Manual

LOGO 10 3D

Mikado
Model Helicopters
www.mikado-heli.de

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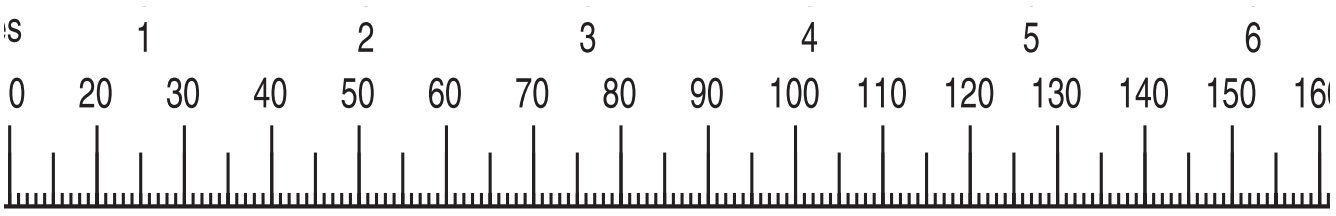
All parts shown in the boxes are displayed in real size.



OPERATING YOUR MODEL SAFELY

Operate the helicopter in spacious areas with no people nearby.
! Warning: Do NOT operate the helicopter in the following places and situations (or else you risk severe accidents):

in places where children gather or people pass through
in residential areas and parks
indoors and in limited space
in windy weather or when there is any rain, snow, fog or other precipitation
If you do not observe these instructions you may be held reliable for personal injury or property damage!

Always check the R/C system prior to operating your helicopter.
When the R/C system batteries get weaker, the operational range of the R/C system decreases. Note that you may lose control of your model when operating it under such conditions.

Keep in mind that other people around you might also be operating a R/C model.
Never use a frequency which someone else is using at the same time. Radio signals will be mixed and you will lose control of your model.

If the model shows irregular behavior, bring the model to a halt immediately. Turn off all power switches and disconnect the batteries. Investigate the reason and fix the problem. Do not operate the model again as long as the problem is not solved, as this may lead to further trouble and unforeseen accidents.

! Warning: In order to prevent accidents and personal injury, be sure to observe the following:

Before flying the helicopter, ensure that all screws are tightened. A single loose screw may cause a major accident.
Replace all broken or defective parts with new ones, as damaged parts lead to crashes.
Never approach a spinning rotor. Keep at least 10 meters/yards away from a spinning rotor blades.
Do not touch the motor immediately after use. It may be hot enough to cause burns.
Perform all necessary maintenance.

PRIOR TO ADJUSTING AND OPERATING YOUR MODEL, OBSERVE THE FOLLOWING

! Warning: Operate the helicopter only outdoors and out of people's reach as the main rotor operates at high rpm!
! Warning: While adjusting, stand at least 10 meters/yards away from the helicopter!

Novice R/C helicopter pilots should always seek advice from experienced pilots to obtain hints with assembly and for pre-flight adjustments. Note that a badly assembled or insufficiently adjusted helicopter is a safety hazard!
In the beginning, novice R/C helicopter pilots should always be assisted by an experienced pilot and never fly alone!
Throttle channel should be in motor OFF position while powering up.
When switching the R/C system ON or OFF, always proceed in the following order:

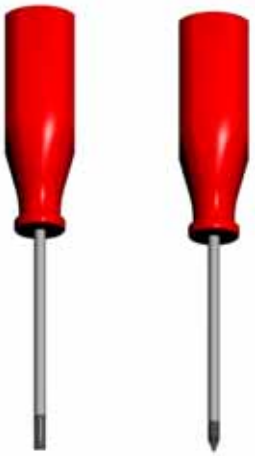
When switching ON:
Position the throttle control stick (on transmitter) to a position where the LOGO 10 motor does not operate.
Turn on the transmitter.
Turn on the receiver.
Connect the motor battery.
Operate your model.

When switching OFF:
Turn off the motor (move throttle control to a position where motor does not operate).
Wait until the rotor head has stopped spinning.
Disconnect the motor battery.
Turn off receiver.
Turn off transmitter.

Tools for Assembly & R/C Equipment

Rubber Hammer

Screwdrivers
(plus and minus)



Threadlock

Drill with
1.5mm bit
(.059 in)

Marker

Ball
link
pliers

Ball
link
pliers

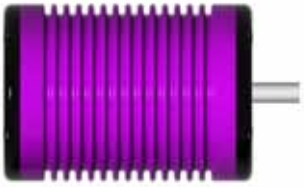
Hex Wrenches
1.5/2.0/2.5/3.0 mm
(.055/.079/.098/.118 in)

Scissors

Pitch Gauge

Alle shown products are examples. You may use different brands.

Motor + Speed Controller (check the Mikado
webpages for recommended motors)



BEC, replaces
receiver battery

Radio with Heli-Software

Fast Charger
(Schulze isl 6-330d or isl 6-636+)

Battery

Receiver (Graupner DS 19
or SMC 19 SPCM)

Receiver Battery
(Sanyo AR500)

Gyro (Futaba GY240
or GY401)

4x Mini Servos (Graupner DS361
or Graupner C341)

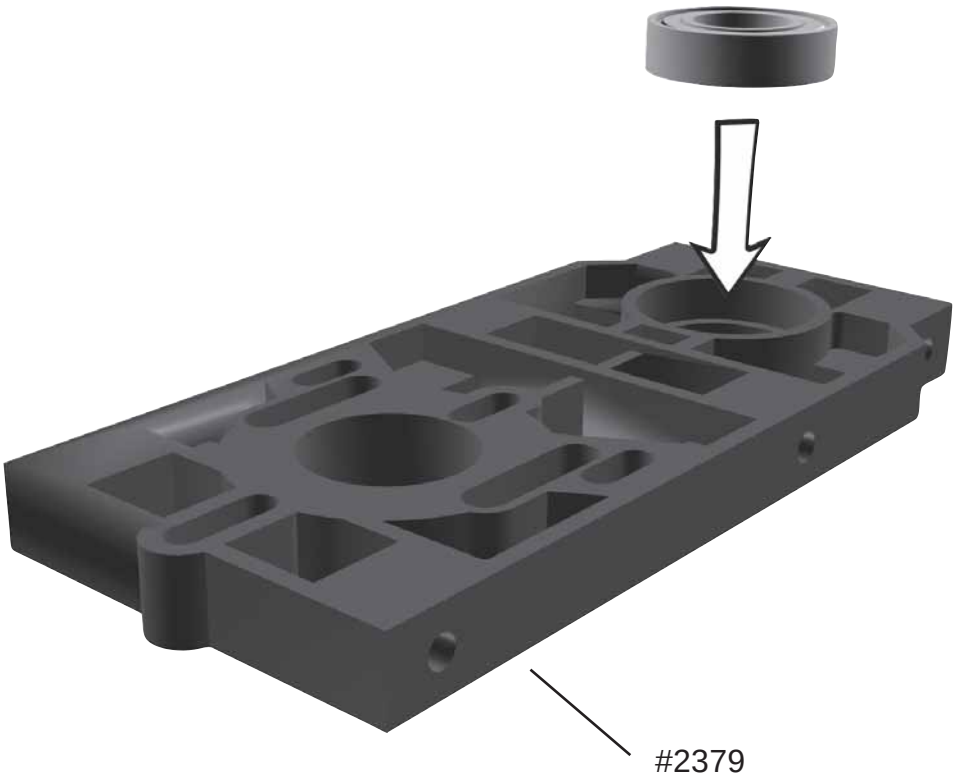
1 Main Frame

1.1 Motorplate

Bag 1 • Bag 10

1x	10x19x5	#1329
6x	M3	#2072

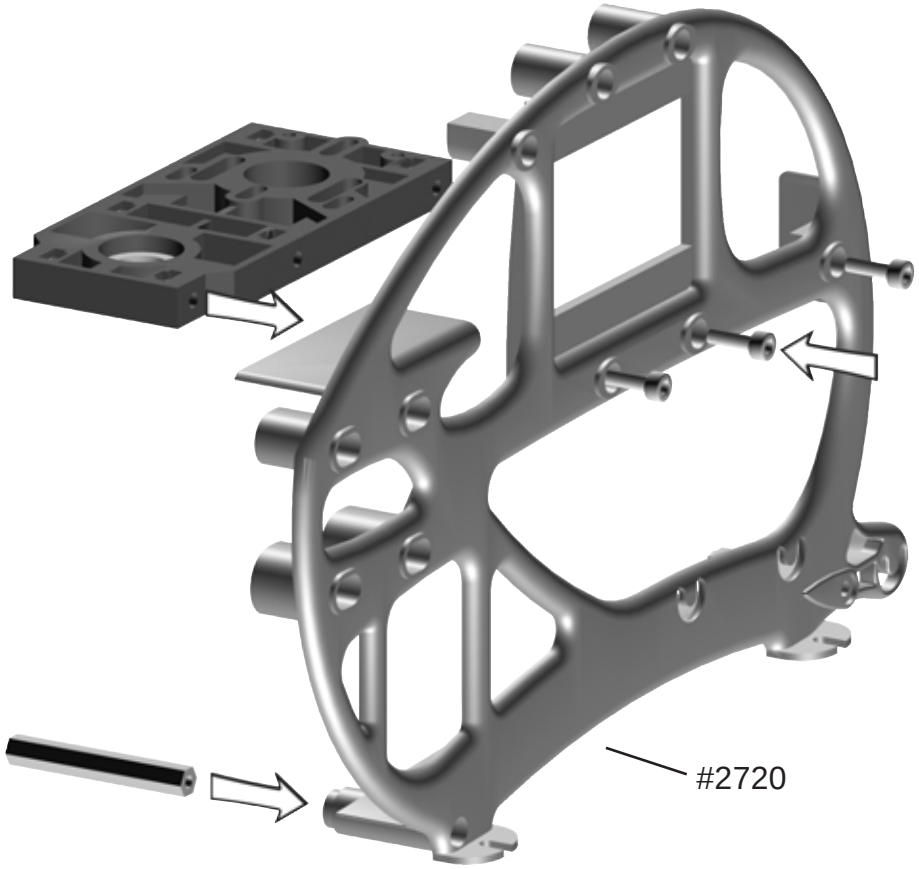
All parts shown in the boxes are displayed in real size.

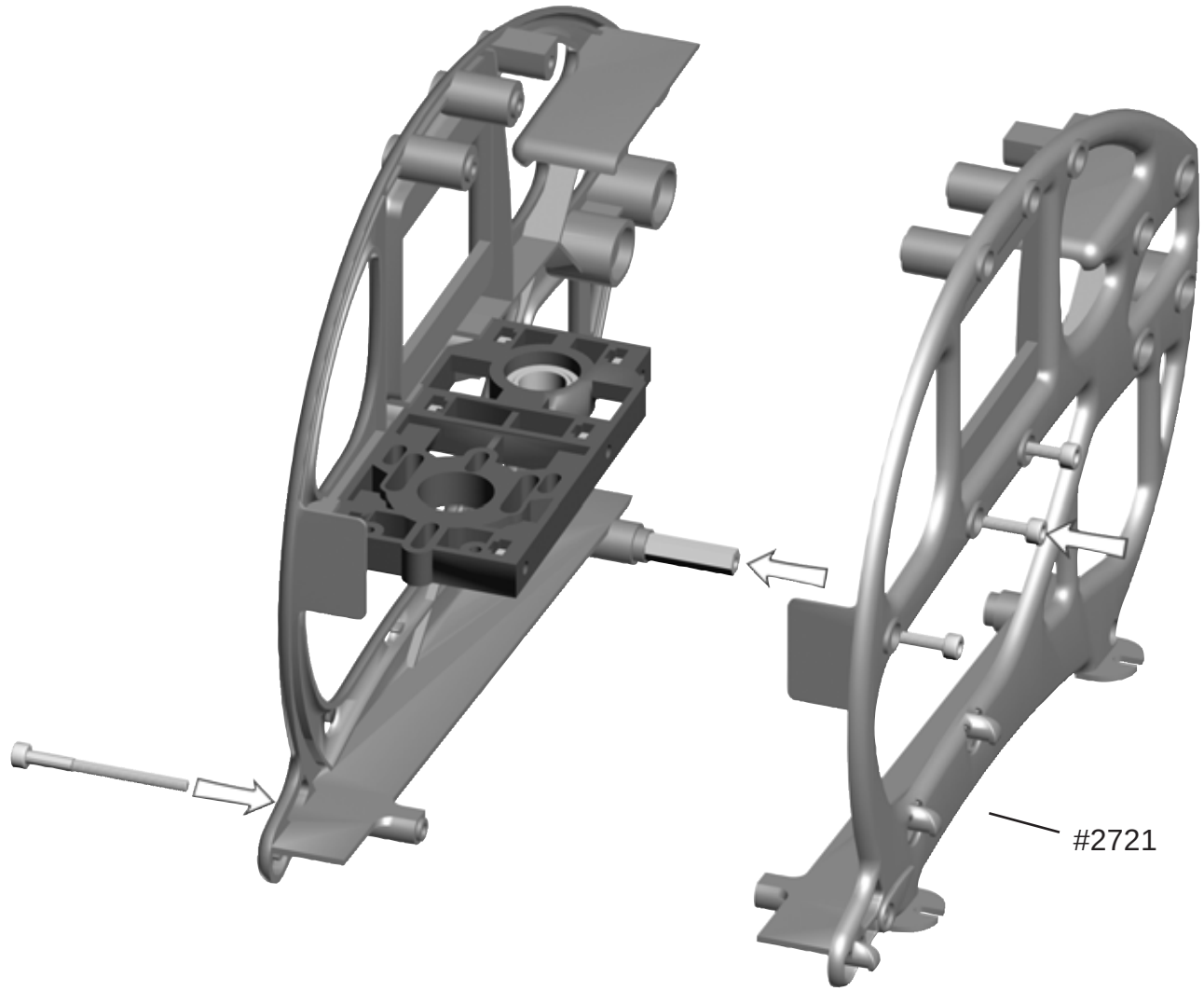


1.2 Main Frame

Bag 1

6x	M3x10	#1953
1x	38 mm	#2370
1x	M3x35	#1961

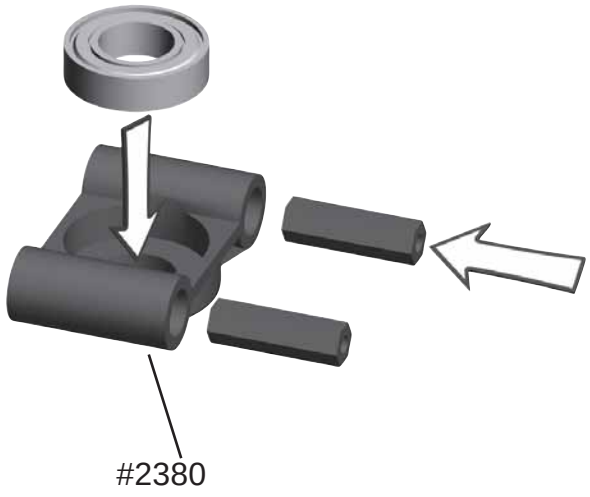


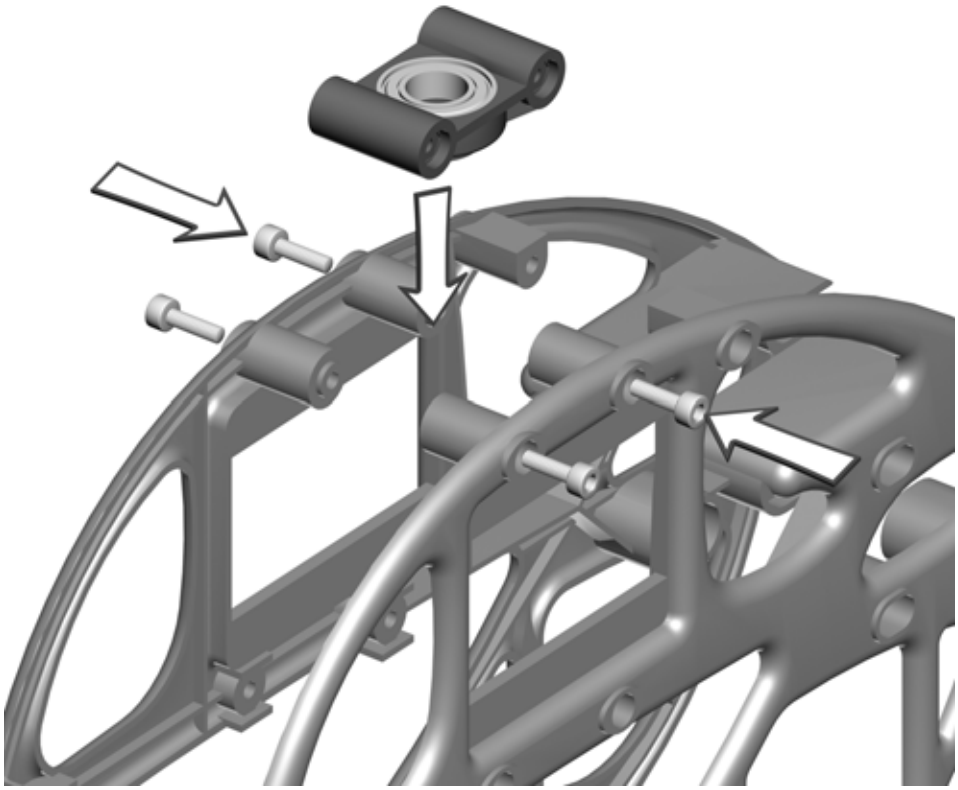


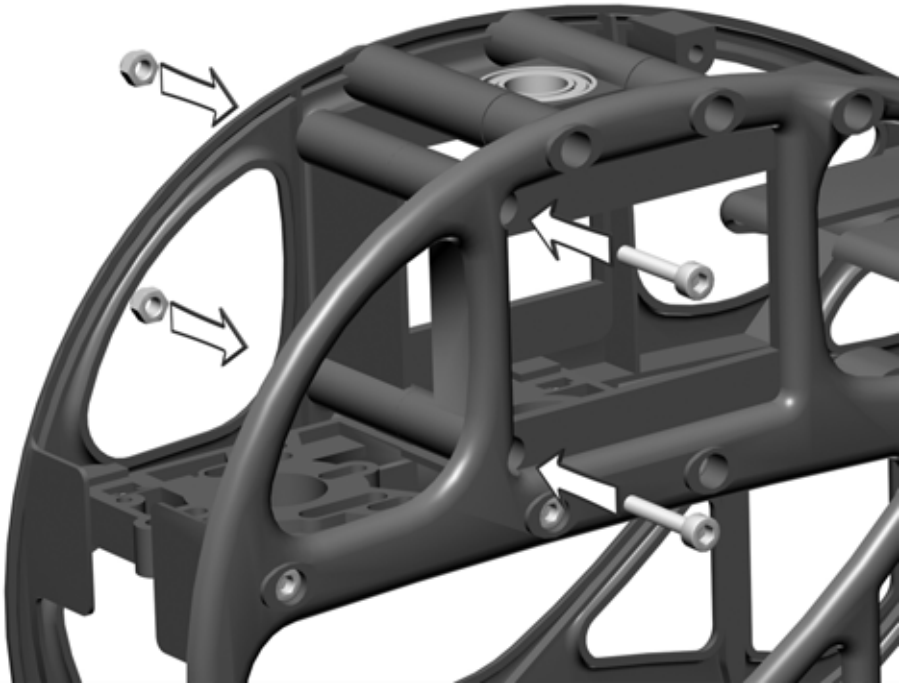
1.3 Bearing Case

Bag 1 • Bag 10

1x	10x19x5	#1329
2x	19 mm	#2370
6x	M3x10	#1953







New 2006

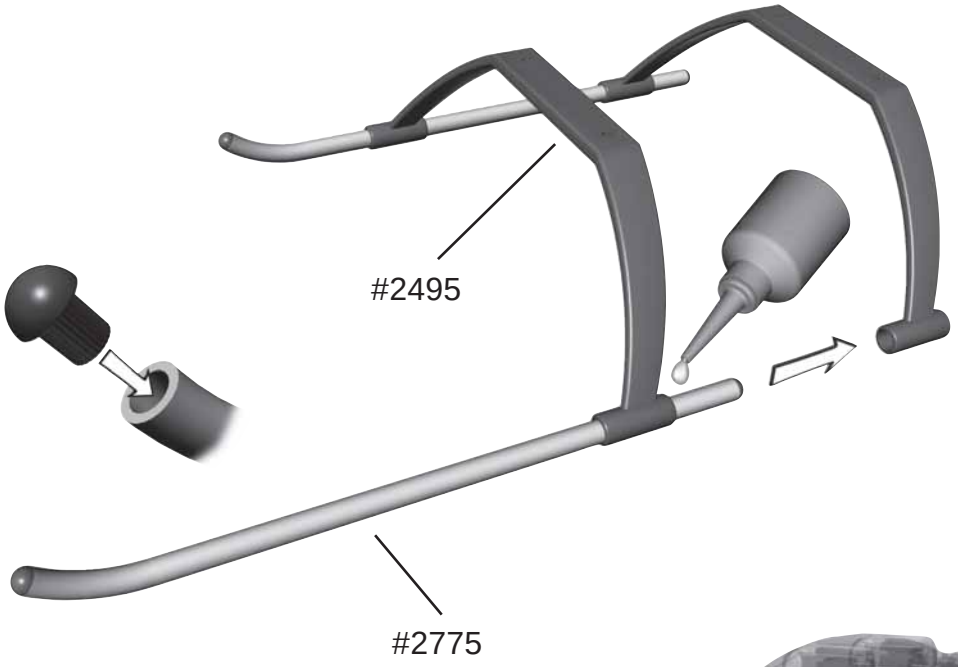
2x	M3x14	#1955
2x	M3 Stopp	#2074

2 Landing Gear

Bag 8

4x	M3x12	#1954
4x	M3	#2074
4x	3x7x0,5	#2012

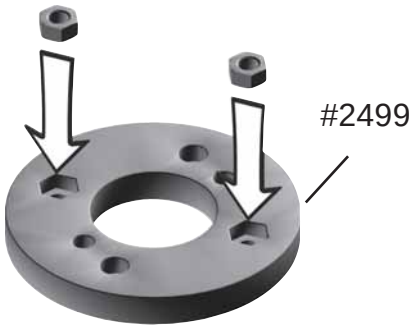
Align the skids and secure them with superglue.



3.1 Motor Adaptor Plate

Bag 1

2x	M3x8	#1915



Some electric motors (e.g. Kontronik, Plettenberg, Speed 700 Neodyme motors) are constructed such that they cannot be moved along the motor plate. If you are using one of these motors, please use the motor adaptor plate #2499. The plate is not needed for Hacker motors.

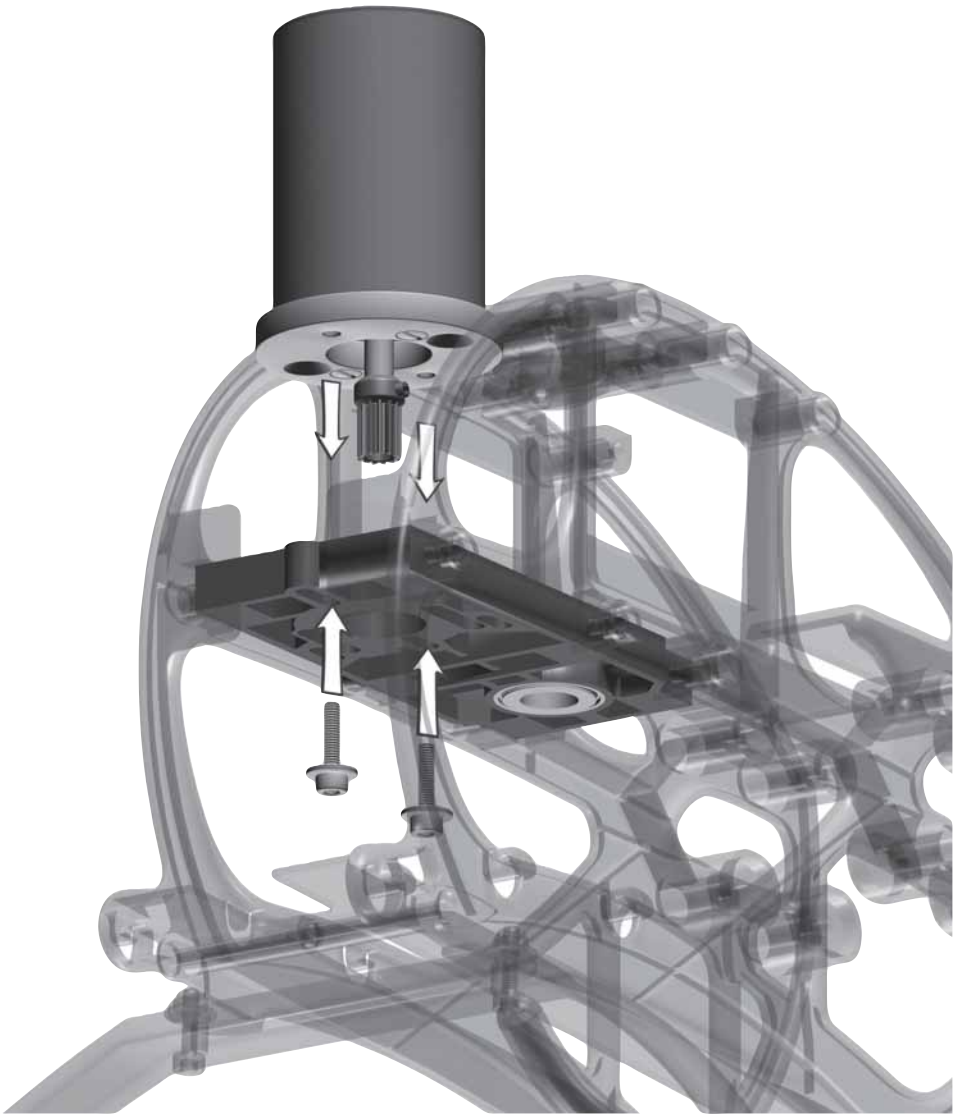
Please check from the Mikado website which pinion works best with the motorset you have (on www.mikado-heli.com go to LOGO 10 and click “Motorization”). When a wrong pinion is chosen, the performance of your electric helicopter will deteriorate and the motor or speed controller can be damaged.

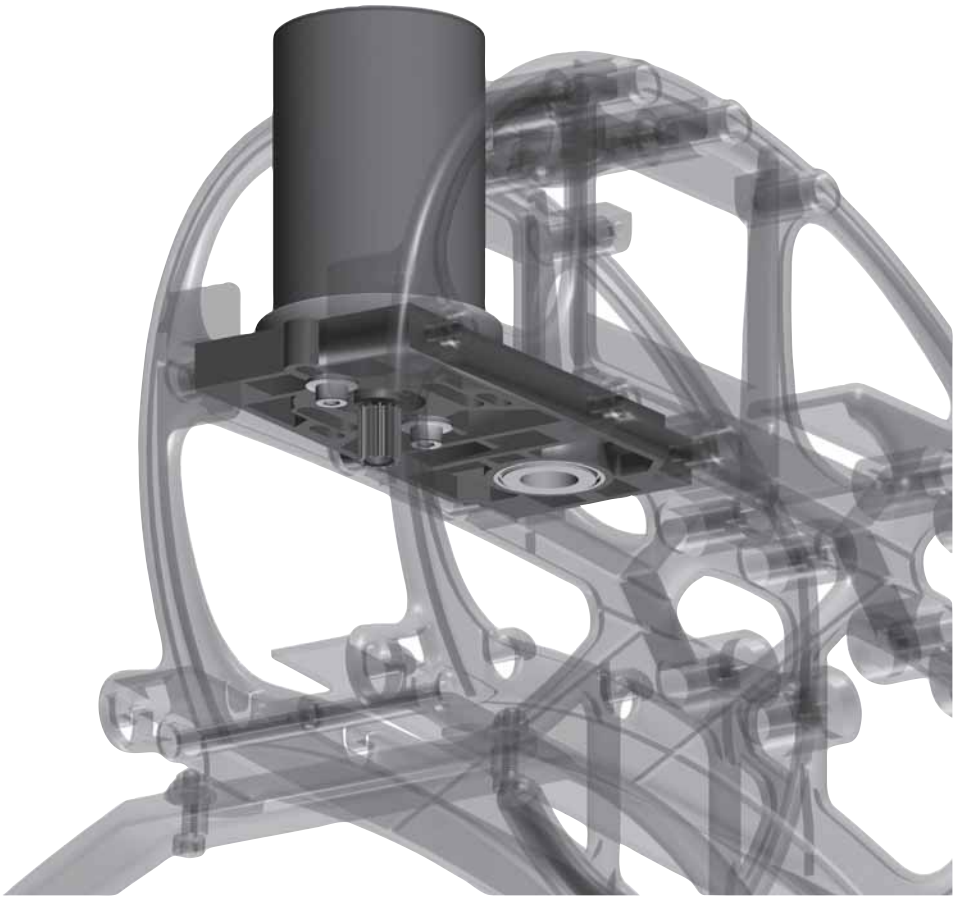
Do not tighten the set screw fully until the final position of the pinion on the motor shaft is determined. This is done after installing the main gear.

There are two options for attaching the pinion:

1. For securing the pinion, you may flatten the motor shaft where the set screw meets the motor shaft - without making a flat surface on the motor shaft.

2. Alternatively, you may screw the set screw directly onto the motor shaft. For this it is required that the set screw has an appropriate rim for engaging the motorshaft (all Mikado pinions have this rim). Note, however, that after attaching the set screw once, the rim becomes blunt and may not be used again.





3.2 Motor Attachment

Bag 1

2x	M3x12	#1964
2x	3x7x0.5	#2012

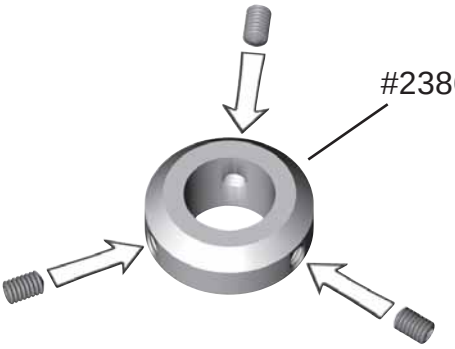
When installing the motor, tighten the socket head cap screws only slightly, making sure that the motor can still be moved on the motor plate.

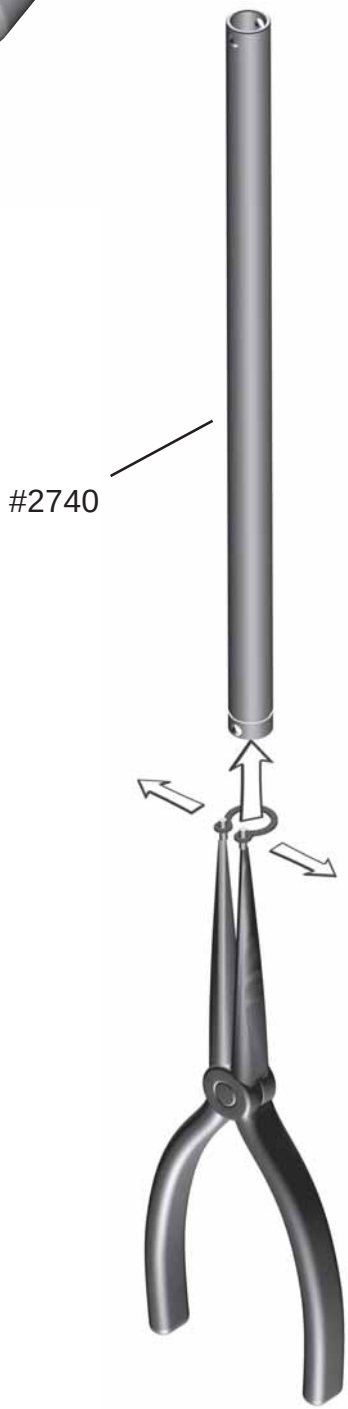
4.1 Hub

Bag 2

4x	M3x8	#1915
3x	M4x5	#1922
2x	10x16x0.5	#2010

Do not yet tighten the three M4x5 set screws on the mainshaft collar.



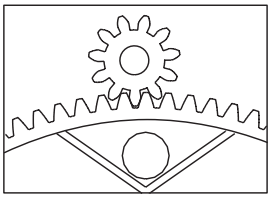


1x		#1344

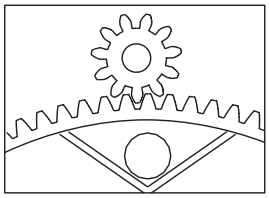
Bag 2

After having attached the freeway hub of the main gear to the rotor shaft, pull the rotor shaft slightly upward and simultaneously push the main shaft collar down onto ball bearing. Next tighten the set screws. The rotor shaft should turn easily and it should not have any axial play.

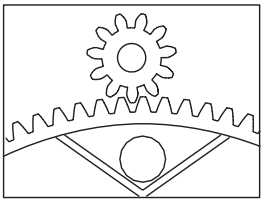
4.2 Adjusting Gear Backlash



too much backlash

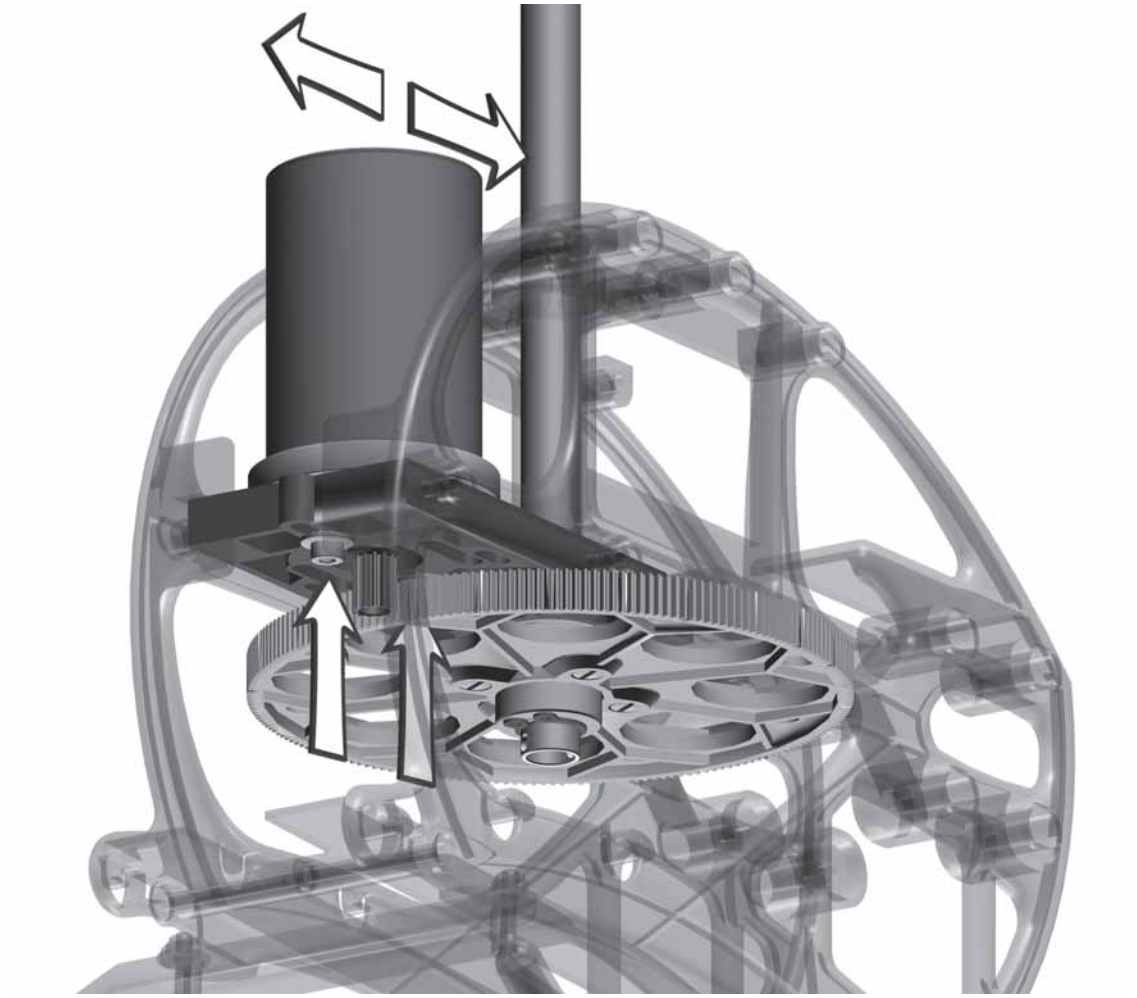


correct backlash



too little backlash

The gear backlash must be adjusted (see drawings). Excess backlash can cause premature wear of the main gear and will lead to shorter flight times.

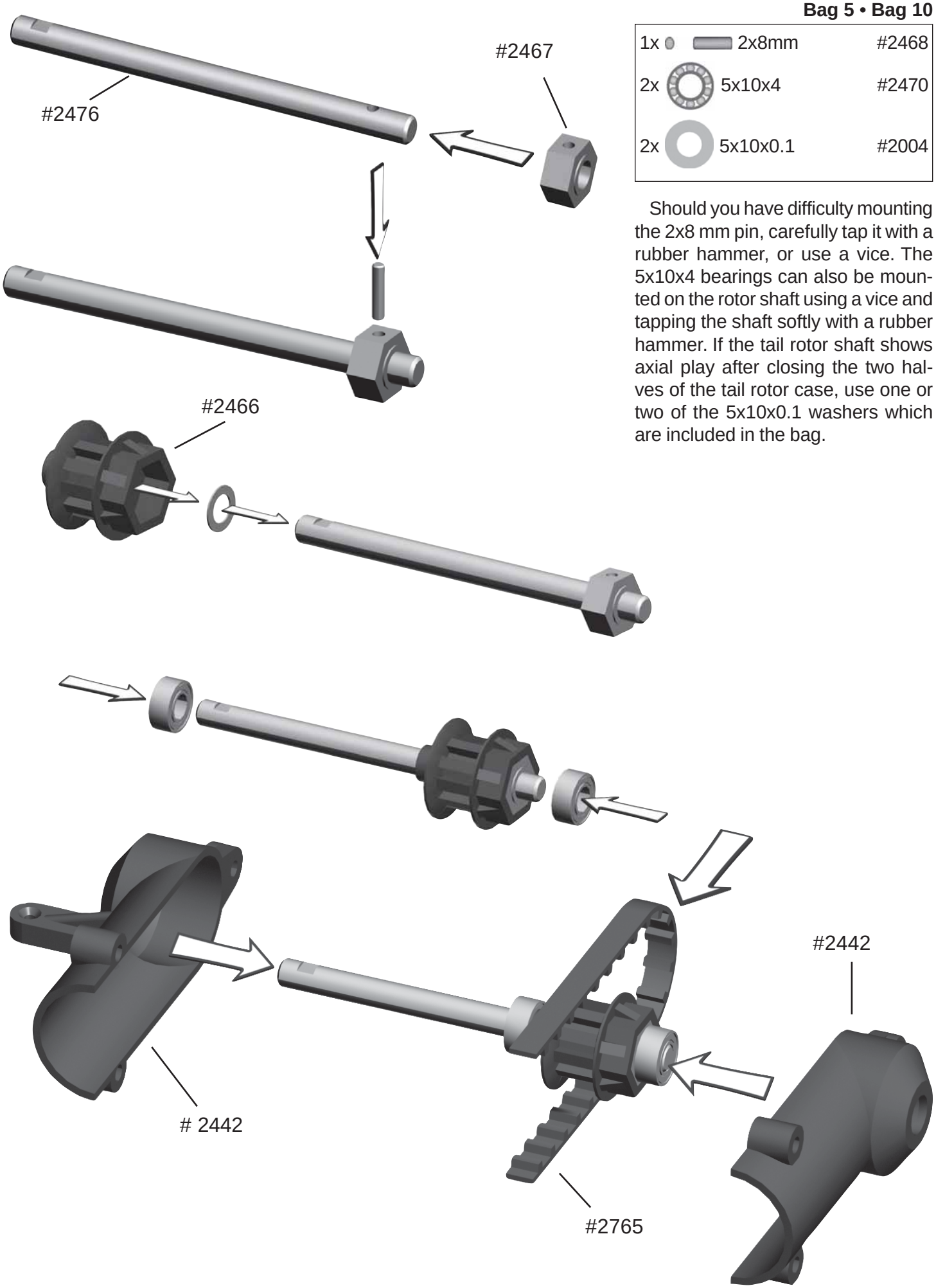


5.1 Tail Rotor Shaft

Bag 5 • Bag 10

1x	2x8mm	#2468
2x	5x10x4	#2470
2x	5x10x0.1	#2004

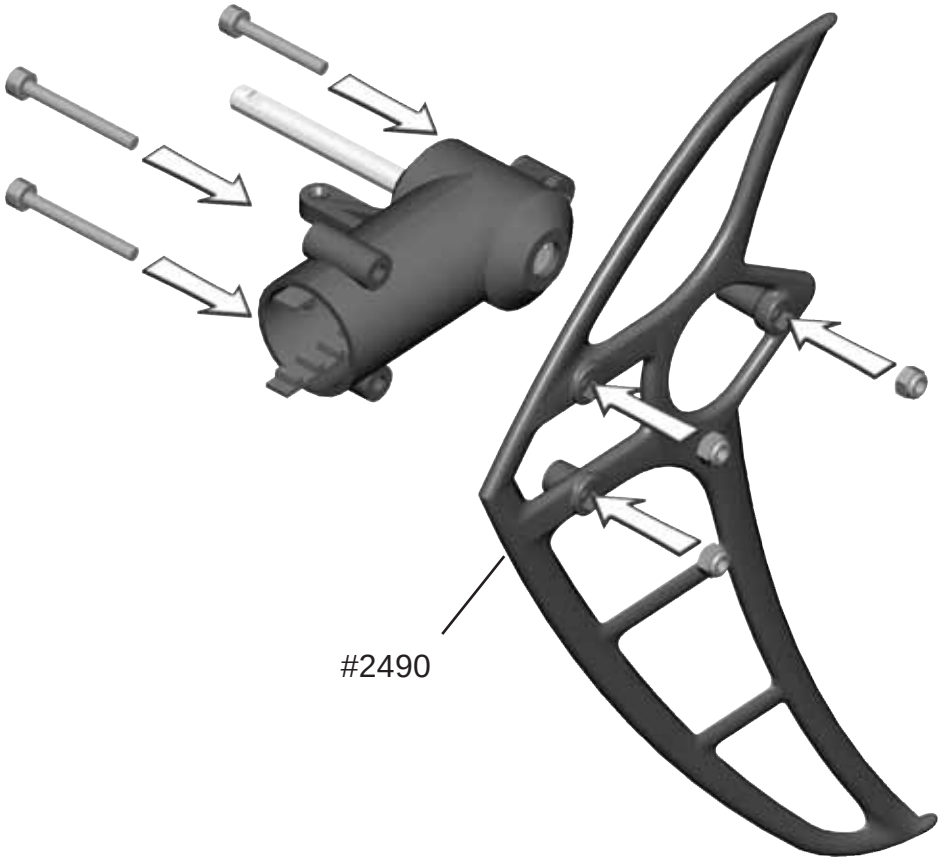
Should you have difficulty mounting the 2x8 mm pin, carefully tap it with a rubber hammer, or use a vice. The 5x10x4 bearings can also be mounted on the rotor shaft using a vice and tapping the shaft softly with a rubber hammer. If the tail rotor shaft shows axial play after closing the two halves of the tail rotor case, use one or two of the 5x10x0.1 washers which are included in the bag.



5.2 Vertical Fin

Bag 5

2x	M3x25	#1958
1x	M3x20	#1957
3x	M3	#2074



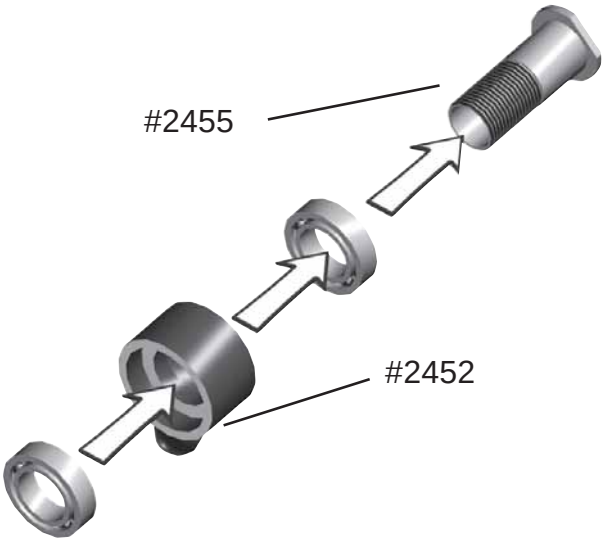
5.3 Pitch Slider

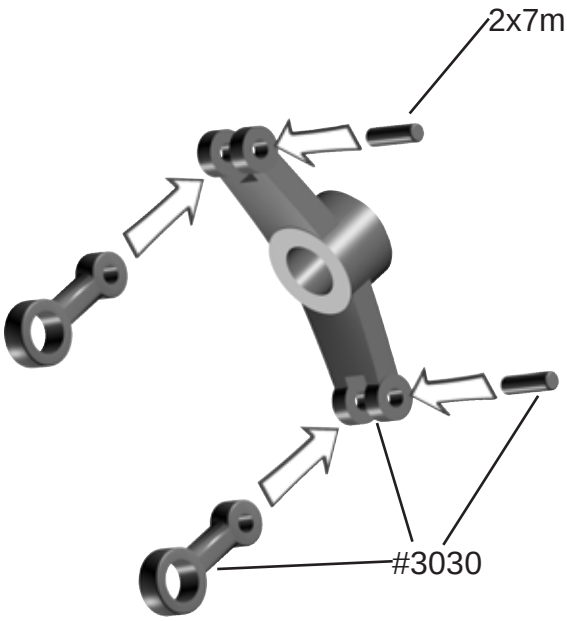
Bag 5 • Bag 10

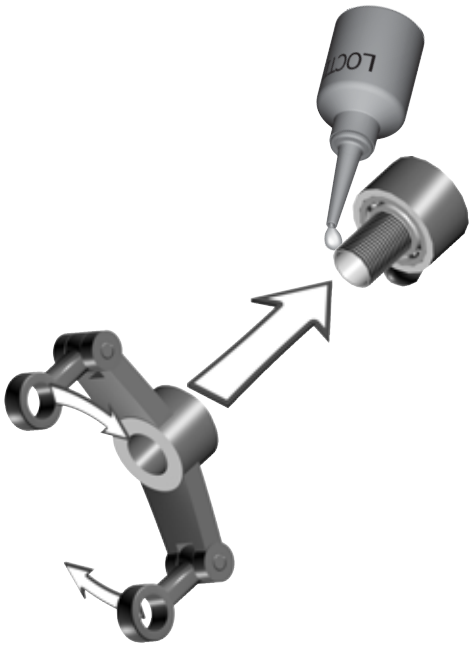
2x	6x10x2,5	#1440

It is important that the tail pitch plate #3030 is aligned properly on the control sleeve #2455. In the case of misalignment, the control sleeve may become deformed.

The mounted tail pitch plate should be able to move on the tail rotor shaft with little resistance.





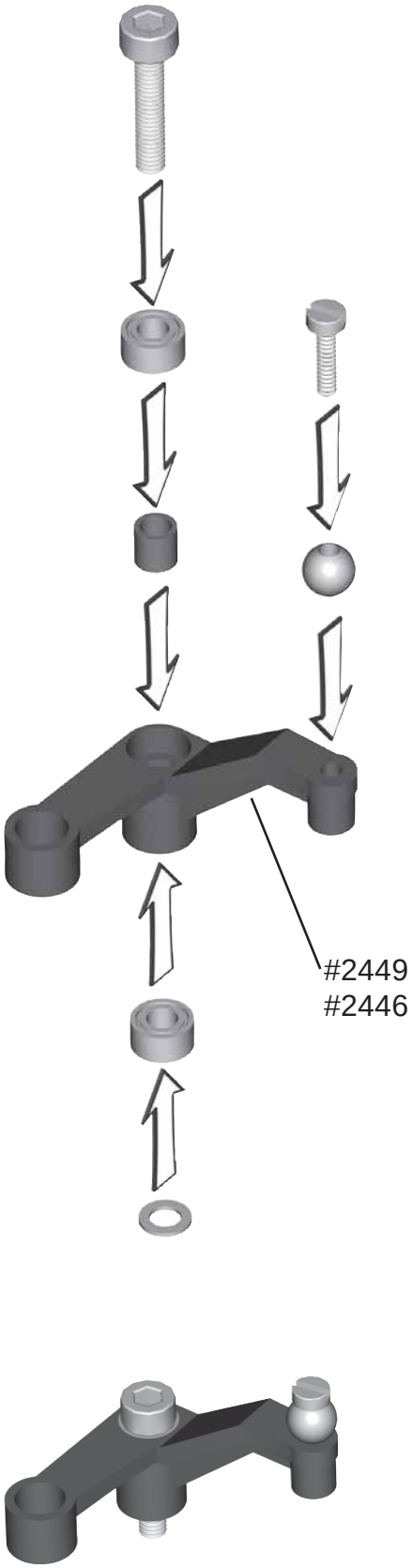


5.4 Tail Rotor Lever

Bag 5

2x	3x6x2,5	#2330
1x	M3x14	#1955
1x	M2x8	#1902
1x		#1570
1x	3x5x5	#2448
1x	3x5x0,5	#2002

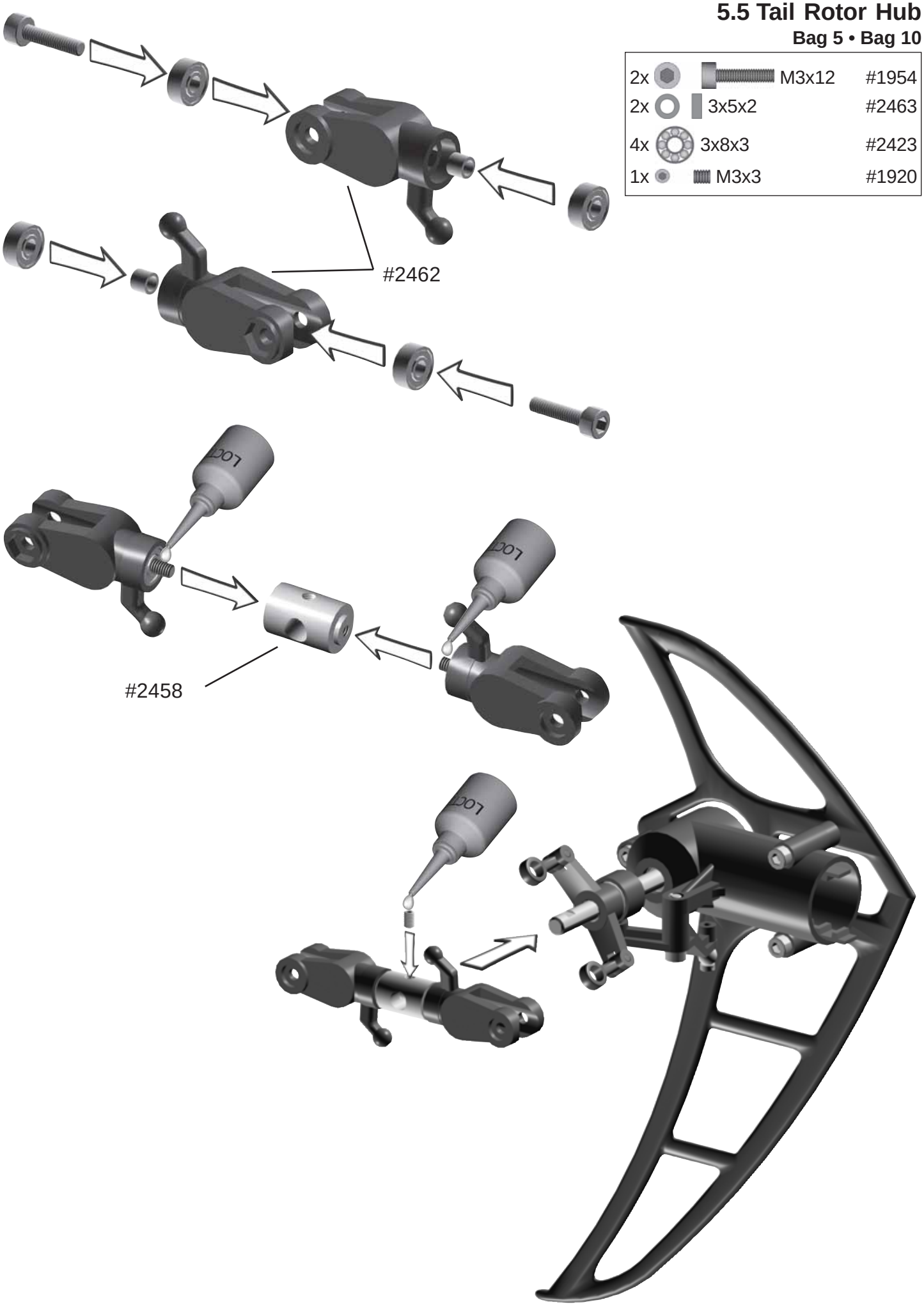
The mounted tail rotor lever should be able to move with little resistance.



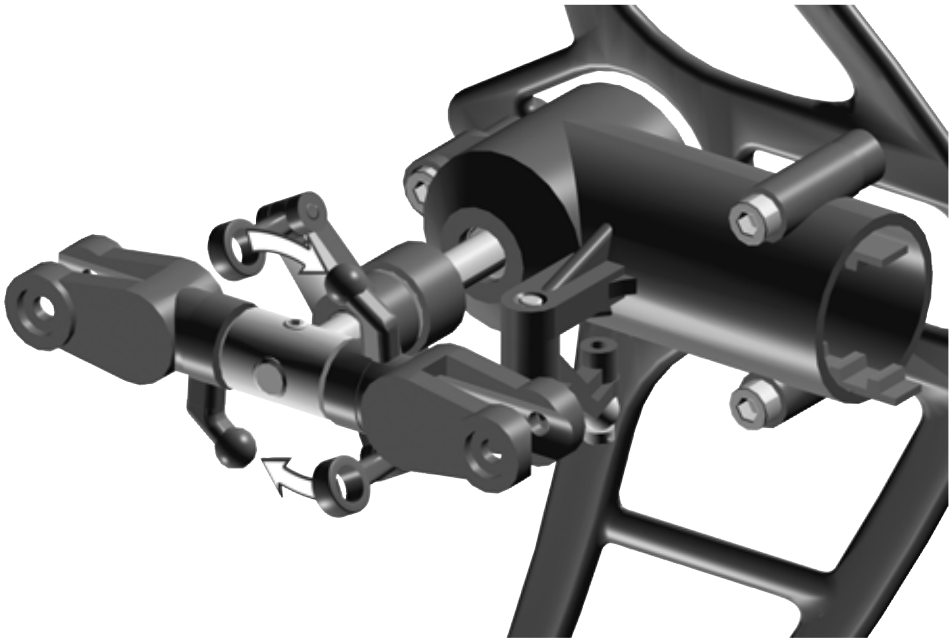
5.5 Tail Rotor Hub

Bag 5 • Bag 10

2x	M3x12	#1954
2x	3x5x2	#2463
4x	3x8x3	#2423
1x	M3x3	#1920



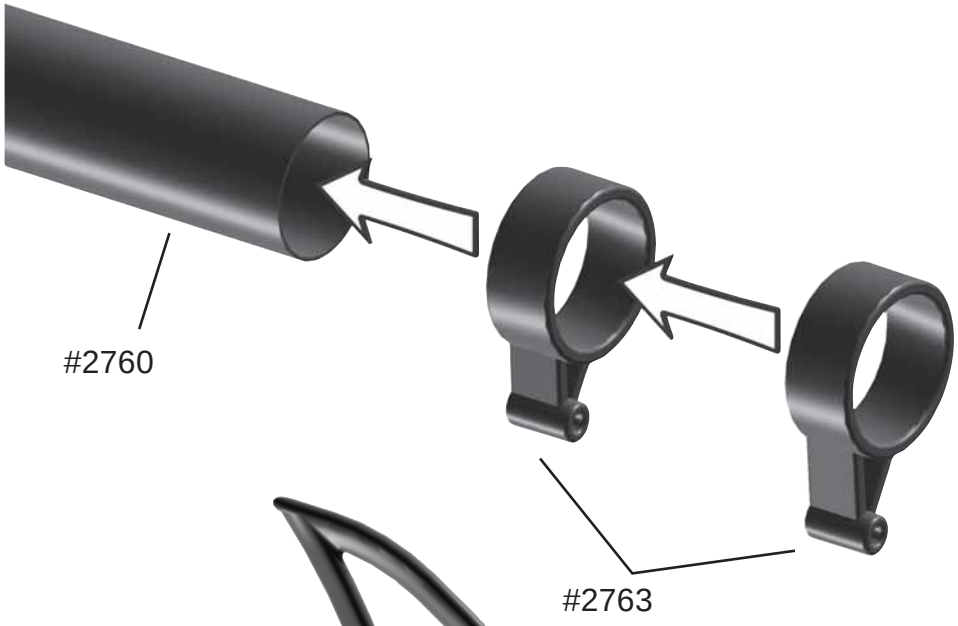
5.6 Final Assembly



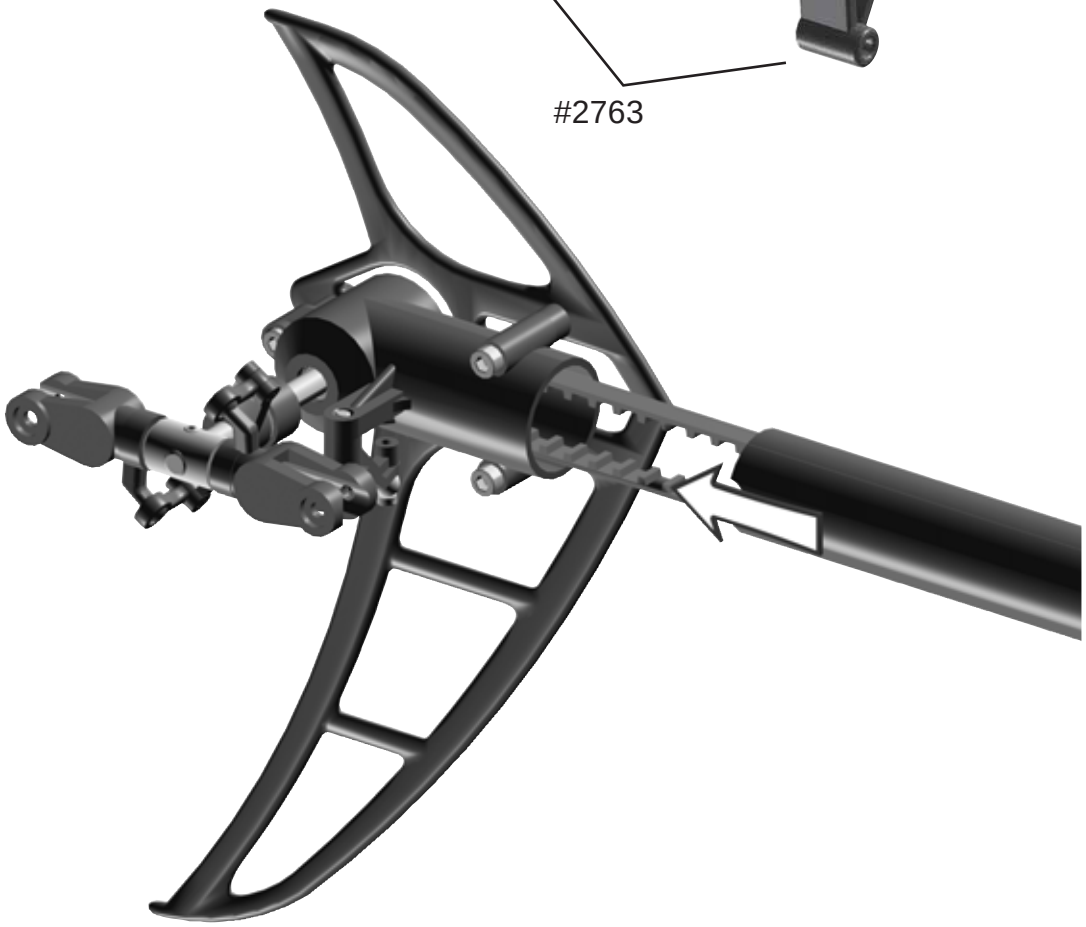
All movable parts of the tail rotor blade holders should be able to move with little resistance. When there is too much resistance, the tail rotor will not react to subtle input and the gyro's maximum sensitivity cannot be fully exploited.

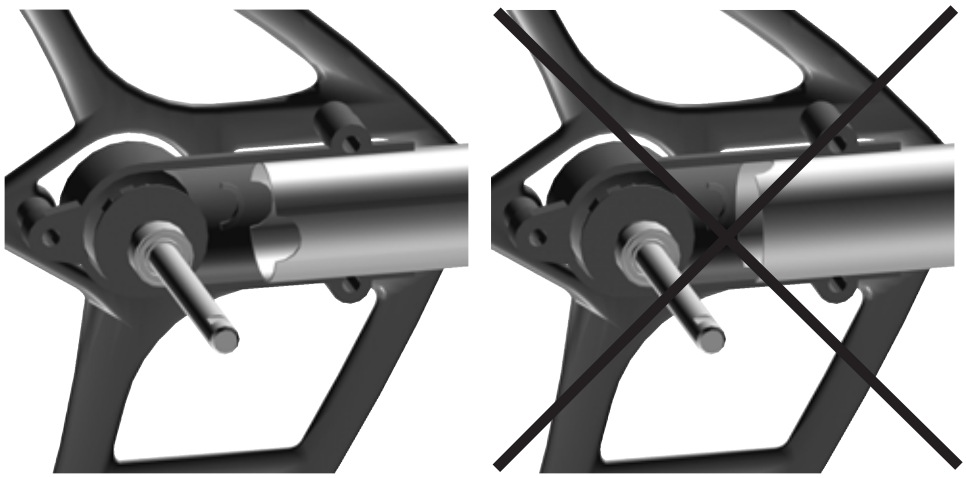
6.1 Tail Boom Assembly

Bag 6 • Bag 11



Note that the two tail rotor pushrod guides are different in height.

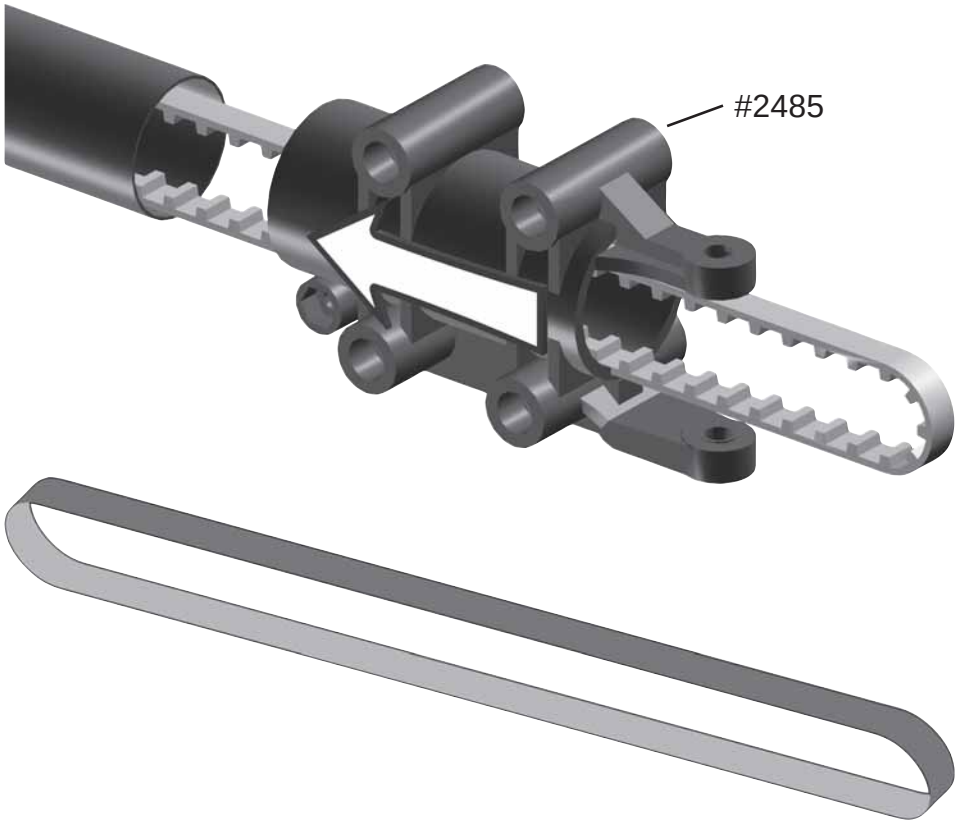


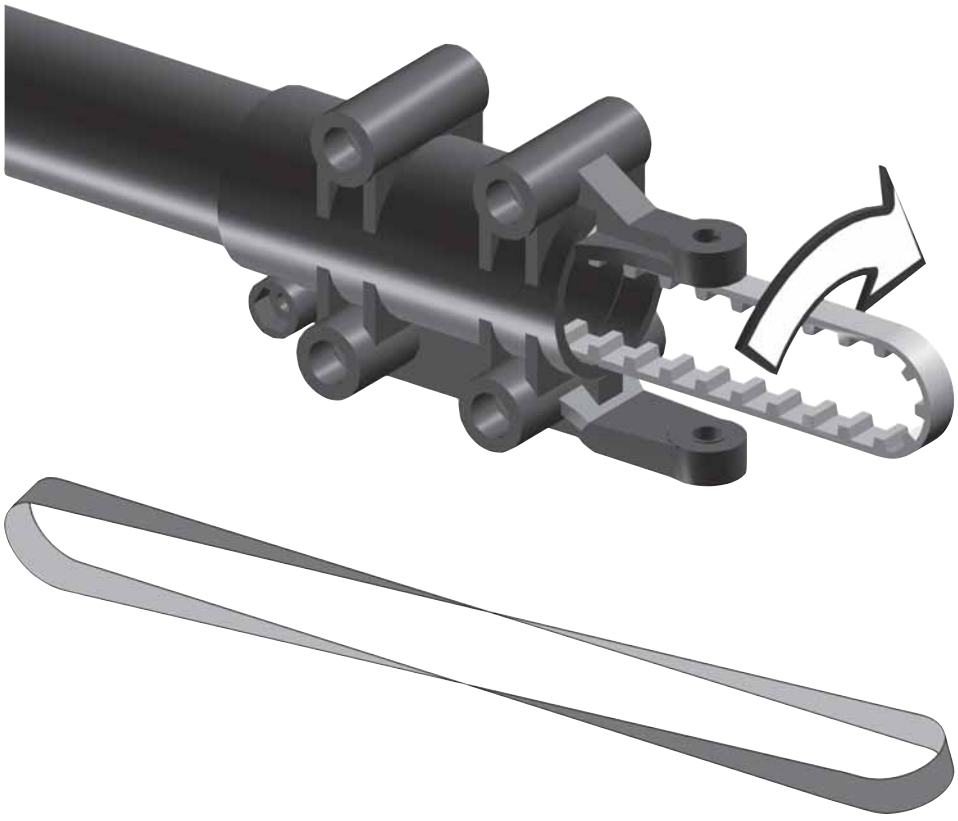


The tail boom has two round cut-outs on one end. These should be fitted into the matching shapes in the tail rotor case.

6.2 Tail Boom Holder

Bag 6



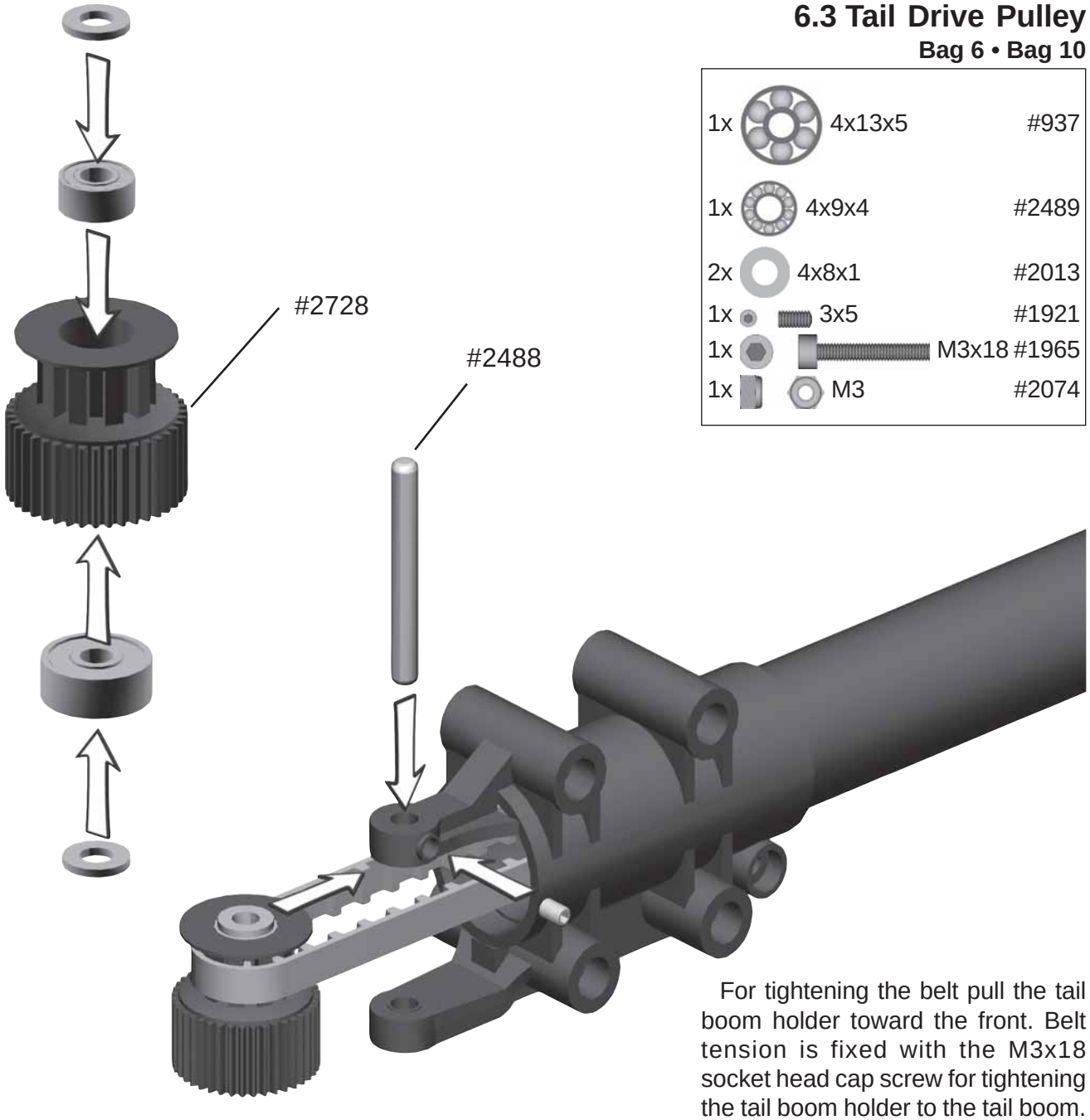


Turn the tail drive belt 90° degrees (clockwise).

6.3 Tail Drive Pulley

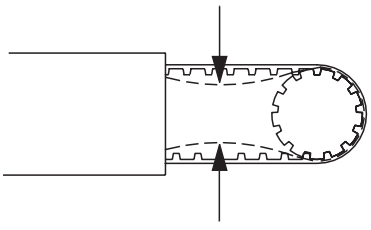
Bag 6 • Bag 10

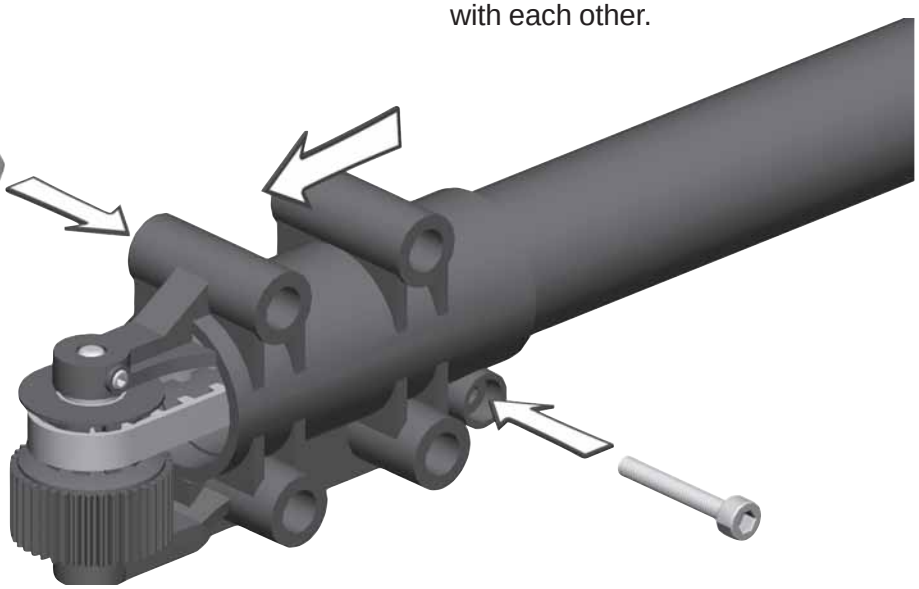
1x	4x13x5	#937
1x	4x9x4	#2489
2x	4x8x1	#2013
1x	3x5	#1921
1x	M3x18	#1965
1x	M3	#2074



For tightening the belt pull the tail boom holder toward the front. Belt tension is fixed with the M3x18 socket head cap screw for tightening the tail boom holder to the tail boom. The belt should be tight. When pressing with your fingers, both sides of the belt should not come in contact with each other.

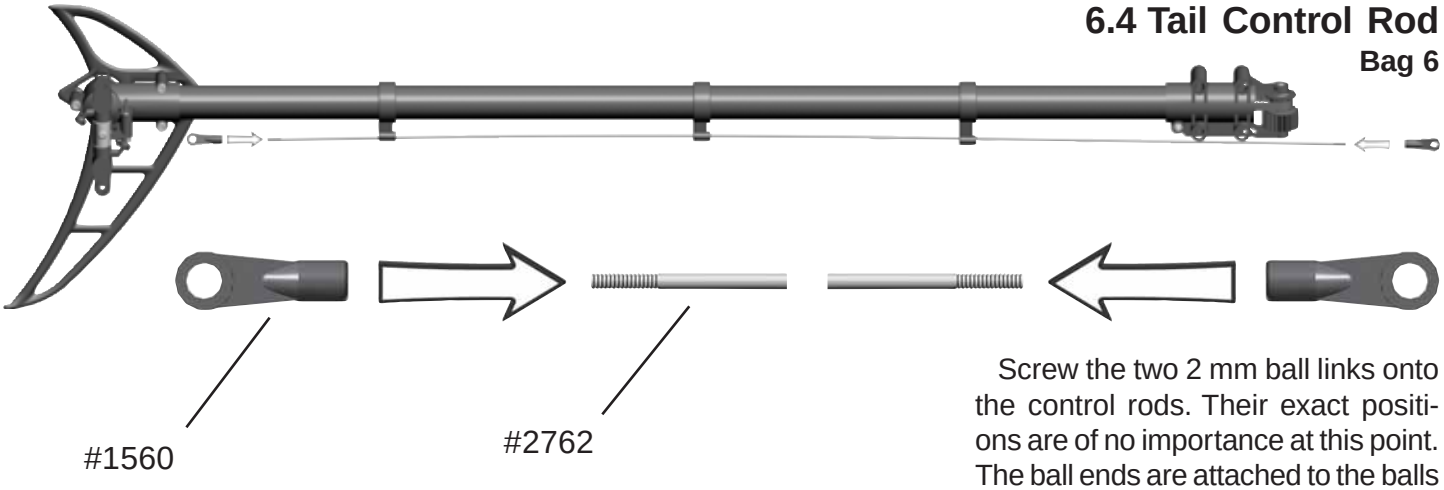
Important: Check belt tension prior to every flight. Incorrect belt tension can cause disturbances for your model R/C system. Incorrect belt tension can lead to a situation where you lose control of the tail rotor of your helicopter.





6.4 Tail Control Rod

Bag 6

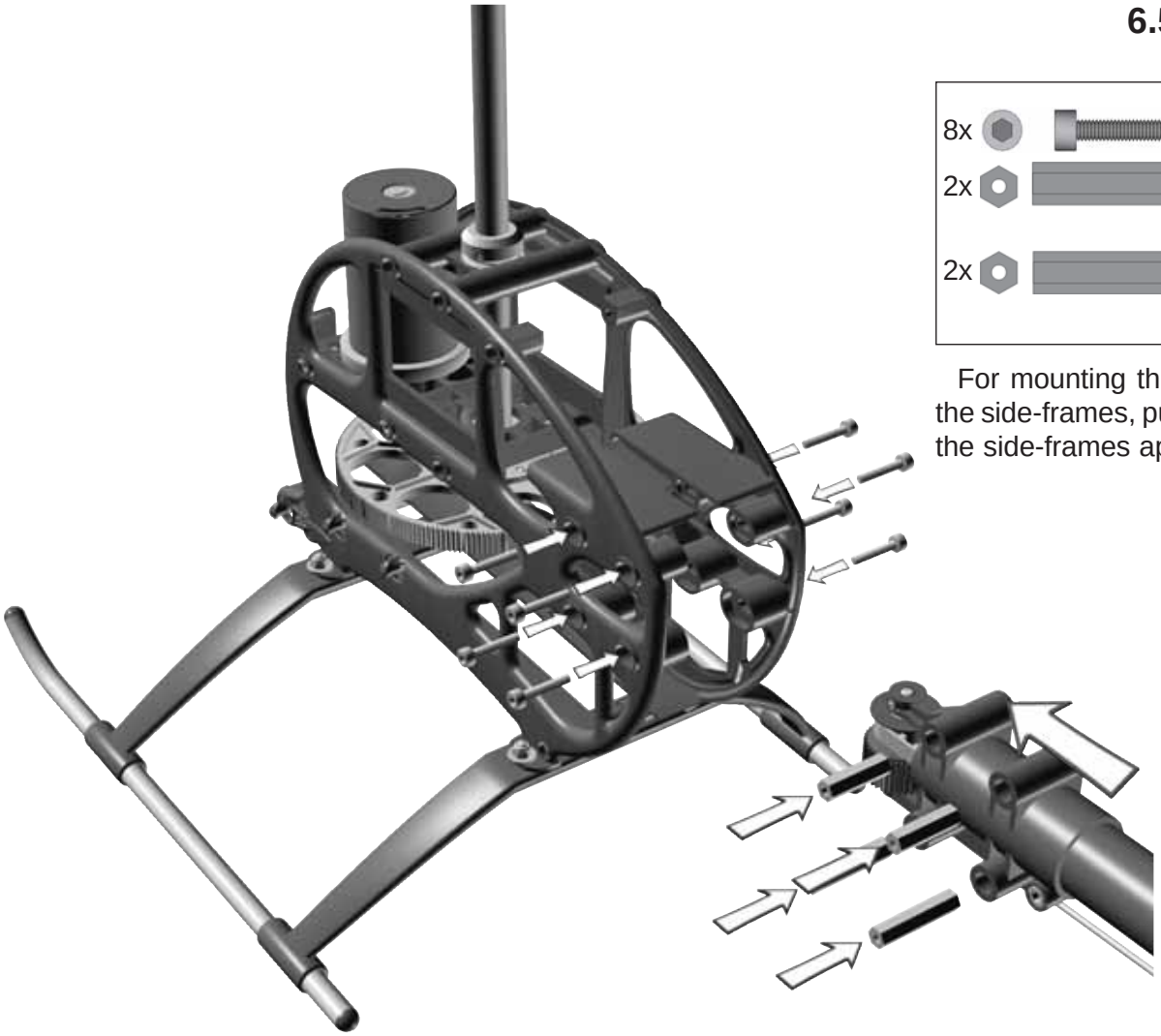


Screw the two 2 mm ball links onto the control rods. Their exact positions are of no importance at this point. The ball ends are attached to the balls more easily when the text on them is pointed away from the helicopter.

6.5 Installation

Bag 6

8x	M3 x12	#1954
2x	27,5 mm	#2370
2x	23 mm	#2370

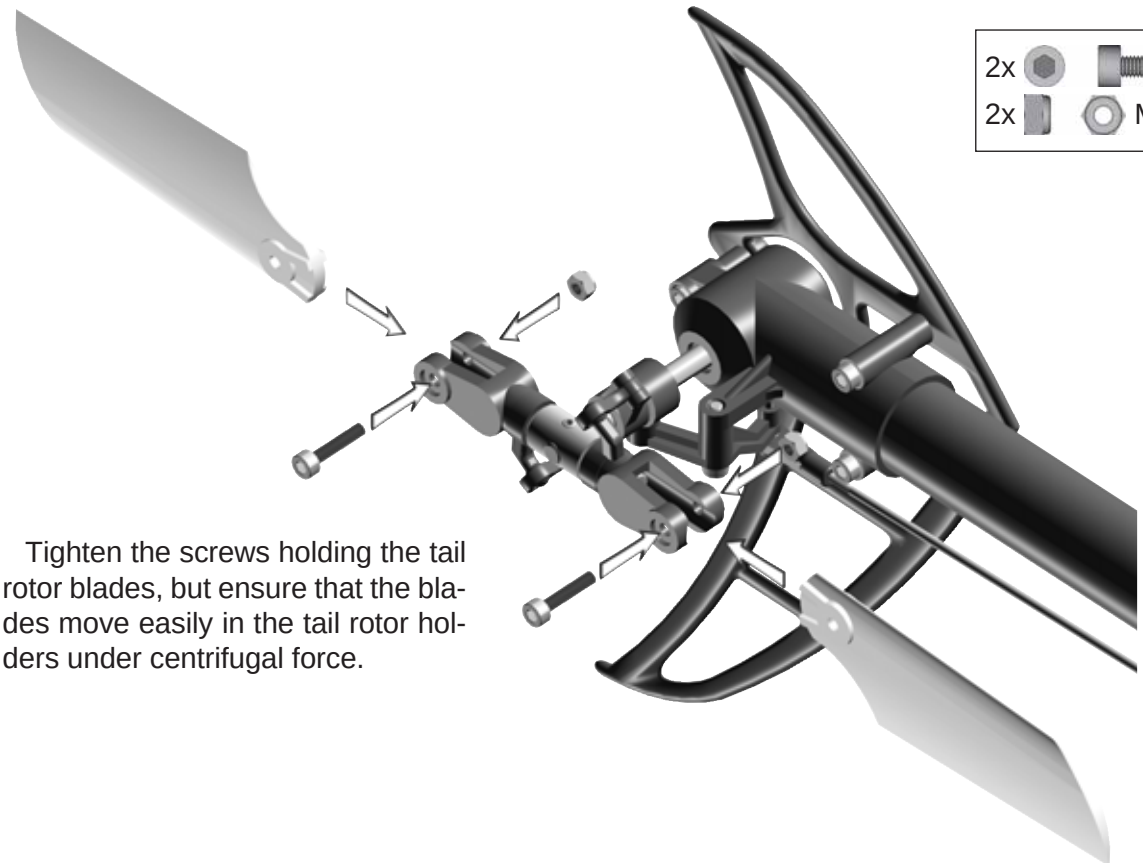


For mounting the tail assembly in the side-frames, pull the rear ends of the side-frames apart.

6.6 Tail Rotor Blades

Bag 5

2x	M3x14	#1955
2x	M3	#2074

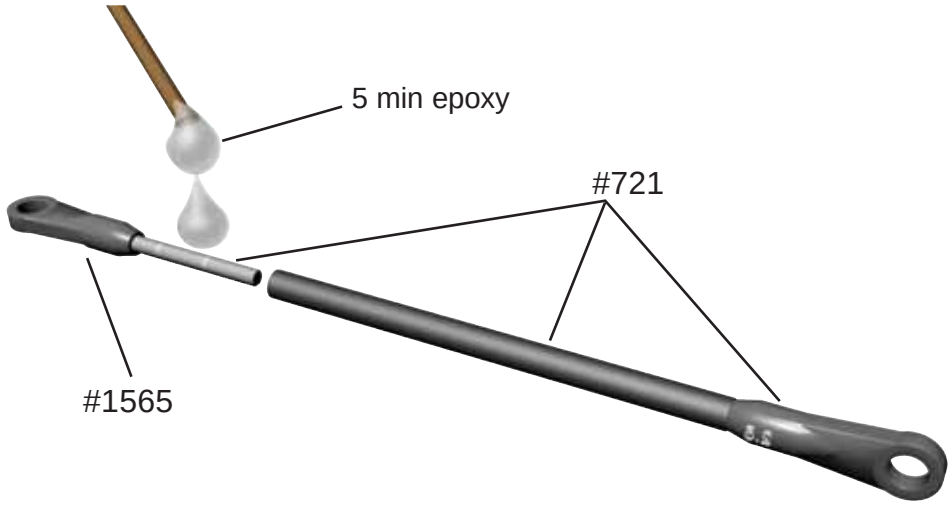


Tighten the screws holding the tail rotor blades, but ensure that the blades move easily in the tail rotor holders under centrifugal force.

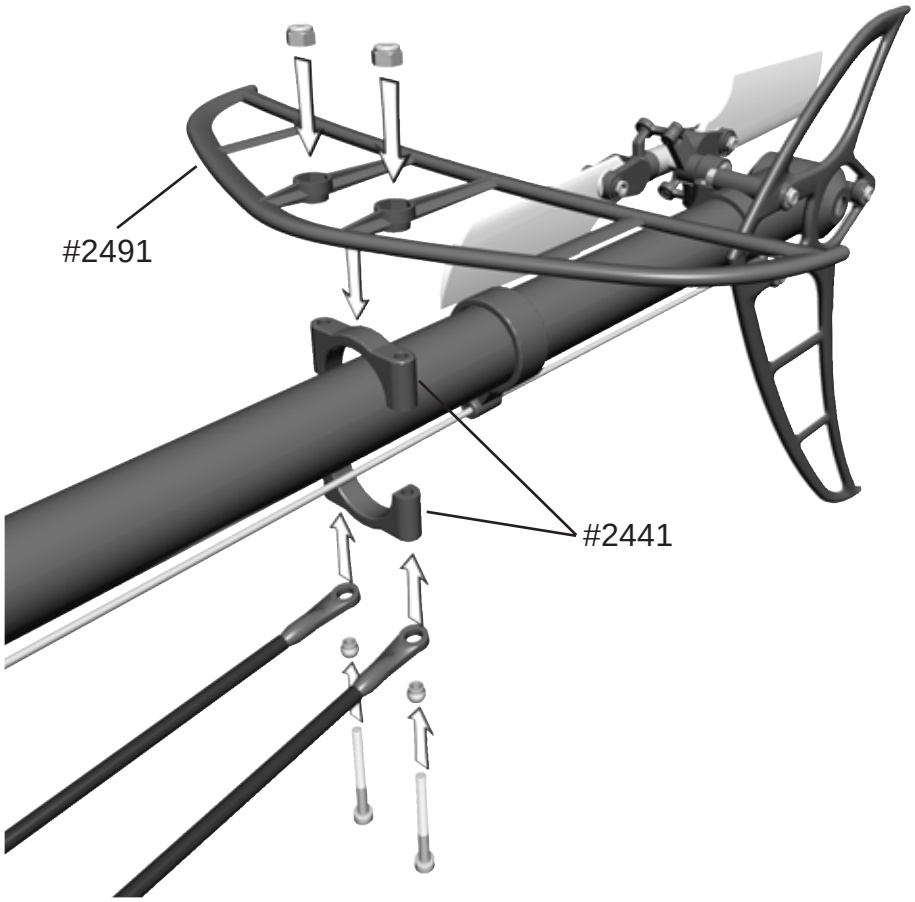
6.7 Tail Boom Brace

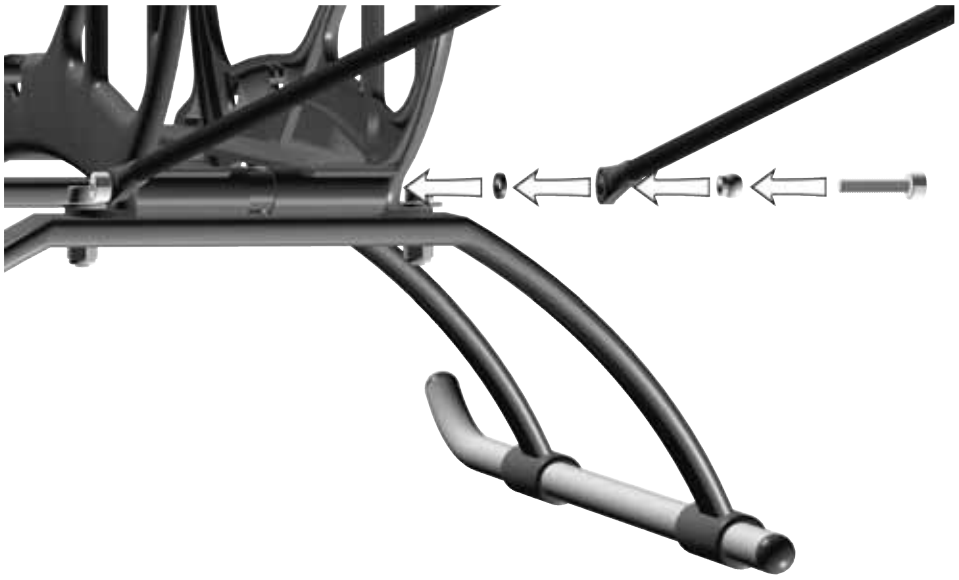
Bag 1 • Bag 6 • Bag 9

2x	M3x30	#1962
2x	M3	#2074
4x	4,8 mm	#1574
4x	M2,5x30	#2770
2x	M3x20	#1957
2x	3x5x2	#2463

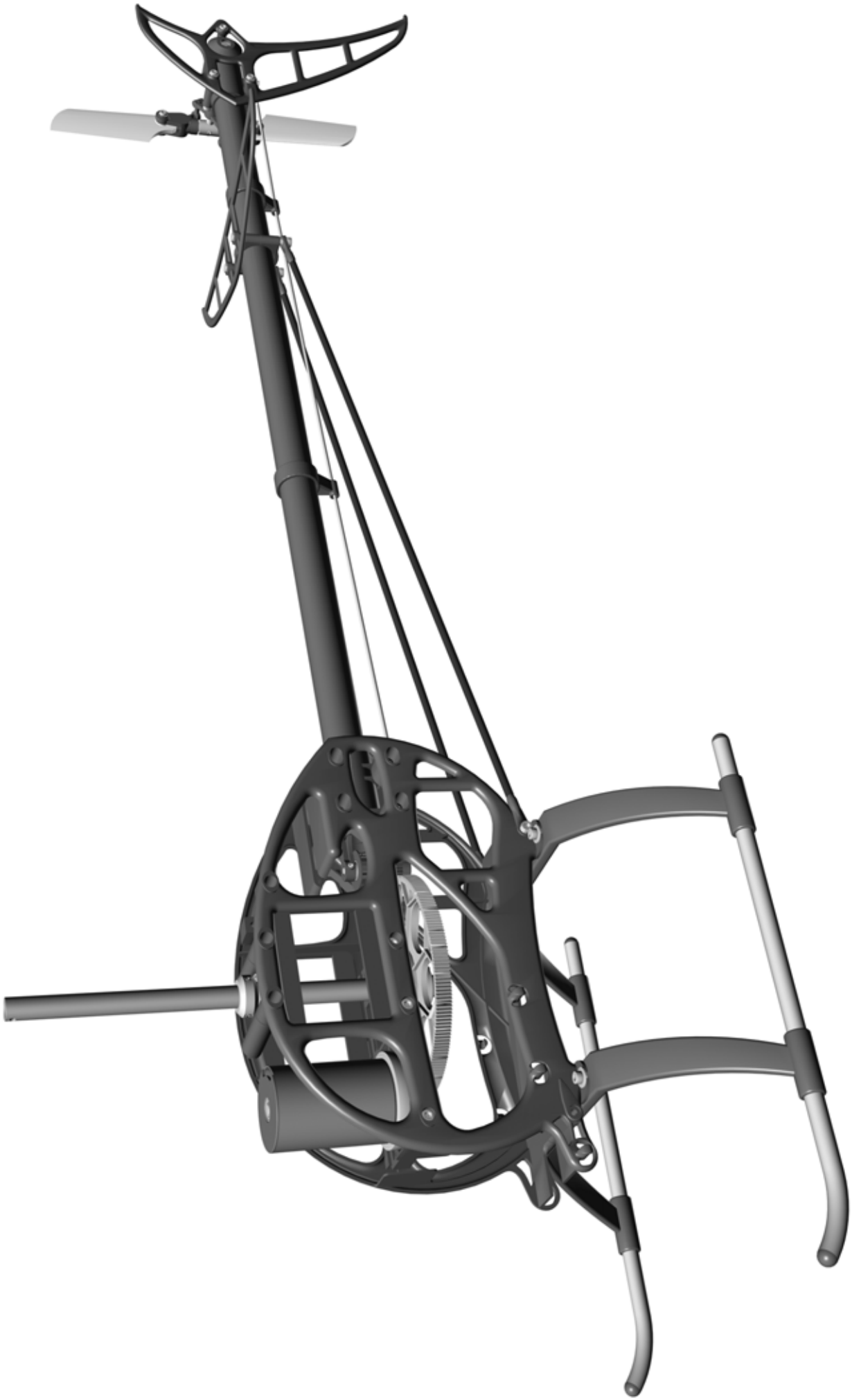


The ball links should be screwed onto the control rod such that one is turned at 90 degrees with respect to the other.





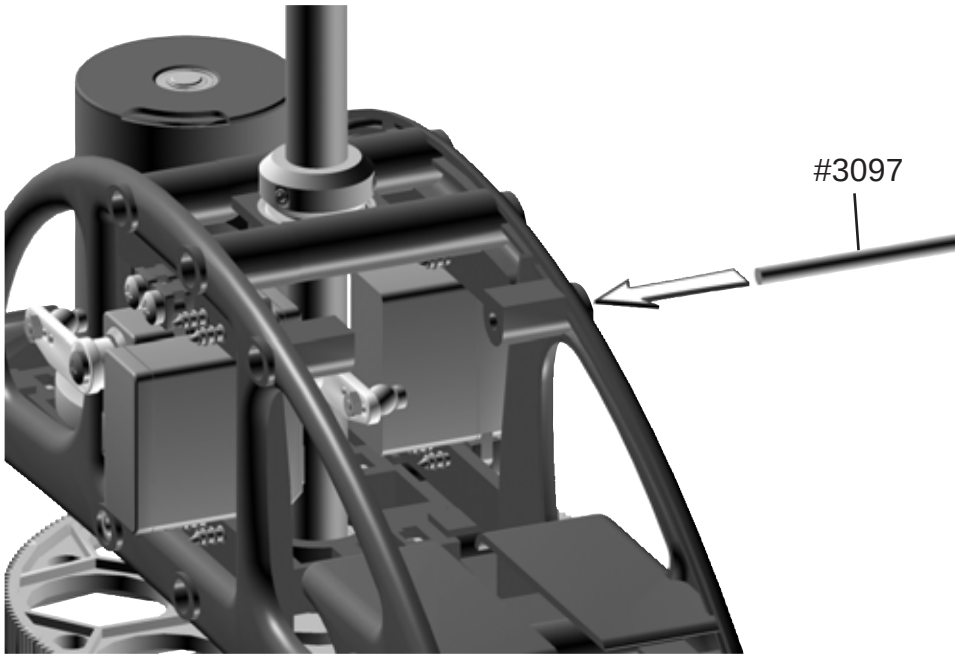
7 Finished Main Frame & Tail Boom



8.1 Mounting

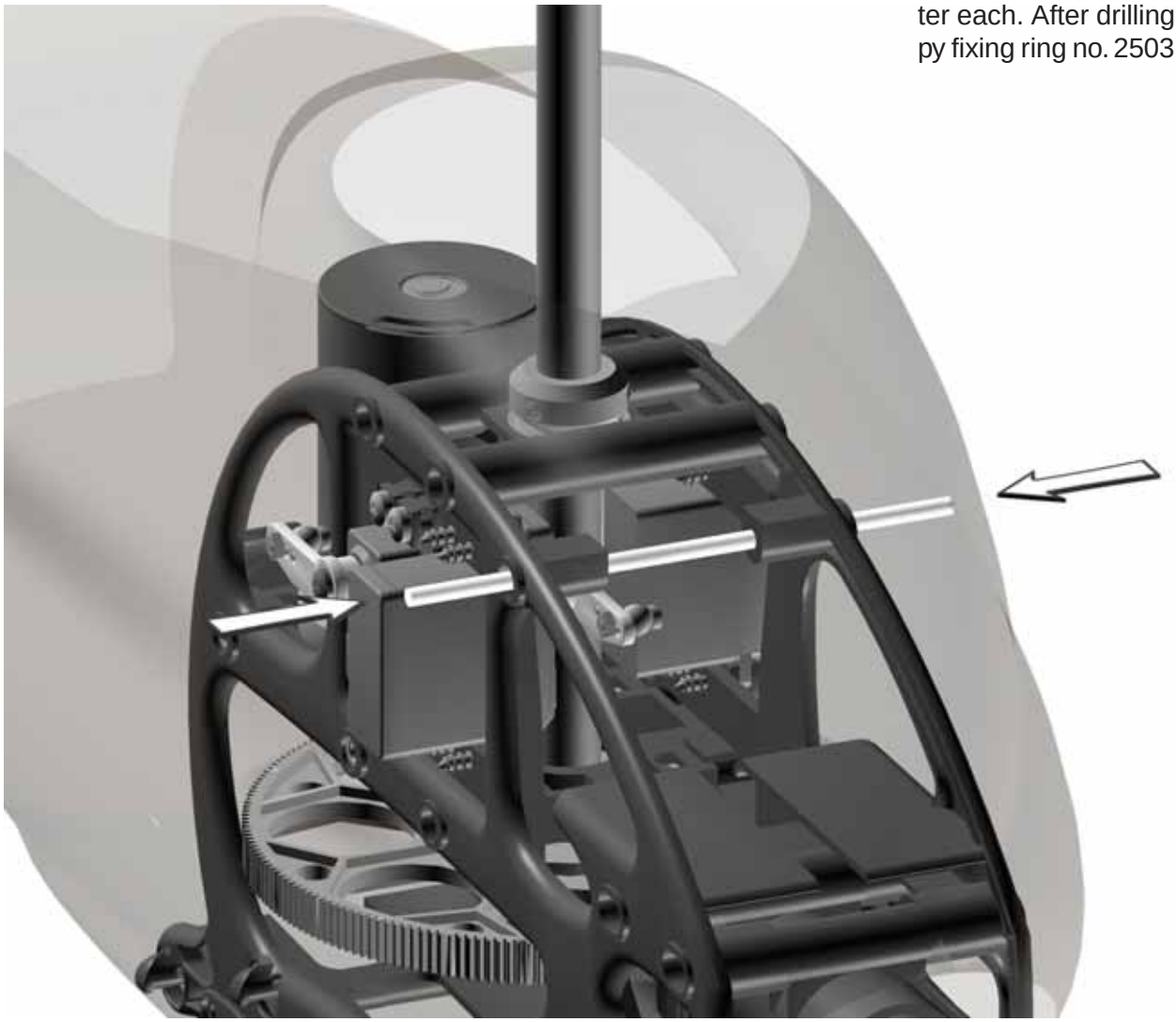
Bag 1

2x	4x11x5mm	#2503



The canopy does not yet have any holes for attaching it to the helicopter. In order to fit the canopy properly to your model, please proceed as follows: First, use rod no. 743 for marking where the holes will be cut out. Push the rod through the mainframe, as shown in the picture. Then position the canopy exactly like you want it to be attached to your helicopter. The lower end of the canopy will almost touch the tail boom. Close the canopy with tape, letting the two halves overlap slightly.

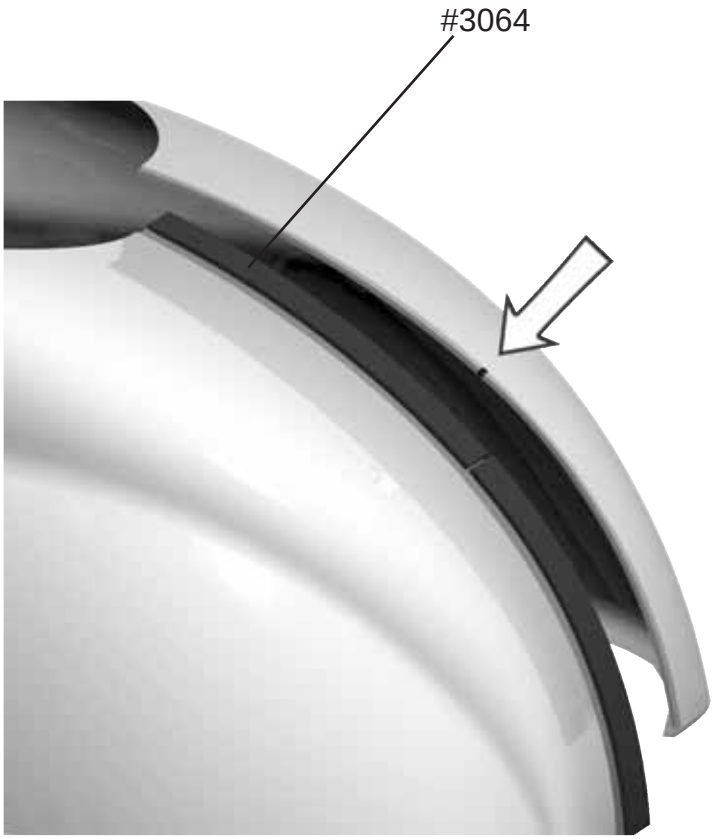
Now apply light pressure to the canopy in the area of the two ends of the rod. In this way you will obtain round marks just where you need to drill the holes for attaching the canopy. Drill two holes with 8mm diameter each. After drilling, place a canopy fixing ring no. 2503 into each hole.



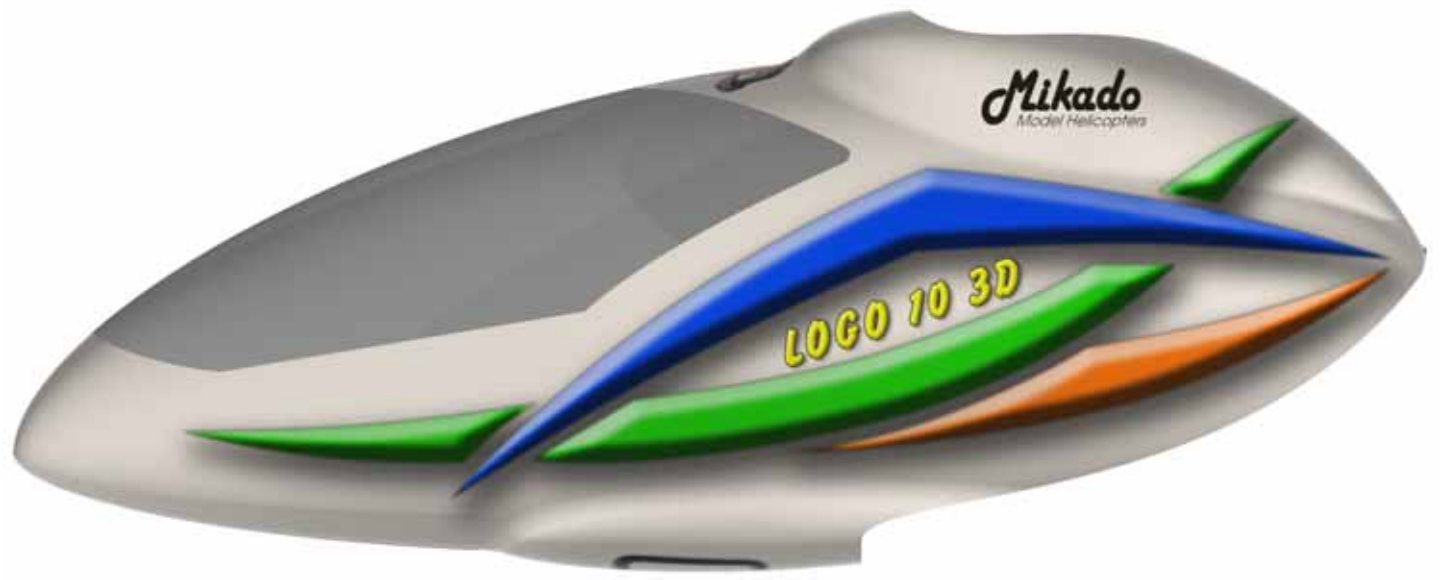
8.1 Mounting

Bag 1

For closing the backs of the canopy properly, attach the velcro tape to the overlapping area.



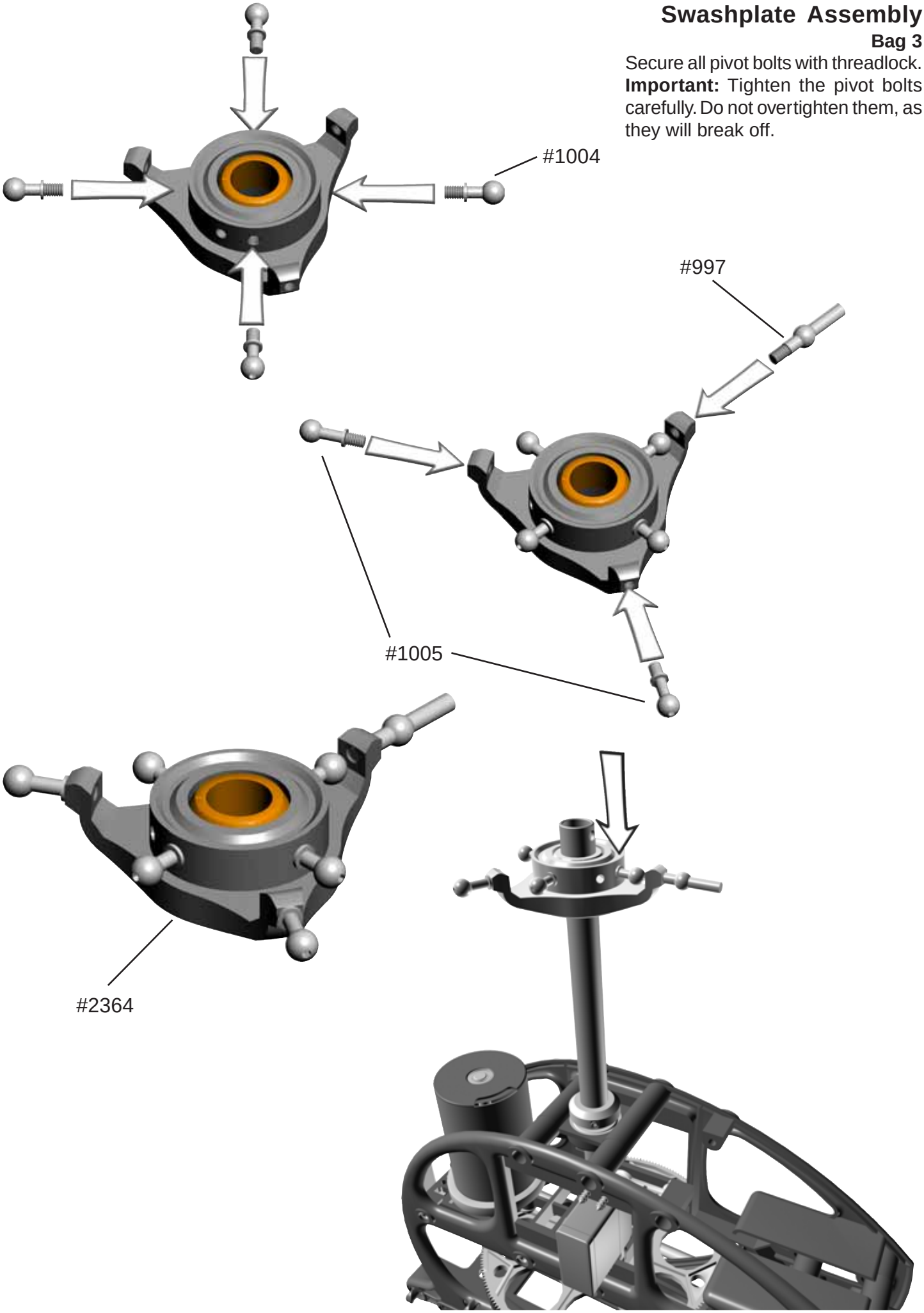
8.2 Decals



Swashplate Assembly

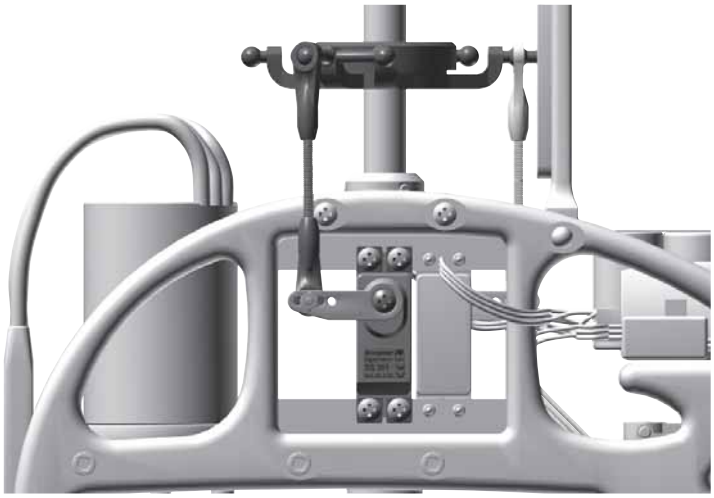
Bag 3

Secure all pivot bolts with threadlock.
Important: Tighten the pivot bolts carefully. Do not overtighten them, as they will break off.

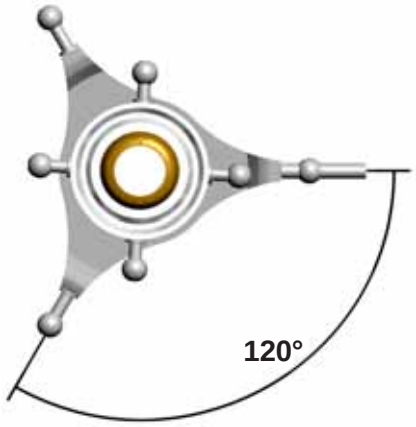


10 Preparation for Servo Installation

10.1 120° CCPM



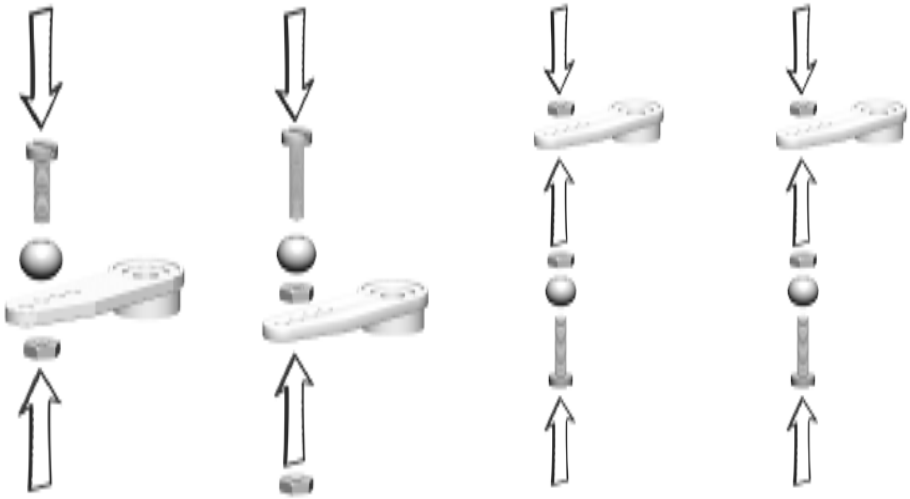
The swashplate in the LOGO 10 3D is designed to be operated by three servos. The transmitter provides for electronic mixing.



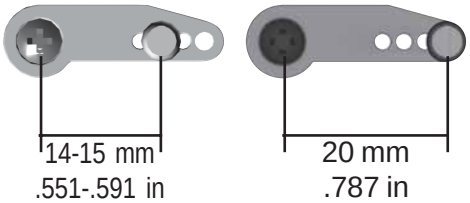
10.2 Servo Arms

Bag 1

1x	M2x8	#1902
3x	M2x10	#1903
7x	M2	#2070
4x	4,8	#1570



Rudder Servo | Elevator Servo | Aileron Servo | Aileron Servo



10.3 Servo Centering

Connect the servo wires to the receiver and set all channels in your transmitter to neutral. Now attach the servo arms perpendicular to the servos.

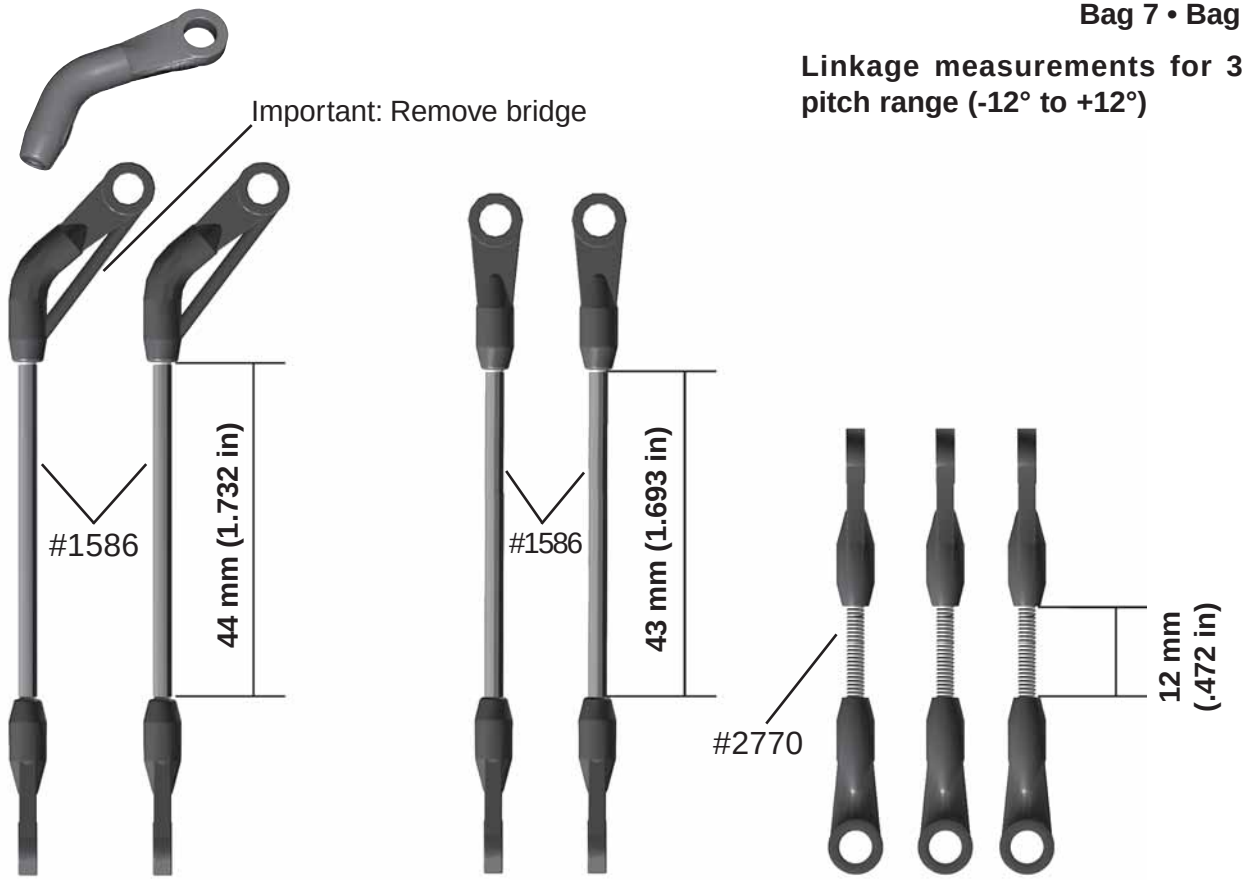
Rudder Servo | Elevator Servo | Aileron Servo left | Aileron Servo right

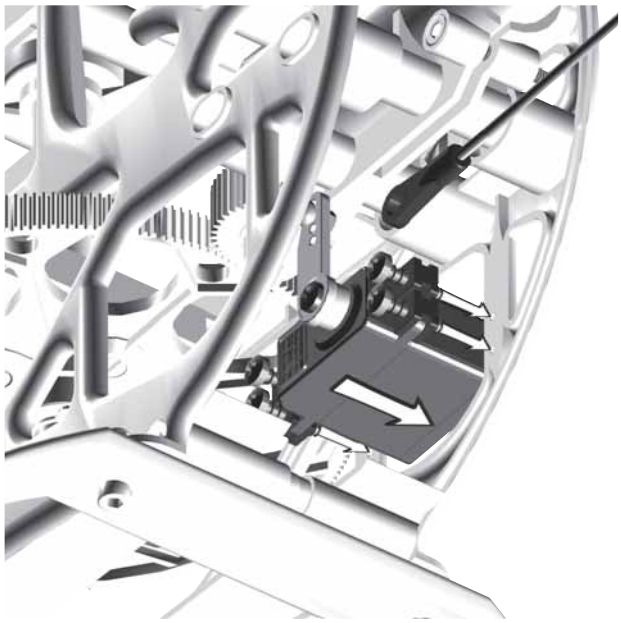
120° CCPM

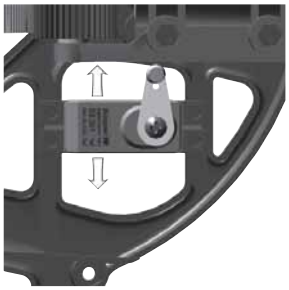
10.4 Linkage

Bag 7 • Bag 9

Linkage measurements for 3D pitch range (-12° to +12°)





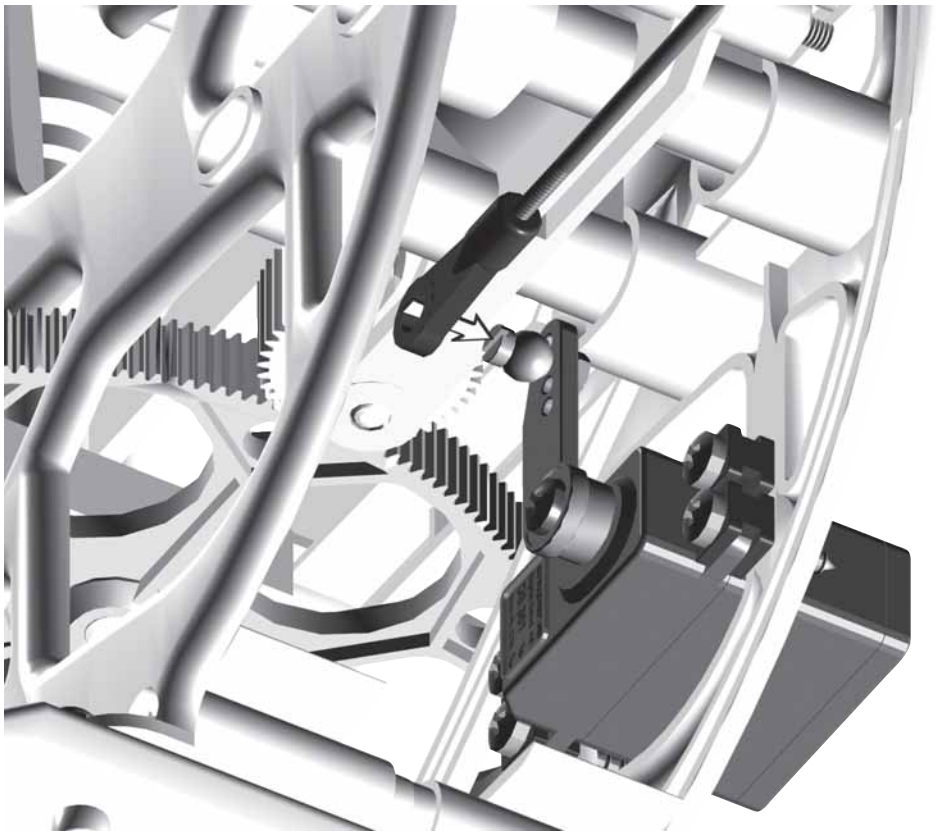


11 .1 Tail Rotor Servo

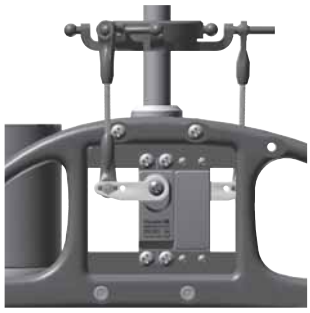
With LOGO 10 side-frames you can use two different sizes of tail rotor servos. A larger standard-size tail rotor servo can be mounted to the left side-frame, a smaller mini servo is mounted to right side-frame.

For determining the appropriate position for mounting the tail rotor servo, place the servo against the chassis and mark the holes for attachment with a pen or needle. Then drill where you have made the markings. The ball links are attached more easily when the text on them are pointed away from the helicopter.

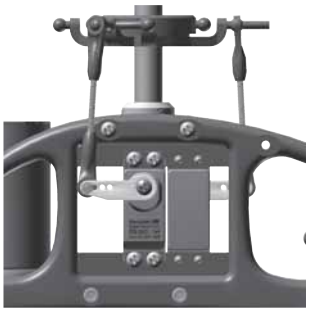
Servo mounting at tail boom
(not included in the kit)



Swashplate servo installation



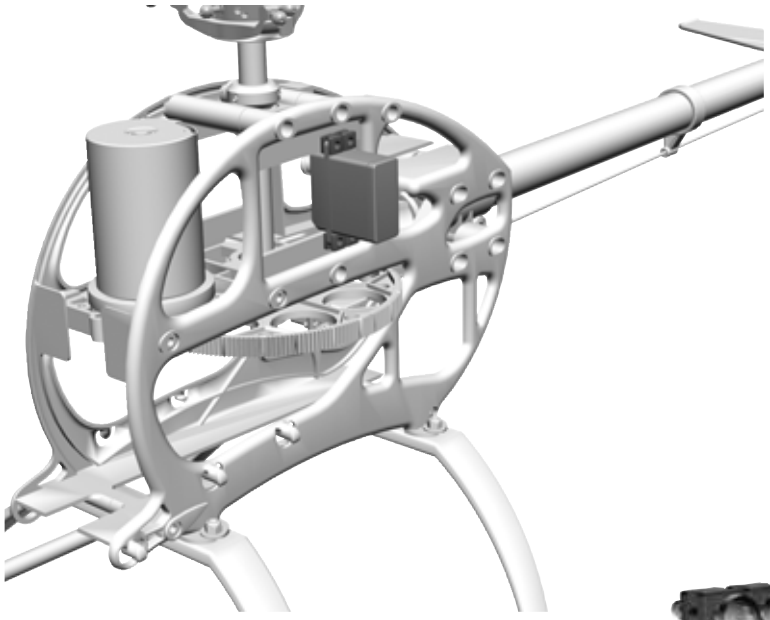
When microservos are used, the linikages should be aligned as close as possible to vertical.



When using larger servos the linkages should be aligned as close as possible to vertical or have the same angle.

Incorrect!

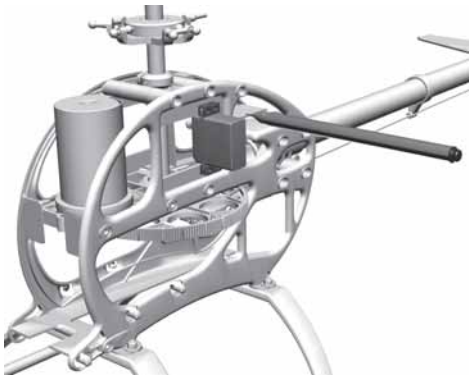
Incorrect!

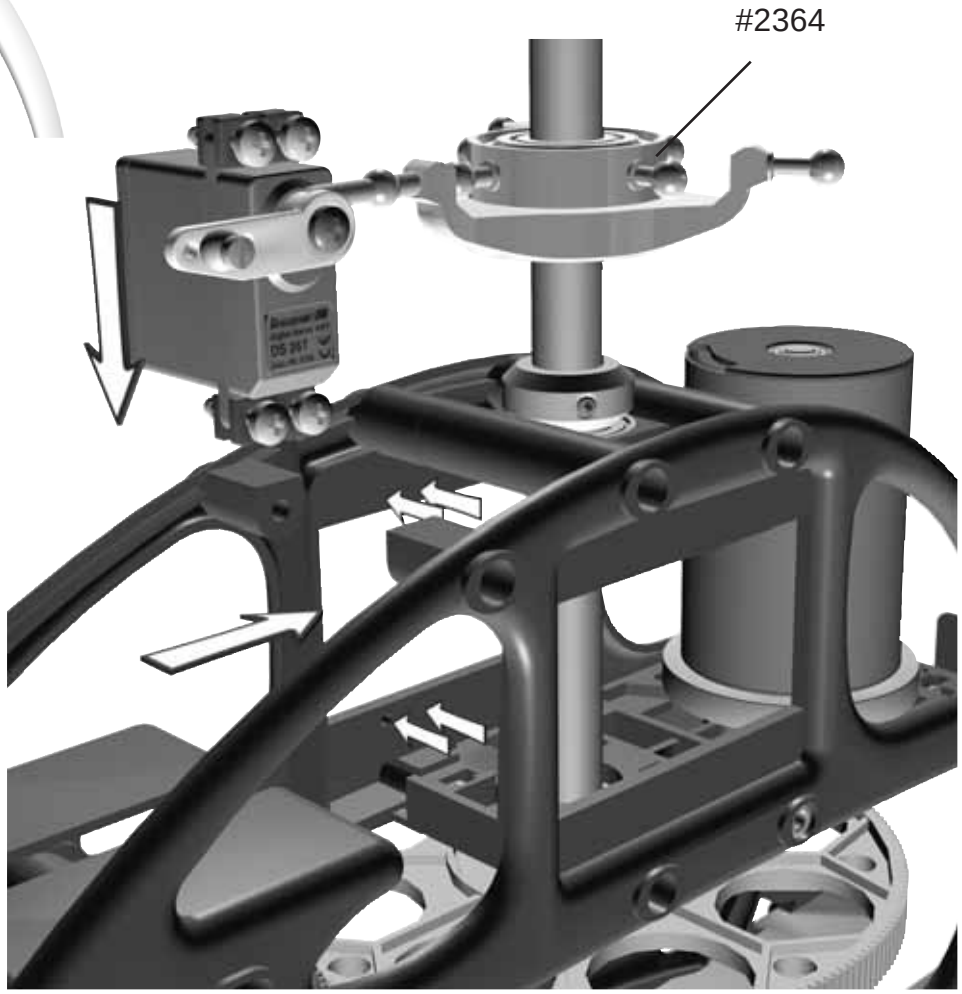


11.2 Elevator Servo

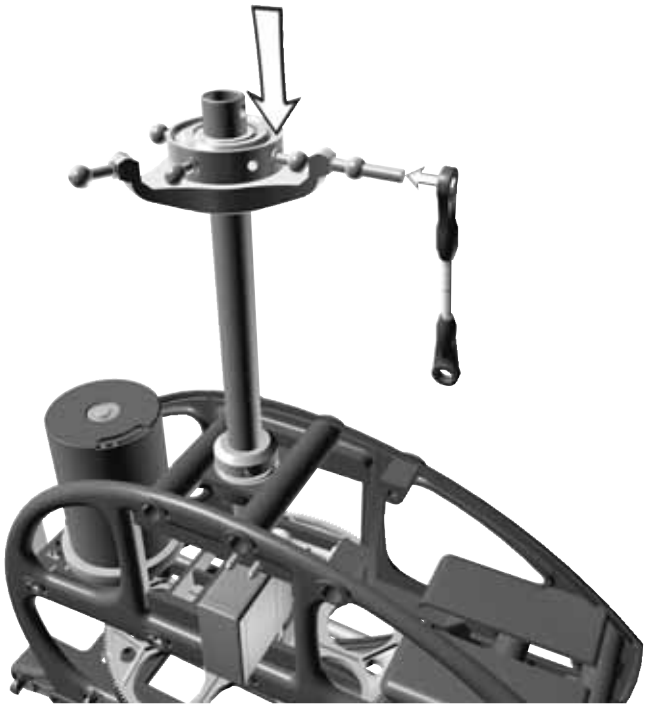
Bag 3

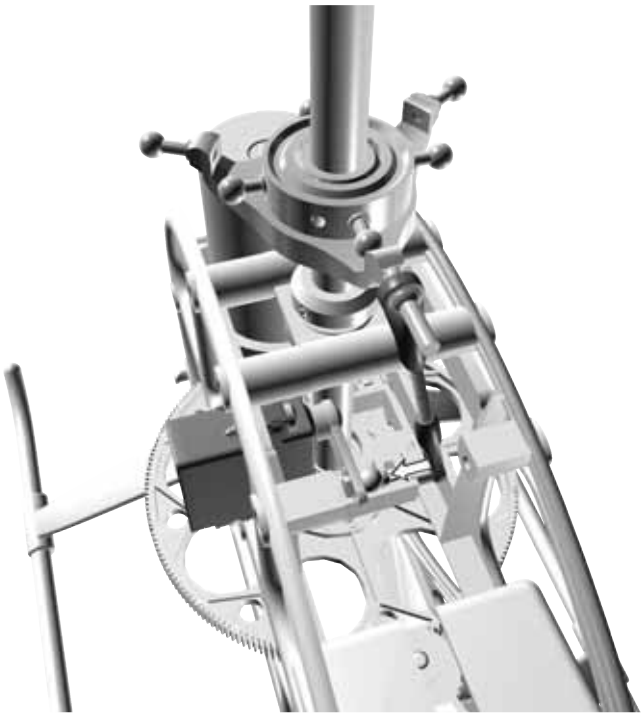
For determining the best position for the elevator servo, place the servo against the chassis and mark the attachment holes with a pen or needle. Then drill where you have made the markings.





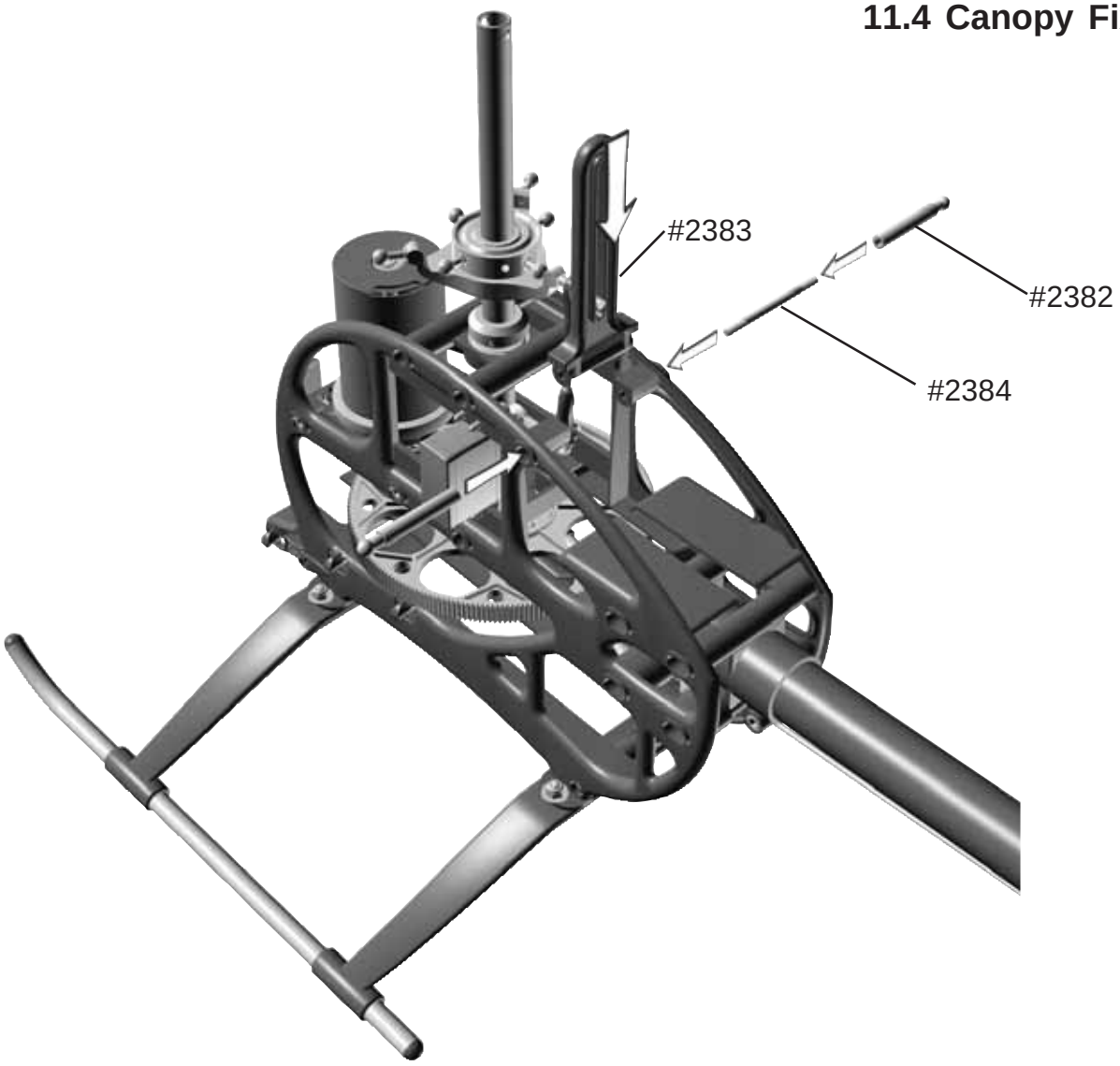
11.3 Elevator Linkage/Swashplate



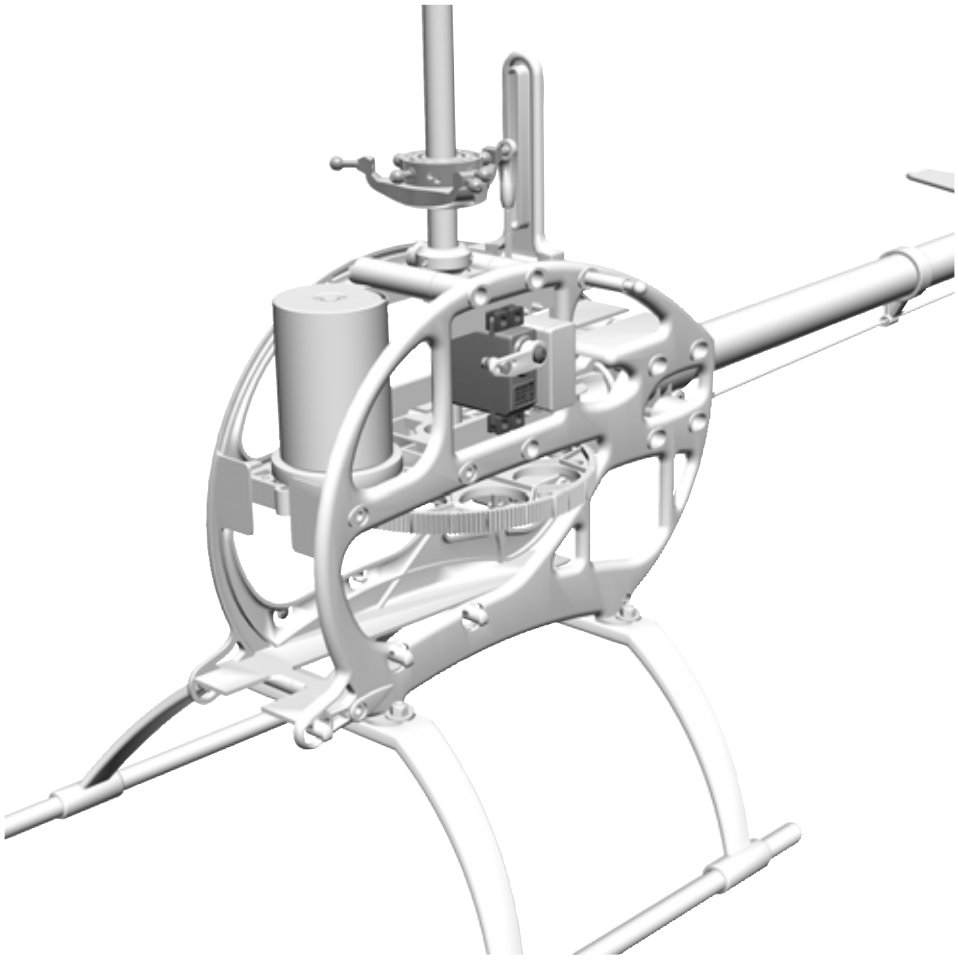


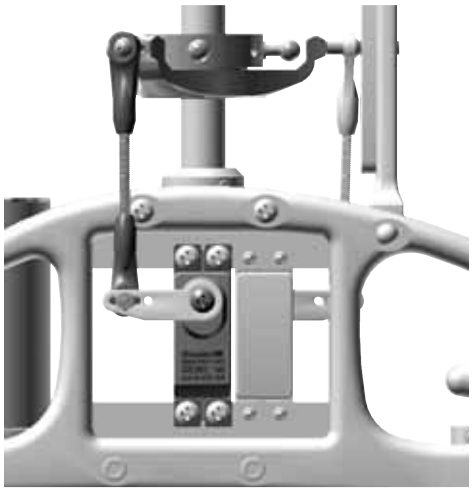
11.4 Canopy Fixing Bolts

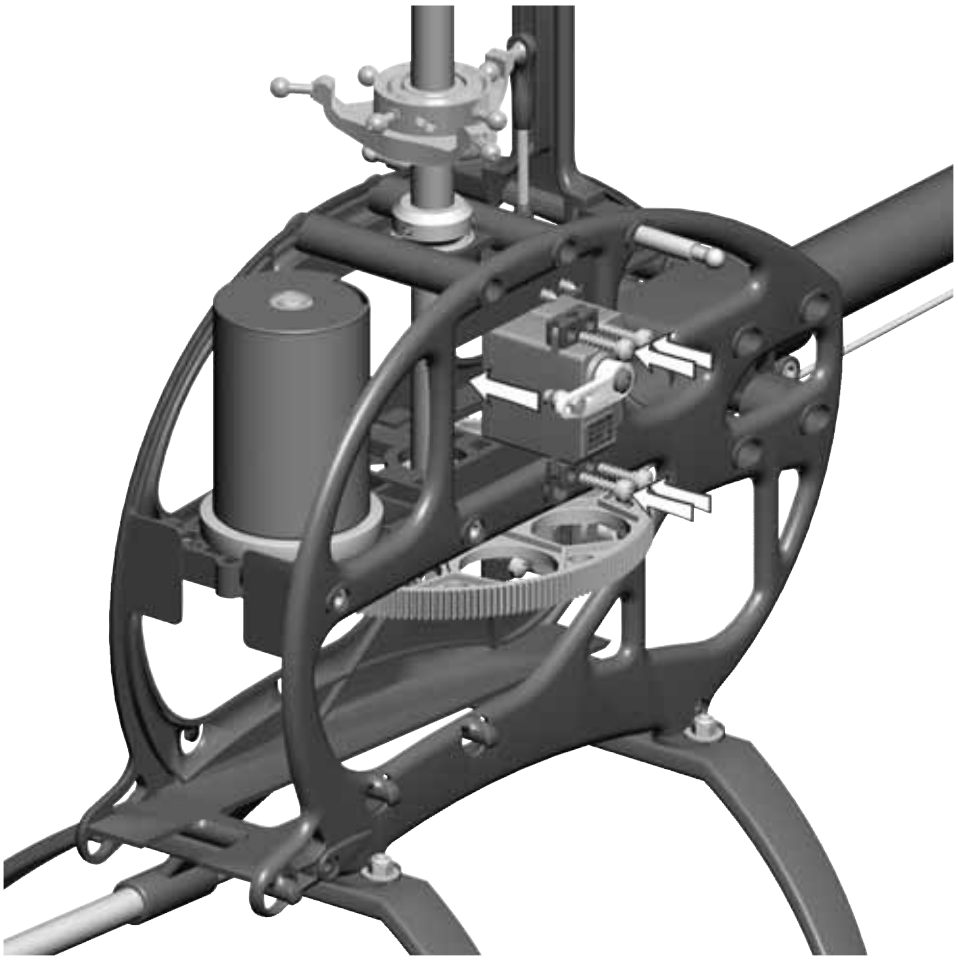
Bag 1



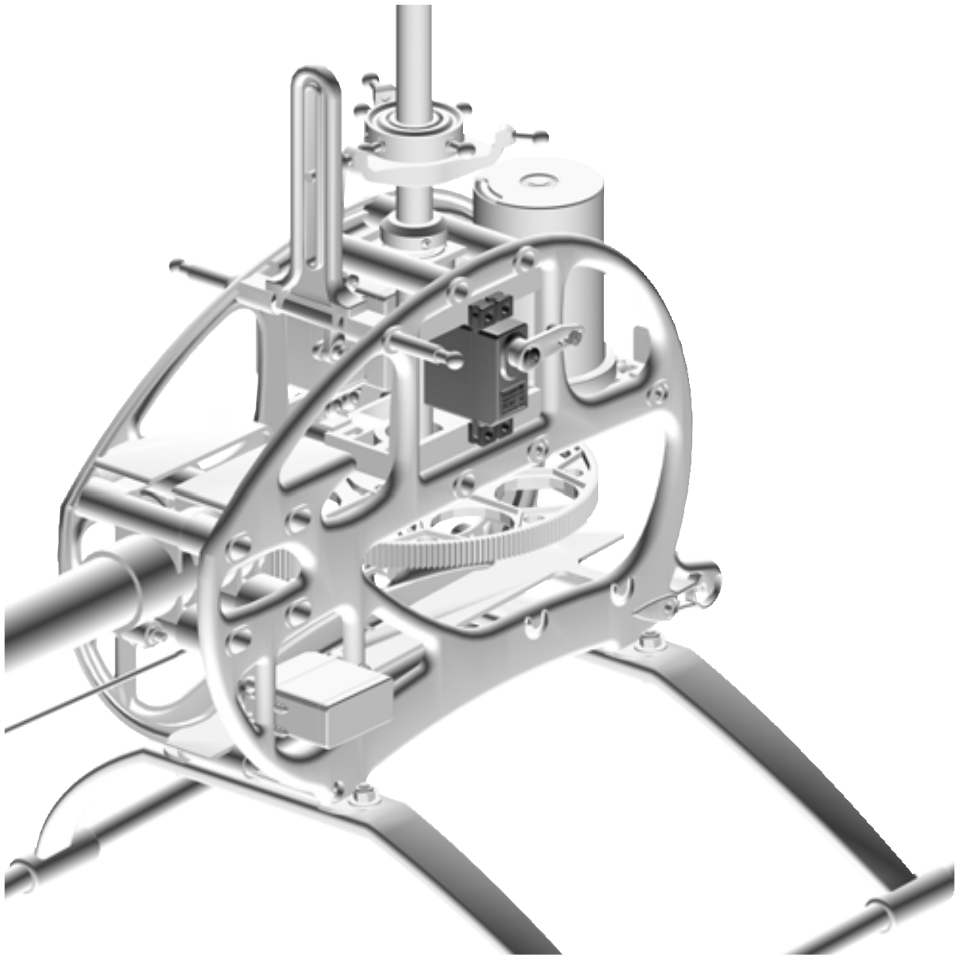
11.5 Aileron Servo left

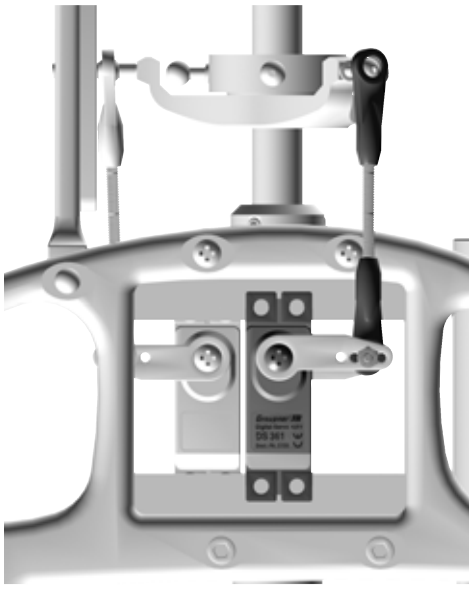


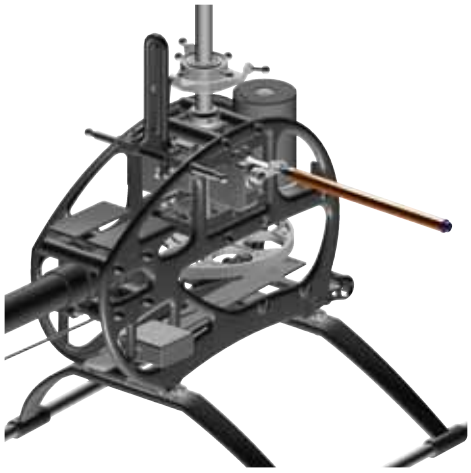


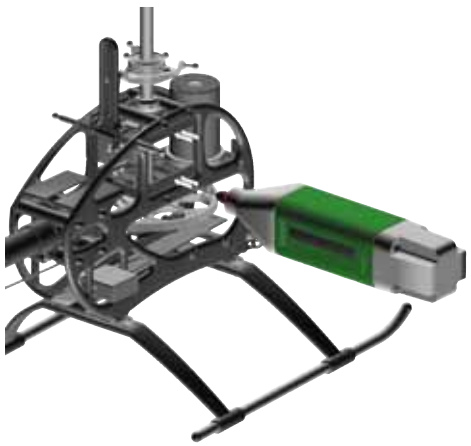


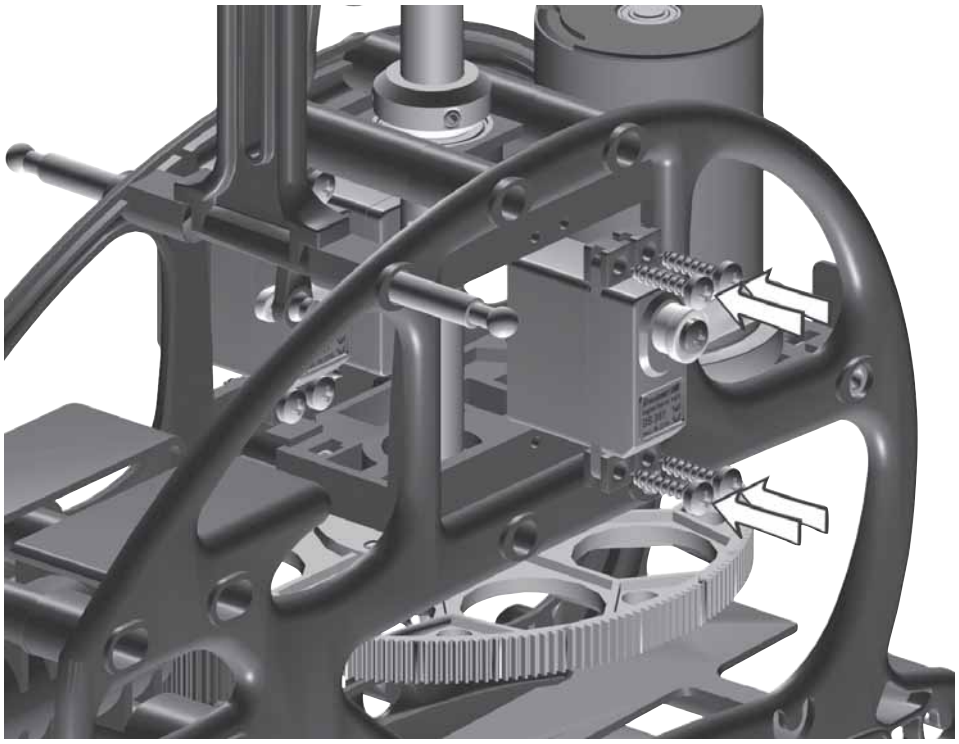
11.6 Aileron Servo right



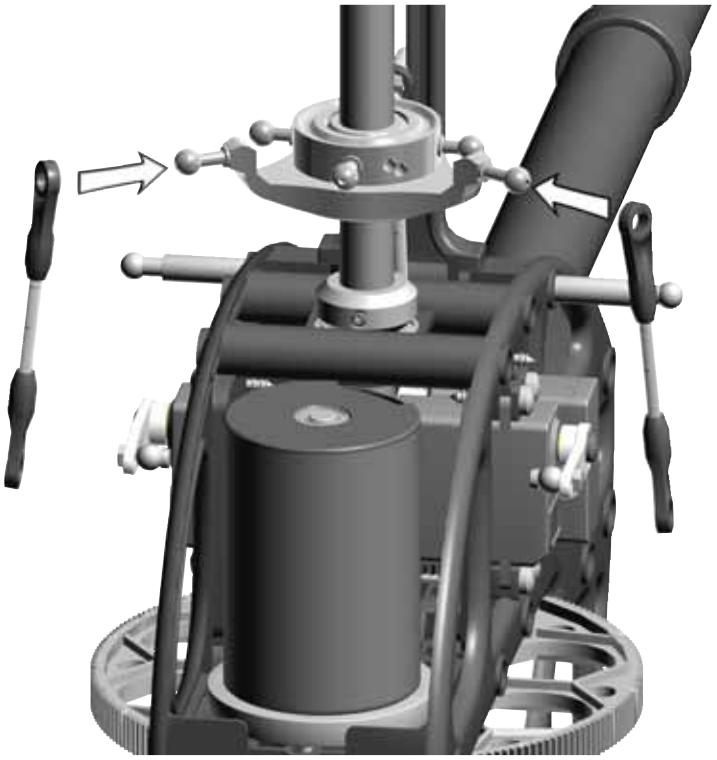


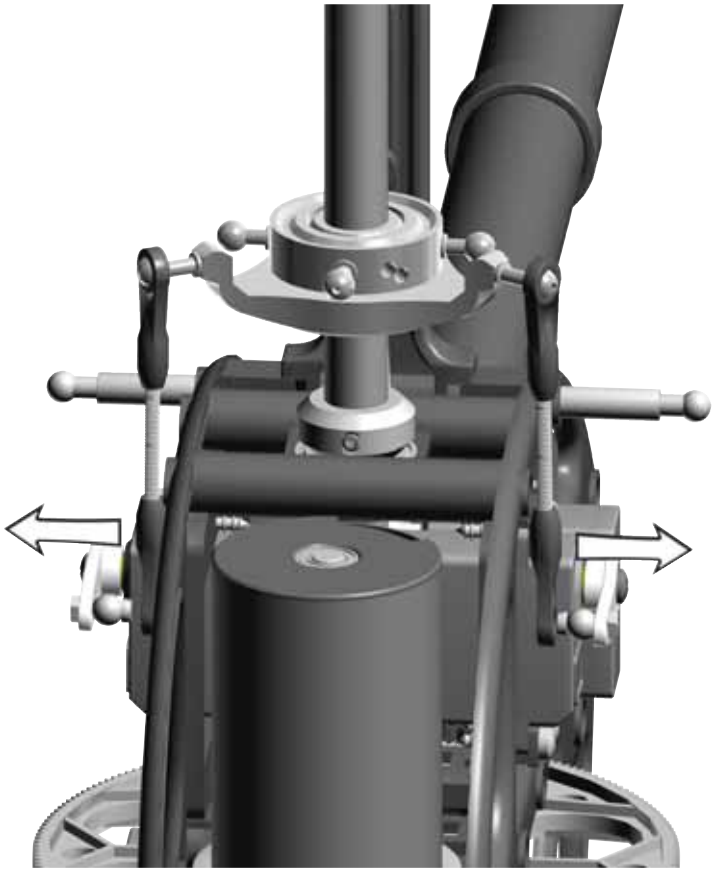


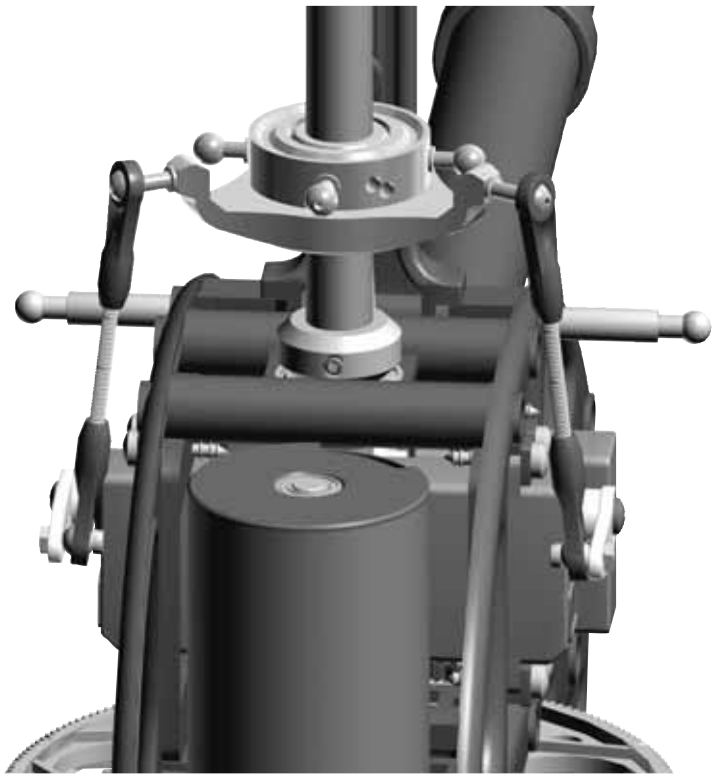




11.7 Aileron Linkage





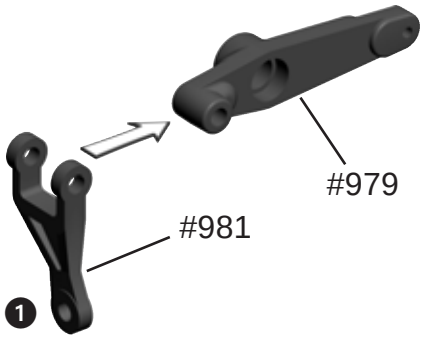


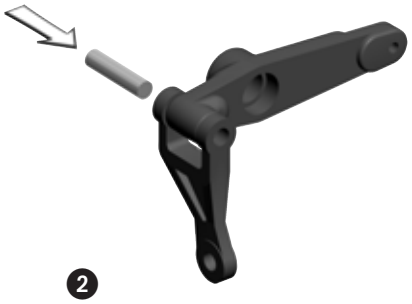
12.1 Assembly

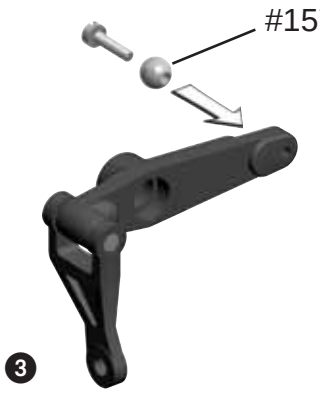
Bag 3

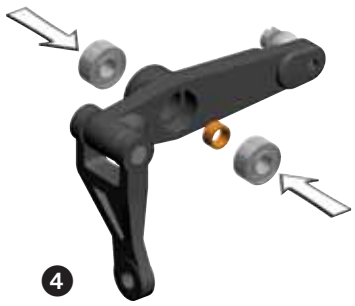
2x	2x8mm	#980
2x	M2x8	#1902
2x	Ø4,8 mm	#1570
4x	3x7x3	#930
2x	3x5x2,1	#2463
2x	M3x14	#1955
2x	3x5x0,5	#2002

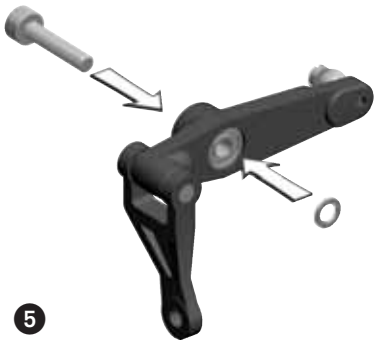
The Y-rods #981 must be able to move easily on the wash-out.

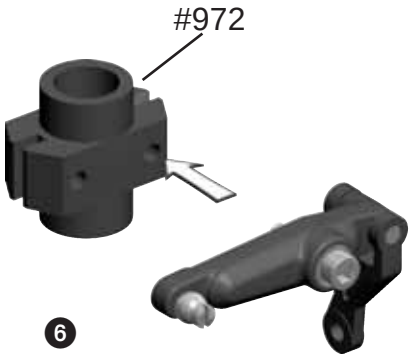


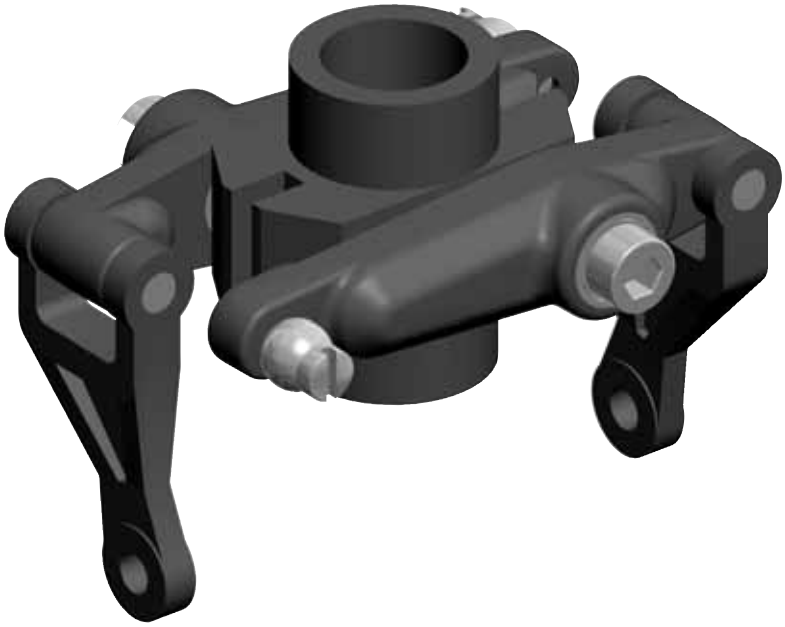






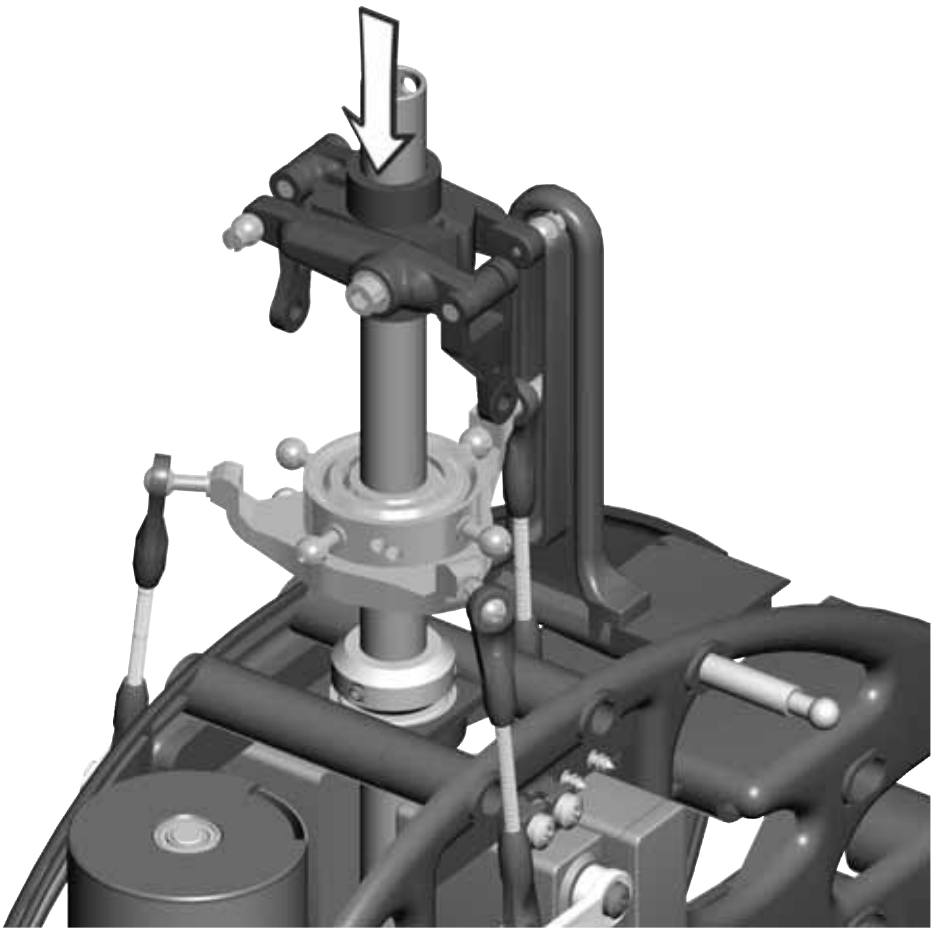


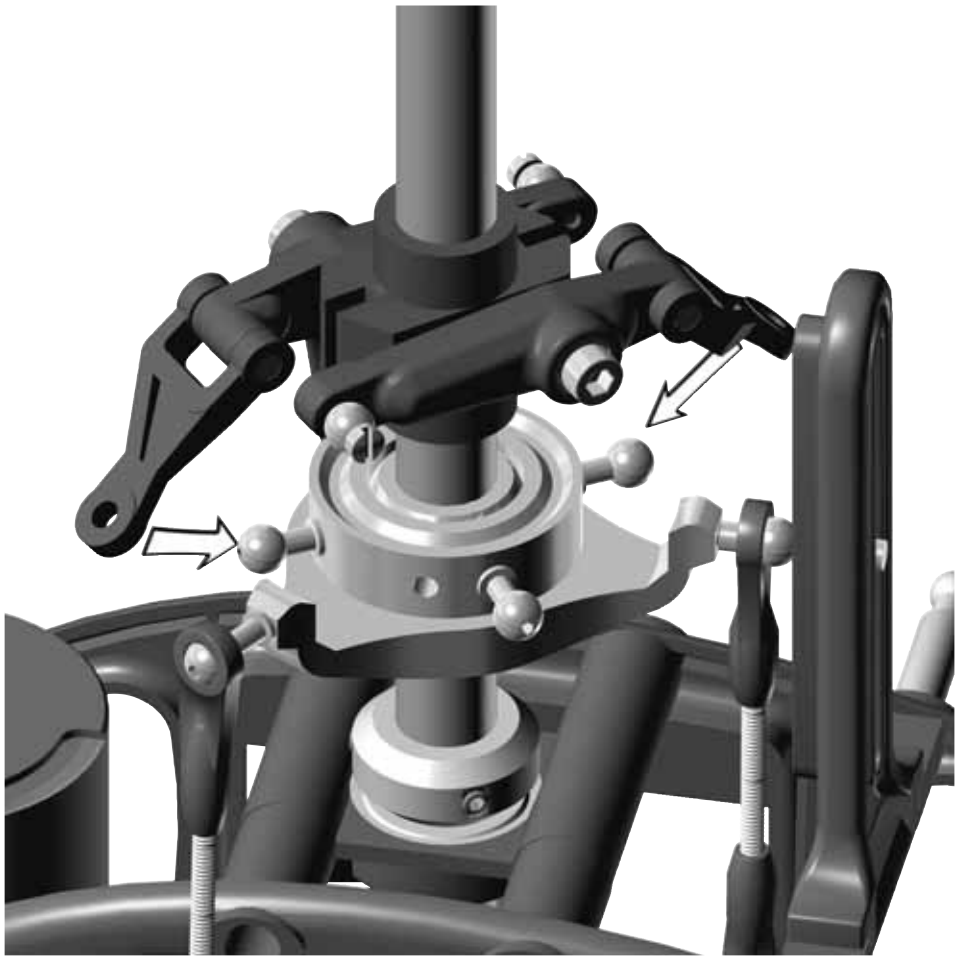




12.2 Installation

The wash-out hub must be able to move up/down easily on the rotor shaft.



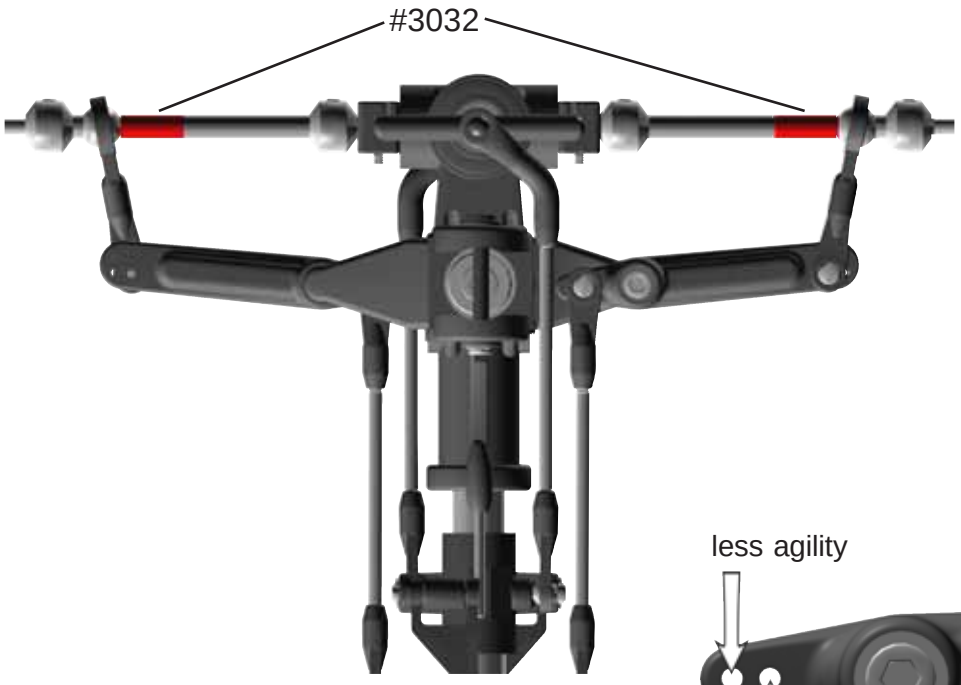


13.1 Head Adjustment 3D Performance

Before mounting the rotor head, please choose from one of the following two types of head adjustment, as they will influence the agility and stability of the helicopter.

1) very agile, very direct cyclic response, suitable for 3D-style flying.
2) very stable performance, calm cyclic response, very suitable for flying straight, even at low rotor head speed

Stable Flight Performance

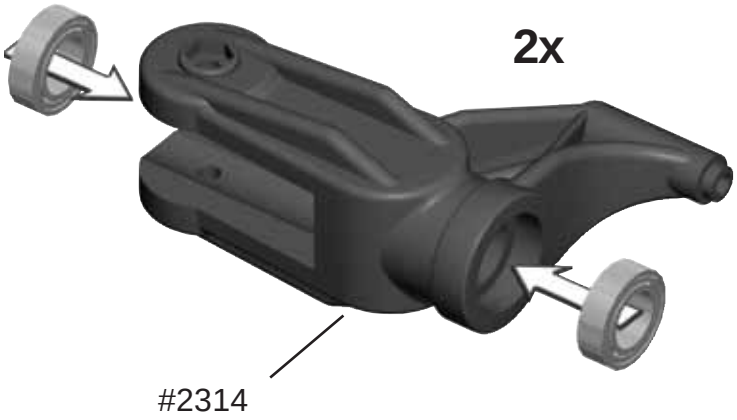


2x	3x4x12	#3032

13.2 Blade Grips

Bag 7 • Bag 10

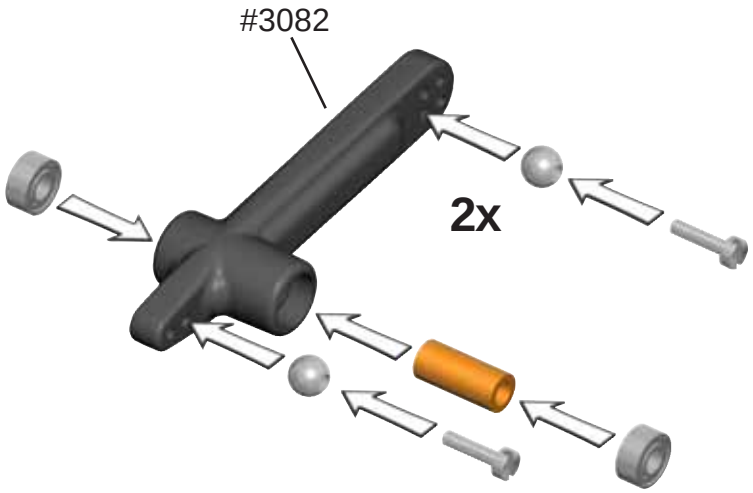
4x	8x14x4	#2351

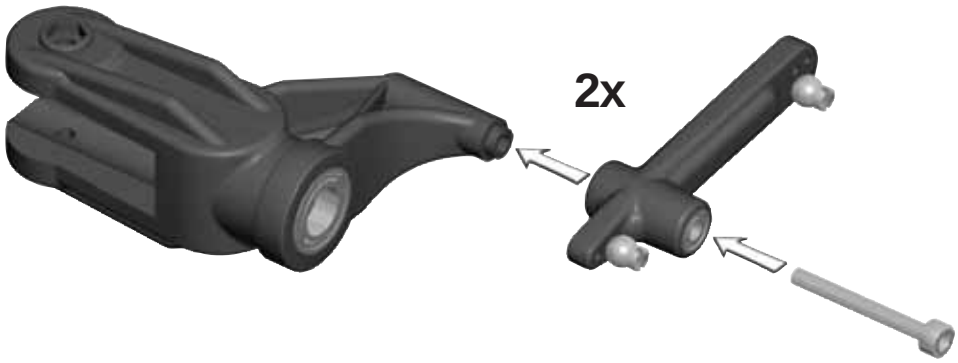


13.3 Mixing Arms

Bag 7 • Bag 10

4x	M2x8	#1902
4x	4,8	#1570
2x	M3x25	#1958
4x	3x7x3	#930
2x	3x5x12	#3090

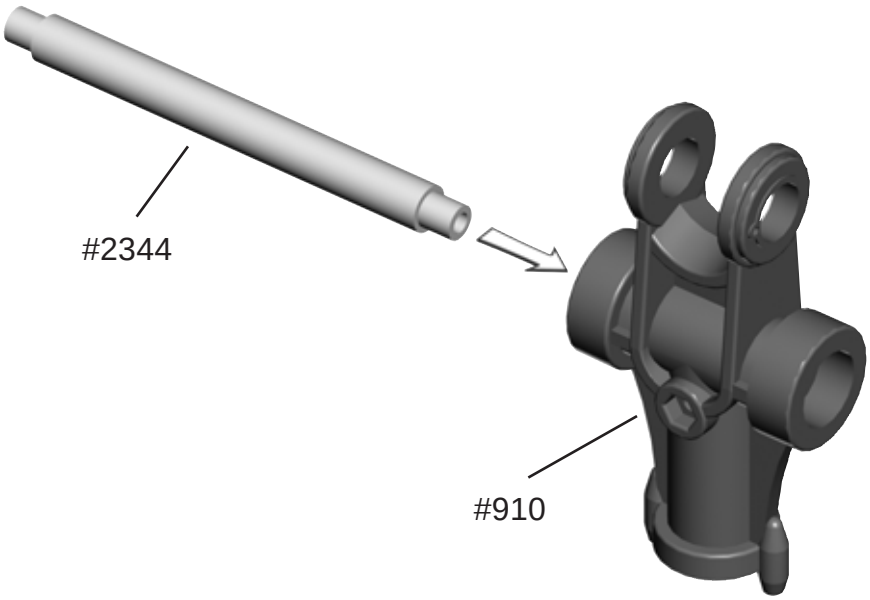


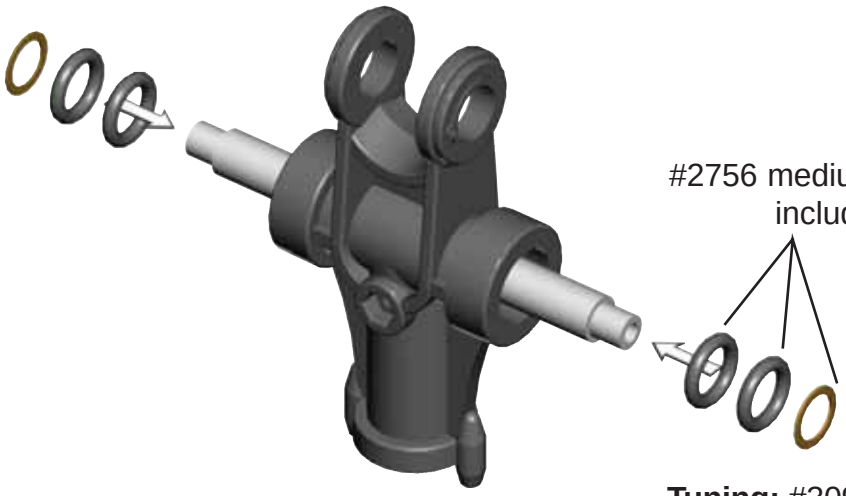


13.4 Yoke

Bag 7

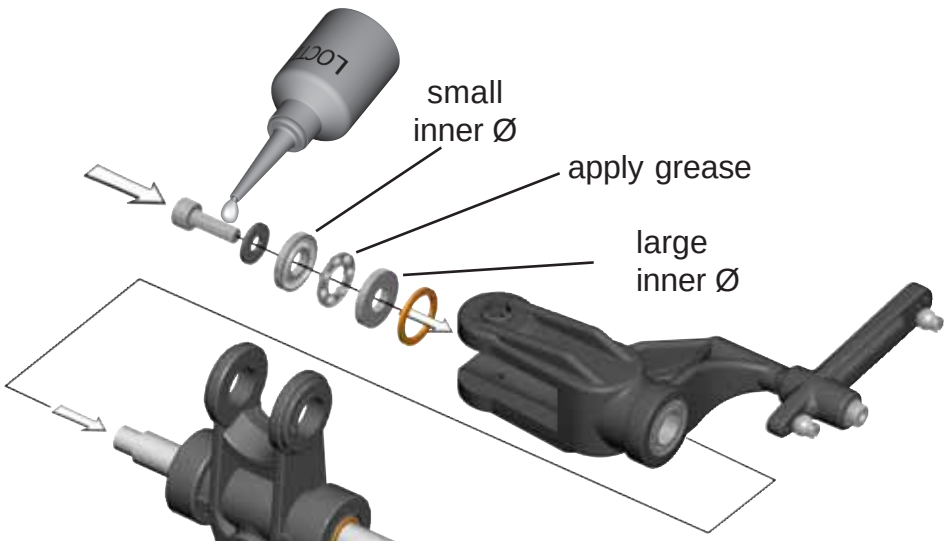
4x	3x7	#951
2x	8x11x1	#952



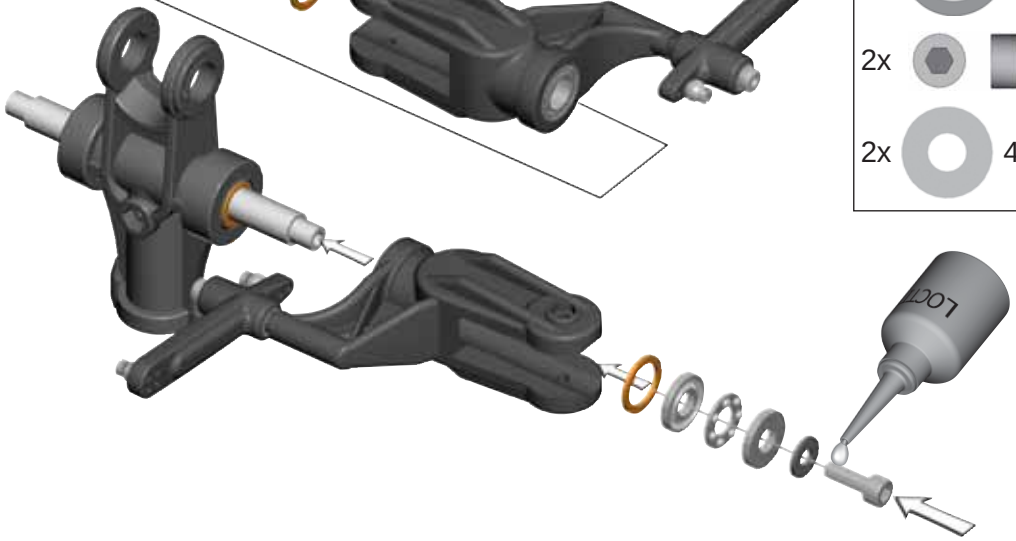


#2756 medium hard dampening, included in the kit

Tuning: #3092 extra hard dampening, not included



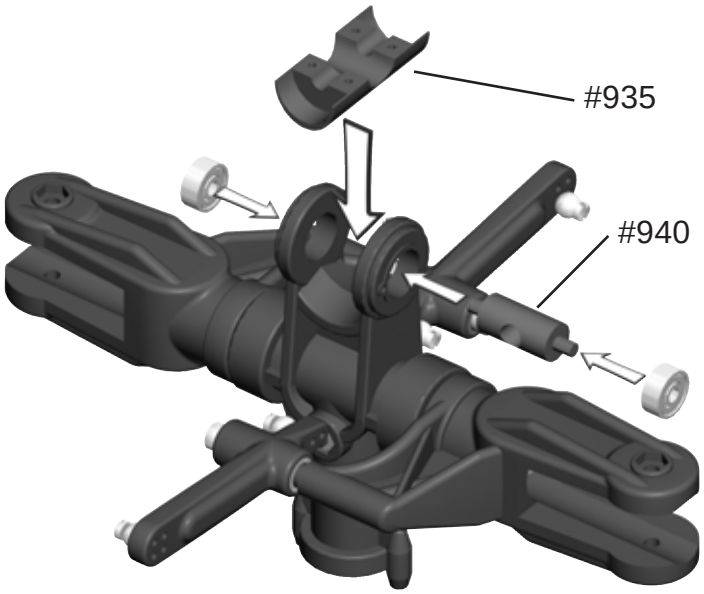
2x	6x14x5	#2349
2x	10x14x0,5	#2351
2x	M4x12	#1972
2x	4x12x1 mm	#2015

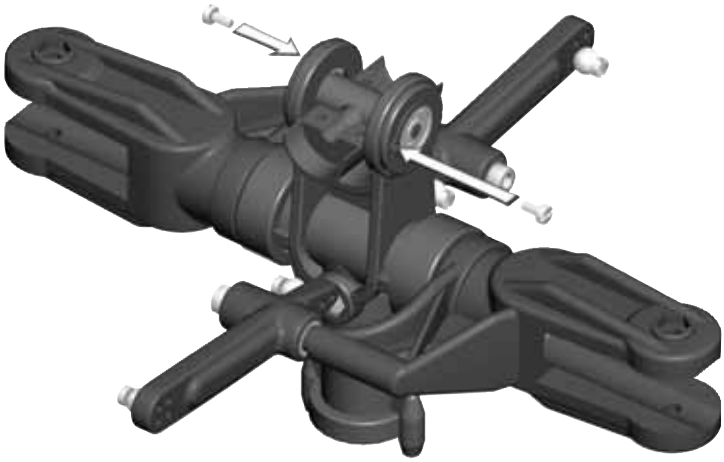


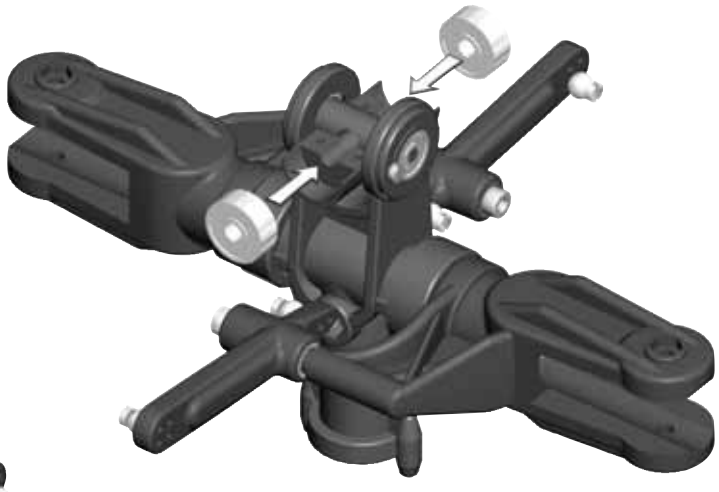
13.5 Seesaw

Bag 7 • Bag 12

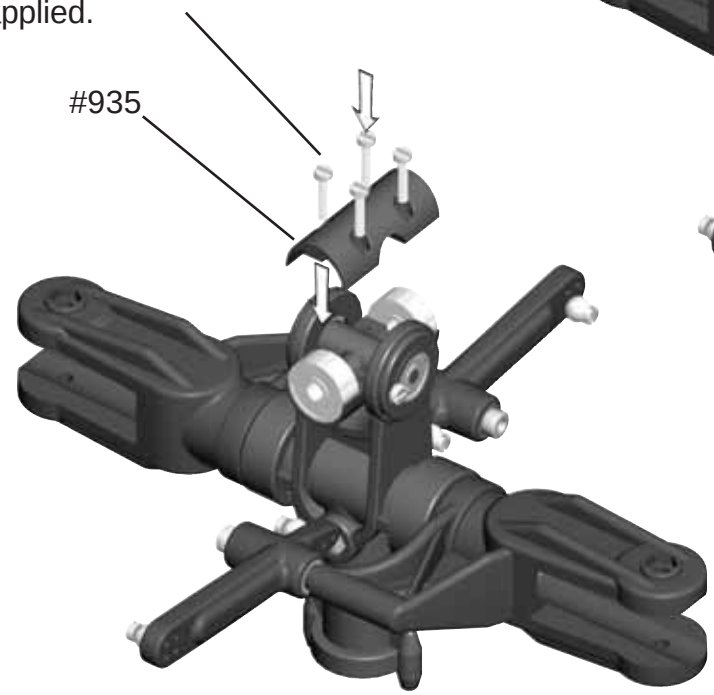
2x	4x13x5	#936
2x	4x10x4	#726
2x	M2x3	#1900
4x	M2x8	#1902







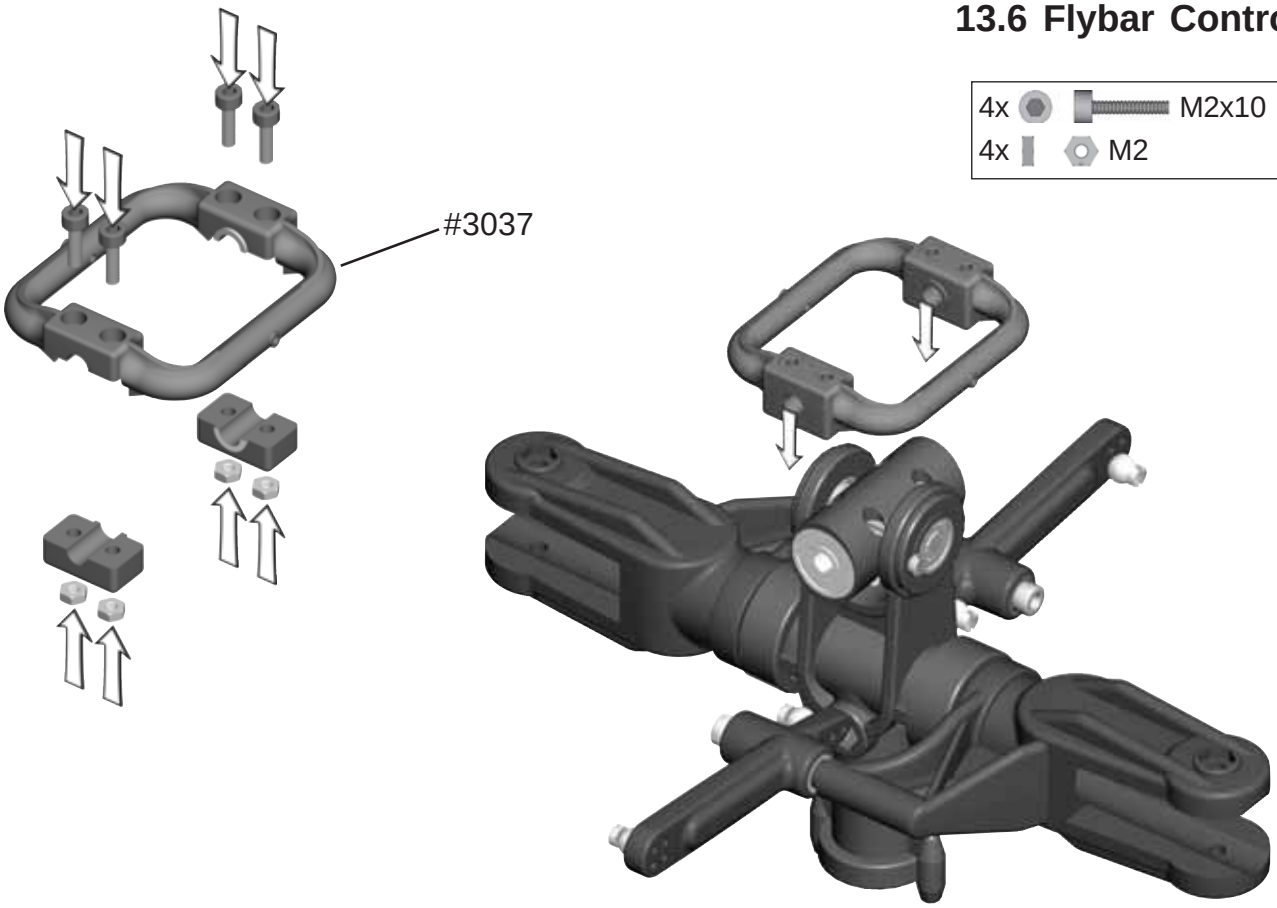
Note: The screws are tightened more easely when some grease is applied.



13.6 Flybar Control Bridge

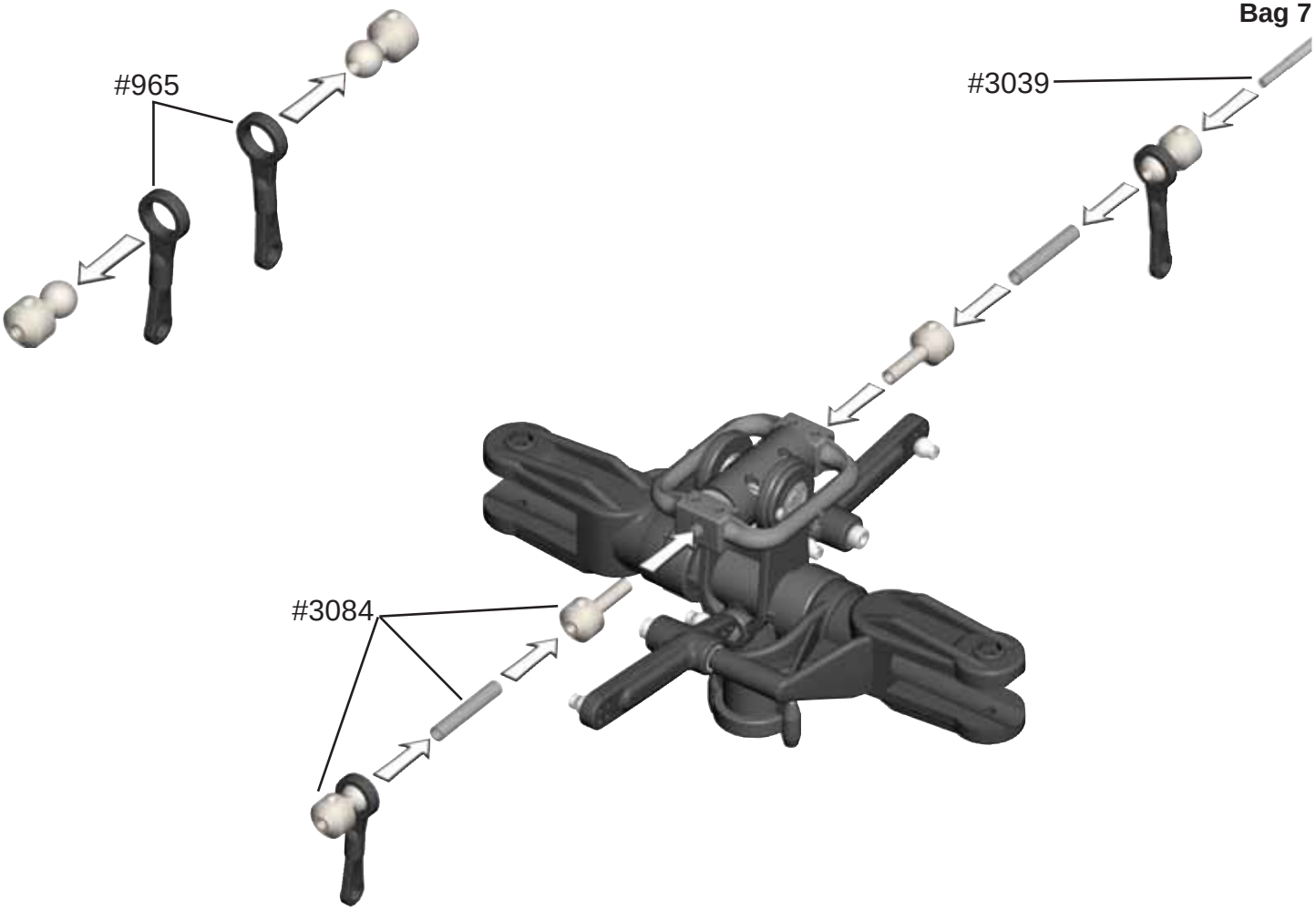
Bag 7

4x	M2x10	#1939
4x	M2	#2070



13.7 Ball Bolts

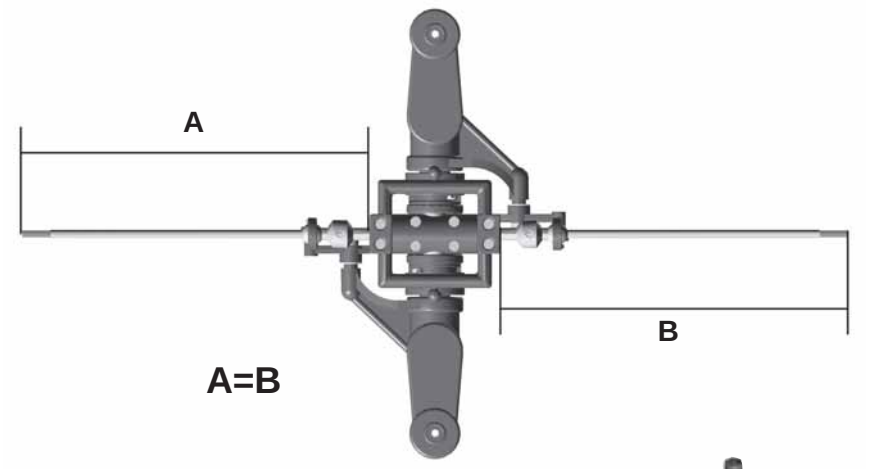
Bag 7

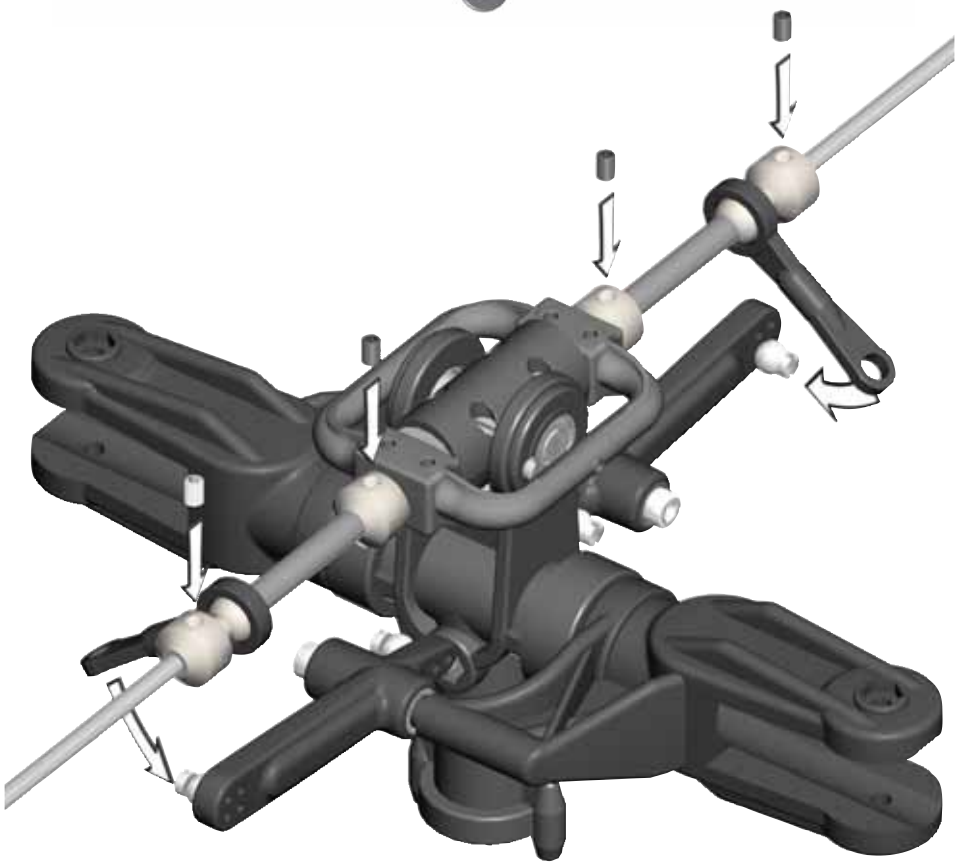


13.8 Flybar

Bag 7

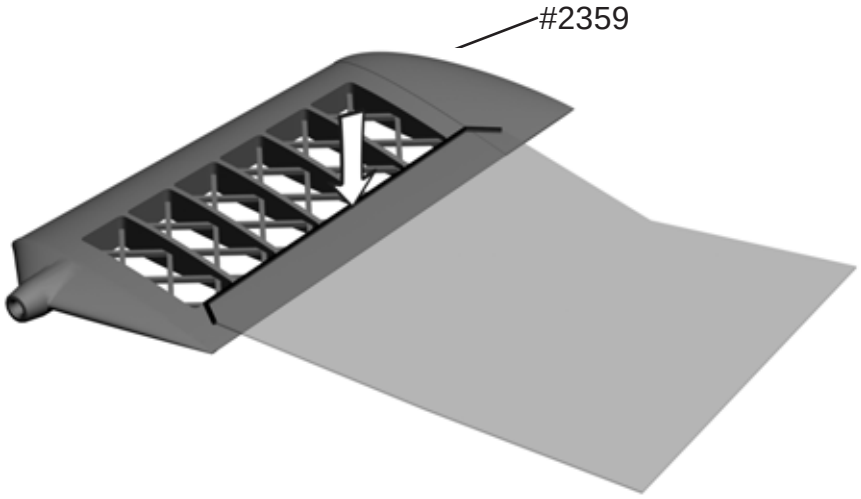
4x	M3x3	#1920

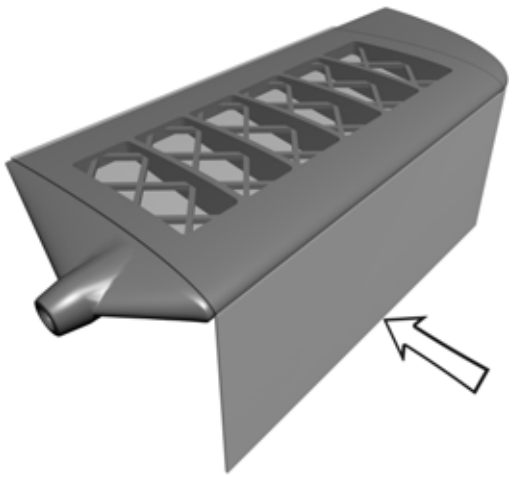


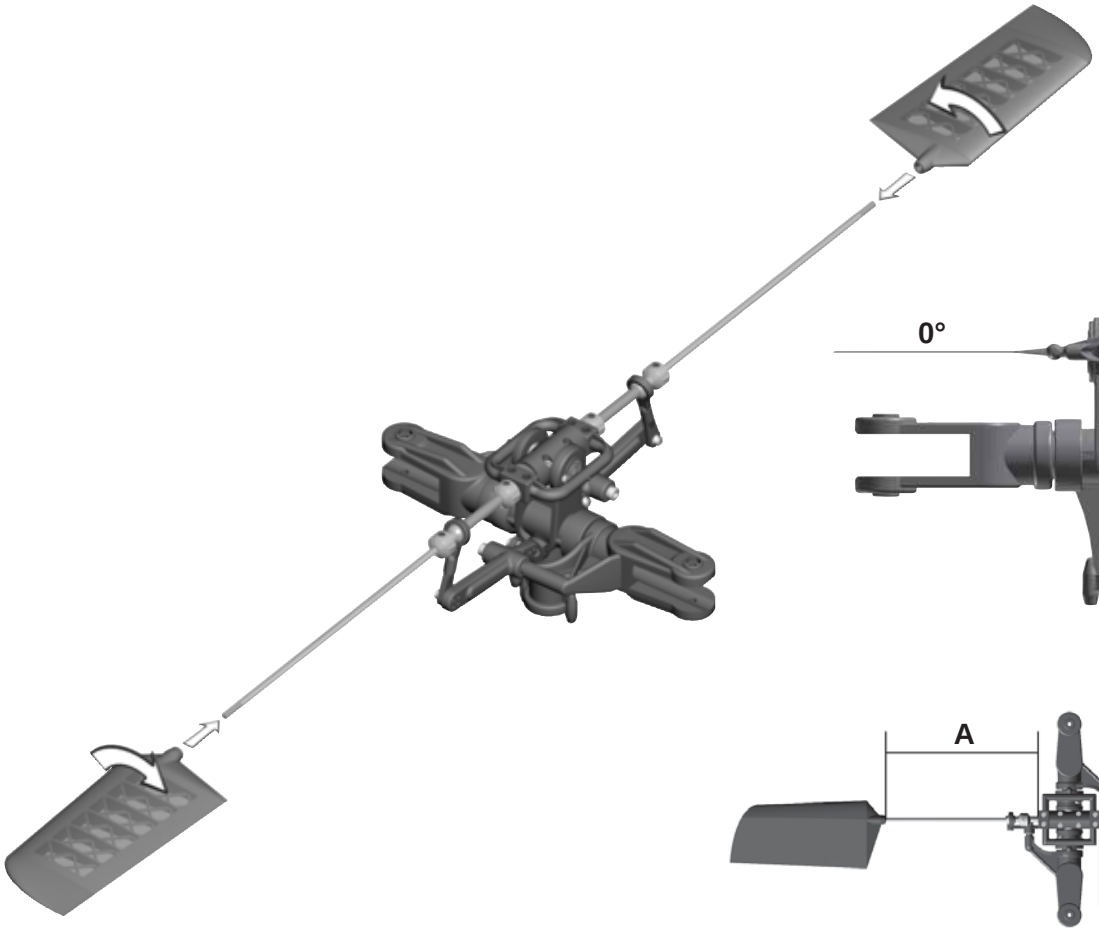


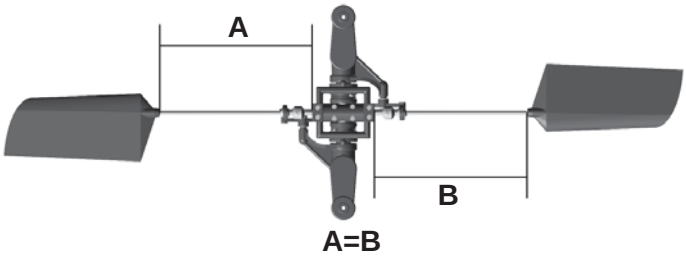
13.9 Flybar Paddles

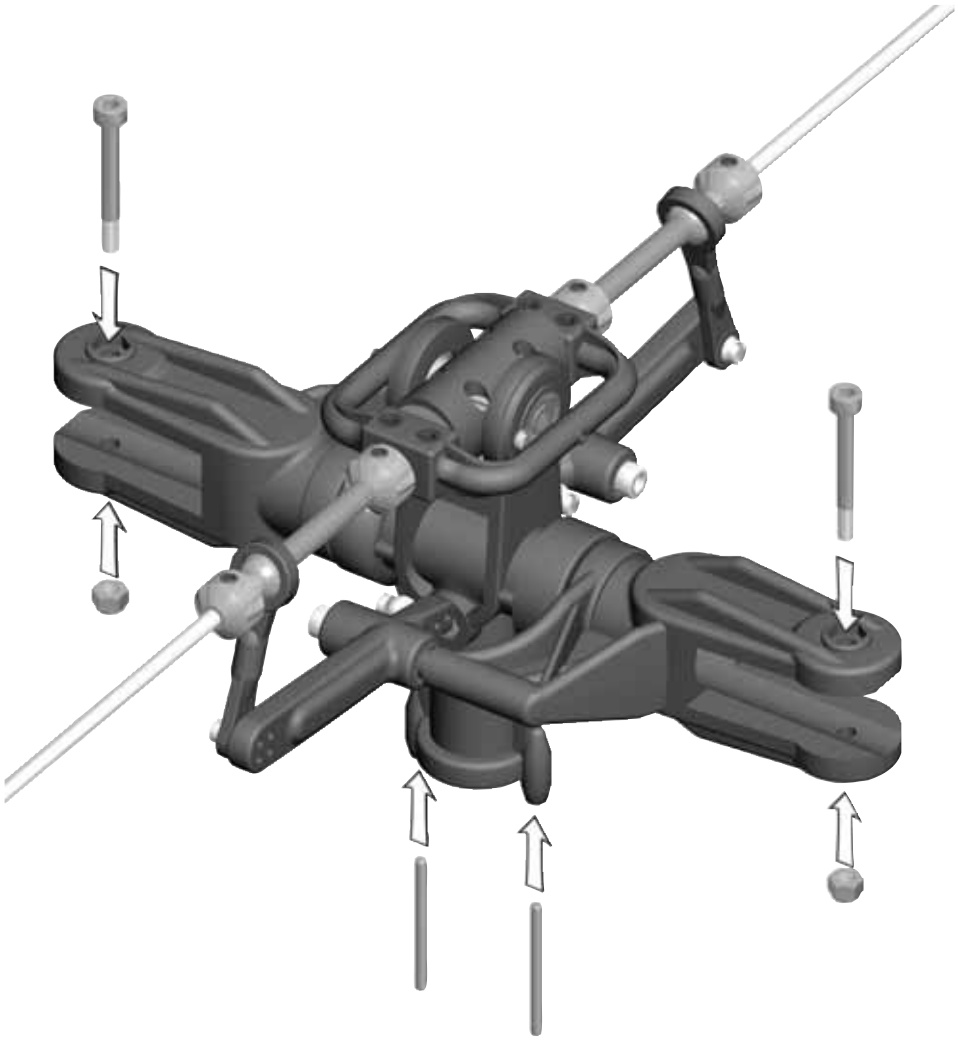
Bag 7











13.10 Final Assembly

Bag 7 • Bag 12

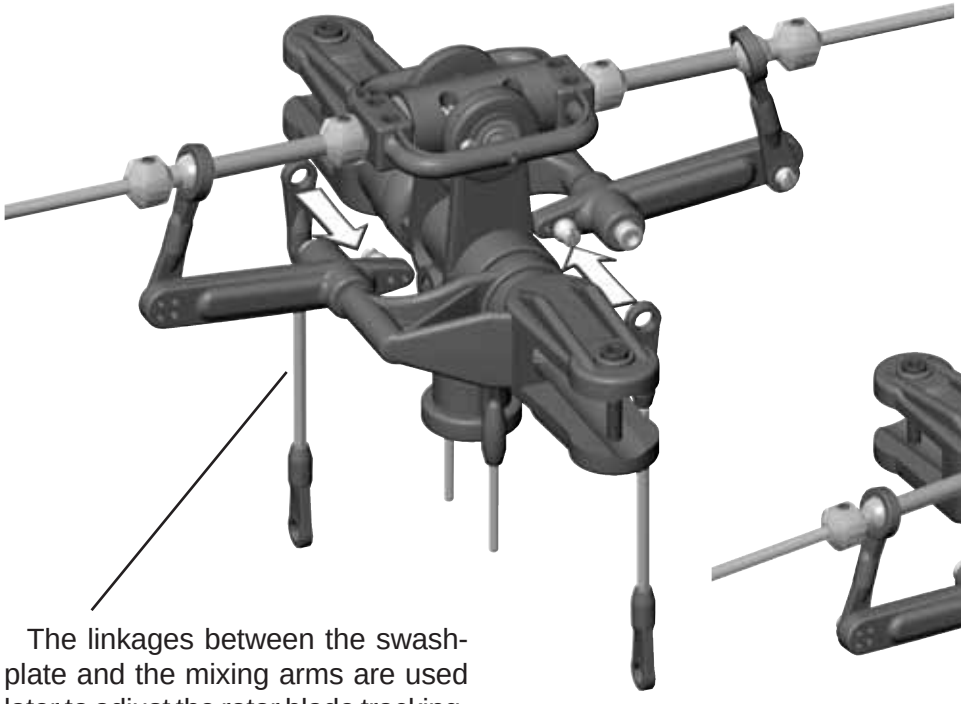
2x		M4x25 #2079
2x	M4	#2076
2x		2x30 mm #912
1x		M3x18#1965
1x	M3	#2072

13.10 Final Assembly

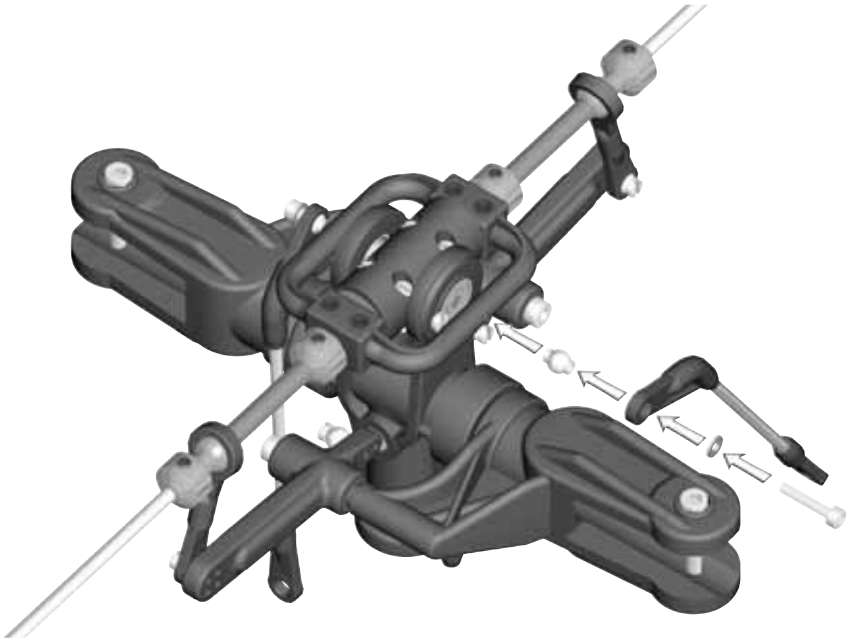
Bag 7

13.11 Rotor Head Linkage

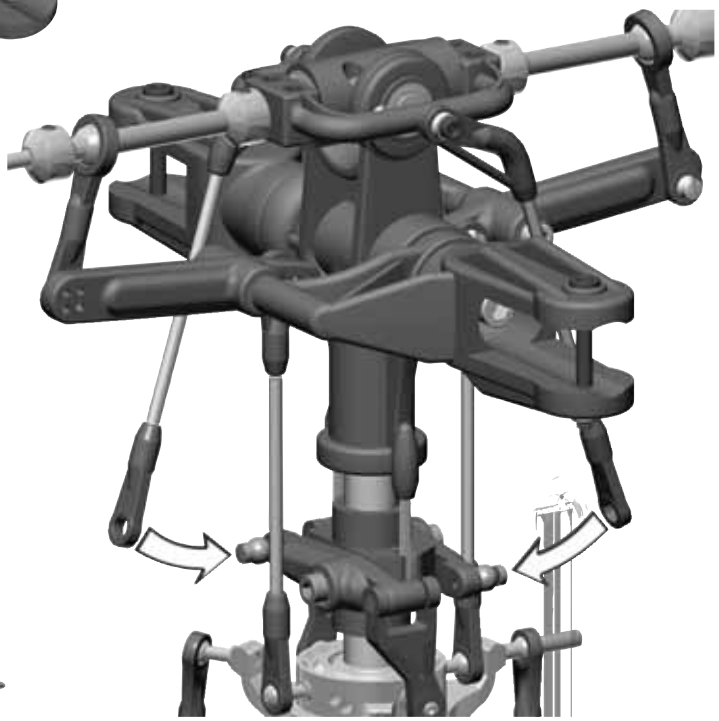
Next mount the length-adjusted fly-bar control linkages. The ball links are attached to the balls more easily when the text on them is pointed away from the helicopter.



The linkages between the swash-plate and the mixing arms are used later to adjust the rotor blade tracking.

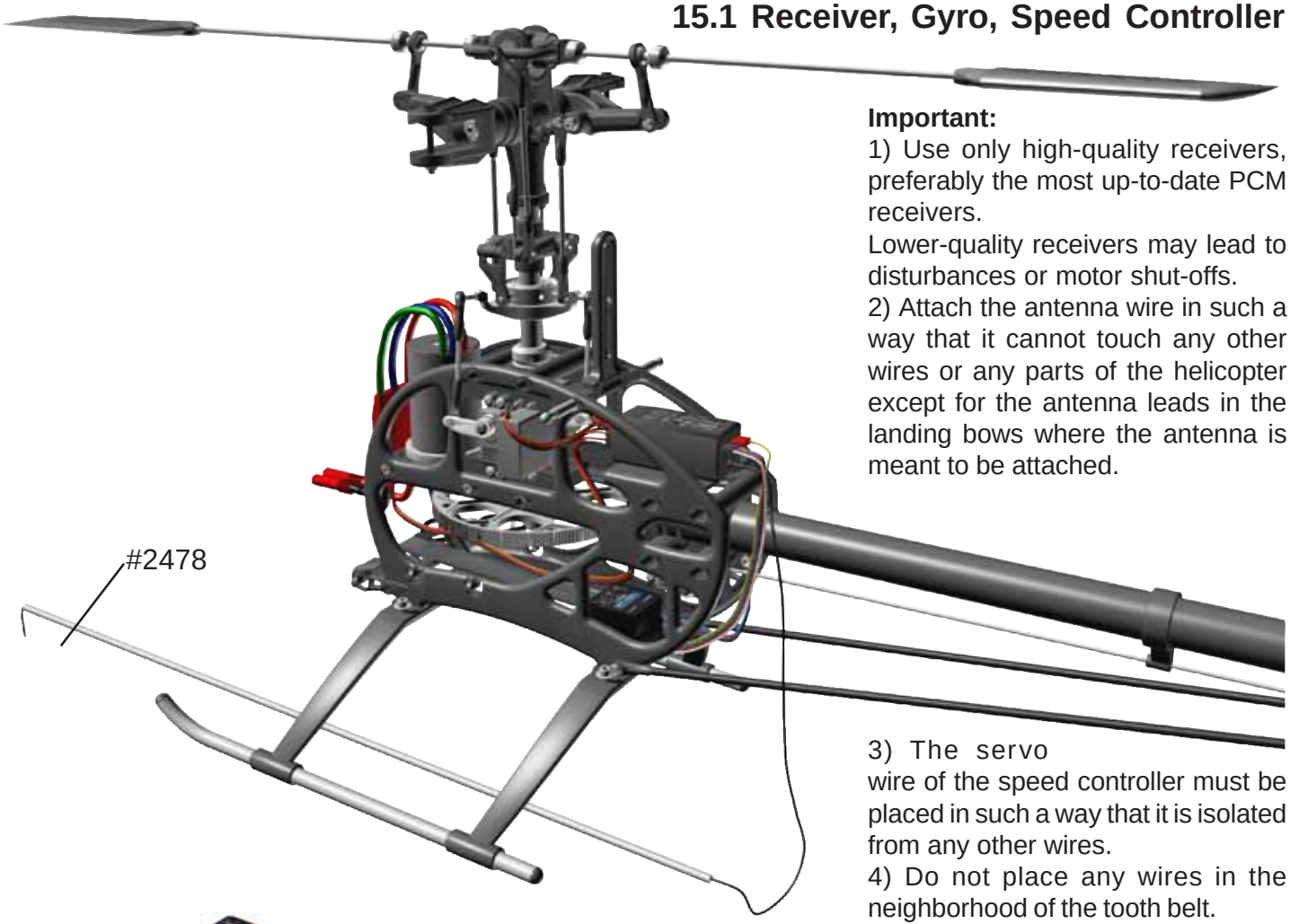


2x	M2x12	#1942
2x	4,8	#1571
2x	2x4,5x0,5	#2018



14 Logo 10 assembled

15.1 Receiver, Gyro, Speed Controller



Important:

1) Use only high-quality receivers, preferably the most up-to-date PCM receivers.
Lower-quality receivers may lead to disturbances or motor shut-offs.

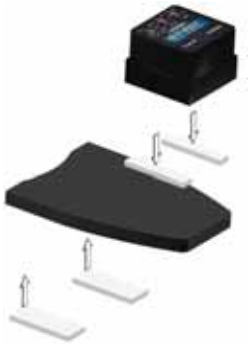
2) Attach the antenna wire in such a way that it cannot touch any other wires or any parts of the helicopter except for the antenna leads in the landing bows where the antenna is meant to be attached.

3) The servo wire of the speed controller must be placed in such a way that it is isolated from any other wires.

4) Do not place any wires in the neighborhood of the tooth belt.

5) Do not use braces made from metal or any other metal parts for attaching the gyro, horizontal stabilizer or tail boom brace on the tail boom.

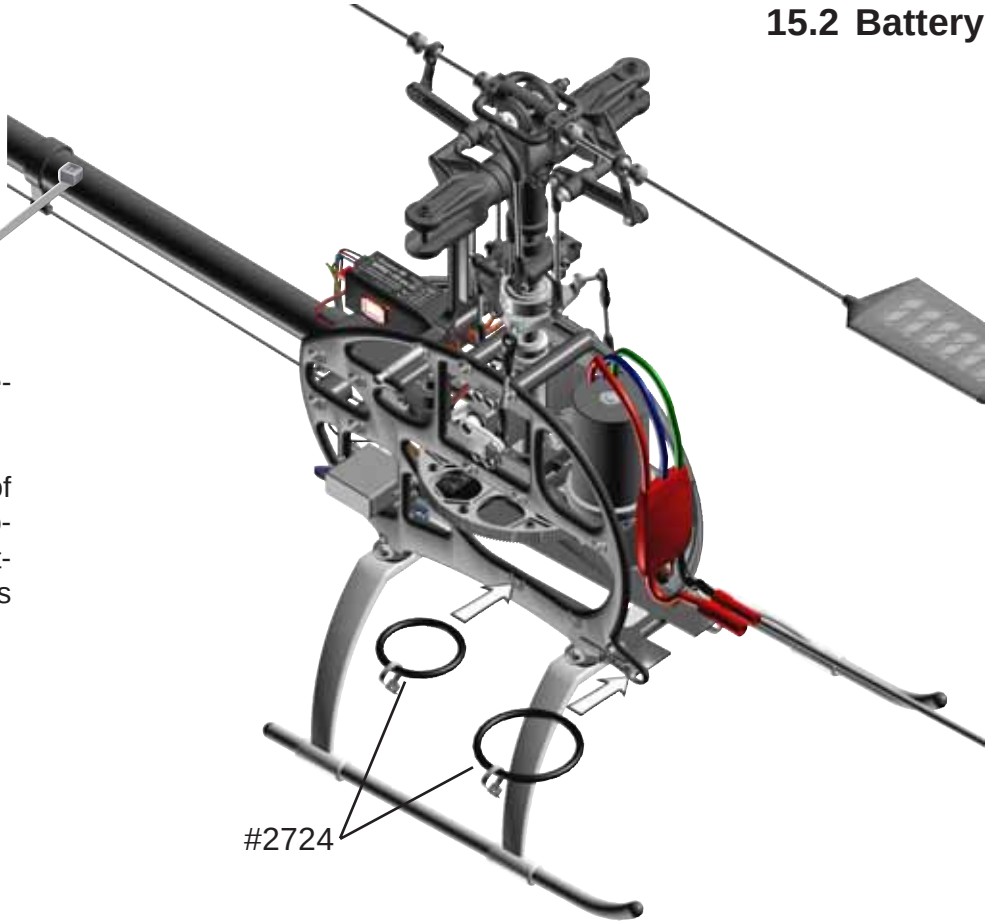
6) If you are using a separate BEC, attach it on the bottom side of the mainframe and lead the live wire to the receiver in such a way that it cannot touch any other wires.



15.2 Battery

Use cable tie straps to simplify removal of battery fixing rings.

This kit contains battery rings of four different sizes. Please use those battery rings which will fit the battery used in your heli. The batteries must be mounted securely!



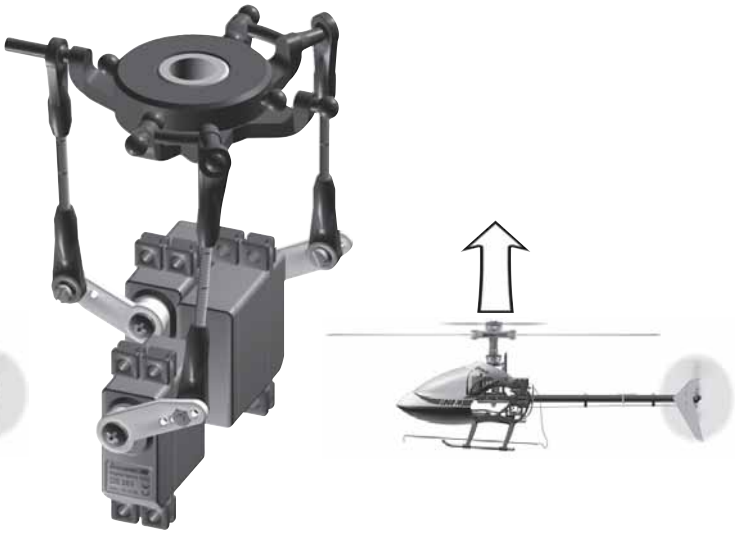
120° Swashplate Mixing (120° CCPM)

The LOGO 10 swashplate is designed to be controlled via electronic CCPM. Thus the corect control inputs of the three swashplate servos are automatically mixed by the R/C transmitter. If you have never programmed 120° CCPM before, please read this introductory text carefully.

Collective (Pitch)

Pitch function is used to control the lift or sink of the helicopter. When pitch input is given, all three swash-plate servos travel together in the same direction and the same amount. As a result the swash-plate moves up or down on an even level.

Minimum Pitch



Maximum Pitch

Aileron (Roll)

Aileron (roll) is used to control the helicopter's movements around its longitudinal axis. When aileron (roll) input is given, the two roll servos (in the front of the swashplate) travel in opposite directions. As a result the swash-plate tilts to the right or to the left.

Roll to the right

Roll to the right (view from rear)

Elevator (Tilt)

For tilting the helicopter, use the elevator function. For tilting forward, the two aileron servos move downward and the backward elevator servo moves upward. The elevator servo moves twice as much as the two aileron servos.

Elevator forward

Elevator forward (view from side)

Programming 120° CCPM

As the programming procedure varies with different types of R/C systems, it is necessary for you to refer to the instruction manual of your R/C system. Here are only a few general guidelines which apply to most systems.

Servo Centering with Sub-Trim Function

As indicated in the above sections on mounting the servos, it is important that the servo arms are exactly centered. You should use the servo sub-trim function of your R/C system for this purpose.

Activating 120° CCPM

Likely, the 120° CCPM function is initially disabled in your R/C transmitter software and needs to be separately activated. Please refer to your R/C system manual, where you will also find information on which channels should be used for the elevator servo and the two roll servos. It is important that you stick with the requirements stated in the manual. Otherwise the 120° CCPM will not function properly.

Your R/C may support various different CCPM mixings. For Logo 10 choose the 120° mixing with two roll servos in the front and one elevator servo in the back.

Use the relevant menus for setting the mixing proportions for roll, elevator and pitch functions. Begin by setting the mix values to 50% each. Higher mix values give higher servo travel for that function This can have the unwanted result that the swashplate reaches its mechanical limits and causes damage to the servos or rods or to the swashplate.

If necessary, you may use the CCPM menu to reverse the direction of the function. This is necessary, for example, if the swashplate tilts to the wrong side or the pitch function is inverted.
The menu for reversing servo functions can be used for reversing the movements of individual servo arms, but not for reversing the entire control function and of all the involved servos.

Servo Travel

It may be the case that all swash-plate servos do not travel the same distance at maximum deflection. Even small differences between the 3 servos can prevent the swash-plate from being level during collective pitch inputs and cause the heli to drift.

In order to correct such servo travel differences, you must increase or decrease the servo travel setting accordingly. Use the menu ATV for adjusting the end points, if necessary. Do not get this menu mixed up with Dual/Rate. (Dual/Rate menu allows using multiple servo travel ranges and toggling between them during flight.)

Example:

If during maximum pitch the elevator servo travel is slightly smaller than travel of the two aileron servos, then the swash-plate will be tilted backwards, causing the heli also to drift backwards. In this case you should increase the travel of the elevator servo.

Increase servo travel of elevator servo on one side

All servos travel the same distance at maximum deflection

Setting Pitch Values

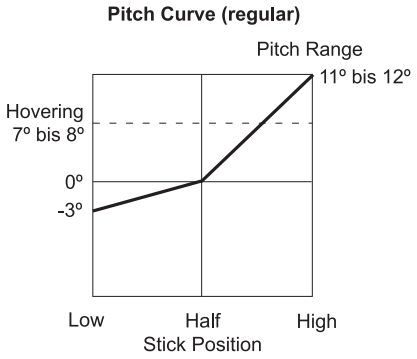
Please choose from two different pitch settings, depending on your flying style. The two settings are illustrated below. The standard range is for beginners and for pilots who will do some aerobatic flight without extended periods of inverted flight.

The final pitch values must be tested during test flying. Once set, the values will work with the rotor blades you used. In case you change over to a different set of rotor blades, the pitch values will have to be adjusted to the properties (size, profile etc.) of the new set.

Pitch Values

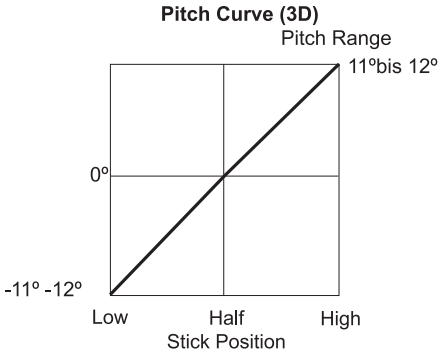
The center position of the sticks in your R/C radio corresponds to 0° pitch of the rotor blades. At 0° pitch, all levers (servo arms, washout lever, mixing arms) should be in horizontal position. At 0° pitch, the swashplate is in center position, allowing the same travel in upward (positive pitch) and downward (negative pitch) direction. This setting results in a linear pitch curve, which is ideal for 3D-style flying. Pilots who wish to fly with less negative pitch should reduce the pitch curve to approx. -3° pitch. Note that with this latter set-up the sticks are not at center position for hovering.

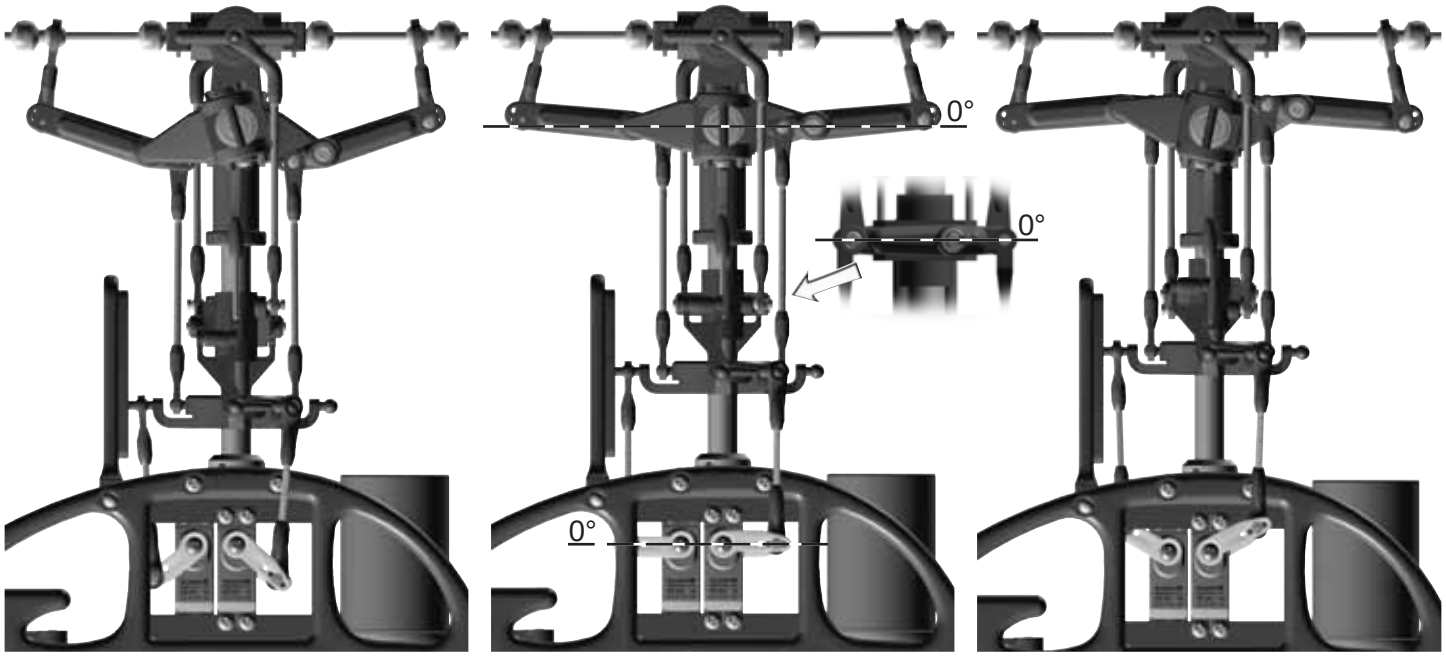
Application	Low Pitch	Hovering (Stick Centered)	High Pitch
Standard	– 3º	7º to 8º	11º to 12º



If you are an experienced pilot and plan on flying inverted, select the 3D settings:

Application	Low Pitch	Stick Centered	High. Pitch
3D	– 10º bis – 12º	0º	11º to 12º





Minimum Pitch | 0° Pitch | Maximum Pitch

For setting the respective pitch values, please use a pitch gauge. The values for minimum and maximum can be specified in the menus of the transmitter.

Aileron and Elevator Travel

The travel range of the aileron and elevator servos are limited by the swash-plate's mechanical limits. Please take care that the swash-plate does not hit the maximum of its travel. This can have the unwanted result that the swashplate reaches its mechanical limits and causes damage to the servos or rods to the swash-plate itself.
If you desire more agility for your helicopter, use lighter flybar paddles.

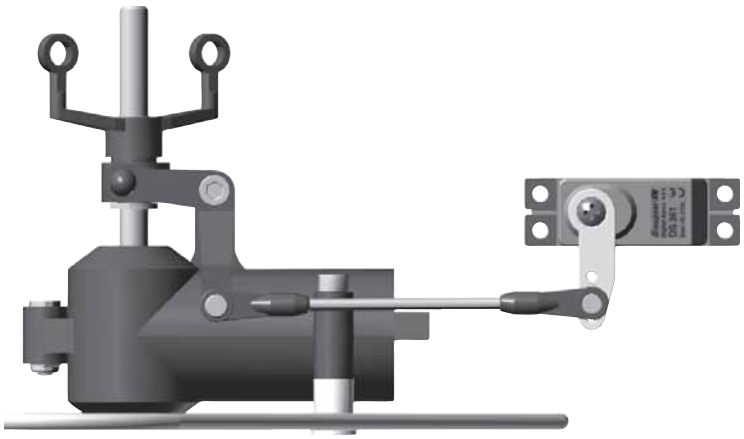
Tail rotor settings

When the servo arm of the tail rotor servo is in the center, the tail rotor lever and the servo arm should be perpendicular with respect to each other. The tail rotor pitch lever should never reach its mechanical limits.

In case the servo travel is too large, you have the following options for correcting this:
1. Move the ball end of the tail rotor servo closer to the center of the servo arm.
2. Reduce the servo travel in your R/C system using ATV.
3. Reduce the servo travel in your gyro (not all gyros have this option).

In case the servo travel is too small, you have the following options for correcting this:
1. Move the ball end of the tail rotor servo further away from the center of the servo arm.
2. Increase the servo travel in your R/C system using ATV.
3. Increase the servo travel in your gyro (not all gyros have this option).

Ensure that the tail rotor servo turns in the correct direction. If necessary, reverse the direction of the tail rotor servo function in your R/C system.



Adjust the tail rotor linkage in length such that the tail rotor servo arm and the tail rotor lever are at 90 with respect to each other.
All parts serving the tail rotor movements must move smoothly. When there is too much resistance, the tail rotor will not react to subtle input and the gyro's maximum sensitivity cannot be fully exploited.

Revo-Mix/Gyro

It is necessary to compensate for the torque created by the motor during flight (but not during autorotation). This compensation is done by adjusting the tail rotor pitch. There are two options for achieving this:

1. Using normal gyro mode
Please refer to your R/C system manual for activating the revolution mixing function and for setting all parameters correctly. Final settings should be trimmed during test flights.

2. Using a gyro in Heading-Hold mode

The Heading-Hold gyro mode compensates automatically the deviation caused by the motor torque. Therefore, if Heading-Hold mode is used, revo-mix should not be programmed additionally.

Important: Check to ensure that the tail rotor assembly moves smoothly and without play. Otherwise the gyro and servo will not compensate the torque properly.

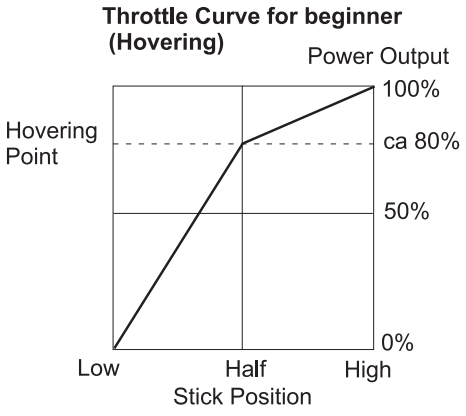
Rotor Head RPM control

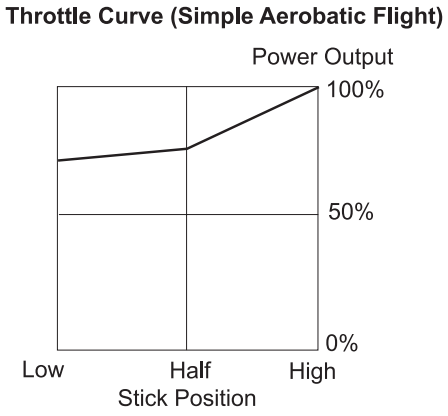
LOGO 10 is designed to be flown with constant rotor head speed. Irrespective of flight attitude (ascending, descending, hovering), rotor speed should be kept roughly constant. There are two different methods for obtaining constant rotor speed:

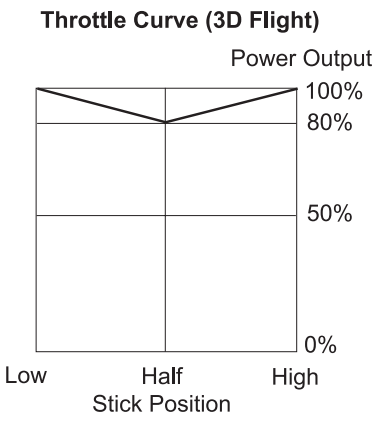
Rotor speed control with speed controller

All speed controllers can be used in this mode. With speed controller it is necessary to program a throttle curve (see manual). Programming of throttle curve requires that you associate a given throttle value with a particular pitch value. In this way, the rotor speed is held almost constant with all pitch values.

Throttle curve programming depends on the type and quality of the R/C system. Simpler, inexpensive R/C systems designed for model helicopters usually have a 3-point throttle curve. High-end R/C systems typically have throttle curves with more configurable points (up to 9). Fine tuning of throttle curves will be necessary during test flights.

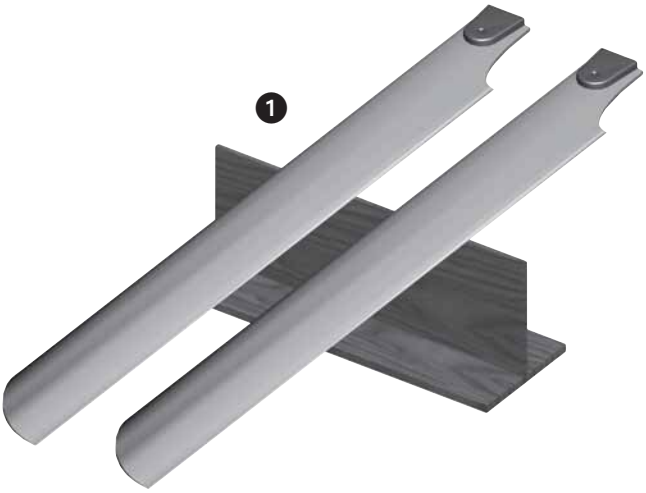






Note that an incorrectly programmed throttle curve reduces performance and can lead to overheating of the motor and the speed controller.

Rotor speed control with governor (RPM regulation mode)
A speed controller with governor function keeps the rotor head speed constant, independent of flight attitude (ascending, descending, hovering). It is not necessary to program a throttle curve. The head speed is simply controlled on the radio transmitter using a switch or lever.
Important:
1) Governor mode must be activated in the speed controller first (see manual of the speed controller)
2) In governor mode, the servo wire of the speed controller must not be connected to the throttle channel. Use a free channel in your radio to connect the servo wire.



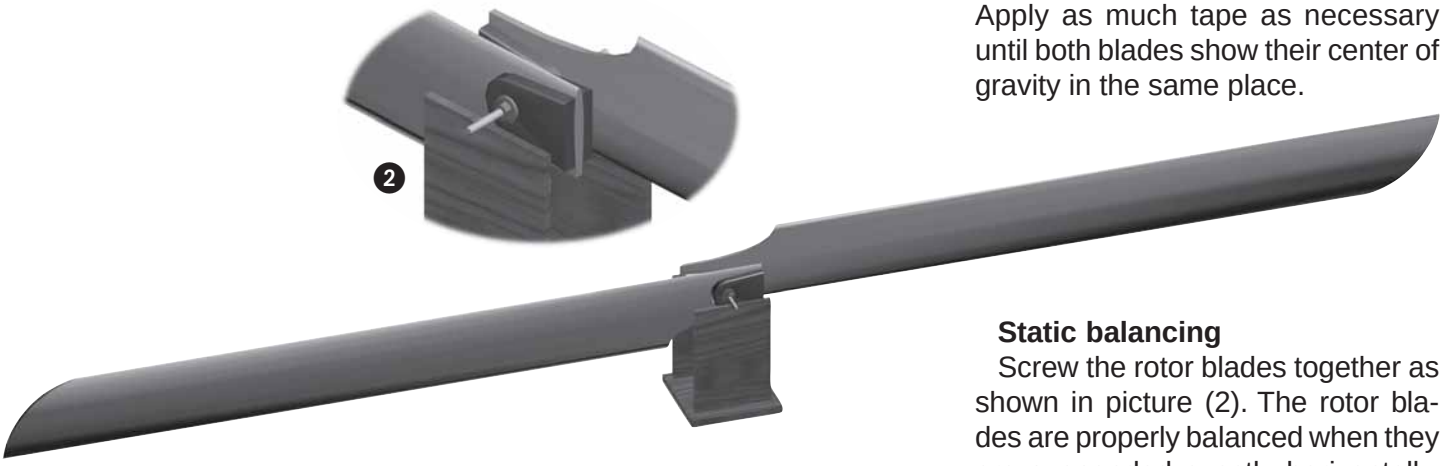
Carbon Rotor Blades

Rotor blades made from glass-fiber-enhanced plastic or carbon are typically in ready-to-fly condition when new. It will only be necessary to adjust blade tracking.

Wooden Rotor Blades

Balancing of Rotor Blades (Center of Gravity)

Place each rotor blade over an edge as shown in picture (1). Adjust the blades so that they are in equilibrium. If the center of gravity is not in the same place in each blade, this needs to be corrected using tape. Apply as much tape as necessary until both blades show their center of gravity in the same place.

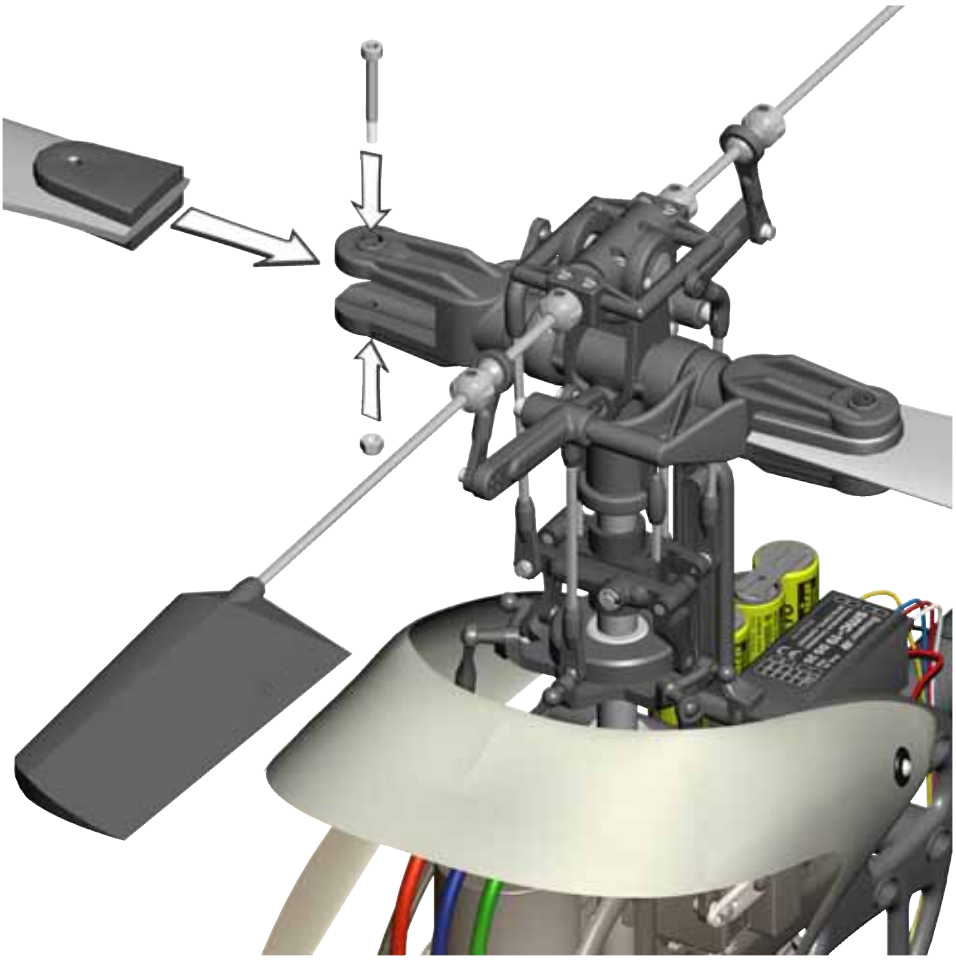


Static balancing

Screw the rotor blades together as shown in picture (2). The rotor blades are properly balanced when they are suspended exactly horizontally. If one of the rotorblades is not exactly horizontal, the blades are not in equilibrium.

This is corrected by applying tape to lighter blade.

When mounting the rotor blades to the blade holders, note the proper direction (clockwise rotation). Tighten the cap screws holding the rotor blades, so that the blades cannot move easily in the blade holders.



18 Final Pre-Flight Check

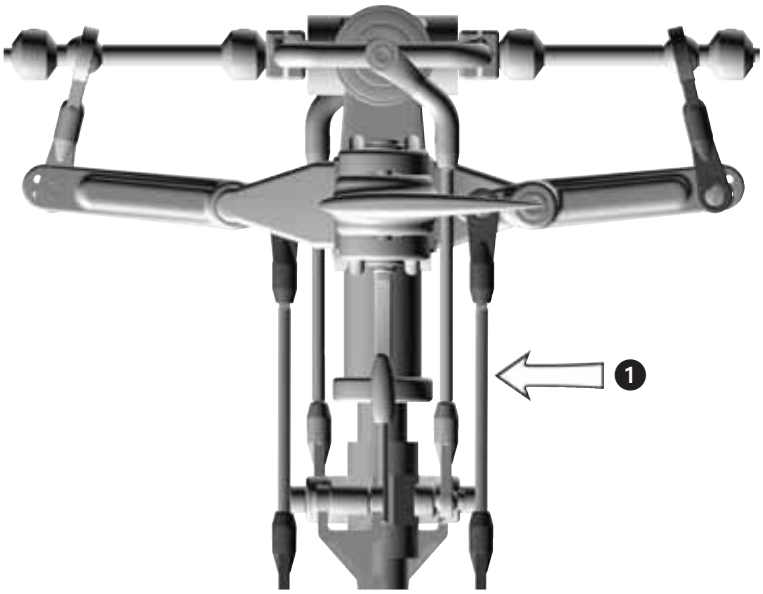
18.1 Direction of Main and Tail Rotation

Prior to the first flight double-check the direction of rotation of the main rotor head and the tail rotor.

18.2 Blade Tracking Adjustment

False

OK



Prior to the first flight the tracking of the rotor blades needs to be adjusted. If the tracking is not adjusted properly, this can cause vibrations and lead to instability of the helicopter.

Apply colored tape to the tip of one of the rotor blades. Apply tape of a different color to the tip of the other rotor blade. When you are ready for your first flight, increase the rotor speed to just before lift-off. From a safe distance, check the rotor disk at eye-level. Very likely, one rotor blade will move below the other.

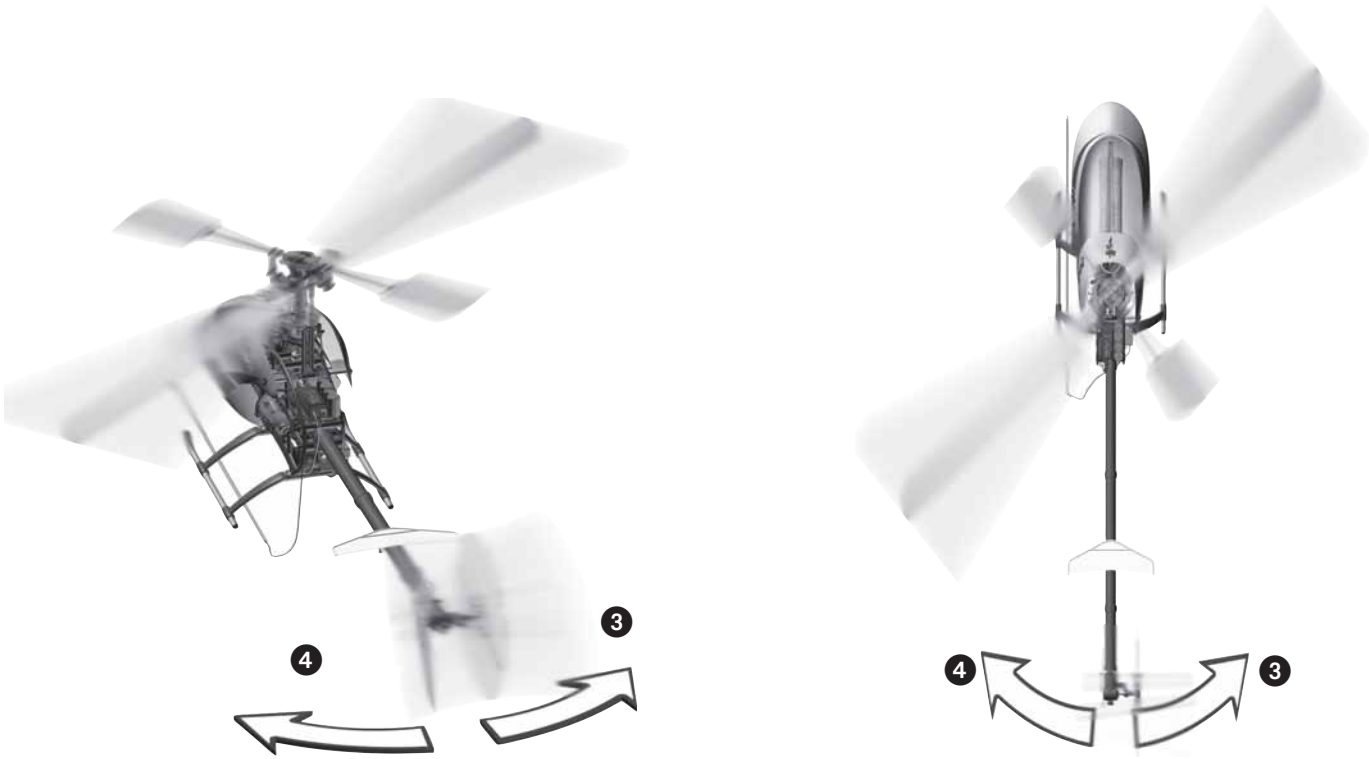
Make a note of the color of the low-moving blade. Then turn off the motor and wait until the rotor head has come to a halt. Lengthen the linkage (1) of the rotor blade which was moving low by unscrewing the ball links somewhat. Repeat the checking procedure until both rotor blades move on the same level.

19.1 Pitch/Throttle

You may want to program a different stick mode than the one shown. Please check which stick mode is used by other local pilots. Use the same one, so fellow pilots can assist you on the field.

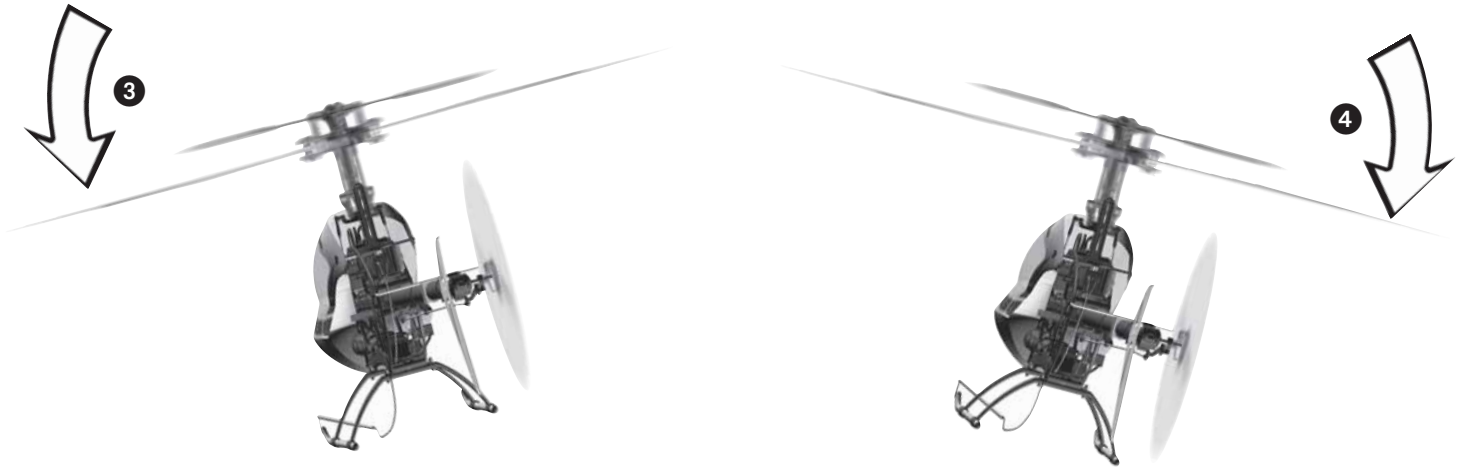
Important: Flying a model helicopter requires many hours of training. During your first attempts, while familiarizing yourself with the different control movements, keep the helicopter low above the ground (just a few centimeters/a couple of inches.)

19.2 Rudder

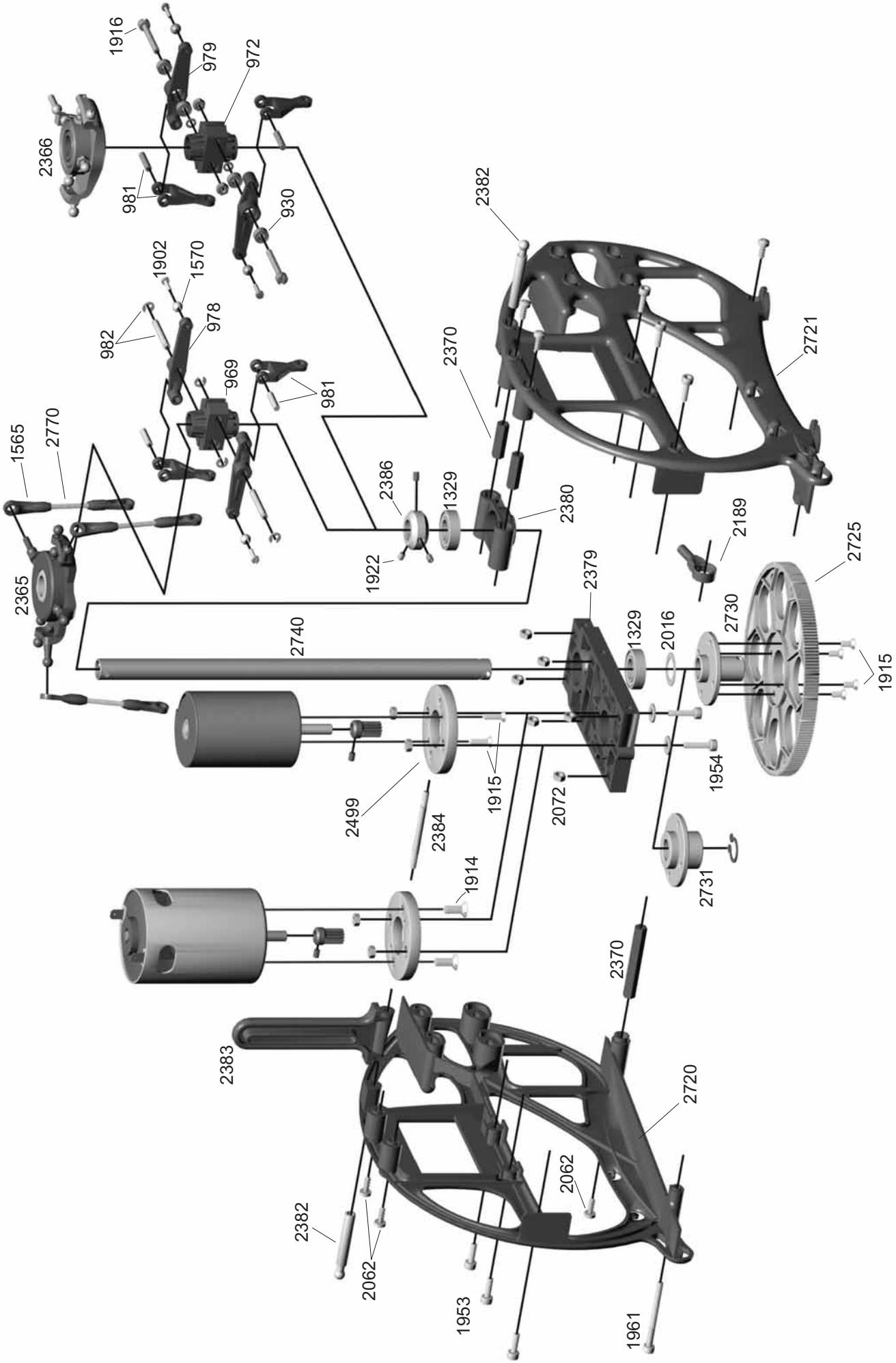


19.3 Elevator

19.4 Aileron



20.1 Chassis


1916
979
972
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930
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982
969
981
1565
2770
2365
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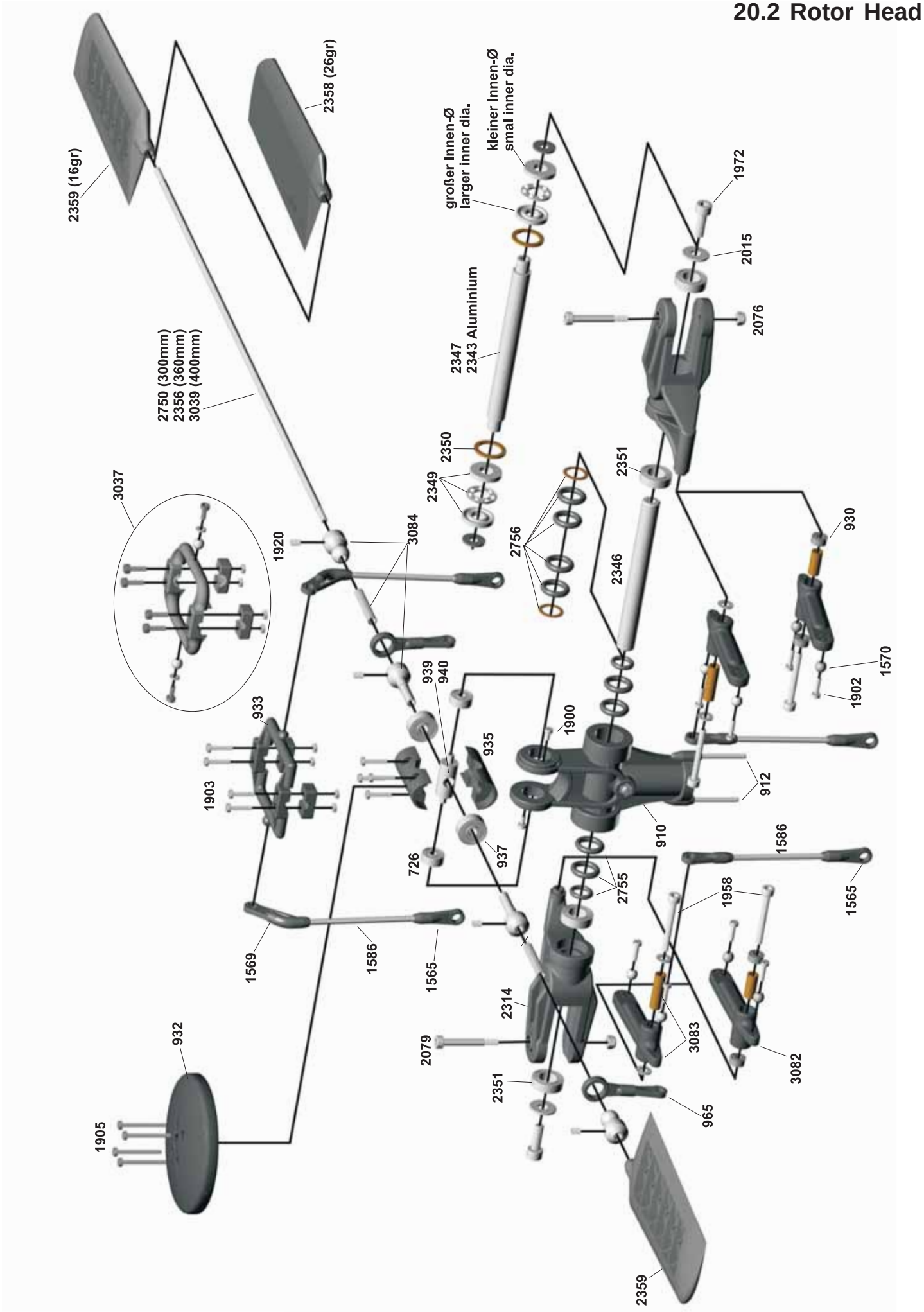
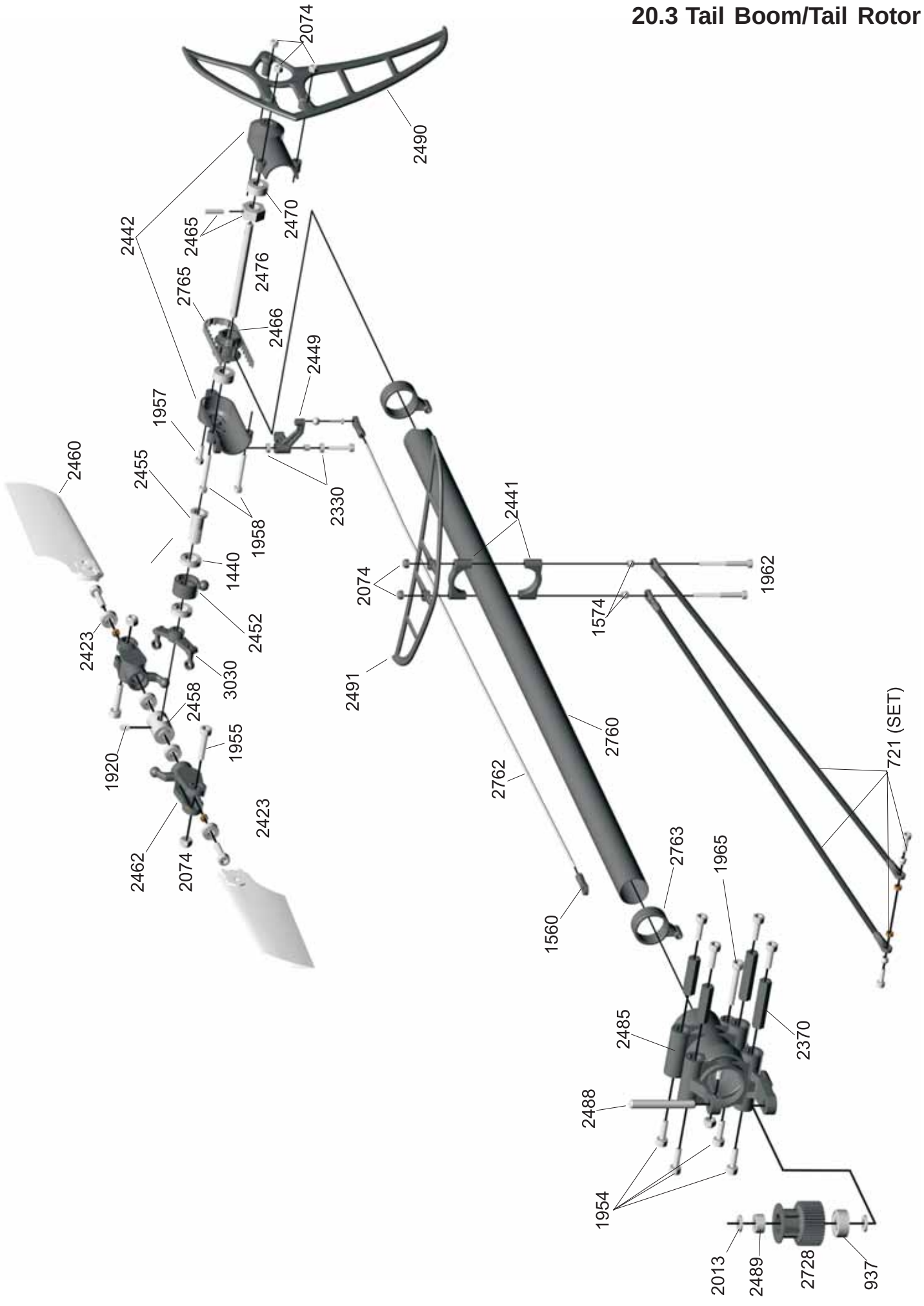
2721
2386
1329
2380
1922
2189
2725
2379
2740
1329
2016
2730
1915
2499
2384
1915
2072
1954
2731
1914
2370
2383
2720
2062
2382
2062
1953
1961

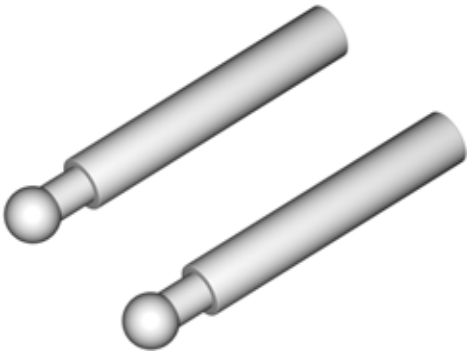
20.2 Rotor Head



20.3 Tail Boom/Tail Rotor



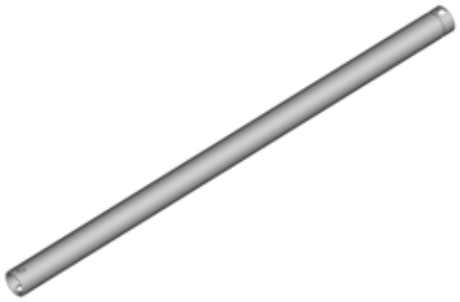
Alu canopy holders #3038



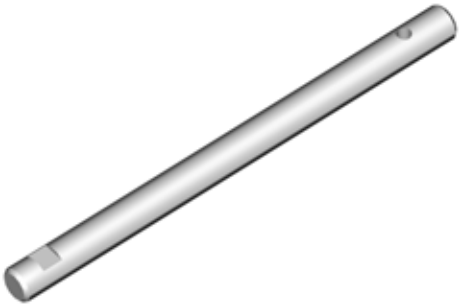
Carbon tail boom #2758

Carbon main rotor blades #2712

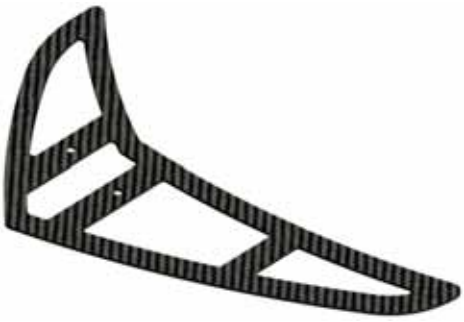
Main rotorshaft hardened #2741



Tail rotorshaft hardened #2475



Carbon vertical fin #2780

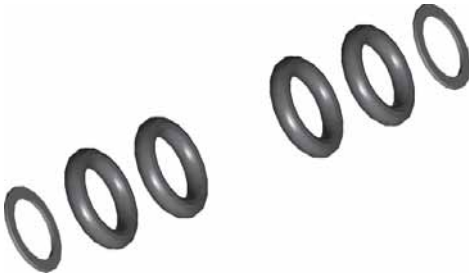


Carbon horizontal fin #2781

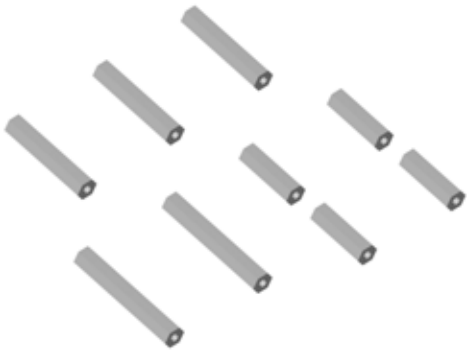
Battery support plate #2782

Clamp ring #2385

Extra hard dampening #3092

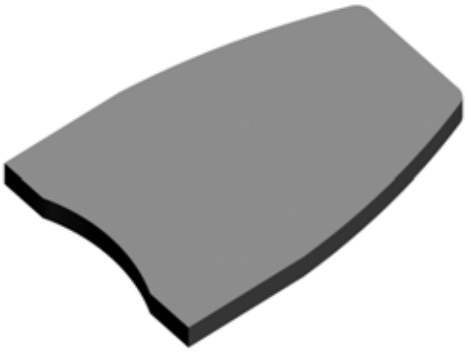


Alu hex bolts #2371

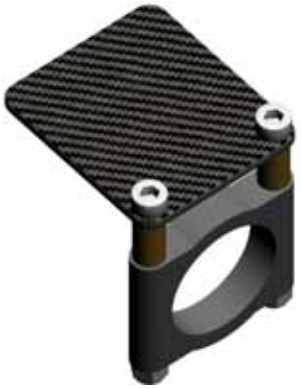


Alu washout unit #973

Gyro plate for chassis #3096



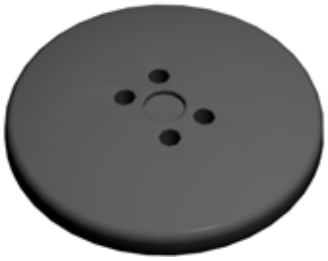
Carbon gyro plate #2486



Alu motorplate #3061

Tail rotor hub with thrustbearings #3052

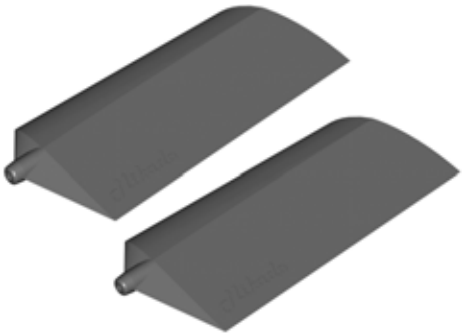
Rotor disk #932



Tail boom long (upgrade set) #2769

BEC #2530

Heavy stabilizer paddles #2358

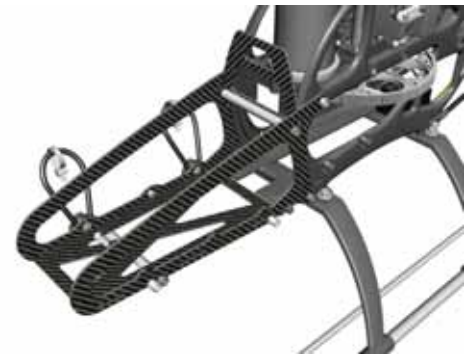


Carbon Tail servo holder #828

Carbon rotor blades #2713

Carbon tail rotor upgrade set #3062

Carbon battery support #4000



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LOGO 103 D

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