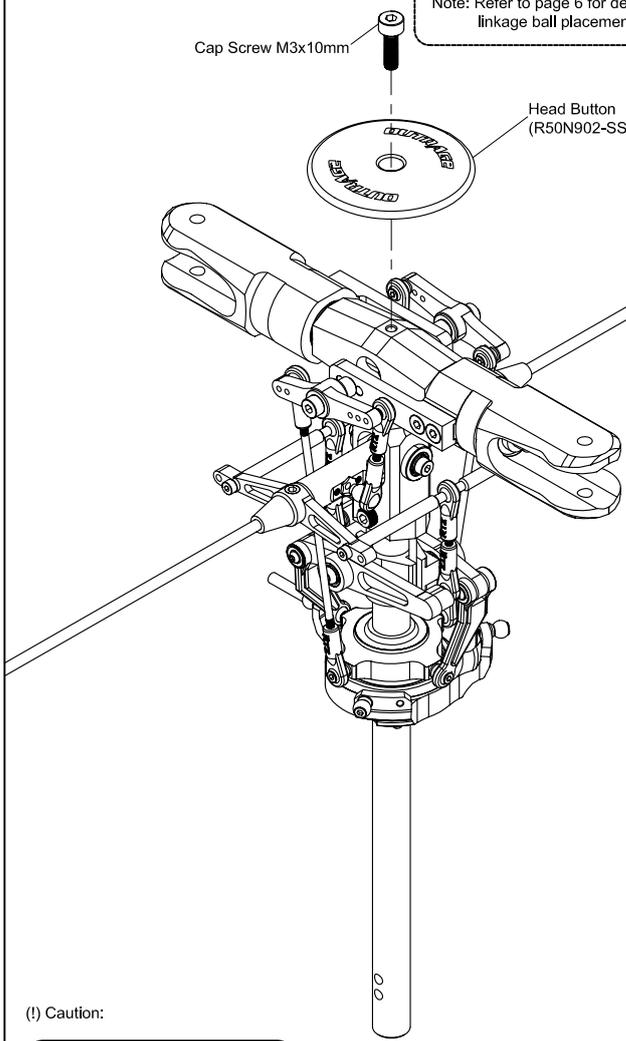


Flybar Paddle 50N (R50N915-SS)

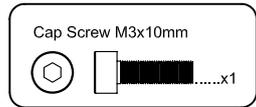
Cap Screw M3x10mm

Head Button (R50N902-SS)

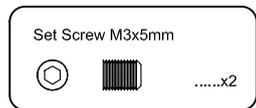
Set Screw M3x5mm



R50N902-SS

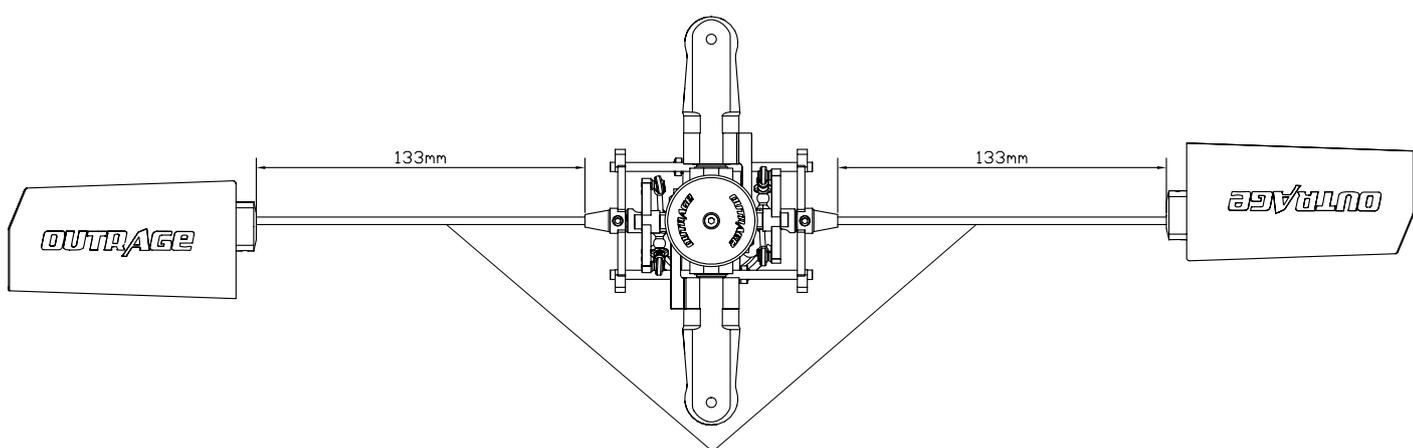


R50N915-SS



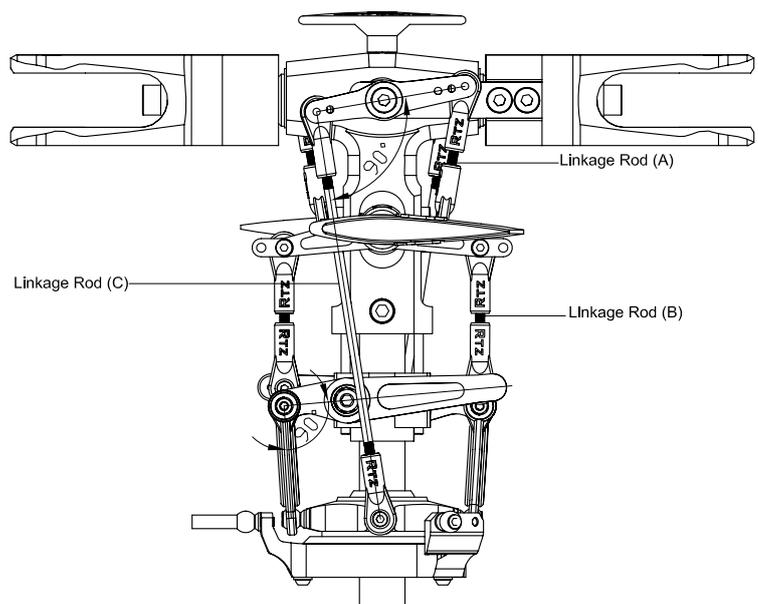
(!) Caution:

Use medium strength thread lock compound on all screws



Basic setup configurations for beginner, intermediate, and advanced flying skills

In the diagram below we supply three basic mechanical setting possibilities of this rotor head. There are many other achievable setups all providing different results. Adjust these settings on demand of you and your capability. Some of the settings can produce binding. Ensure that servo travel settings in the radio and linkage rod at adjustments allowing no binding. This is important to achieve a good performance of the rotor head.



These are Basic recommended Programmable Head Configurations

Beginner settings:

Use locations noted in component boxes

- G3
- S1
- E1
- B1
- M1
- H1
- Linkage rod lengths
- A: 2.75 mm
- B: 1.5 mm
- C: 60.5 mm

1700-1800 RPM Target Head Speed.
Aileron and Elevator Pitch 4 Degree
Pitch Settings + 9 Degree - 2 Degree

Intermediate settings:

Use locations noted in component boxes

- G2
- S2
- E1
- B2
- M2
- H1
- Linkage rod lengths
- A: 3.5 mm
- B: 1.5 mm
- C: 60.5 mm

1950 RPM Target Head Speed
Aileron and Elevator Pitch 6 Degree
Pitch Settings + 10 Degree - 10 Degree

Advanced settings:

Use locations noted in component boxes

- G2
- S2
- E2
- B3 to outside ball on dual ball on seesaw
- M2
- H2
- Linkage rod lengths
- A: 3 mm
- B: 1.5 mm
- C: 61 mm

2000-2100 RPM Target Head Speed
Aileron and Elevator Pitch 7 Degree
Pitch Settings +12 Degree - 12 Degree

Basic How To For Head Tuning

Linkage Rod A:

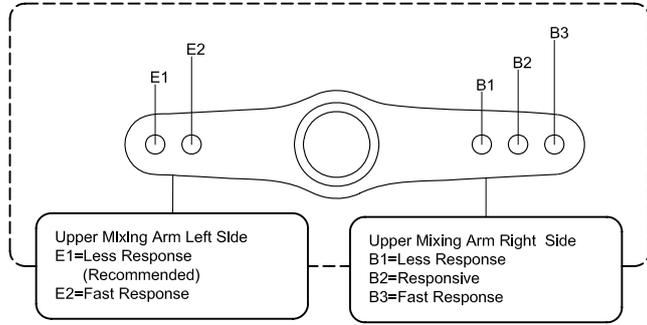
Adjustments to this linkage rod will change balance between positive and negative pitch ranges
Example: You have + 13 and - 11 degrees of pitch to achieve equal pitch range for both + and - sides you will change length of this rod to achieve proper balance.

Linkage Rod B:

Adjustments to this rod should not vary from key setup object is to maintain approximate 90 degree relation with plastic radius arms and lower mixing arm as noted in diagram above.

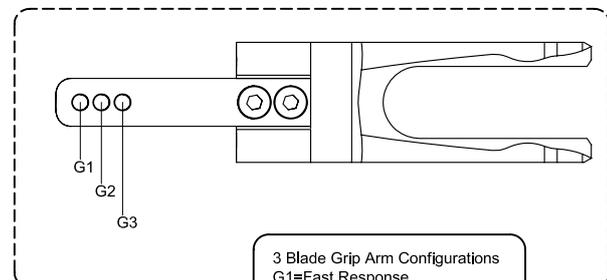
Linkage Rod C:

Adjustments to this linkage rod are for initial setup of zero degree pitch when set at center stick on your transmitter also for minor blade tracking corrections. Excessive length variations between both blade grips may be a sign of other problems such as 1. Improperly matched set of blades 2. A result from a crash or hard landing verify no parts are bent or damaged

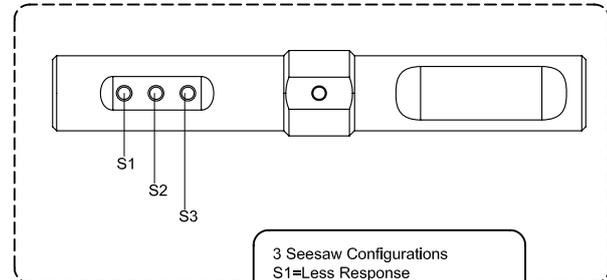


Upper Mixing Arm Left Slide
E1=Less Response (Recommended)
E2=Fast Response

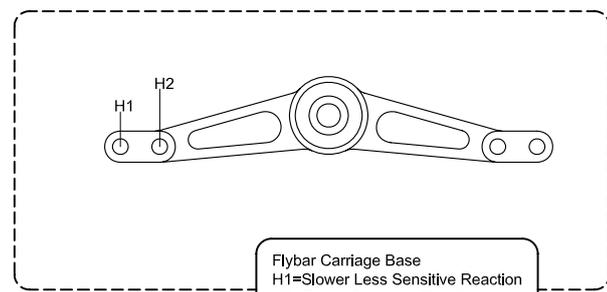
Upper Mixing Arm Right Side
B1=Less Response
B2=Responsive
B3=Fast Response



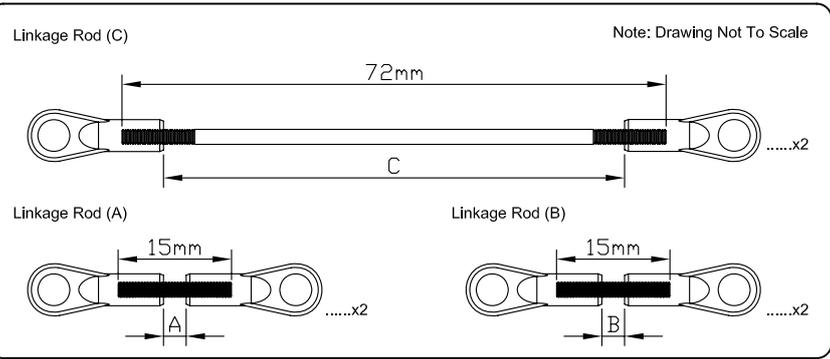
3 Blade Grip Arm Configurations
G1=Fast Response
G2=Responsive (Recommended)
G3=Less Response



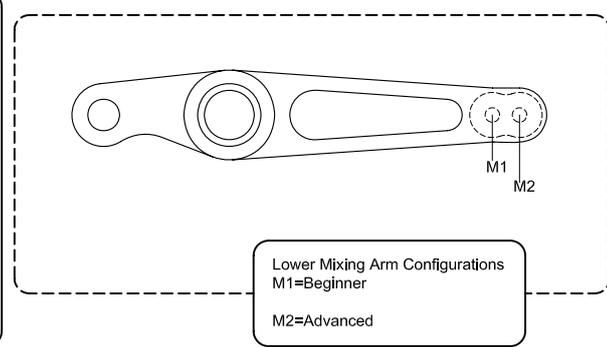
3 Seesaw Configurations
S1=Less Response
S2=Responsive
S3=Fast Response



Flybar Carriage Base
H1=Slower Less Sensitive Reaction
H2=Faster Sensitive Reaction (Advanced)



Note: Drawing Not To Scale

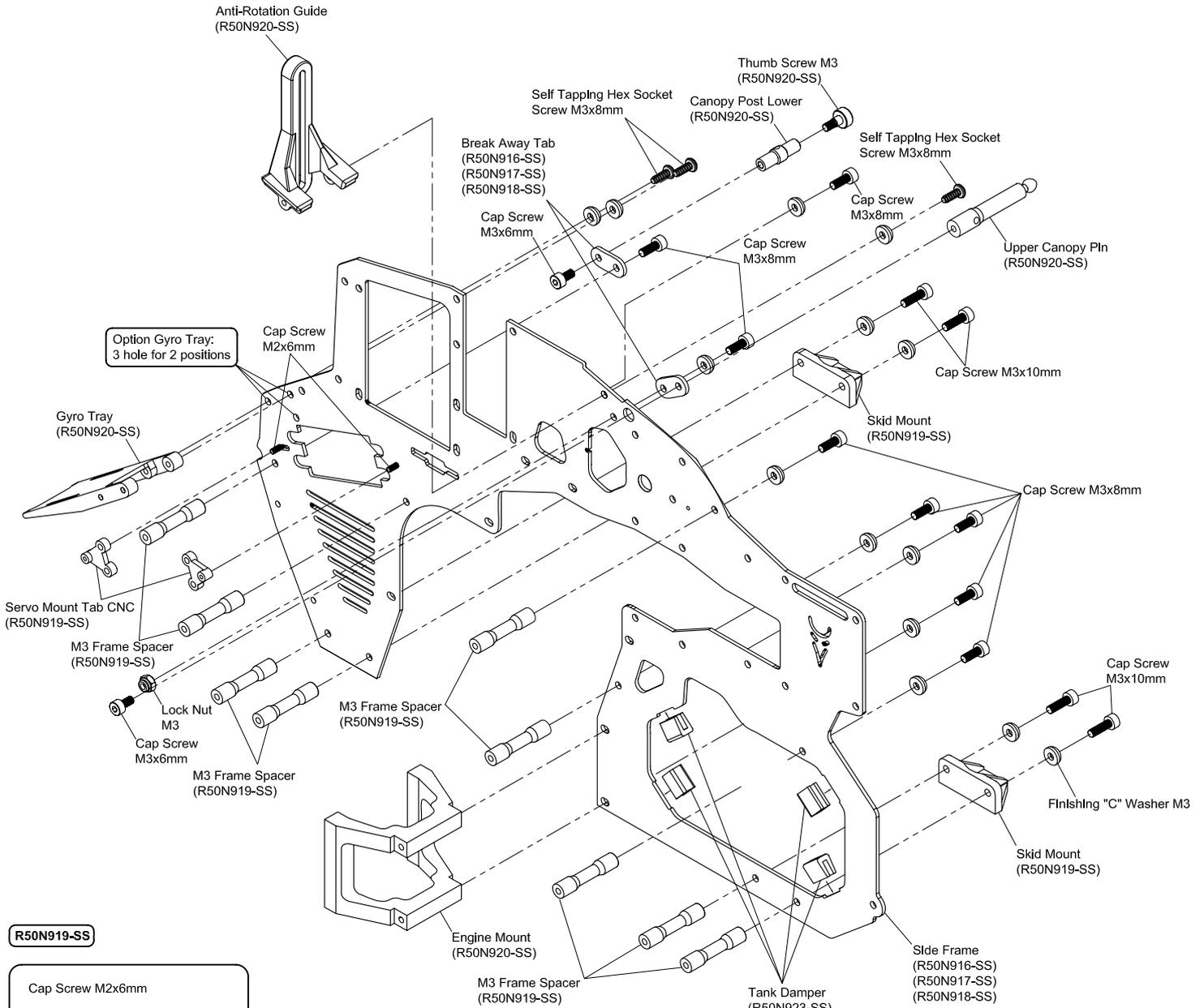


Lower Mixing Arm Configurations
M1=Beginner
M2=Advanced

Use medium strength thread lock compound on all screws



Pre-assembly for the next Side Frame Of the locations Similar



Option: CA Dampers to Frame

R50N919-SS

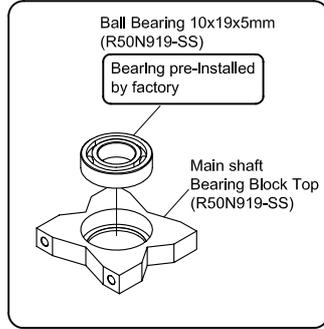
- Cap Screw M2x6mmx2
- Cap Screw M3x6mmx4
- Cap Screw M3x8mmx16
- Cap Screw M3x10mmx8
- Lock Nut M3x2
- Finishing "C" Washer M3x22

R50N920-SS

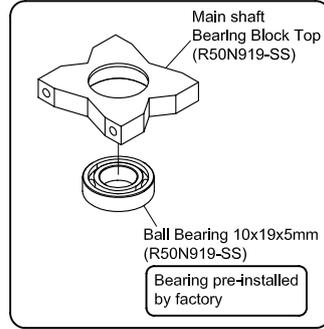
- Self Tapping Hex Socket Screw M3x8mmx6
- Finishing "C" Washer M3x6

Main bag 5, 7

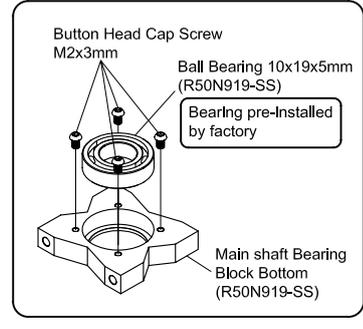
Assembly 1



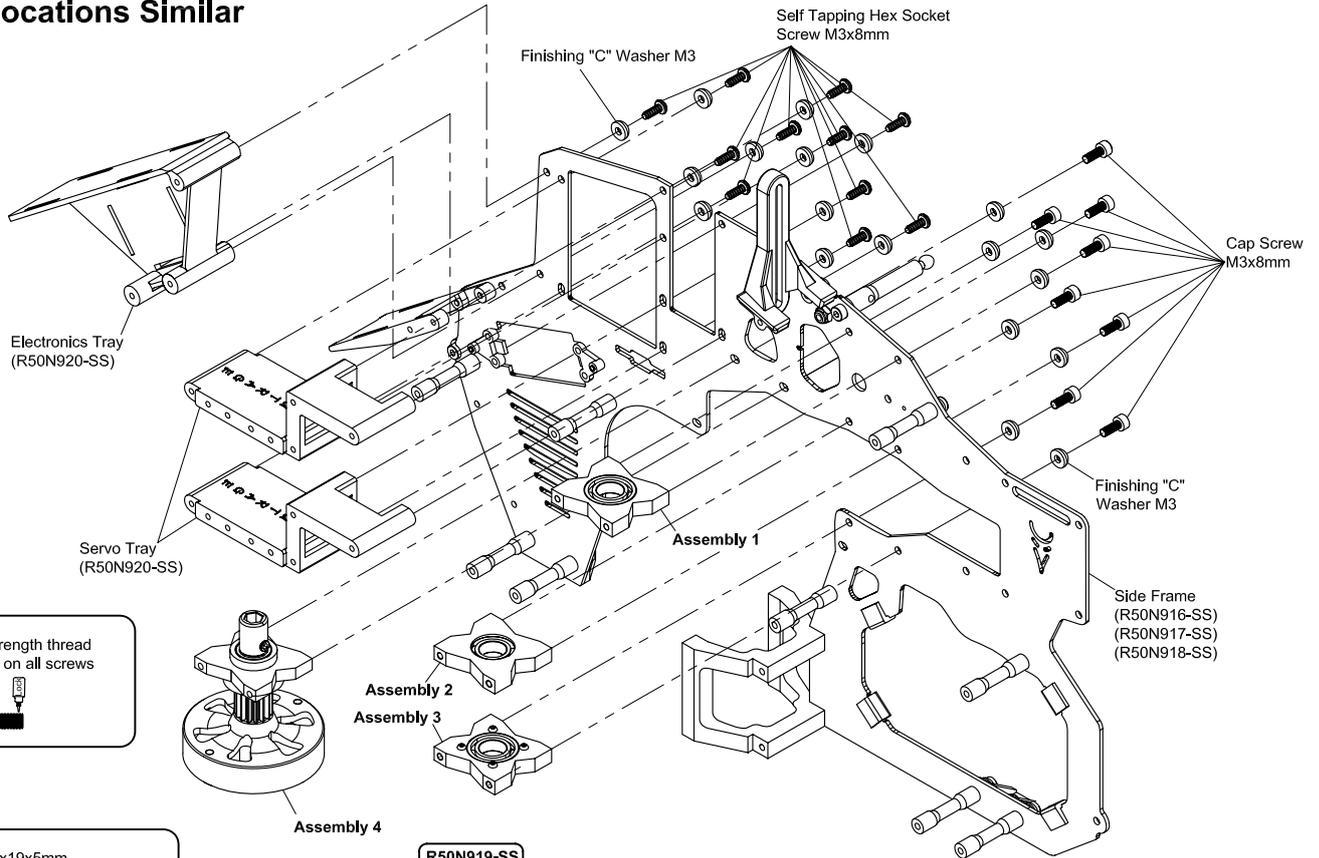
Assembly 2



Assembly 3



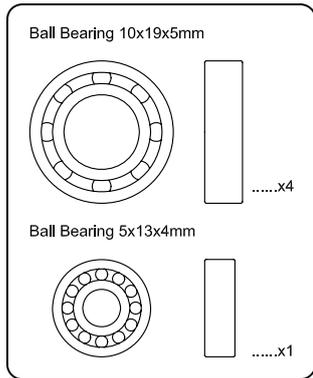
Pre-assembly for the next Side Frame
Of the locations Similar



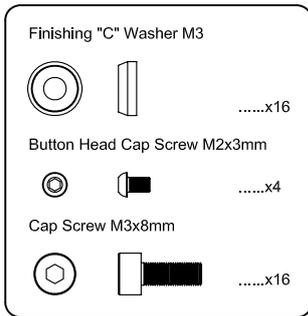
(!) Caution:

Use medium strength thread lock compound on all screws

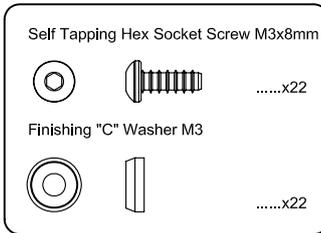
R50N919-SS



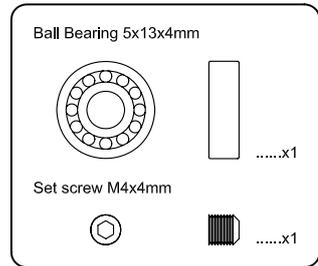
R50N919-SS



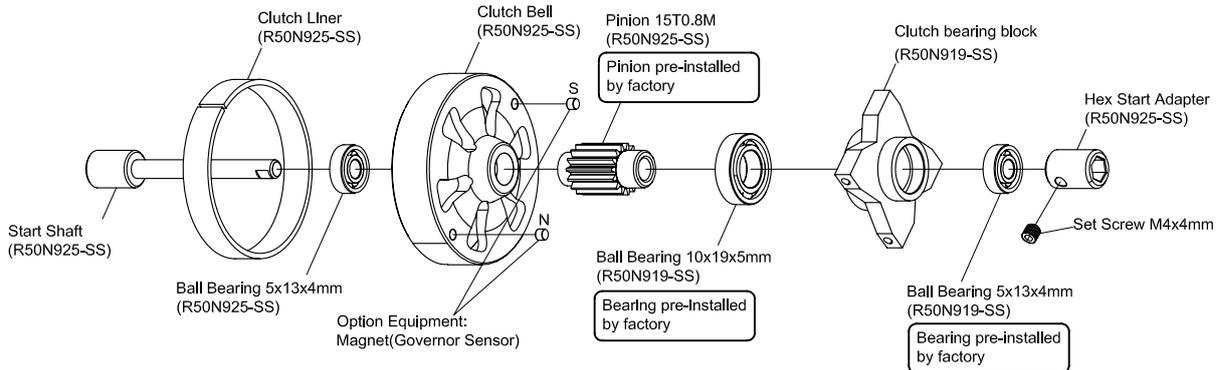
R50N920-SS



R50N925-SS



Assembly 4

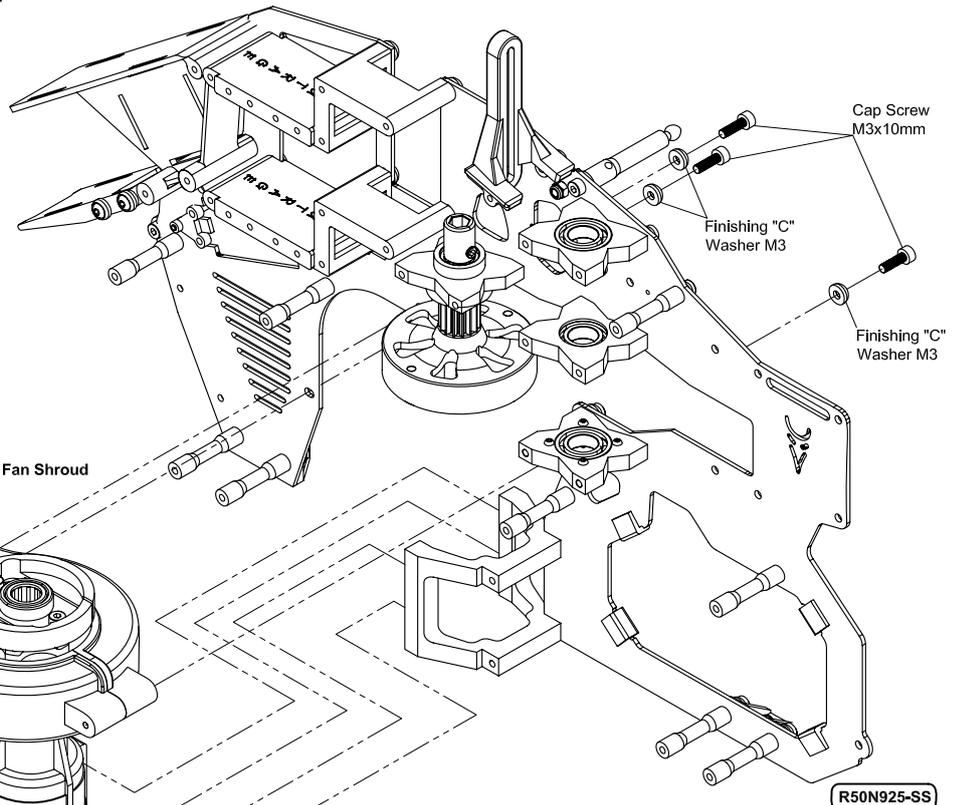


Pre-assembly for the next Side Frame Of the locations Similar

R50N925-SS

Finishing "C" Washer M3x6

Flat Washer Ø3XØ8x1mmx4



R50N925-SS

R50N925-SS

Cap Screw M3x12mmx4

Cap Screw M3x10mmx6

Cap Screw M3x8mmx4

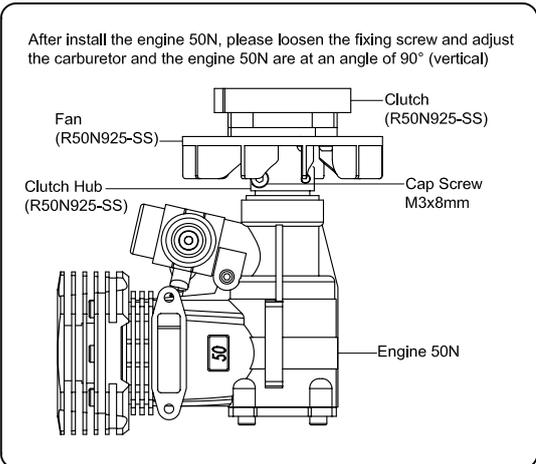
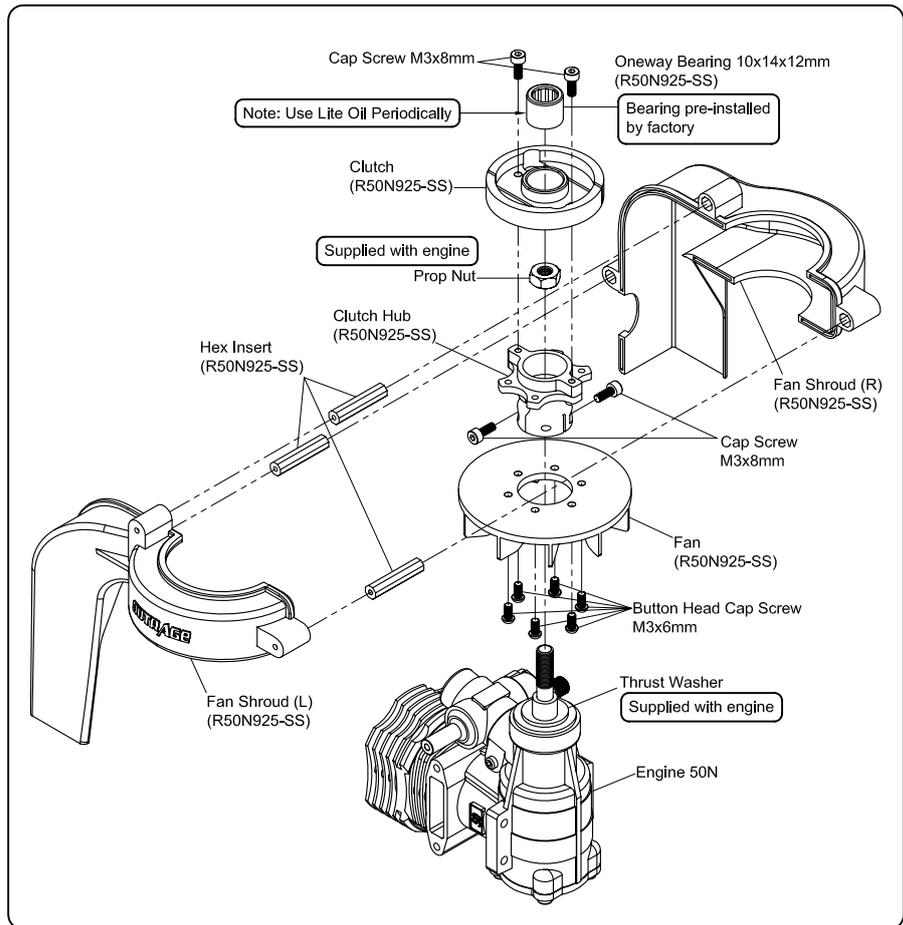
Button Head Cap Screw M3x6mmx6

(!) Caution:

Use medium strength thread lock compound on all screws

Oneway Bearing 10x14x12mmx1

Assembly Fan Shroud



Main bag 4, 6, 8, 11

Elevator Arm Assembly

R50N926-SS

Cap Screw M2x6mm



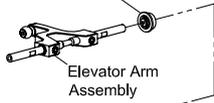
Linkage ball 4.75 x5mm



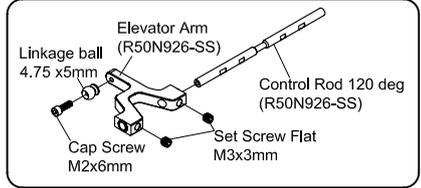
Set Screw Flat M3x3mm



Ball Bearing 3x7x3mm Flanged



Elevator Arm Assembly



Elevator Arm (R50N926-SS)

Linkage ball 4.75 x5mm

Control Rod 120 deg (R50N926-SS)

Cap Screw M2x6mm

Set Screw Flat M3x3mm

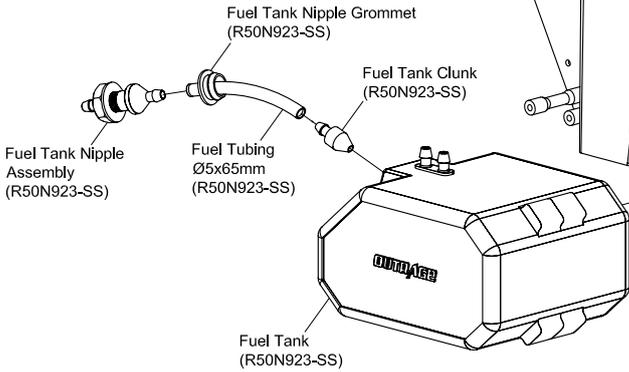
R50N916-SS
OR R50N917-SS
OR R50N918-SS

Ball Bearing 3x7x3mm Flanged



(!) Caution:

Use medium strength thread lock compound on all screws



Fuel Tank Nipple Grommet (R50N923-SS)

Fuel Tank Clunk (R50N923-SS)

Fuel Tank Nipple Assembly (R50N923-SS)

Fuel Tubing Ø5x65mm (R50N923-SS)

Fuel Tank (R50N923-SS)

After pre-assembly for the next Side Frame Of the locations Similar

R50N964-SS

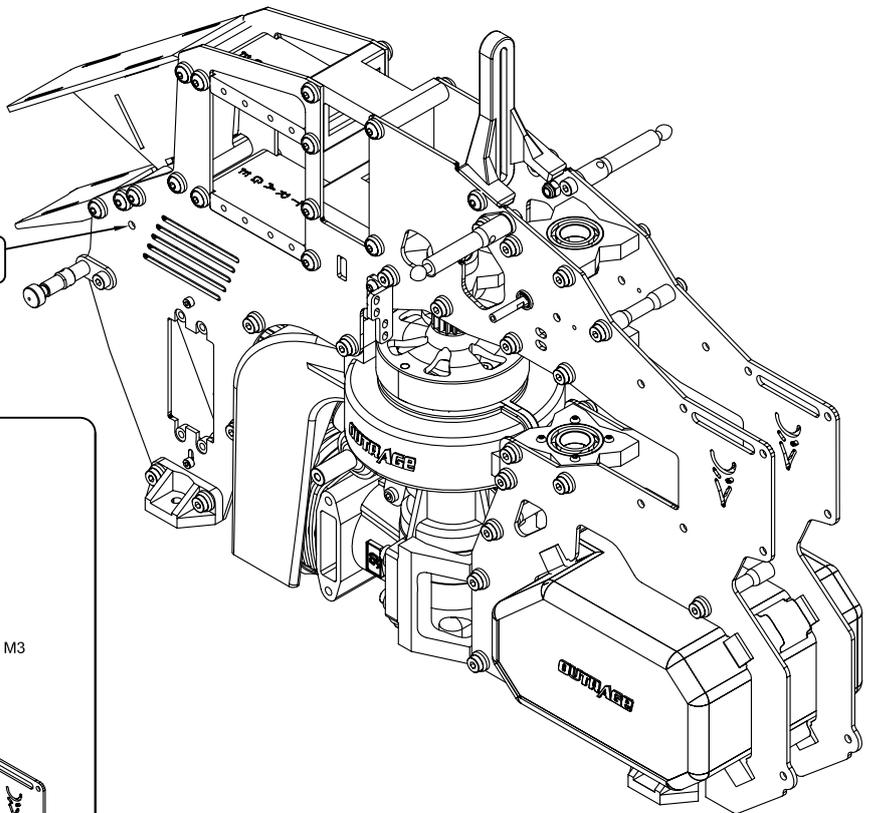
Button Head Cap Screw M3x10mm



Lock Nut M3



Note: Optional mounting position for Gyro Tray



Note: Assembly Servo Mount Tab and Governor Sensor Mount for next Side Frame

Servo Mount Tab (R50N919-SS)

Lock Nut M3

Cap Screw M2x6mm

Governor Sensor Mount (R50N251)

Cap Screw M2x6mm

Button Head Cap Screw M3x10mm

R50N919-SS

Cap Screw M2x6mm



Aileron Bell Crank CNC Assembly

Aileron Bell Crank 2 CNC Assembly

R50N926-SS

- Cap Screw M2x6mmx8
- Cap Screw M2x4mmx2
- Linkage ball 4.75 x5mmx8
- Set Screw Flat M3x3mmx2
- Shim Washer Brass Ø3xØ5x0.5mmx3
- Flat Washer Ø2xØ4x0.5mmx2
- Ball Bearing 3x6x2.5mmx4

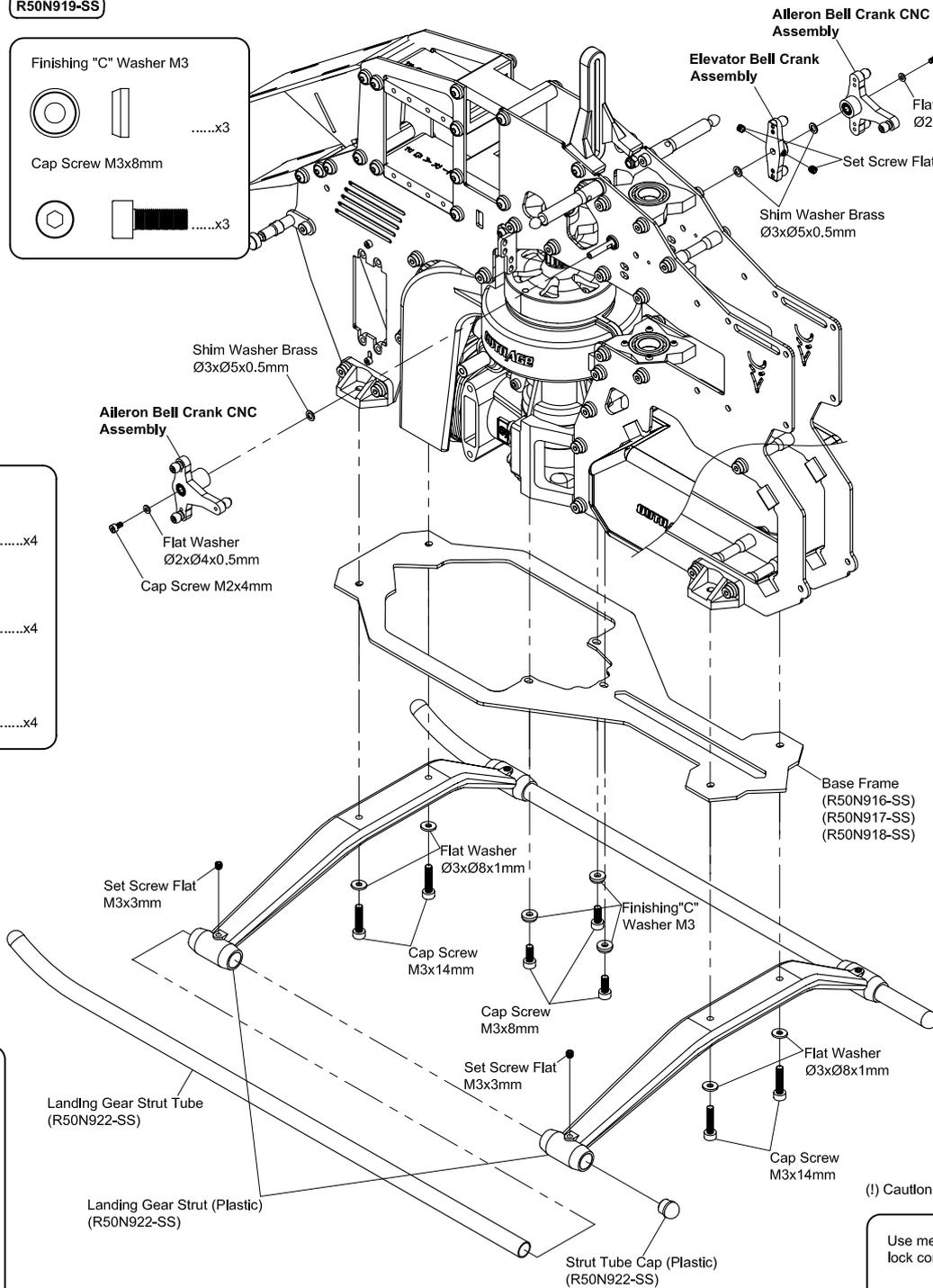
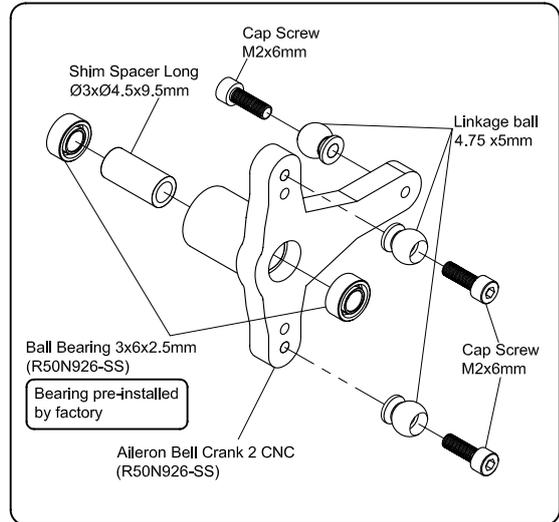
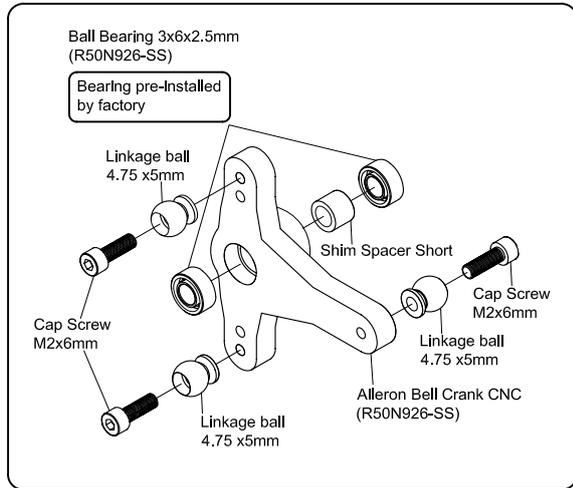
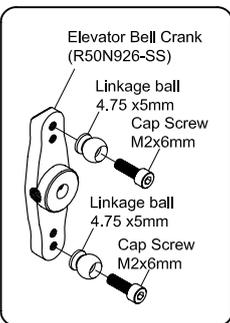
R50N919-SS

- Finishing "C" Washer M3x3
- Cap Screw M3x8mmx3

R50N922-SS

- Cap Screw M3x14mmx4
- Set Screw Flat M3x3mmx4
- Flat Washer Ø3xØ8x1mmx4

Elevator Bell Crank Assembly



(!) Caution:

Use medium strength thread lock compound on all screws

Main bag 8

R50N927-SS

Self Tapping Hex Socket Screw M3x12mm



Cap Screw M2.5 x15mm



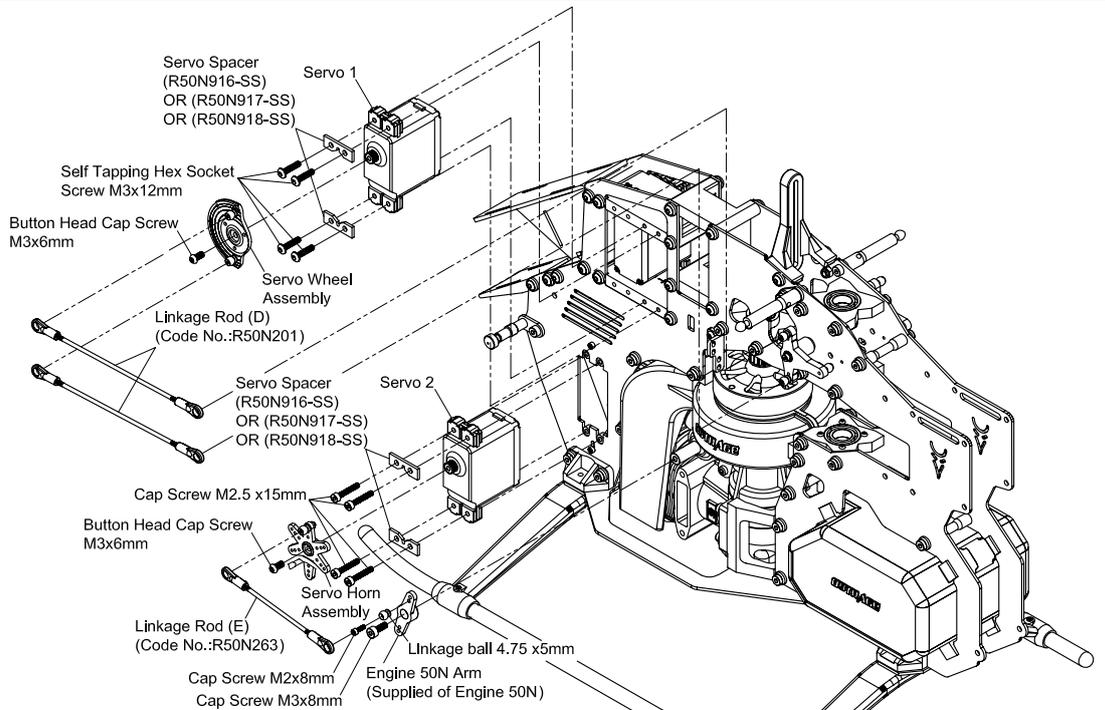
Cap Screw M2x8mm



Linkage ball 4.75 x5mm

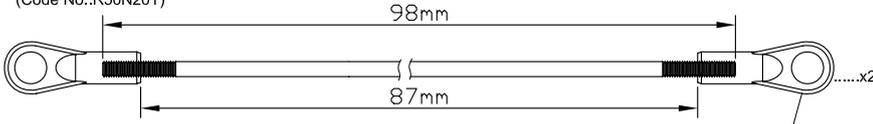


Nut M2

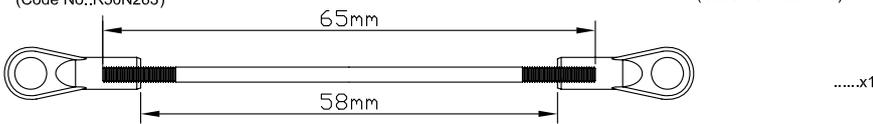


R50N927-SS

Linkage Rod (D) (Code No.:R50N201)



Linkage Rod (E) (Code No.:R50N263)



Supplied of Engine 50N

Cap Screw M3x8mm

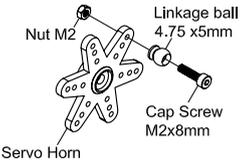


Supplied of Servos

Button Head Cap Screw M3x6mm

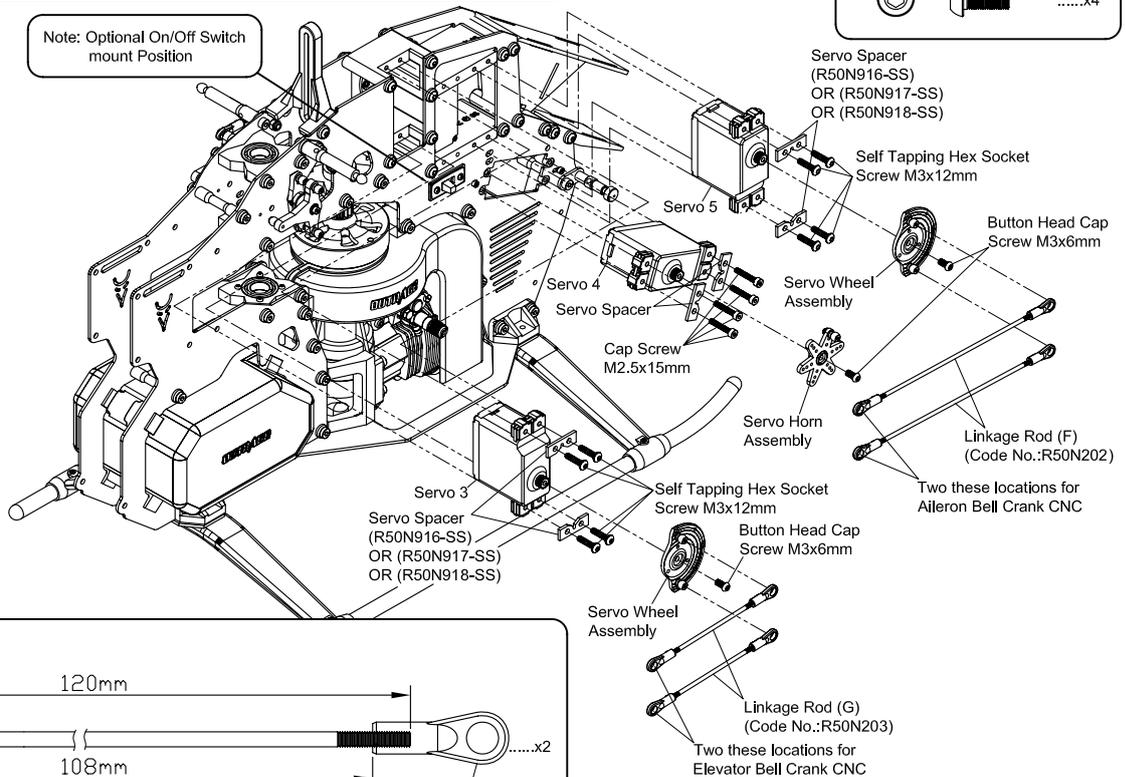
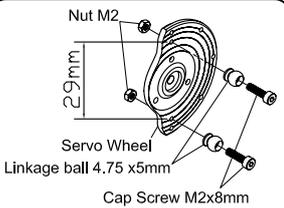


Assembly Servo Horn ...x2



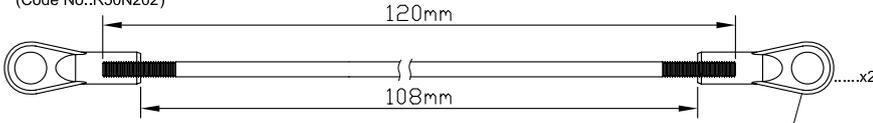
Note: Optional On/Off Switch mount Position

Assembly Servo Wheel...x3

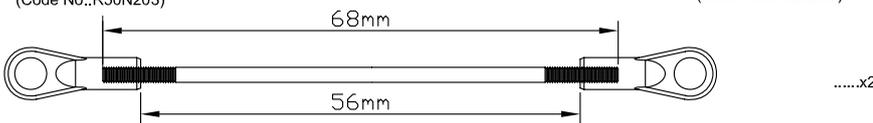


R50N927-SS

Linkage Rod (F) (Code No.:R50N202)



Linkage Rod (G) (Code No.:R50N203)



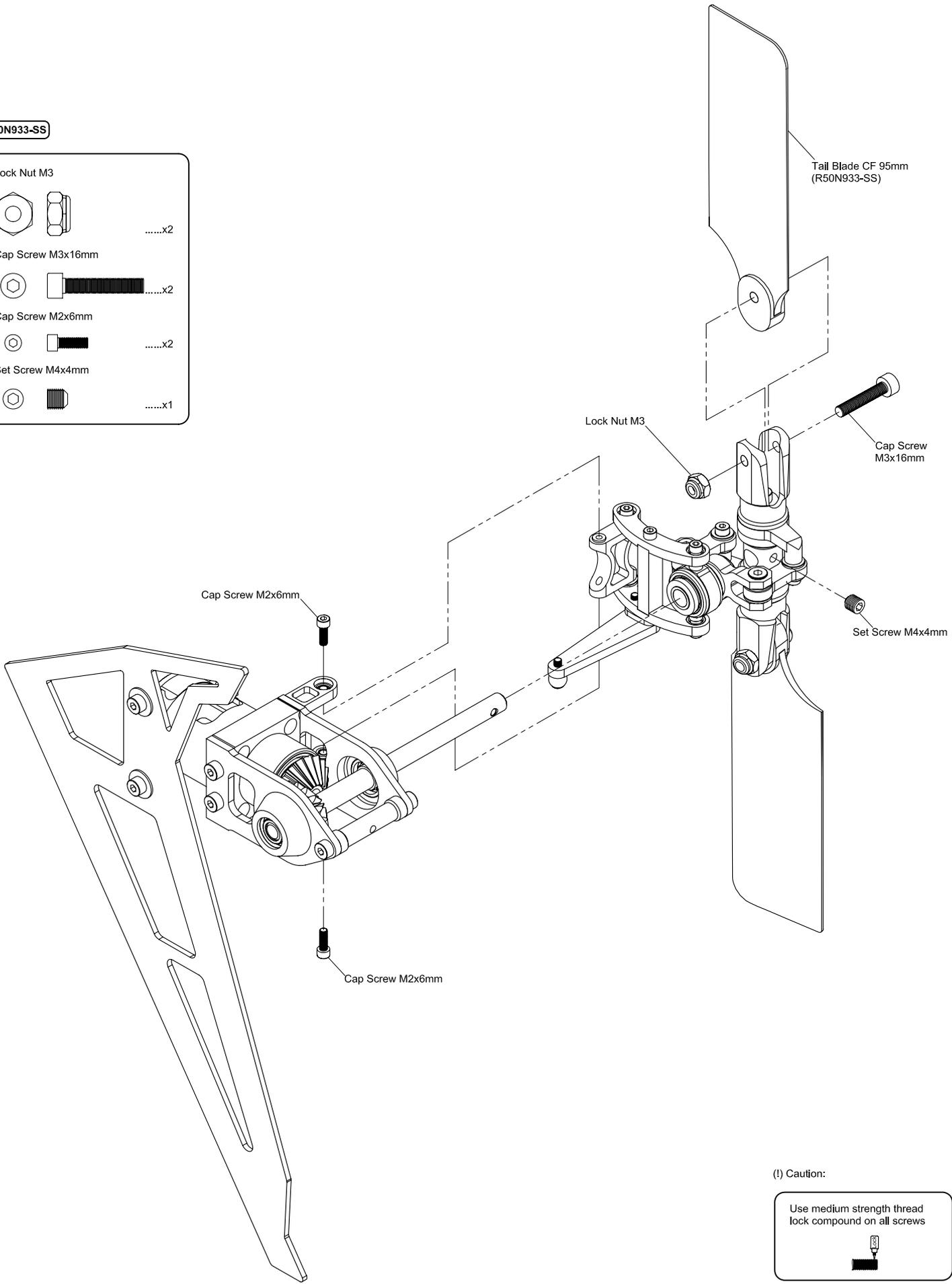
(I) Caution:

Use medium strength thread lock compound on all screws



R50N933-SS

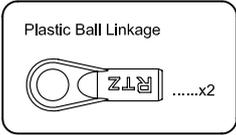
- Lock Nut M3x2
- Cap Screw M3x16mmx2
- Cap Screw M2x6mmx2
- Set Screw M4x4mmx1



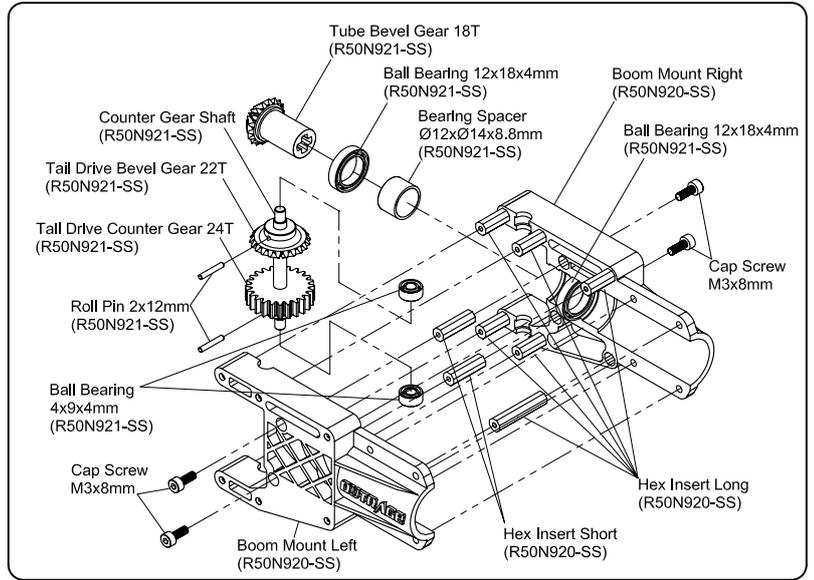
(!) Caution:
Use medium strength thread lock compound on all screws



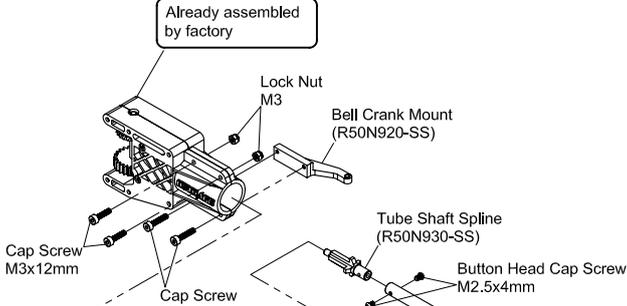
R50N929-SS



Boom Mount Assembly

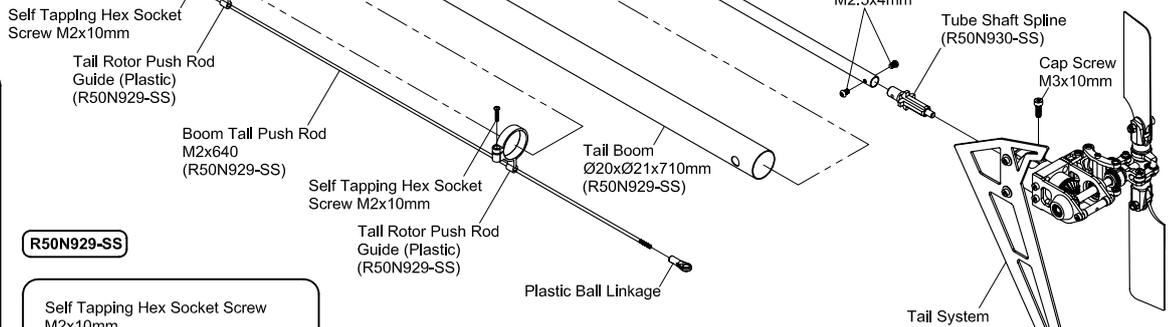
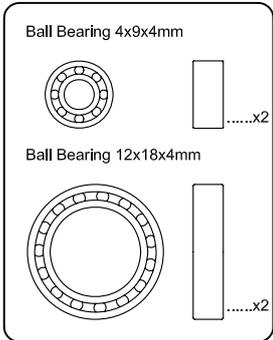


Boom Mount Assembly



Apply lite oil onto rubber bearing support surface for easy install into boom.

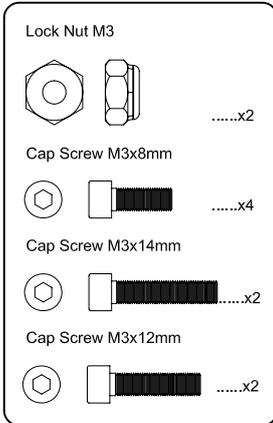
R50N921-SS



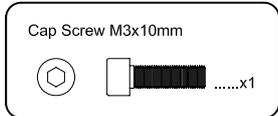
R50N929-SS



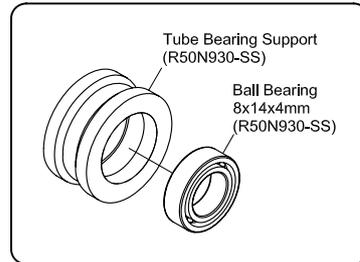
R50N920-SS



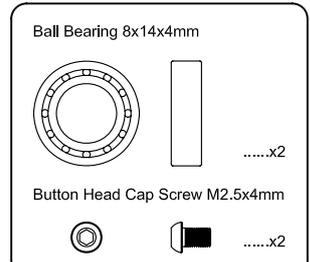
R50N933-SS



Tube Bearing Support Assembly

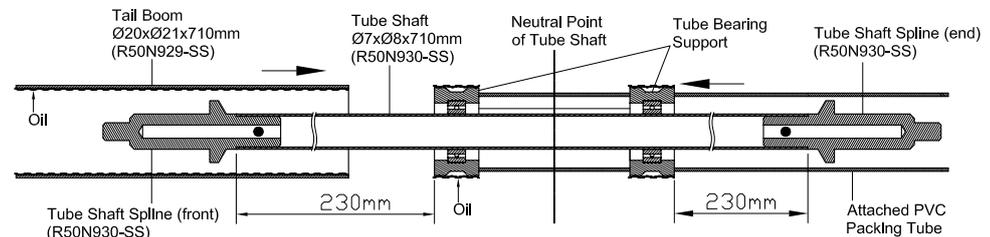


R50N930-SS

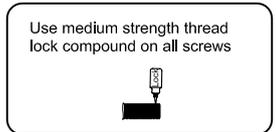


Note: Tube Shaft Assembly

Set bearing positions using measurement below. Lock bearings in place using a minor amount of CA glue only at inner race of bearing. Apply lite oil at opening of boom for first rubber bearing support installation then again prior to second support to allow support to slide in place easier. Use packaging tube to aid in installation. Do not use excessive force when pushing into place as this may cause bearings to unseat from supports. Once installed verify all bearings remain seated in place. After installing boom and tail case assemblies verify no binding is on all bevel gears to prevent premature failure.



(!) Caution:



Use medium strength thread lock compound on all screws



R50N931-SS

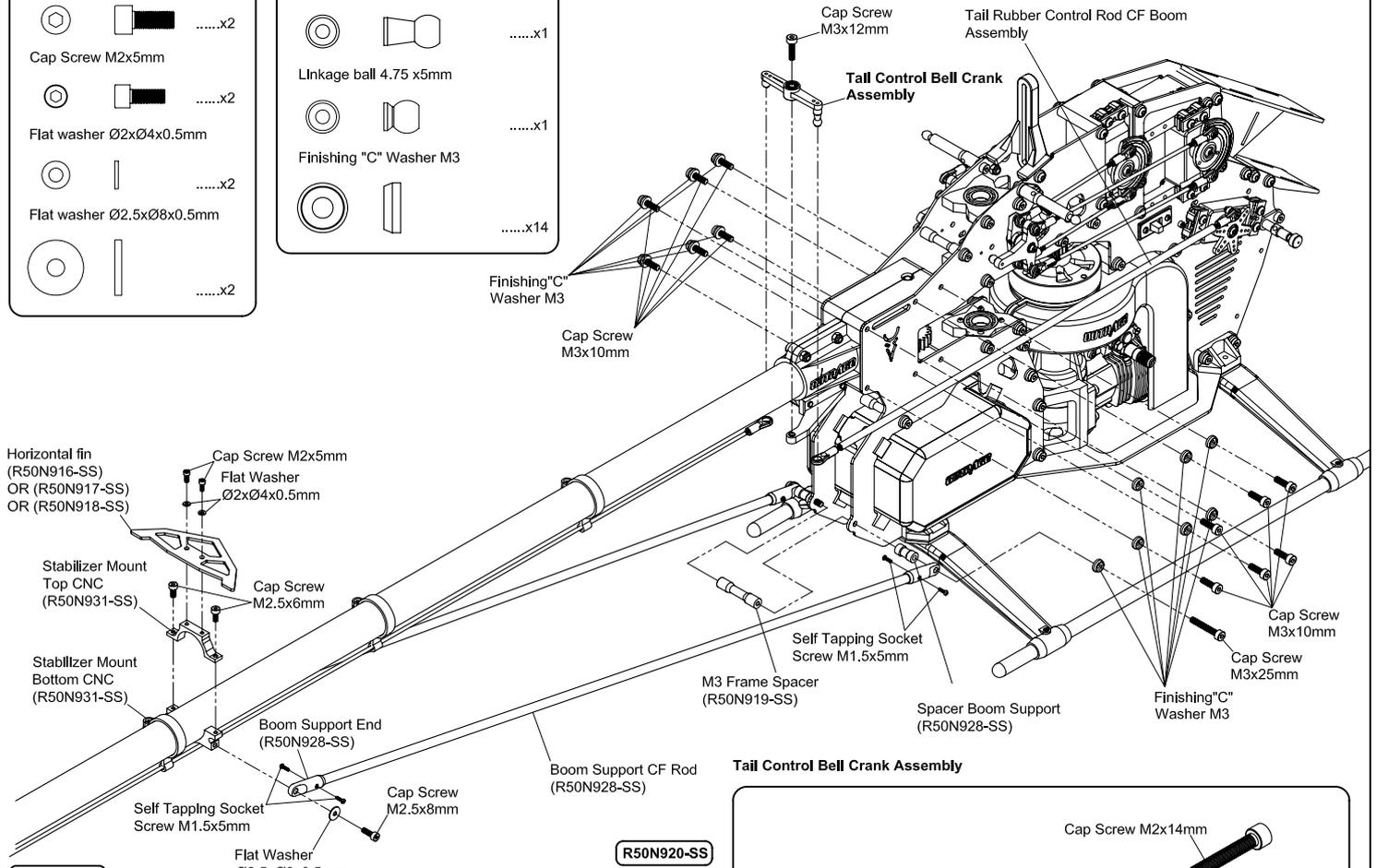
- Cap Screw M2.5x8mmx2
- Cap Screw M2.5x6mmx2
- Cap Screw M2x5mmx2
- Flat washer Ø2xØ4x0.5mmx2
- Flat washer Ø2.5xØ8x0.5mmx2

R50N920-SS

- Linkage Ball Spacer Ø2xØ4.5x3.5mmx1
- Linkage ball 4.75 x8mmx1
- Linkage ball 4.75 x5mmx1
- Finishing "C" Washer M3x14

R50N928-SS

- Self Tapping Socket Screw M1.5x5mmx8



R50N920-SS

- Ball Bearing 3x7x3mmx2

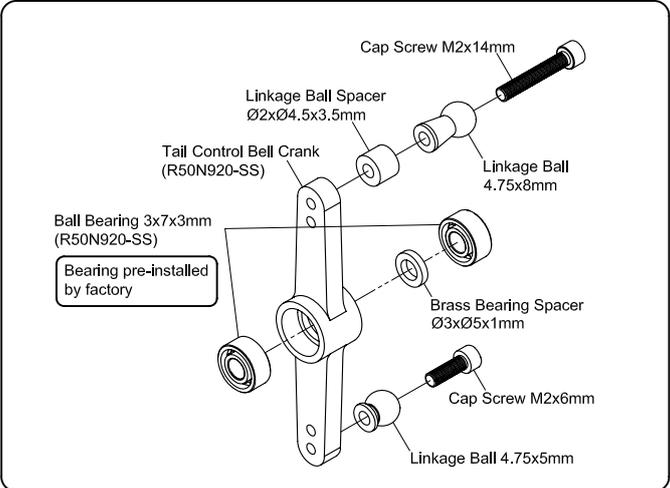
R50N920-SS

- Cap Screw M3x25mmx2

R50N920-SS

- Cap Screw M3x12mmx1
- Cap Screw M3x10mmx12
- Cap Screw M2x14mmx1
- Cap Screw M2x6mmx1

Tail Control Bell Crank Assembly

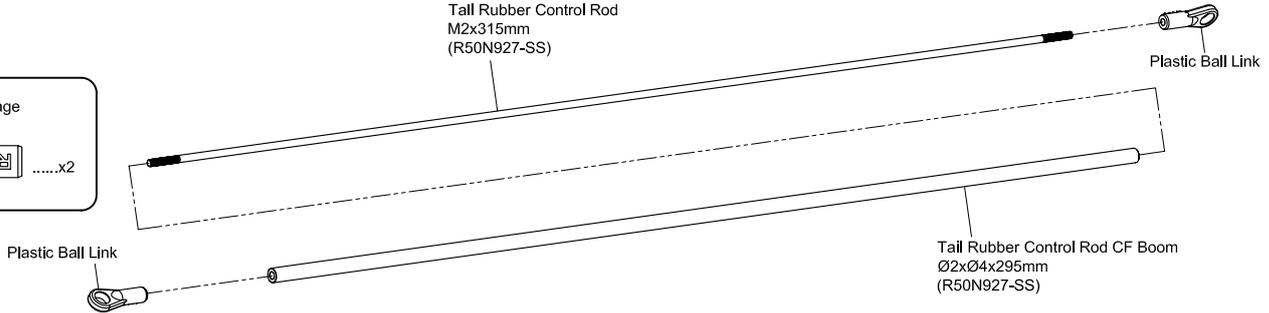


Tail Rubber Control Rod CF Boom Assembly

Note: Use CA glue to center CF tube onto control rod.

R50N920-SS

- Plastic Ball Linkagex2



R50N924-SS

Cap Screw M3x20mm shoulderedx1

Cap Screw M3x8mmx4

Lock Nut M3x1

Shim Washer 10x13x1mmx1

Flat Washer Ø3xØ7x0.8mmx4

R550319-SS

Oneway Bearing 12x18x16mmx1

R50N927-SS

Swash Linkage Rod (Code No.:R550404)x3

Plastic Ball Linkage (Code No.:R550205)

40mm

28mm

R50N908-SS

Ball Bearing 10x22x6mmx1

R50N908-SS

Set screw M4x4mmx2

Shim Washer 10x13x1mm

Cap Screw M3 x20mm Shouldered

Lock Nut M3

Oneway Hub and Drive Assembly (R50N924-SS)

Note: Install mast screw in lower hole

Main Shaft Collar (R50N908-SS)

Set Screw M4x4mm

(!) Caution:

Use medium strength thread lock compound on all screws

Oneway Hub and Drive Assembly

Ball Bearing 10x22x6mm (R50N924-SS)

Oneway Bearing 12x18x16mm (R50N924-SS)

Oneway Sleeve (R50N924-SS)

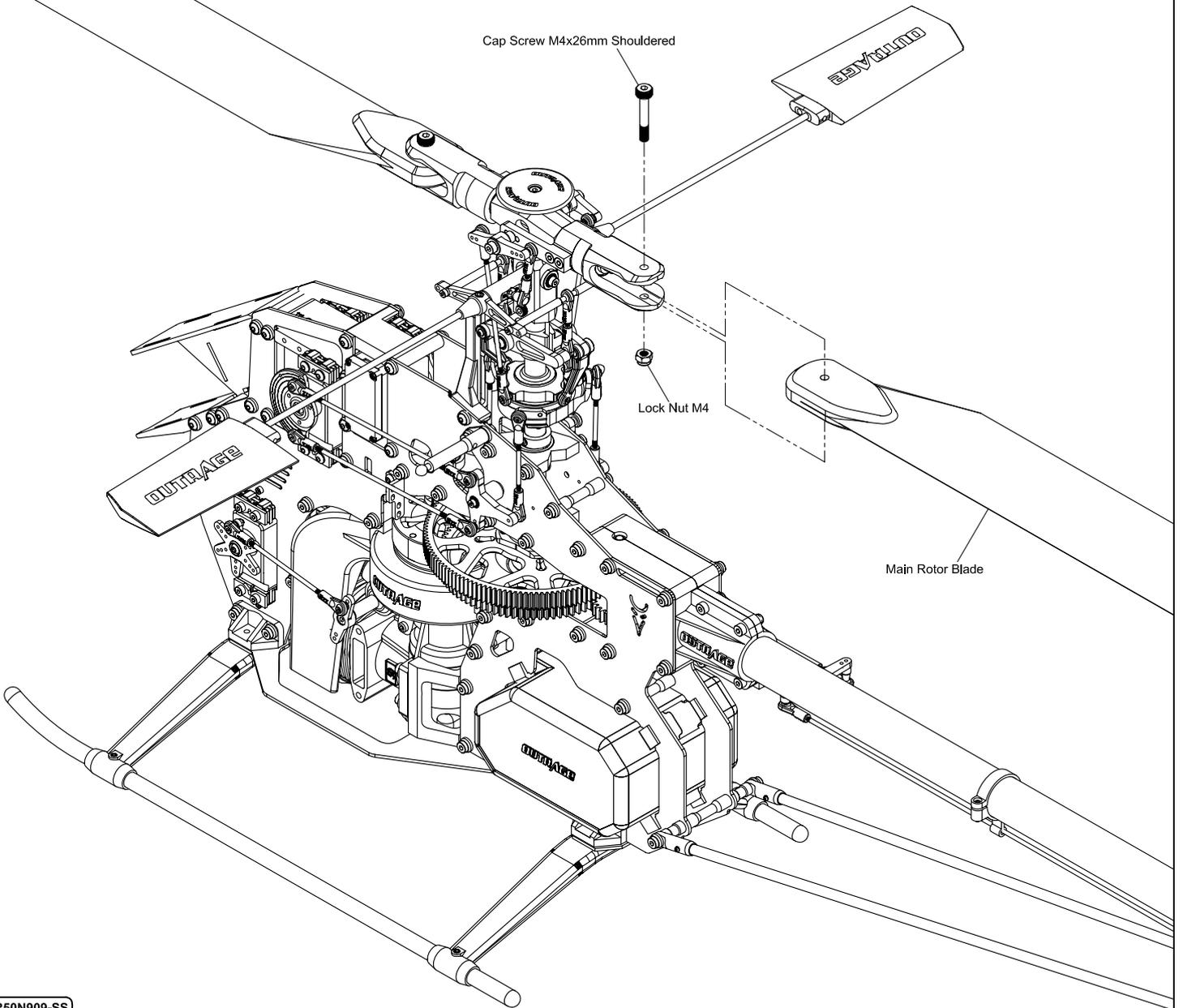
Main Gear 129T 0.8M (R50N924-SS)

Flat Washer Ø3xØ7x0.8mm

Cap Screw M3x8mm

Main Tail Drive Gear 90T (R50N924-SS)

Factory Installed In oneway hub

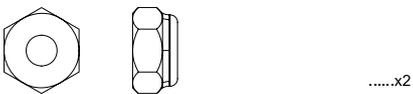


R50N909-SS

Cap Screw M4x26mm shouldered



Lock Nut M4



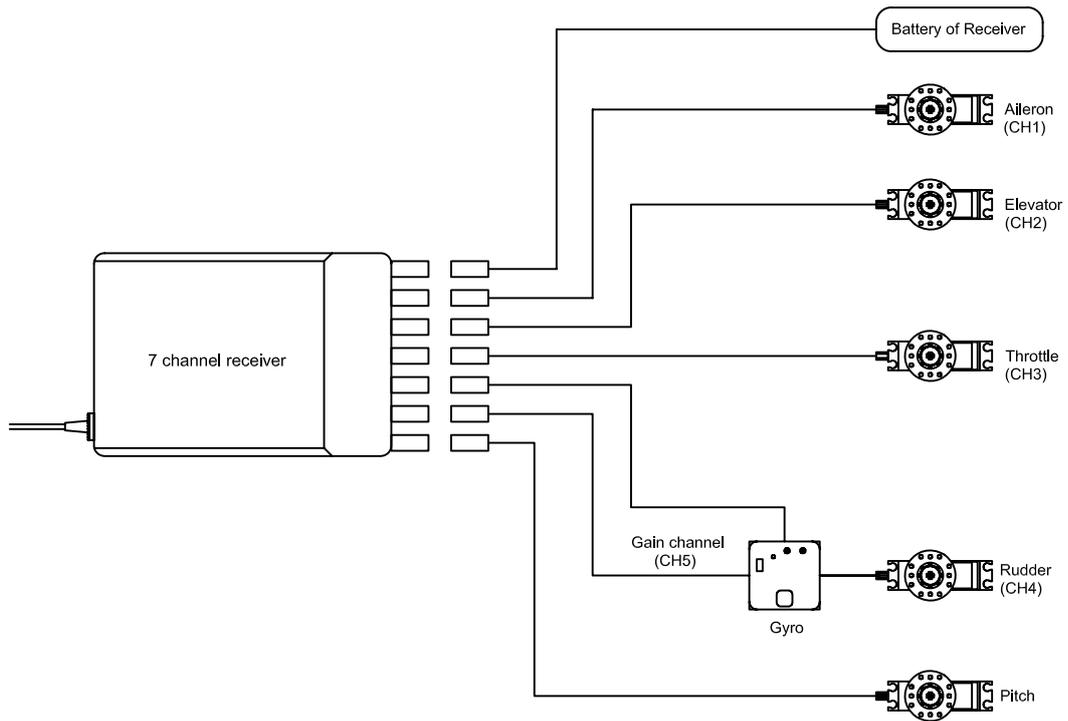


Diagram 1: FUTABA, HITEC 7CH receiver wiring

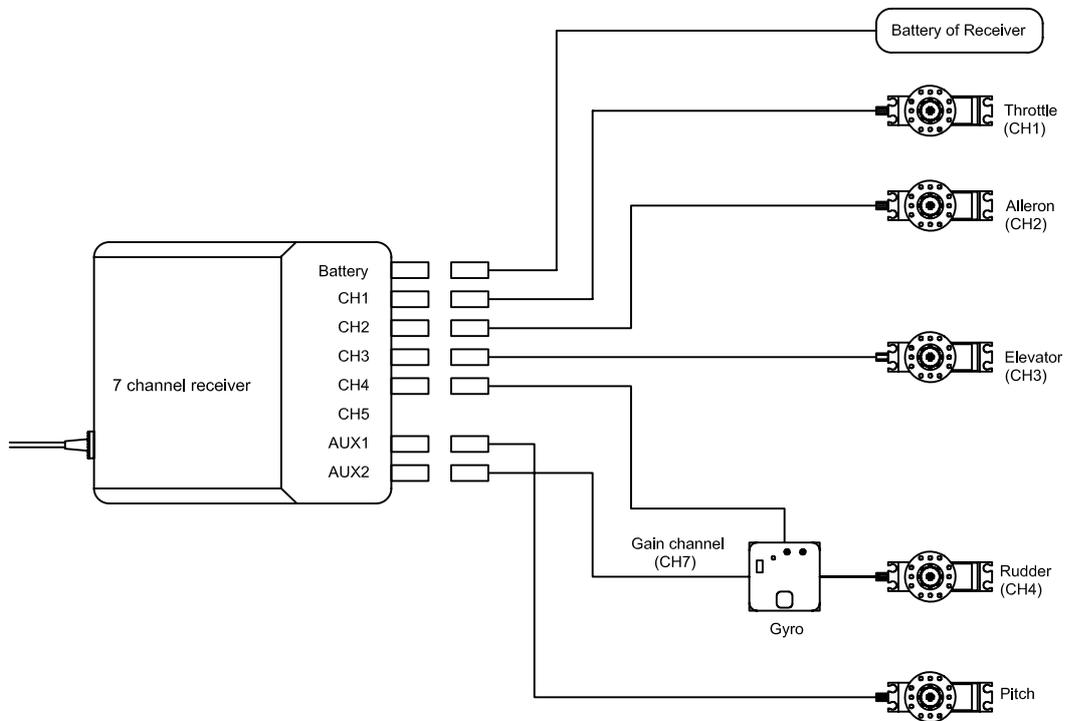
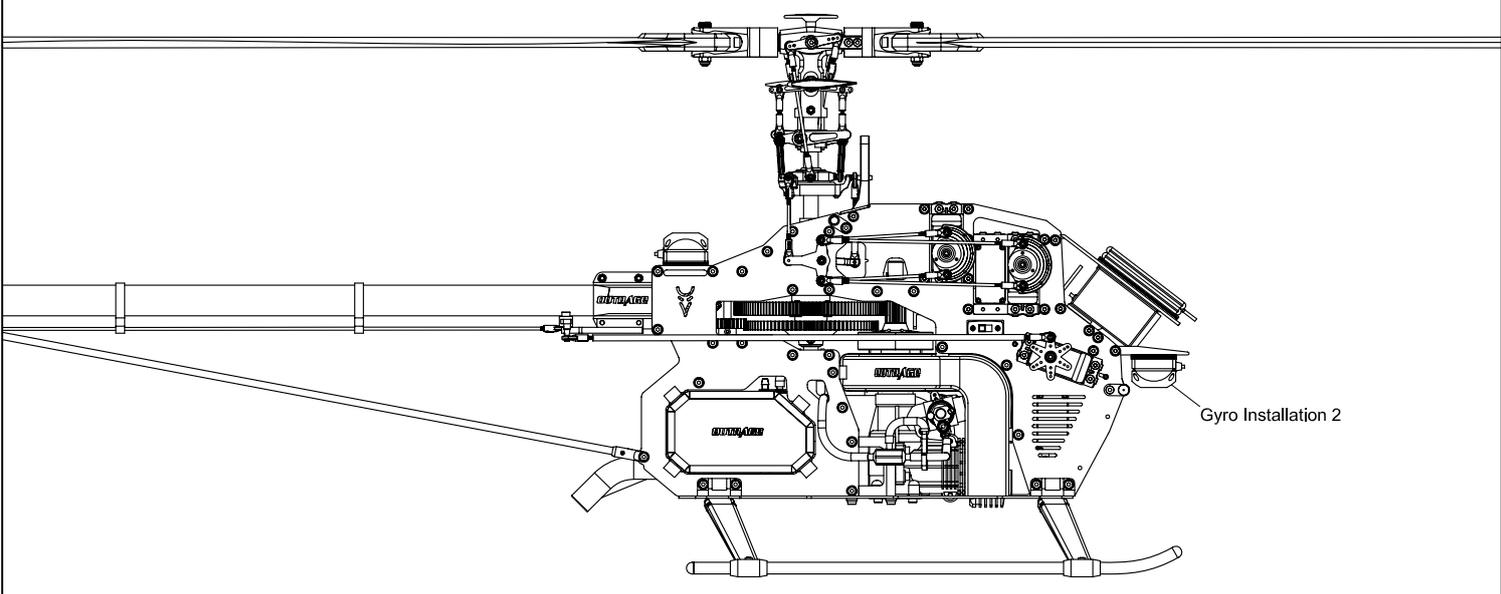
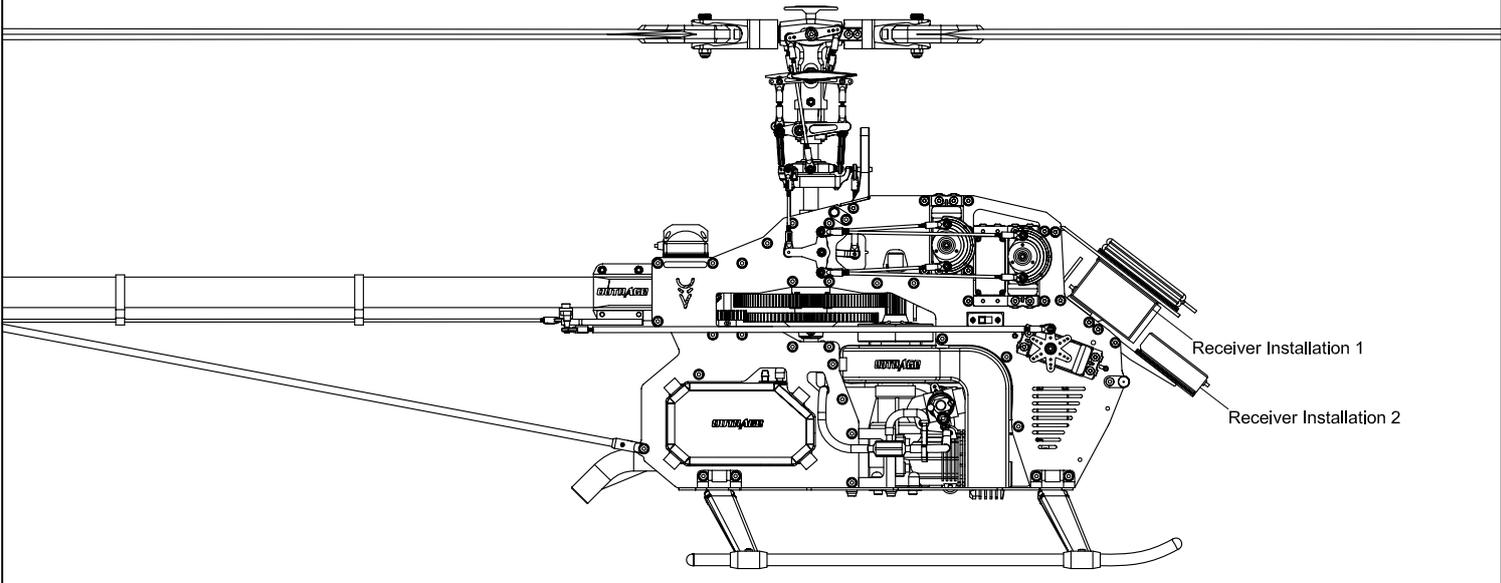
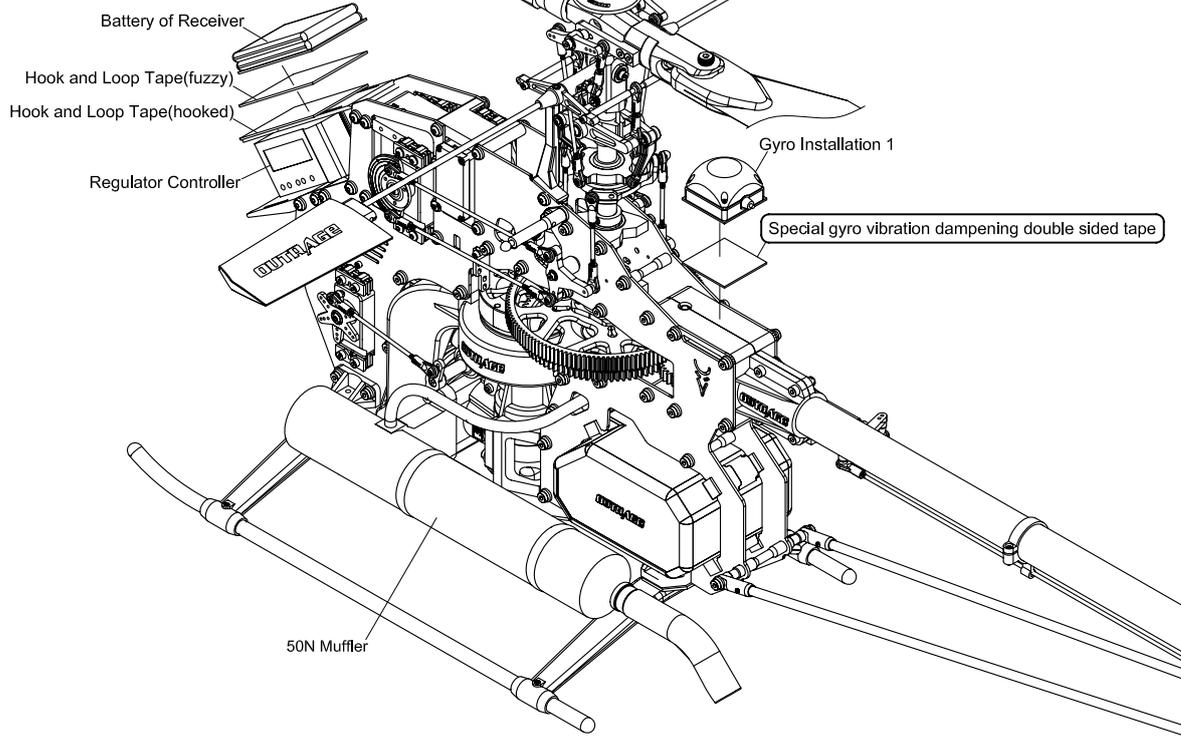
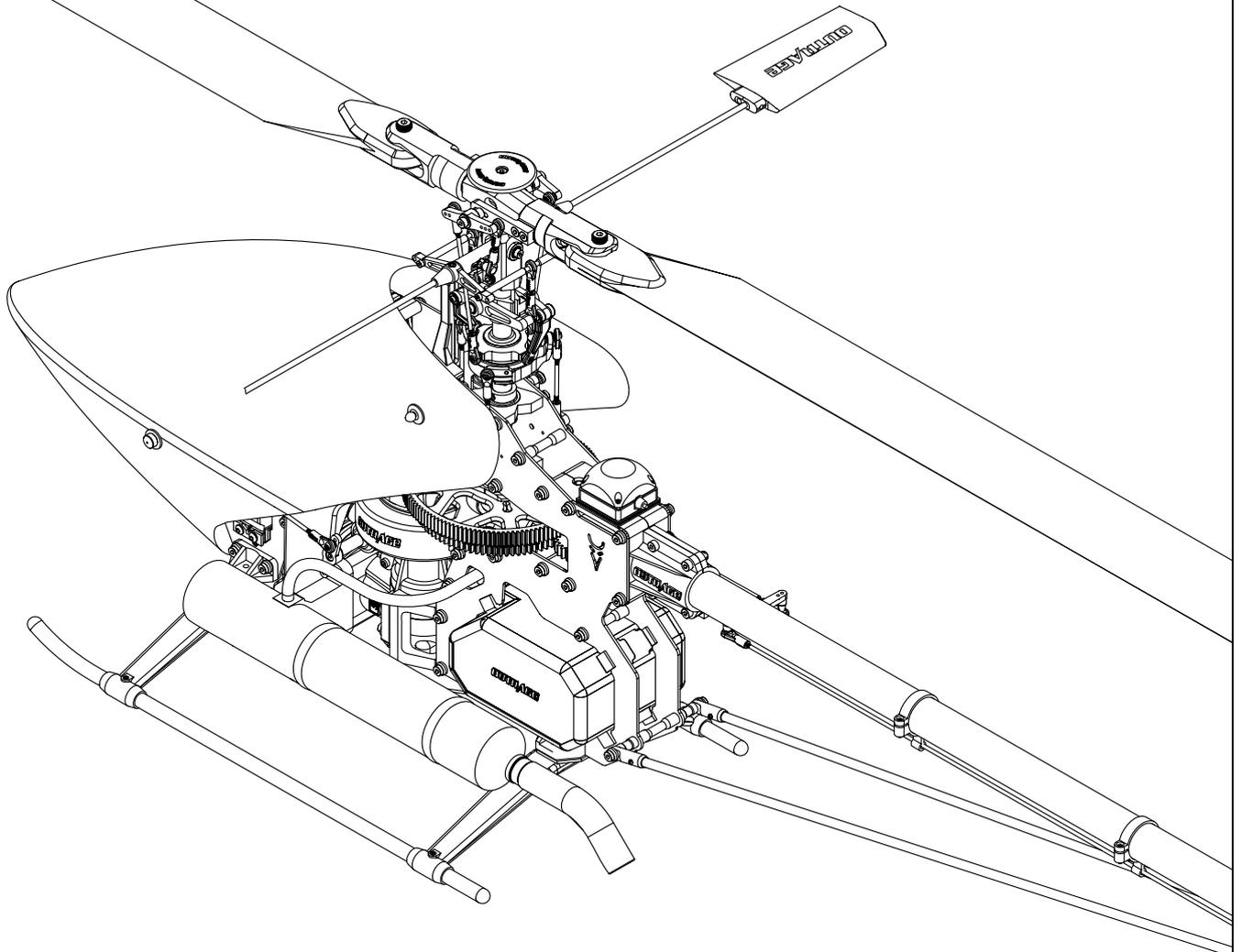
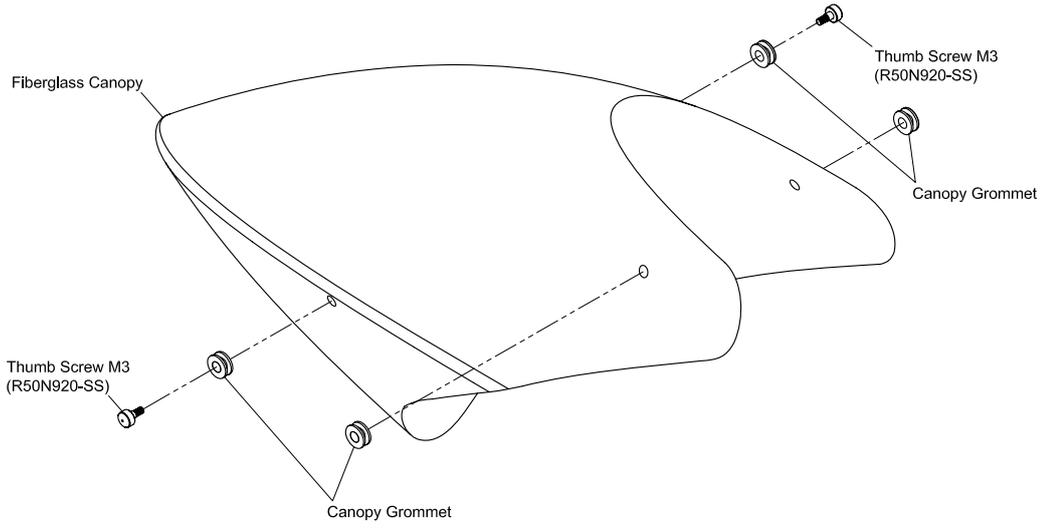


Diagram 2: JR 7CH receiver wiring

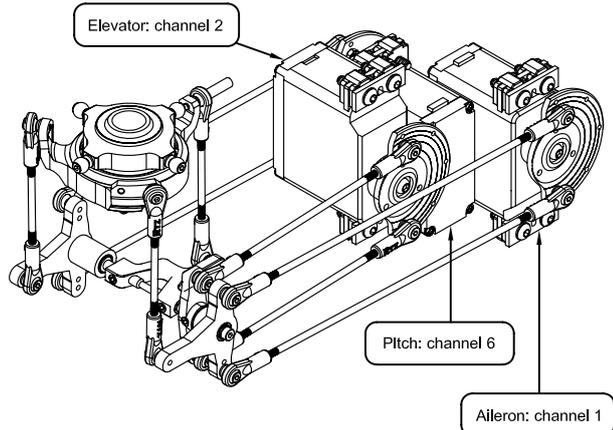


Canopy Assembly



Servo setting and adjustment

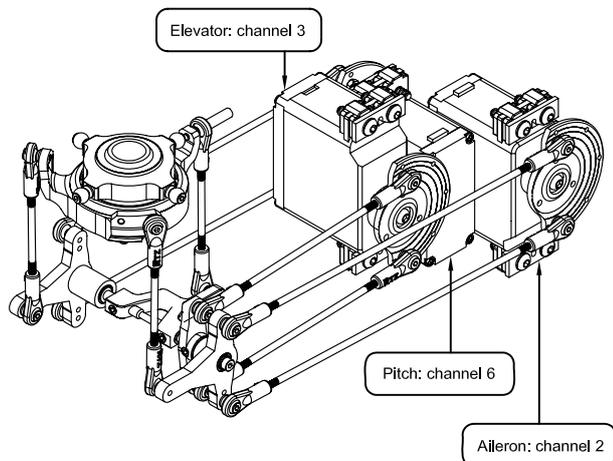
To perform servo setup turn on a fully charged transmitter. Apply power to helicopter
 Note: For safety disconnect all three wires on esc from motor to prevent accidental powering of brushless motor to prevent possible bodily injury or damage to helicopter.



Futaba/Hitec transmitter servo position

Set transmitter to 120 Degree CCPM mode, remove all sub trim set to zero. Set all servo travel values to 100. In swash menu set values on pitch, Aileron, and Elevator values to 50 for start settings (these values are only basic your final setup may vary). Move throttle stick up and down all 3 servo must move together in the correct direction. If not use servo reverse or swash menu setting for proper operation. Move Aileron/Elevator stick up/down, left/right if swash does not complete same movement reverse setting in swash menu by dialing + or - values.

(Note: Channels 6 and 1 servos are interchangeable). Level swash plate using a leveling tool, add or subtract sub trim while throttle stick is at center position. Move throttle stick to top use travel adjustment values to level swash. Move throttle stick down repeat travel adjustments.



JR/Spektrum transmitter servo position

Set transmitter to 120 Degree CCPM mode, remove all sub trim set to zero. Set all servo travel values to 100. In swash menu set values on pitch, Aileron, and Elevator values to 50 for start settings (these values are only basic your final setup may vary). Move throttle stick up and down all 3 servo must move together in the correct direction. If not use servo reverse or swash menu setting for proper operation. Move Aileron/Elevator stick up/down, left/right if swash does not complete same movement reverse setting in swash menu by dialing + or - values.

(Note: Channels 2 and 6 servos are interchangeable). Level swash plate using a leveling tool, add or subtract sub trim while throttle stick is at center position. Move throttle stick to top use travel adjustment values to level swash. Move throttle stick down repeat travel adjustments.

Adjustment for gyro and tail neutral setting

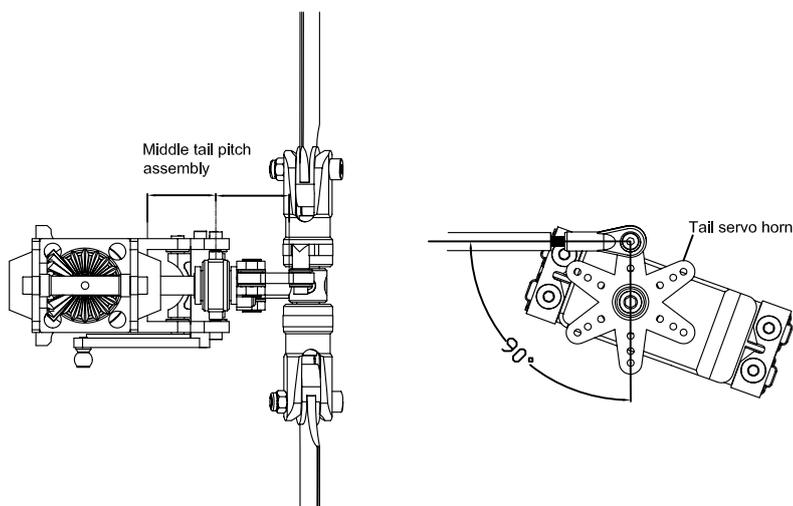
Note: We recommend using a heading hold gyro for best performance

Tail Neutral Setting

In transmitter disable use of revolution mixing. Activate gyro mode in radio, set gyro gain to a starting point of 50-75% this is a basic setting, results may vary depending on brand of equipment used reference manufacturers recommended settings.

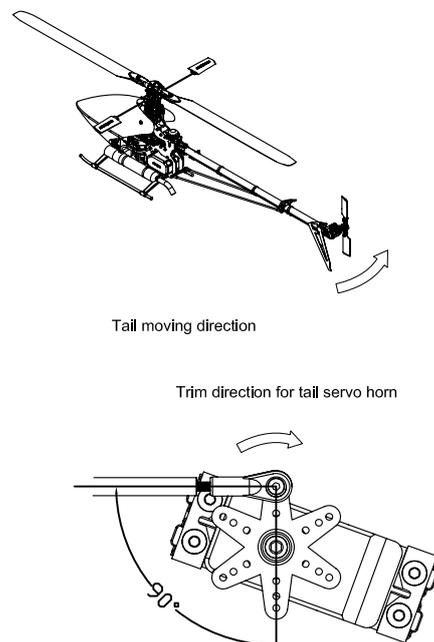
When connecting power to helicopter reduce all movement to model, do not move transmitter rudder stick, and allow 3-5 seconds for gyro to initialize. Upon gyro initialization the servo horn should position itself to 90 degrees to servo center line. See diagram below.

Set tail blade pitch similar to diagram below by adjusting linkage rod length or shifting servo mount assembly front or back.



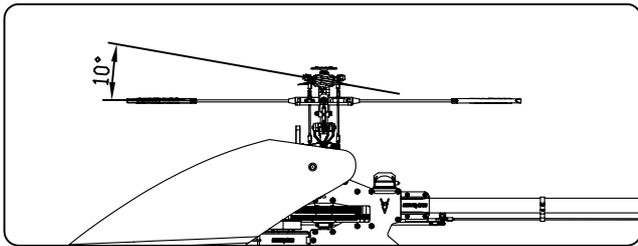
Directional setting of gyro

To check correct gyro setting turn nose of helicopter left, the linkage ball on tail rotor servo horn should travel towards the front. If it does not, change directional switch (normal or reverse) on gyro not in transmitter.

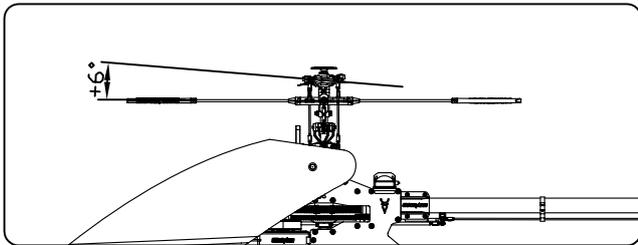


PITCH AND THROTTLE SETTING

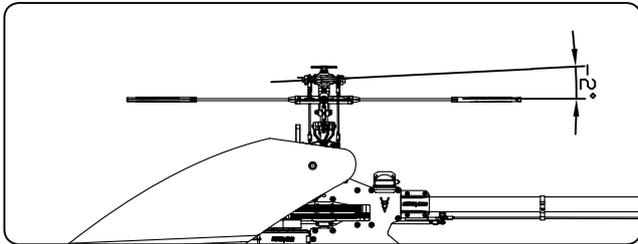
General Flight



Stick position at high/Throttle 100%/Pitch +10°



Stick position at Hovering/Throttle 70%~75%/Pitch +6°

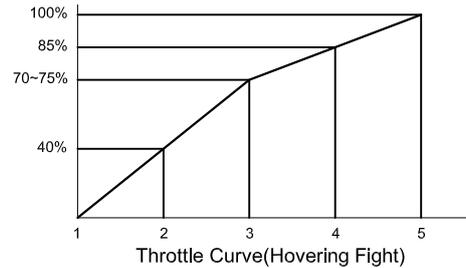


Stick position at low/Throttle 0%/Pitch -2°

GENERAL FLIGHT

	Throttle	Pitch
5	100% High Speed	+10°
4	85%	
3	70~75% Hovering	+6°
2	40%	
1	0% Low Speed	-2°

Note: Recommend head speed for general flight for beginner / intermediate 1700-1950 rpm



Pitch curve setting

1. Refer to your radio transmitter's instruction manual for specific curve setting descriptions.
2. Adjust your radio's pitch curve percentages so the following suggested pitch curve degrees are measured on your helicopter at low, mid and high points using a pitch gauge.

Note: Flight results may vary depending on engine, servos, battery, etc...

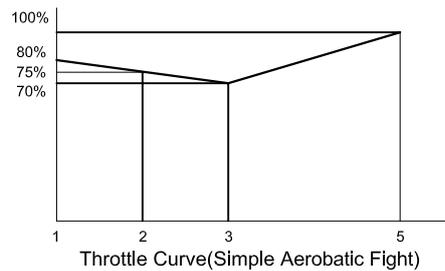
This data is to be used as a general guideline only.

Throttle Curve Setting

Throttle curve may vary due to engine, muffler/tuned pipe, weather, etc... graphs and data provided in this manual are basic starting points only and may require fine tuning after first flight has been made.

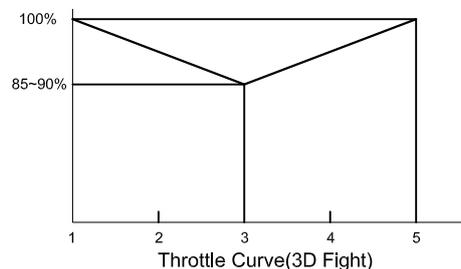
IDLE 1: SPORT FLIGHT

	Throttle	Pitch
5	100%	+12°
4	75%	
3	70%	+5°~ +6°
2	75%	
1	80%	-6°~ -5°

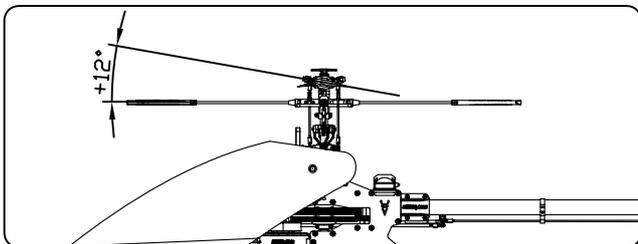


IDLE 2: 3D FLIGHT

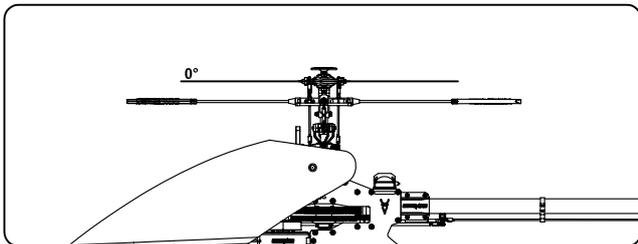
	Throttle	Pitch
5	100% High	+12°
3	85%~90% Middle	0°
1	100% Low	-12°



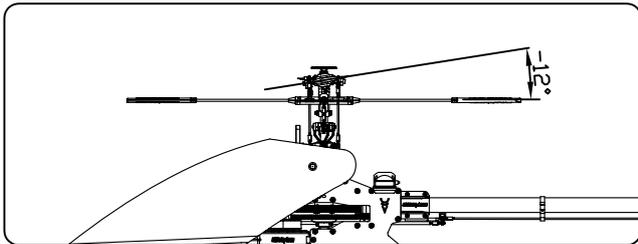
3D Flight



Stick position at high/Throttle 100%/Pitch +12°



Stick position at middle/Throttle 80~85%/Pitch 0°



Stick position at low/Throttle 100%/Pitch -12°

NOTE!

1. Achievable pitch range 30 Degrees(+15/-15)
2. Recommended Head speed for 3D flight 2000-2100 RPM

! Caution: For safety of flight and helicopter structure. Main rotor speed should not Exceed 2250 RPM or maximum RPM set by rotor blade manufacturer.

GENERAL FLIGHT INFORMATION FOR BEGINNERS

Beginner pilots we Highly recommend the use of Computer aided flight simulation software todays programs will offer increased success of flying your Helicopter. Such software can aid you through beginner, intermediate and 3D flight practice. With reduced crash costs!

Beginner pilots we recommend the use of flight Training gear to help reduce possible offset landings.

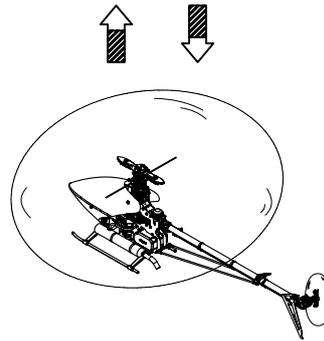
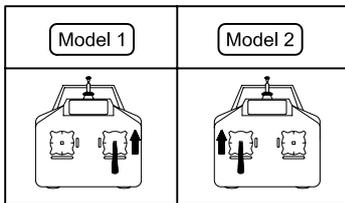
Please stand approximately 5m diagonally behind the helicopter.

CAUTION

Make sure that no one or obstructions in the vicinity. You must first practice hovering for flying safety. This is a basic flight action. (Hovering means keeping the helicopter in mid air in a fixed position)

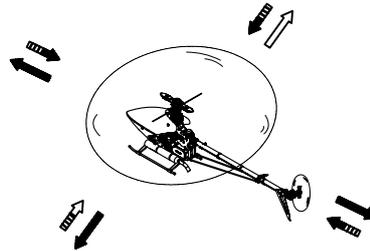
Throttle Operation Practice

1. Slowly raise throttle stick, when Helicopter begins to lift-off the ground, slowly lower the throttle stick and bring the unit back down.
2. Continue to practice raising and lowering the helicopter from the ground until you feel comfortable with the operation of throttle.



Aileron and elevator operation practice:

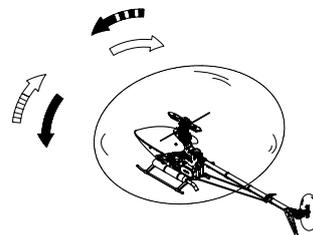
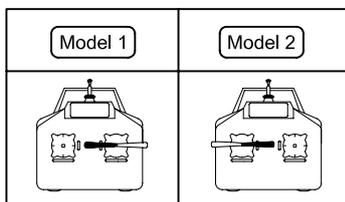
1. Slowly raise the throttle stick
2. when the Helicopter moves in any direction back, forth, left, or right, gently move the aileron and elevator sticks in the opposite direction to return Helicopter to it original position.



Model 1	Model 2	Illustration

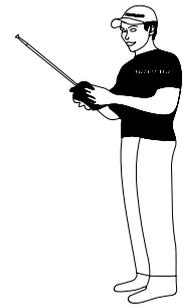
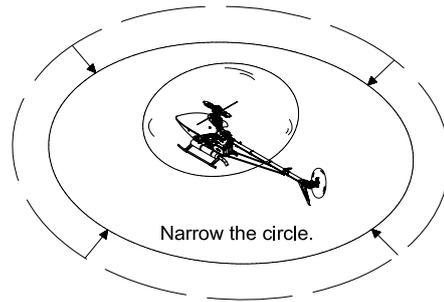
Rudder Operation practice:

1. Slowly Raise the throttle stick
2. If the nose of the Helicopter moves left or right, gently move the rudder stick in the opposite direction to get the unit back in it original position.



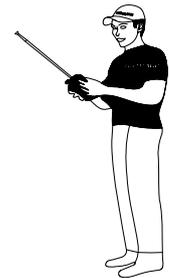
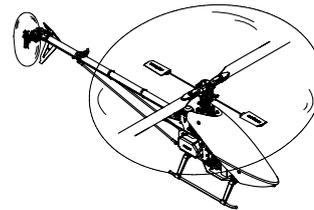
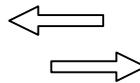
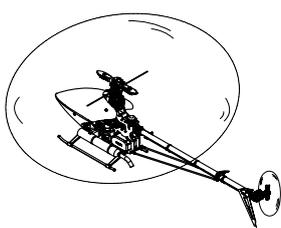
Practice Circular movement:

After you feel comfortable with the above operations, you can draw a circle on ground and practice flying the helicopter within that circle to increase your flying skill and accuracy. As your skill increases you can narrow the circle.



Changing Helicopter Orientation During Hover:

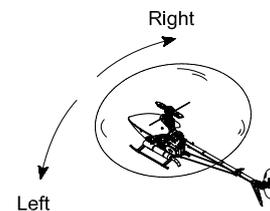
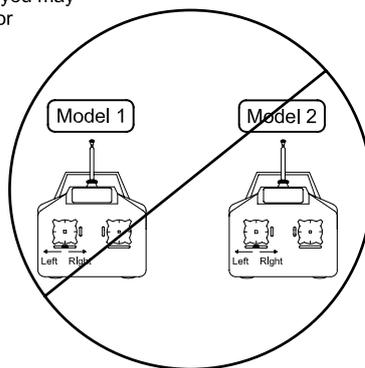
After you feel comfortable with the above practice operation, stand and face the helicopters left side hover in this position until comfortable, use rudder and turn helicopter to switch to right side and continue. After you are comfortable in these orientations slowly transition nose in hover. Perform this by doing it in increments progressing to the point that the nose is pointing directly at you, think of this as digits on a clock. Currently you should be able to fly comfortable with nose facing 12:00, 3:00, and 9:00 slowly turn nose of helicopter to 8:00 7,6 and rotate from opposite 3:00, 4,5 etc... Practice this until comfortable and you are able to rotate helicopter 360 degrees in both directions right or left.



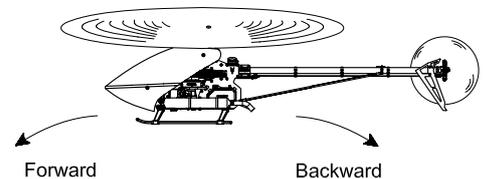
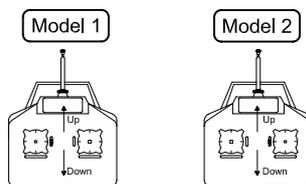
ADJUSTMENT OF EACH TRIM

-Performing trim adjustments is better achieved in low wind conditions.
 -Slowly raise throttle stick and as helicopter lifts off the ground, you may notice leaning towards different directions either front, back, left or right, use of the trim levers to correct this may be needed.

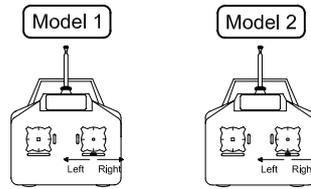
1. With today's heading hold gyros offered on the retail market use of pre-programmed sub trim or use of slide action trim on transmitter is not needed. Refer to instructions provided by manufacturer for proper installations and setup or seek assistance.



2. Adjustment for elevator slide action trim. Just before Helicopter lift-off if the nose leans forward or backward
 -For forward movement move trim lever down to install trim.
 -For backward movement move trim lever up to install trim.



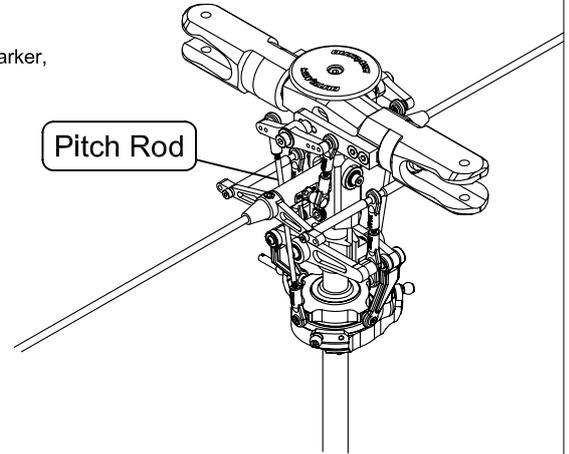
3. Adjustment for aileron slide action trim. Just before helicopter lift-off, it the body leans left or right.
 -For left movement move trim lever right to install right trim.
 -For right movement move trim lever left to install forward trim.



CAUTION

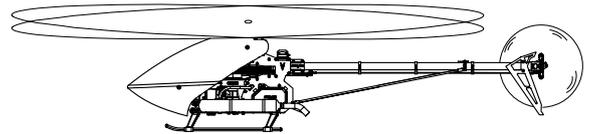
Blade tracking adjustment can be very dangerous, maintain a minimum of 5 feet distance from helicopter while performing this action!

Prior to adjusting blade tracking, we recommend using red piece of tape or using a permanent red marker, mark on "one" blade or place tape on leading edge prior to curve or angle of blade tip. Raise throttle stick slowly and stop just before the helicopter lifts-off the ground, look at the spinning blades from the side of the helicopter. Look at the path of the rotor blades(carefully). If both blades rotate in same path forming a single looking disk. No adjustment is necessary. If they do not travel in same path 2 blades will be seen. Look for red tape or mark at blades tip notice if it is higher or lower than non marked blade.
 -If higher decrease pitch rod length on marked blade.
 -If lower increase pitch rod length on marked blade.
 for large variations in tracking, adjustment of both blade pitch rods may be required, increase length of one and decrease length on opposite blade.



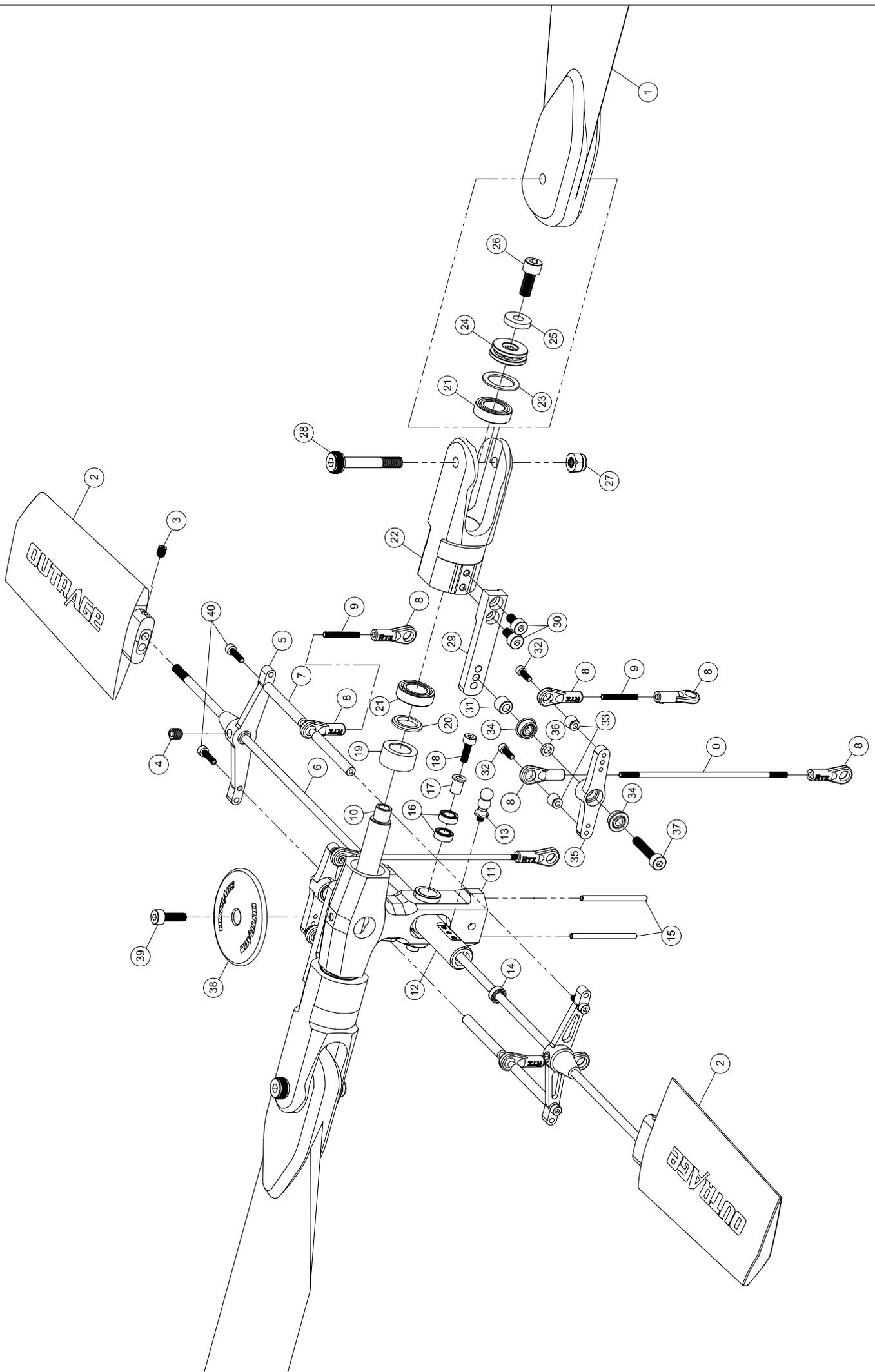
CAUTION

Incorrect tracking may cause vibration. Repeat tracking adjustment over and over until rotor is correct. After having adjusted the tracking, check pitch angle in hovering once more approximate hovering pitch is +6 degrees.

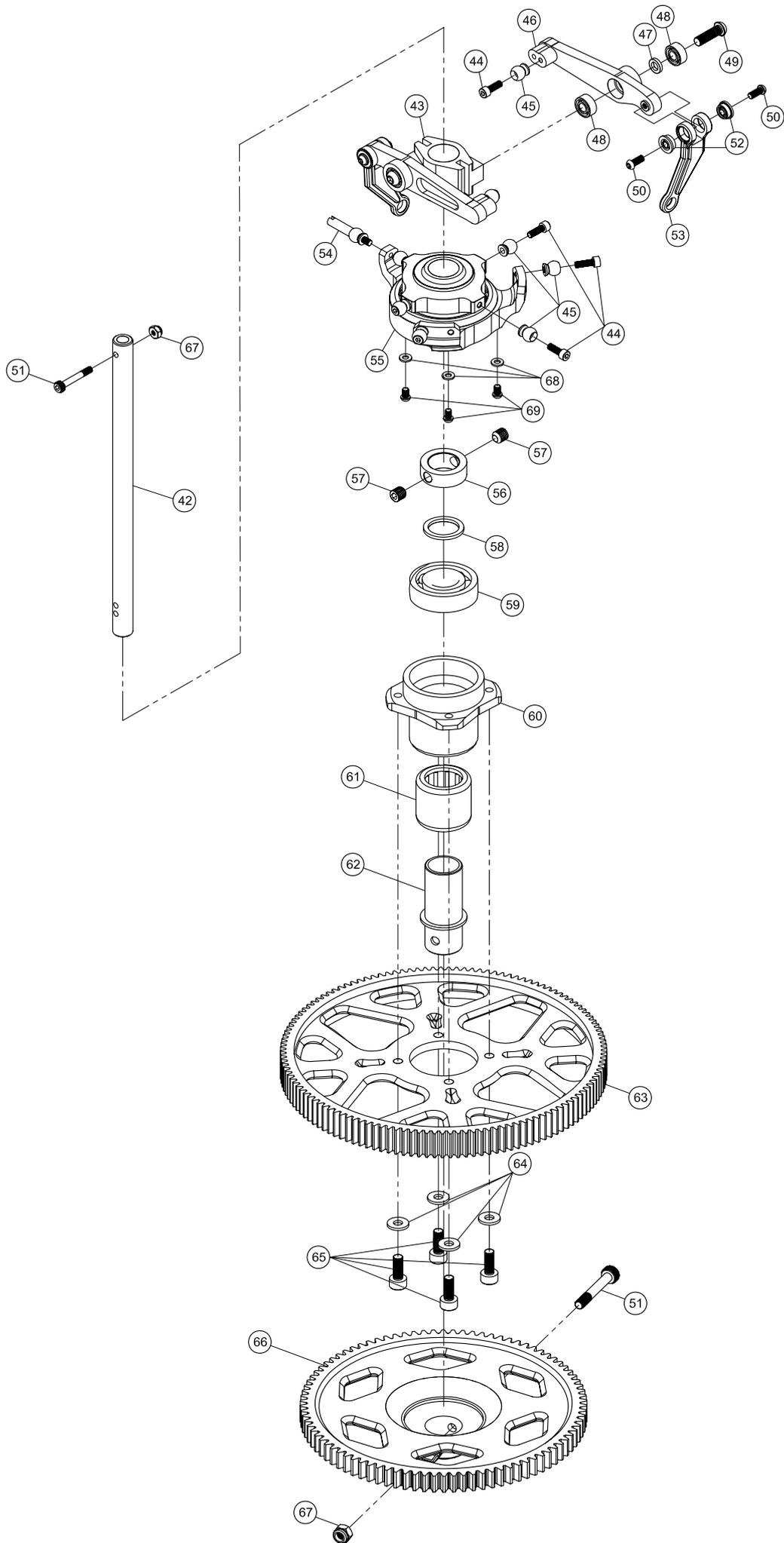


TROUBLE SHOOTING DURING FLIGHT

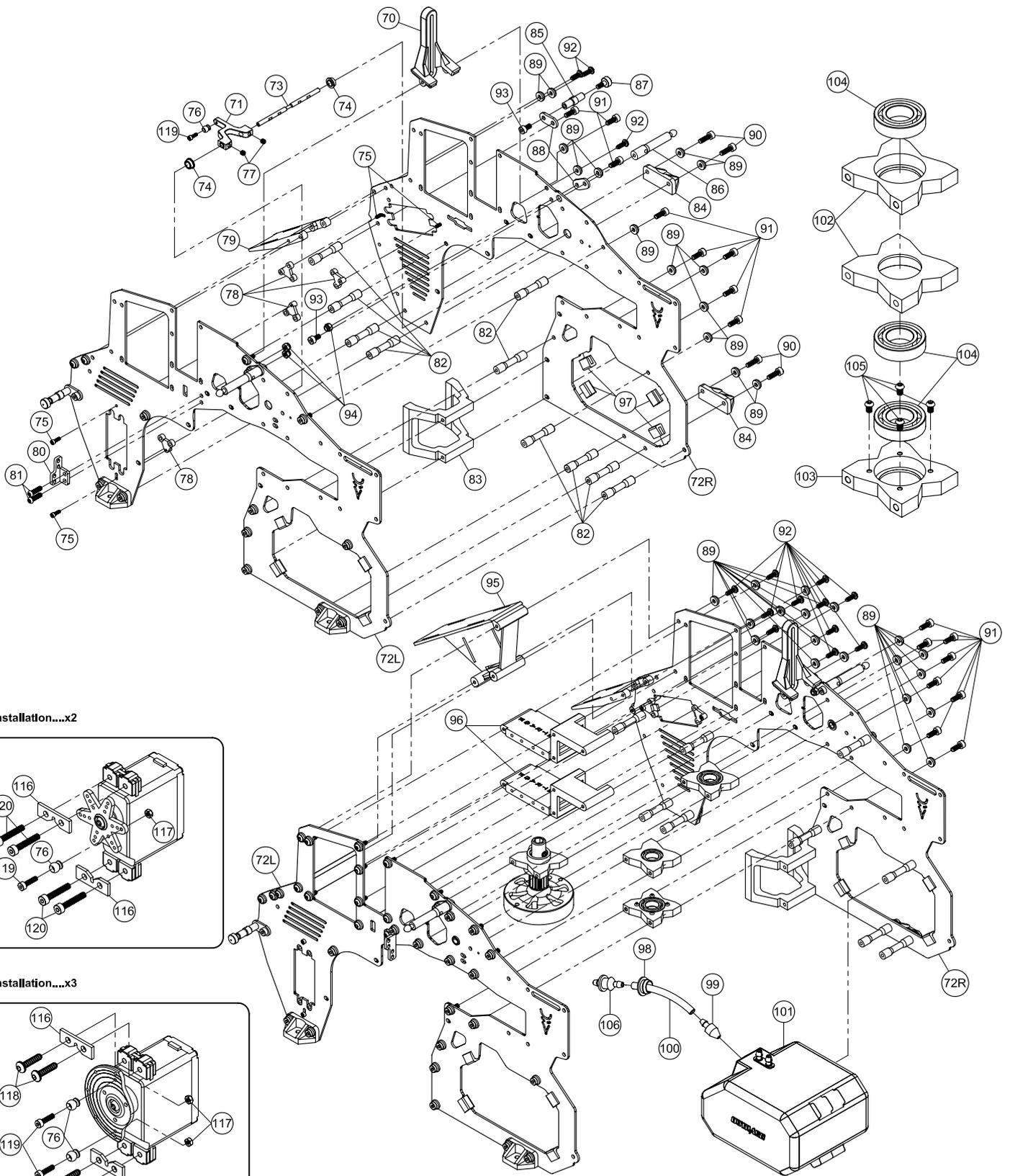
	Problem	Possible Cause	Possible fix
Blade Tracking	Out of tracking	<ul style="list-style-type: none"> Adjustment of pitch rod has not been done. Possible mismeasurement of linkage rods. Possible faulty or mismatched blade balance. 	<ul style="list-style-type: none"> Adjust pitch rod(s). Verify rotor head linkage set up verify fly bar paddle are installed correctly. Verify blade balance, install new blade set.
During Hovering	Low rotation speed of the rotor	<ul style="list-style-type: none"> Pitch of main blade is high. Throttle curve is too low during hovering. 	<ul style="list-style-type: none"> Lower the pitch about 5-6° during hovering (the rotation should be about 2,200rpm during hovering). Increase Throttle curve for hovering position.
	High rotation speed of main rotor	<ul style="list-style-type: none"> Pitch of main blade is low. Throttle curve is too high during hovering. 	<ul style="list-style-type: none"> Adjust the pitch rod(the rotation should be about 2,200rpm during hovering). Lower the throttle curve for hovering.
Tail rotor Stability	During hover tail moves or drifts one way	<ul style="list-style-type: none"> Failure setting of tail neutral point. The sensitivity of the gyro is low. Improper gyro installation 	<ul style="list-style-type: none"> Reset tail neutral point. Increase the sensitivity. Use approved gyro mounting tape verify positioning recommended by manufacturer.
	The tail wags left and right during flight at hovering or full speed.	The sensitivity of the gyro is high.	Decrease the sensitivity.



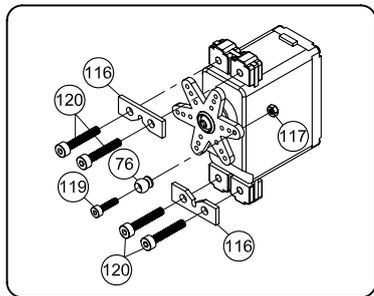
No.	Code No.	Name	Specification	Quantity	Remarks
0	R550410	Linkage Rod	M2x72mm	2	
1		Main Blade			
2	R50N015	Flybar Paddle 50N		2	
3	R550727	Set Screw	M3x5mm	2	
4	R550718	Set Screw	M4x4mm	2	
5	R550104	Flybar Carriage Base		2	
6	R50N003	Flybar Rod	Ø3x400mm	1	
7	R550178	Flybar Control Rod		2	
8	R550205	Plastic Ball Linkage		12	
9	R550411	Linkage Rod	M2x15mm	4	
10	R50N008	Spindle Shaft	Ø8x93mm	1	
11	R50N002	Center Hub		1	
12	R550103	SeeSaw		1	
13	R550180	Double Linkage Ball	4.75x11mm	2	
14	R550610	Ball Bearing	Ø3xØ6x2.5mm	2	
15	R550183	Phasing Pin	Ø2x28mm	2	
16	R550609	Ball Bearing	Ø4xØ7x2.5mm	4	
17	R50N004	Bearing Sleeve Brass		2	
18	R550712	Cap screw	M2.5x8mm	2	
19	R550225	Damper, Red 80	Ø8xØ13x6.5mm	2	
	R50N007	Damper, Black 90	Ø8xØ13x6.5mm	2	
20	R550154	Damper Spacer	Ø8xØ11.5x1.3mm	2	
21	R50N401	Ball bearing	Ø8xØ14x4mm	4	
22	R50N001	Blade Grip 50N		2	
23	R50N450	Thrust Washer Brass	Ø10xØ14x0.6mm	2	
24	R50N402	Thrust Bearing	Ø6xØ14x5mm	2	
25	R550711	Flat Washer	Ø4xØ10x2mm	2	
26	R550710	Cap screw	M4x10mm	2	
27	R550715	Lock Nut	M4	2	
28	R550714	Cap Screw Shouldered	M4x26mm	2	
29	R550101	Blade Grip Arm		2	
30	R550724	Cap screw	M3x6mm	4	
31	R550143	Bell Spacer	3x5.5x4.5mm	2	
32	R550732	Cap screw	M2X6mm	4	
33	R550160	Linkage Ball	4.75x5mm	4	
34	R550617	Ball Bearing Flange	Ø3xØ7x3mm	4	
35	R550102	Upper Mixing Arm CNC		2	
36	R550152	Brass Bearing Spacer	Ø3xØ5x1.9mm	2	
37	R550737	Cap screw	M3X16mm	2	
38	R550141	Head Button		1	
39	R550738	Cap screw	M3X10mm	1	
40	R550717	Cap screw	M2X8mm	4	



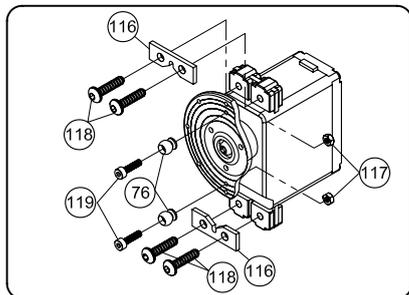
No.	Code No.	Name	Specification	Quantity	Remarks
42	R550172	Main shaft	10x178mm	1	
43	R50N005	Washout Base		1	
44	R550732	Cap Screw	M2x6mm	8	
45	R550160	Linkage Ball	4.75x5mm	8	
46	R550108	Lower Mixing Arm CNC		2	
47	R550152	Brass Bearing Spacer		2	
48	R550611	Ball Bearing	Ø3xØ7x3mm	4	
49	R550719	Button Head Cap Screw	M3x10mm	2	
50	R550745	Button Head Cap Screw	M2x5mm	4	
51	R550713	Cap Screw shouldered	M3x20mm	2	
52	R550618	Ball Bearing Flanged	Ø2xØ5x2.3mm	4	
53	R550211	Radius Arm		2	
54	R550181	Elevator Ball	4.75mm	1	
55	R50N006	Swash plate Dual Ball Bearing		1	
56	R550116	Main Shaft Collar		1	
57	R550718	Set Screw	M4x4mm	2	
58	R550700	Shim washer	Ø10xØ13x1mm	1	
59	R550600	Ball Bearing	Ø10xØ22x6mm	1	
60	R550110	Oneway Hub		1	
61	R550601	Oneway Bearing	Ø12xØ18x16mm	1	
62	R550170	Oneway Sleeve		1	
63	R50N111	Main Gear	129T0.8M	1	
64	R50N455	Flat Washer	Ø3xØ7x0.8mm	4	
65	R550722	Cap Screw	M3x8mm	4	
66	R50N112	Main Tail Drive Gear	90T	1	
67	R550729	Lock Nut	M3	2	
68	R550707	Flat Washer	Ø2xØ4x0.5mm	3	
69	R550731	Button Head Cap Screw	M2x3mm	3	



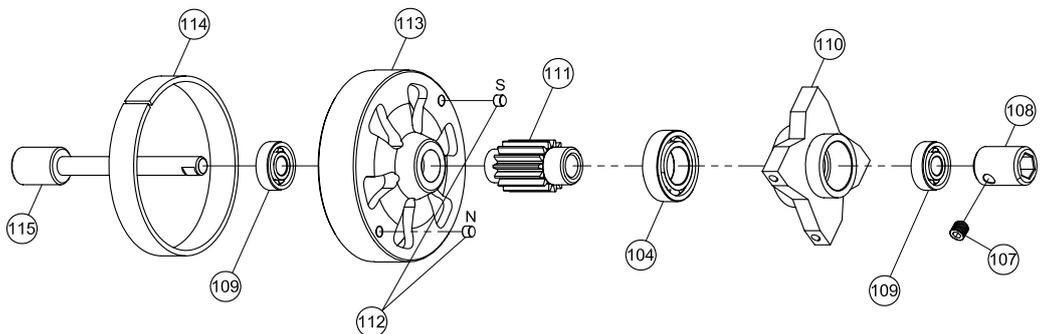
Servo Installation...x2



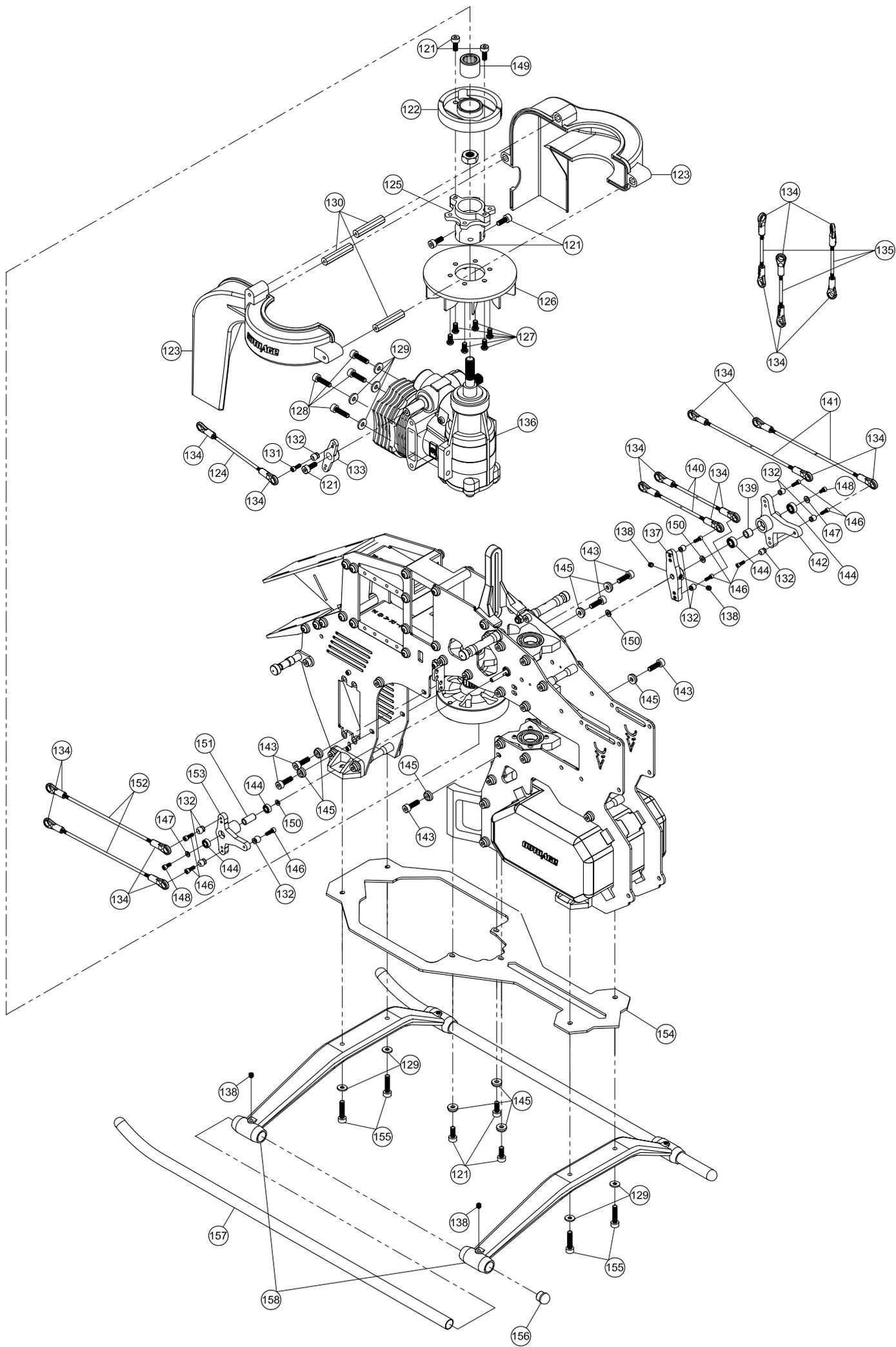
Servo Installation...x3



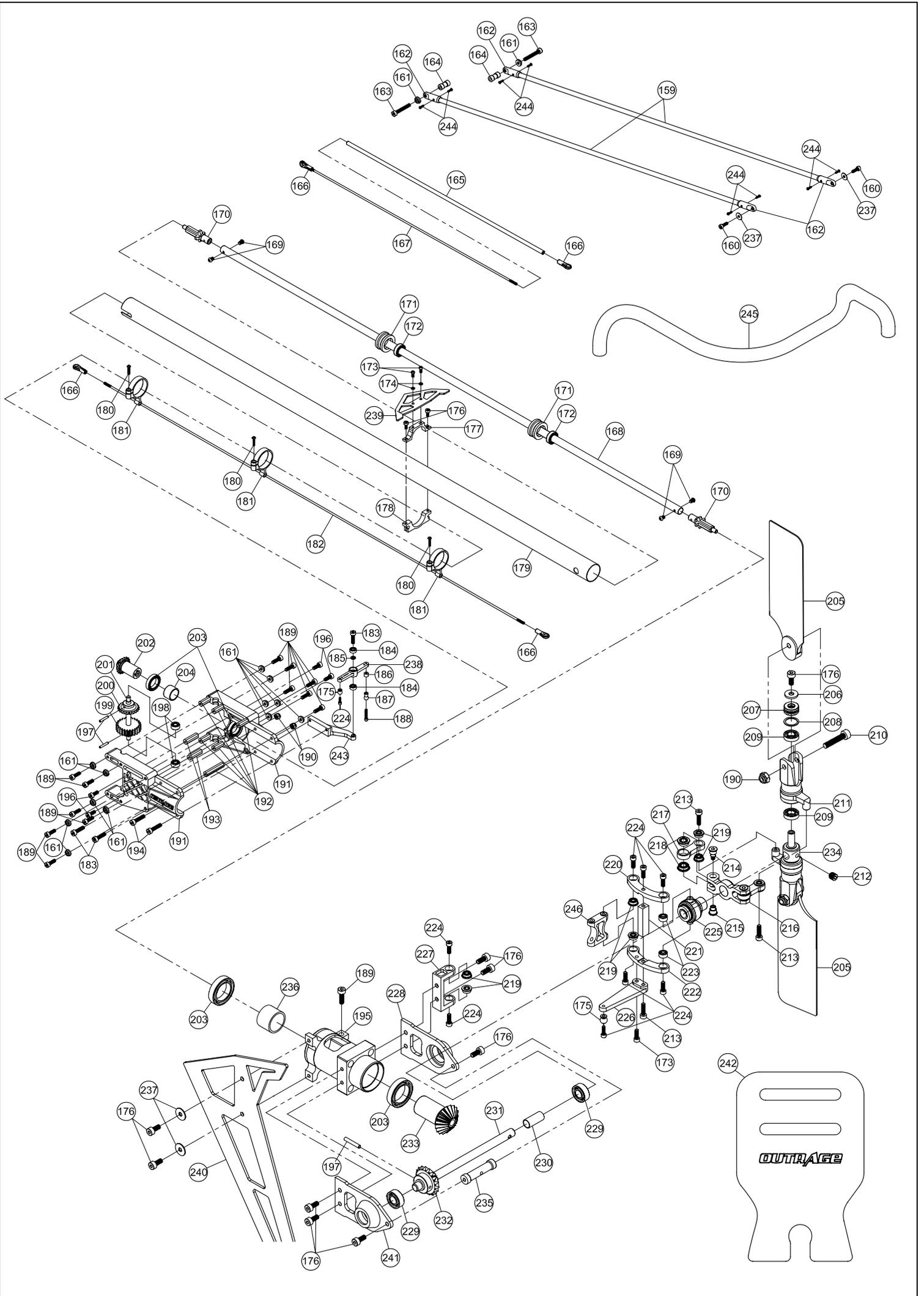
Assembly 4



No.	Code No.	Name	Specification	Quantity	Remarks
70	R550214	Anti-Rotation Guide		1	
71	R50N264	Elevator Arm		1	
72L	R50N201_L	Left Side Frame (option)		1	
72R	R50N201_R	Right Side Frame (option)		1	
73	R550171	Control Rod 120 deg		1	
74	R550617	Ball Bearing Flange	Ø3xØ7x3mm	2	
75	R550732	Cap Screw	M2x6mm	4	
76	R550160	Linkage ball	4.75x5mm	9	
77	R50N457	Set Screw Flat	M3x3mm	2	
78	R90N259	Servo Mount Tab CNC		4	
79	R550213	Gyro Tray		1	
80	R50N251	Govenor Sensor Mount		1	
81	R50N453	Button Head Cap Screw	M3x10mm	2	
82	R550122	M3 Frame Spacer		10	
83	R50N110	Engine Mount		1	
84	R50N239	Skid Mount		4	
85	R50N254	Canopy Port Lower		2	
86	R550216	Upper Canopy Pin		2	
87	R50N264	Thumb Screw		2	
88	R550066	Break Away Tab		4	
89	R550721	Finishing "C" Washer	M3	66	
90	R550738	Cap Screw	M3x10mm	8	
91	R550722	Cap Screw	M3x8mm	32	
92	R550735	Self Tapping Hex Socket Screw	M3x8mm	28	
93	R550724	Cap Screw	M3x6mm	4	
94	R550729	Lock Nut	M3	4	
95	R50N252	Electronics Tray		1	
96	R550207	Servo Tray		2	
97	R50N238	Tank Damper		8	
98	R50N234	Fuel Tank Nipple Grommet		1	
99	R50N236	Fuel Tank Clunk		1	
100	R50N237	Fuel Tubing	Ø5x65mm	1	
101	R50N233	Fuel Tank		1	
102	R550113	Main Shaft Bearing Block Top		2	
103	R550121	Main Shaft Bearing Block Bottom		1	
104	R550602	Ball Bearing	Ø10xØ19x5mm	4	
105	R550731	Button Head Cap Screw	M2x3mm	4	
106	R50N235	Fuel Tank Nipple Assembly		1	
107	R550718	Set Screw	M4x4mm	1	
108	R50N101	Hex Start Adapter		1	
109	R50N404	Ball Bearing	Ø5xØ13x4mm	2	
110	R50N231	Clutch Bearing Block		1	
111	R50N103	Pinion	15T 0.8M	1	
112		Magnet		2	
113	R50N104	Clutch Bell		1	
114	R50N105	Clutch Liner		1	
115	R50N102	Start Shaft		1	
116	R550005	Servo Spacer (option)	Fiber 1.5mm	10	
117	R550739	Nut	M2	9	
118	R550725	Self Tapping Hex Socket Screw	M3x12mm	12	
119	R550717	Cap Screw	M2x8mm	9	
120	R50N462	Cap Screw	M2.5x15mm	8	



No.	Code No.	Name	Specification	Quantity	Remarks
121	R550722	Cap Screw	M3x8mm	8	
122	R50N106	Clutch		1	
123	R50N109	Fan Shroud (R) and (L)		2	
124	R50N263	Linkage Rod (E)	M2x65mm	1	
125	R50N107	Clutch Hub		1	
126	R50N108	Fan		1	
127	R50N451	Button Head Cap Screw	M3x6mm	6	
128	R550728	Cap Screw	M3x12mm	4	
129	R50N455	Flat Washer	Ø3xØ8x1mm	8	
130	R50N255	Hex Inset Long		3	
131	R550717	Cap Screw	M2x8mm	1	
132	R550160	Linkage Ball	4.75x5mm	9	
133		Engine 50N Arm		9	
134	R550205	Plastic Ball Linkage		20	
135	R550404	Swash Linkage Rod		3	
136		Engine 50N		1	
137	R550119	Elevator Bell Crank		1	
138	R50N457	Set Screw Flat	M3x3mm	6	
139	R550703	Shim Spacer Short	Ø3xØ4.5x3.5mm	1	
140	R50N247	Linkage Rod (G)	M2x68mm	2	
141	R50N246	Linkage Rod (F)	M2x120mm	2	
142	R550203	Aileron Bell Crank Plastic		1	
	R550803	Aileron Bell Crank CNC		1	
143	R550738	Cap Screw	M3x10mm	6	
144	R550610	Ball Bearing	Ø3xØ6x2.5mm	4	
145	R550721	Finishing "C" Washer	M3	9	
146	R550732	Cap Screw	M2x6mm	8	
147	R550707	Flat Washer	Ø2xØ4x0.5mm	2	
148	R550705	Cap Screw	M2x4mm	2	
149	R50N403	OneWay Bearing	Ø10xØ14x12mm	1	
150	R550701	Shim Washer Brass	Ø3xØ5x0.5mm	3	
151	R550704	Shim Spacer Long	Ø3xØ4.5x9.5mm	1	
152	R50N245	Linkage Rod (D)	M2x98mm	2	
153	R550204	Aileron Bell Crank 2 Plastic		1	
	R550804	Aileron Bell Crank 2 CNC		1	
154	R50N202	Base Frame		1	
	R50N212	Base Frame		1	
	R50N222	Base Frame		1	
155	R550742	Cap Screw	M3x14mm	4	
156	R550223	Strut Tube Cap (Plastic)		4	
157	R550139	Langding Gear Strut Tube		2	
158	R550217	Langding Gear Strut (Plastic)		2	



No.	Code No.	Name	Specification	Quantity	Remarks
159	R550226	Boom Support CF Rod		2	
160	R550712	Cap Screw	M2.5x8mm	2	
161	R550721	Finishing "C" Washer		14	
162	R550124	Boom Support End		4	
163	R50N459	Cap Screw	M3x25mm	2	
164	R50N458	Spacer Boom Support		2	
165	R50N250	Tail Rubber Control Rod CF Boom	Ø2xØ4x295mm	1	
166	R550205	Plastic Ball Linkage		4	
167	R50N249	Tail Rubber Control Rod	M2x315mm	1	
168	R50N315	Tube Shaft	Ø7xØ8x710mm	1	
169	R50N452	Button Head Cap Screw	M2.5x4mm	4	
170	R50N317	Tail Shaft Spline		2	
171	R50N318	Tube Bearing Support		2	
172	R50N401	Ball Bearing	Ø8xØ14x4mm	2	
173	R550753	Cap Screw	M2x5mm	3	
174	R550707	Flat Washer	Ø2xØ4x0.5mm	2	
175	R550160	Linkage Ball	4.75x5mm	2	
176	R550743	Cap Screw	M2.5x6mm	10	
177	R550807	STabilizer Mount Top		1	
178	R550808	STabilizer Mount Bottom		1	
179	R50N321	Tail Boom	Ø20xØ21x710mm	1	
180	R50N456	Self Tapping Hex Socket Screw	M2x10mm	3	
181	R550220	Tail Rotor Push Rod Guide		28	
182	R50N320	Boom Tail Push Rod	M2x640mm	4	
183	R550728	Cap Screw	M3x12mm	3	
184	R550611	Ball Bearing	Ø3xØ7x3mm	2	
185	R550152	Brass Bearing Spacer	Ø3xØ5x1mm	1	
186	R50N261	Linkage Ball Spacer	Ø2xØ4.5x3.5mm	1	
187	R50N260	Linkage Ball	4.75x8mm	1	
188	R50N454	Cap Screw	M2x14mm	1	
189	R550738	Cap Screw	M3x10mm	12	
190	R550729	Lock Nut	M3	4	
191	R50N301	Boom Mount Right and Left		1	
192	R50N255	Hex Insert Long		6	
193	R50N258	Hex Insert Short		2	
194	R550742	Cap Screw	M3x14mm	2	
195	R50N308	Tail Case Hub CNC		1	
196	R550722	Cap Screw	M3x8mm	4	
197	R550734	Roll Pin	Ø2x12mm	3	
198	R50N405	Ball Bearing	Ø4xØ9x4mm	2	
199	R50N302	Tail Drive Couter Gear	24 T	1	
200	R50N303	Tail Drive Bevel Gear	22 T	1	
201	R50N305	Couter Gear Shaft		1	
202	R50N304	Tube Bevel Gear	18 T	1	
203	R50N406	Ball Bearing	Ø12xØ18x4mm	4	
204	R50N262	Bearing Spacer	Ø12xØ14x8.8mm	1	
205	R50N205	Tail Blade CF	95mm	2	
206	R550723	Flat Washer	Ø3xØ8x1mm	2	
207	R550616	Thrust Bearing	Ø4xØ9x4mm	2	
208	R550155	Thrust Washer	Ø7.2xØ8.9x0.4mm	2	
209	R550613	Ball Bearing	Ø5xØ9x3mm	4	

No.	Code No.	Name	Specification	Quantity	Remarks
210	R550728	Cap Screw	M3x16mm	2	
211	R550127	Tail Blade Grip CNC		2	
212	R550718	Set Screw	M4x4mm	1	
213	R550717	Cap Screw	M2x8mm	3	
214	R550178	Tail Link Bearing Screw		2	
215	R550179	Tail Link Bearing Nut		2	
216	R550129-A	Tail Pitch Slider CNC		2	
217	R550128	Tail Pitch Slider Link CNC		2	
218	R550615	Ball Bearing Flanged	Ø3xØ6x2.5mm	2	
219	R550614	Ball Bearing Flanged	Ø2xØ5x2.3mm	8	
220	R550130-A	Tail Bell Crank Arm Top CNC		1	
221	R550130-C	Tail Bell Crank Arm Spacer CNC		1	
222	R550130-B	Tail Bell Crank Arm Bottom CNC		1	
223	R550619	Washer Bearing (Special)	Ø2xØ5x2.5/3mm	2	
224	R550732	Cap Screw	M2x6mm	9	
225	R550129-B	Slider CNC Arm		1	
226	R550132	Tail Bell Crank Lever CNC		1	
227	R550133	Tail Bell Crank Support CNC		1	
228	R50N309	Tail Case Bearing Support		2	
229	R550612	Sealed Ball Bearing	Ø5xØ11x4mm	2	
230	R50N312	Tail Shaft Spacer	Ø5xØ5.6x12.25mm	1	
231	R50N311	Tail Shaft		1	
232	R50N310	Tail Bevel Gear	18T	1	
233	R50N316	Tail Shaft Bevel Gear	18T	1	
234	R550173	Tail Rotor Hub		1	
235	R50N313	Tail Case Threaded Spacer CNC		1	
236	R50N323	Brass Bearing Spacer	Ø12xØ14x10mm	2	
237	R550746	Flat Washer	Ø2.5xØ8x0.5mm	4	
238	R50N257	Tail Control Bell Crank		1	
239	R550003-A	Horizontal Fin		1	
	R550033-A	Horizontal Fin		1	
	R550063-A	Horizontal Fin		1	
240	R550003-B	Vertical Fin		1	
	R550033-B	Vertical Fin		1	
	R550063-B	Vertical Fin		1	
241	R50N322	Tail Case Bearing Support Extended		1	
242	R550229	Foam Blade Holder		1	
243	R50N256	Bell Crank Mount		1	
244	R50N461	Self Tapping Socket Screw	M1.5x5mm	8	
245	R50N266	Fuel Tube	5x460mm	1	
246	R550131	Tail Bell Crank Link CNC		1	