GOBLIN

HELICOPTER

MANUAL

GOBLIN URUKAY

SAB HELI DIVISION

Goblin URUKAY Manual

Release 1.0 - October 2014

SAB HELI DIVISION
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WORLD DISTRIBUTION
www.goblin-helicopter.com
For sales inquiries, please email: *sales@goblin-helicopter.com*
For info inquiries, please email: *support@goblin-helicopter.com*
Attention: If you are a consumer and have questions or need of assistance,
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please contact in a first time the Goblin retailer where you made the purchase

VERY IMPORTANT

Inside Box 6, you will find Bag 21. This bag contains your serial number tag. Please take a moment to register your kit online via our web site at:

http: //www.goblin-helicopter.com

It is extremely important that you take a moment to register your helicopter with us. This is the only way to ensure that you are properly informed about changes to your kit, such as upgrades, retrofits and other important developments. SAB Heli Division cannot be held responsible for issues arising with your model and will not provide support unless you register your serial number.

To mount the serial number tag on your helicopter, please refer to page 32.

Thank you for your purchase, we hope you enjoy your new Goblin helicopter!

SAB Heli Division

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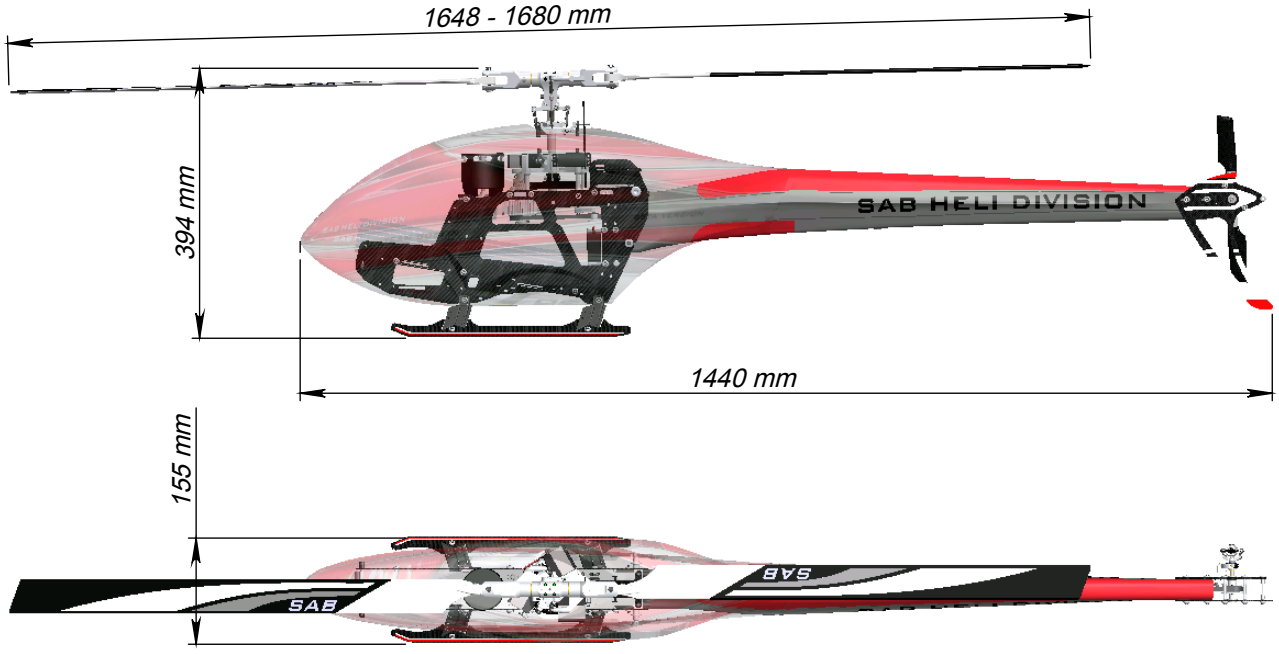
SPECIFICATIONS



Main rotor diameter:
** HPS3, 3 Blade main rotor: 1648mm with 730mm blades.*
** HPS2, 2 Blade main rotor: 1680mm with 750mm blades.*
Main blade length: up to 750mm
Tail rotor diameter: 304mm
Tail blade length: 115mm
Main shaft diameter: 12mm
Tail shaft diameter: 6mm
Spindle diameter: 10mm
Motor size: Maximum 64mm diameter, maximum height 64mm
Battery compartment: 60x58x350mm (adaptable to 75x58x350mm)

IMPORTANT NOTES

*This radio controlled helicopter is not a toy.
*This radio controlled helicopter can be very dangerous.
*This radio controlled helicopter is a technically complex device which has to be built and handled very carefully.
*This radio controlled helicopter must be built following these instructions. This manual provides the necessary information to correctly assemble the model. It is necessary to carefully follow all the instructions.
*Inexperienced pilots must be monitored by expert pilots.
*All operators must wear safety glasses and take appropriate safety precautions.
*A radio controlled helicopter must only be used in open spaces without obstacles, and far enough from people to minimize the possibility of accidents or of injury to property or persons.
*A radio controlled helicopter can behave in an unexpected manner, causing loss of control of the model, making it very dangerous.
*Lack of care with assembly or maintenance can result in an unreliable and dangerous model.

***Neither SAB Heli Division nor its agents have any control over the assembly, maintenance and use of this product. Therefore, no responsibility can be traced back to the manufacturer. You hereby agree to release SAB Heli Division from any responsibility or liability arising from the use of this product.**

SAFETY GUIDELINES

*Fly only in areas dedicated to the use of model helicopters.
*Follow all control procedures for the radio frequency system.
*It is necessary that you know your radio system well. Check all functions of the transmitter before every flight.
*The blades of the model rotate at a very high speed; be aware of the danger they pose and the damage they may cause.
*Never fly in the vicinity of other people.

NOTES FOR ASSEMBLY

Please refer to this manual for assembly instructions for this model.
Follow the order of assembly indicated. The instructions are divided into chapters, which are structured in a way that each step is based on the work done in the previous step. Changing the order of assembly may result in additional or unnecessary steps.
Use thread lockers and retaining compounds as indicated. In general, each bolt or screw that engages with a metal part requires thread lock.

It is necessary to pay attention to the symbols listed below:

Important

⇨Bag xx Indicates that for this assembly phase you need materials that are in bag xx.

Use retaining compound (eg Loctite 648)

Use retaining compound (eg Loctite 243)

Use CA Glue

Use Proper Lubricant

ADDITIONAL COMPONENTS REQUIRED

*Electric Motor: 400 - 560Kv
Maximum diameter 64mm,
Maximum height 64mm,
Pinion shaft diameter 6/8mm

*Speed controller: minimum 120A , suggest 160A

*Batteries: 12S-5000 mAh
*1 flybarless 3 axis control unit
*Radio power system, if not integrated with the ESC
*3 cyclic servos
*1 tail rotor servo
*6 channel radio control system on 2.4 GHz

(See configuration examples on page 18)

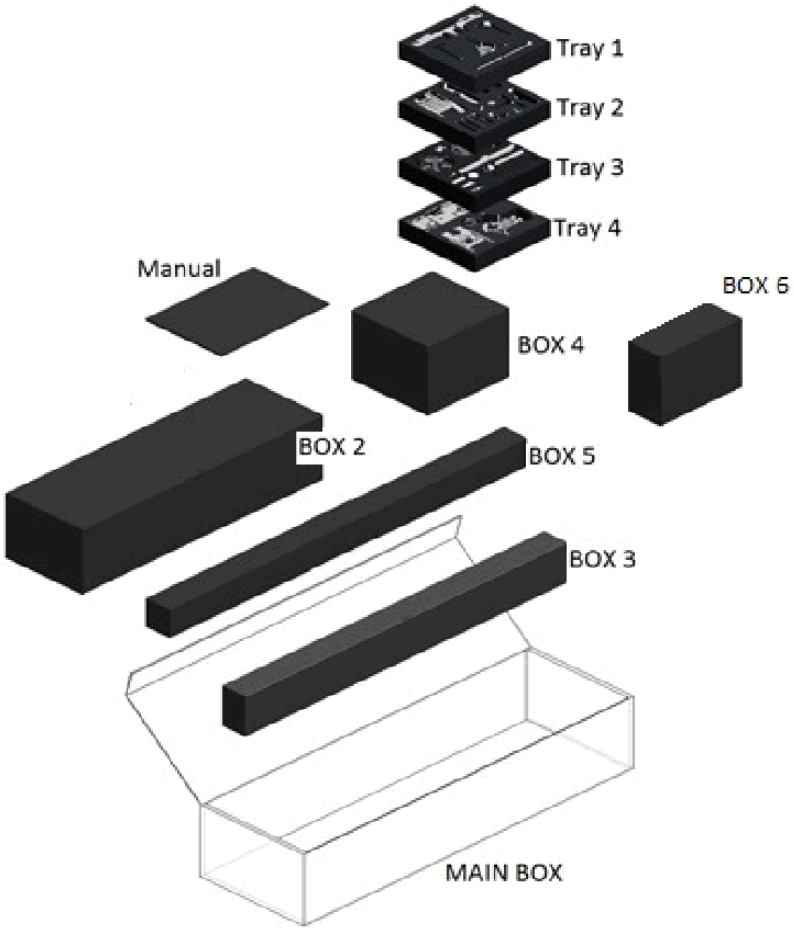
TOOLS, LUBRICANTS, ADHESIVES

*Generic pliers
*Hexagonal driver, size 1.5,2,2.5,3,4mm
*4mm T-Wrench
*5.5mm Socket wrench (for M3 nuts)
*8mm Hex fork wrench (for M5 nuts)

*Medium threadlocker (eg. Loctite 243)
*Strong retaining compound (eg. Loctite 648)
*Spray lubricant (eg. Try-Flow Oil)
*Grease (eg. Microlube GL261)
*Cyanoacrylate adhesive

*Pitch Gauge (for set-up)
*Soldering equipment (for motor wiring)

Inside the main box there are:



Inside the main box:

Box 2: Canopy, Blade Holder, Carbon parts.

Box 3: Boom,Carbon rod.

Box 4: Mechanical parts in 4 trays:
Tray 1: Main rotor.
Tray 2: Carbon frame and tail rotor.
Tray 3: Transmission.
Tray 4: Main structure.

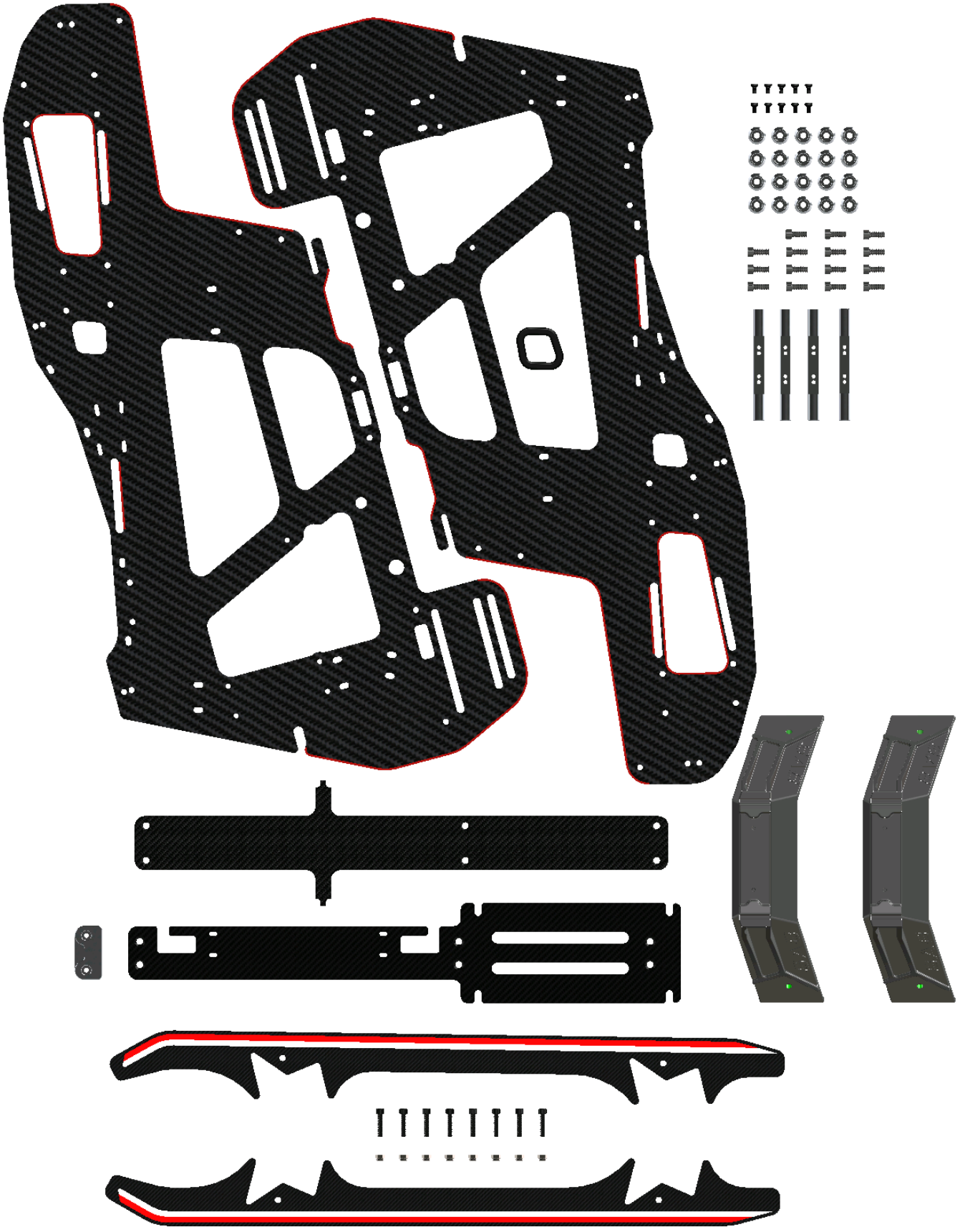
Box 5: Bags, Blades.

Box 6: Bags, Tail Blades.

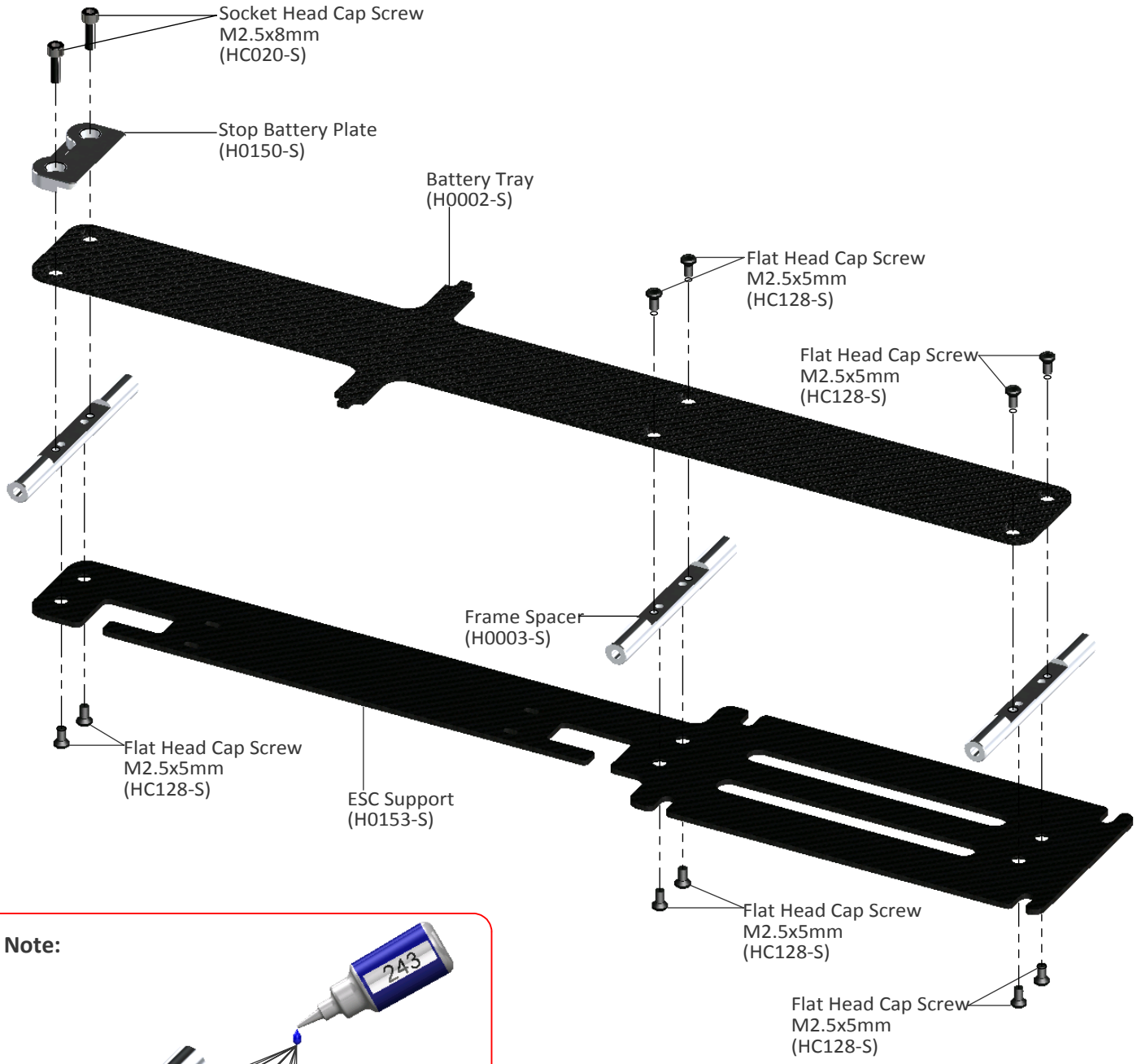
The assembly process is described in the following chapters. Each chapter provides you with the box, bag and/or foam tray numbers you will need for that chapter. The information is printed in a green box in the upper right hand corner of the page at the beginning of every chapter.

4-Carbon Frame

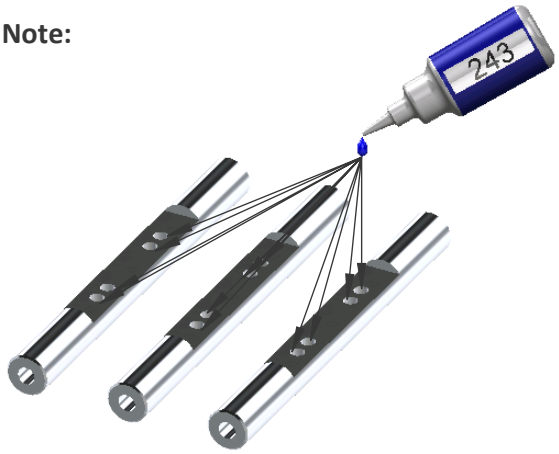
The manufacturing process of the carbon parts often leaves micro-burrs and sharp edges. We recommend de-burring the edges to minimize the risks of electrical wire cuts, etc. Very important in red line zone.



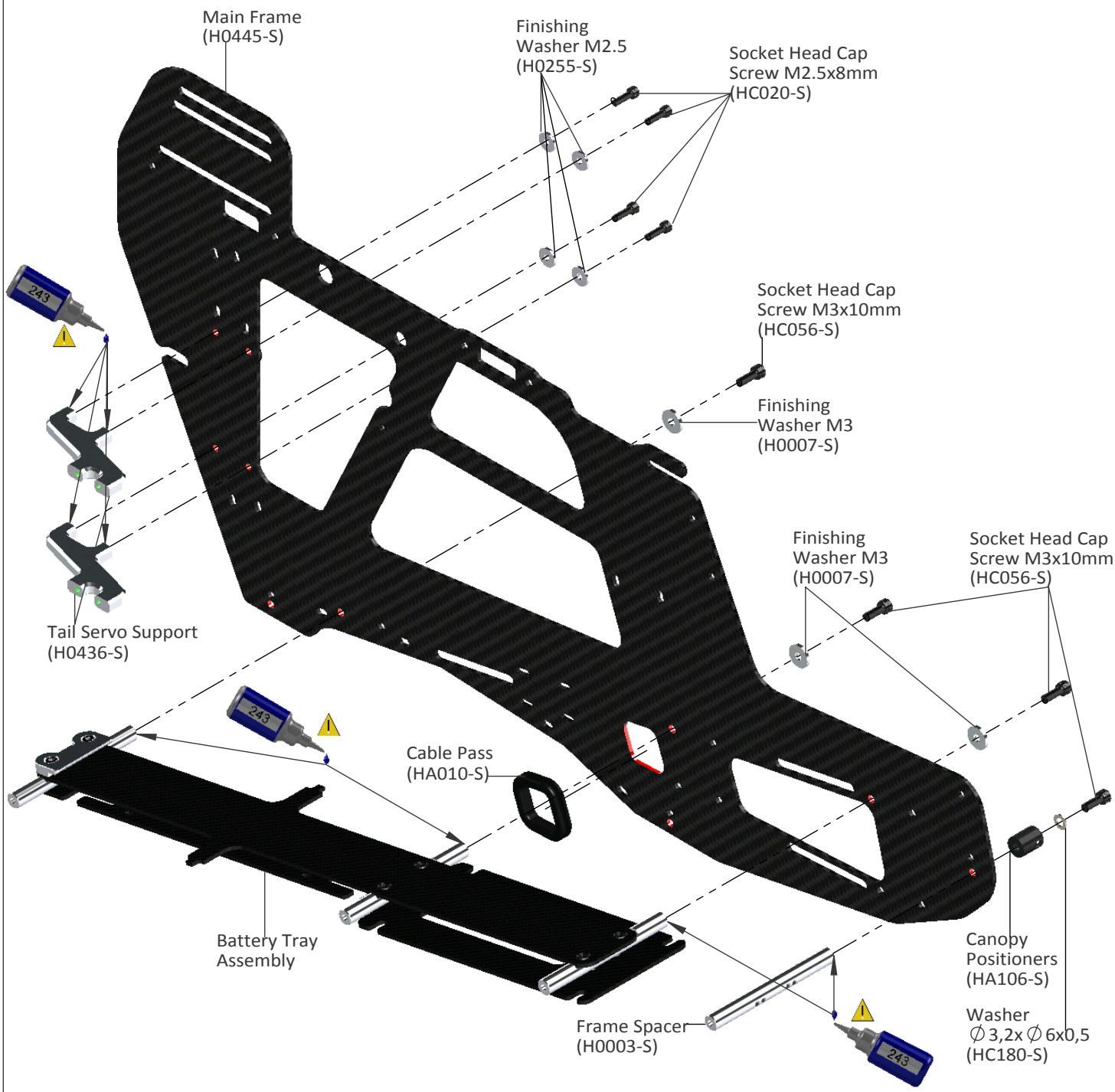
Battery Tray Assembly



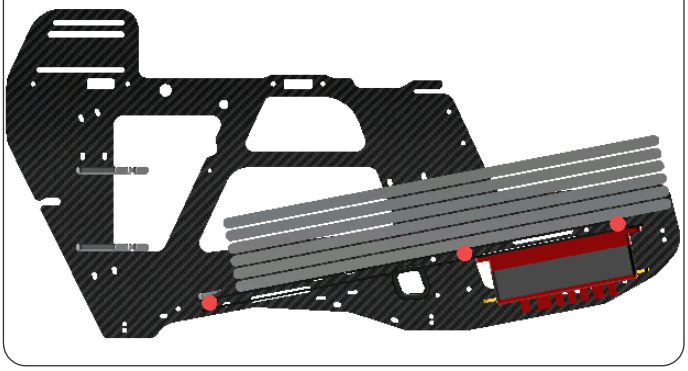
Note:



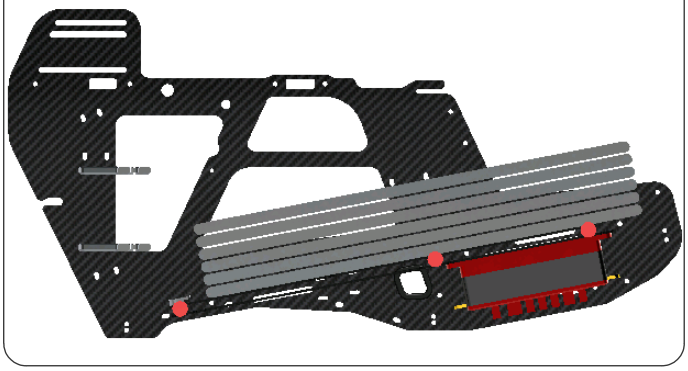
Left Main Frame Assembly

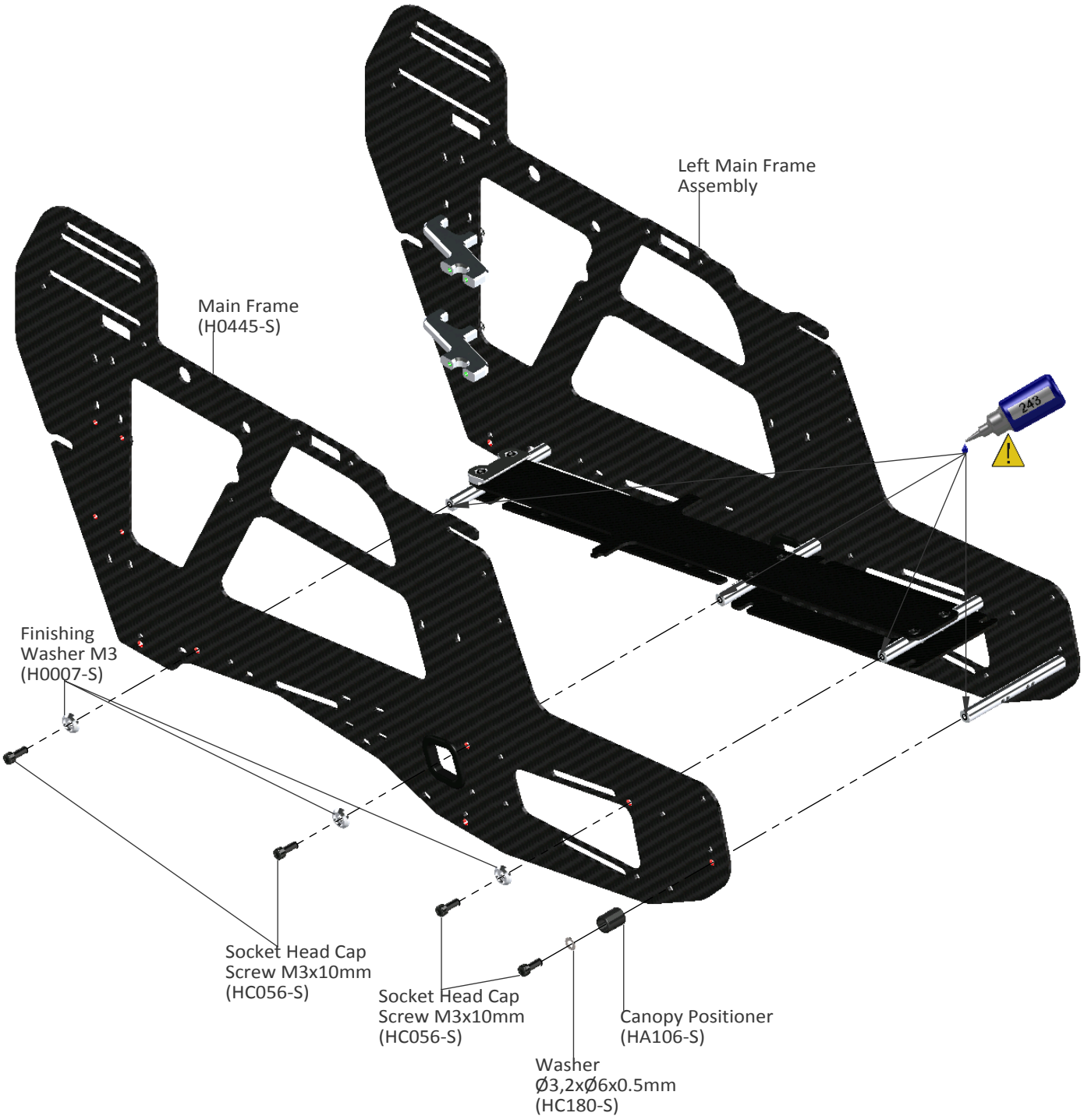


Font Position for Battery Support
(Light Batteries < 1500-1600g)

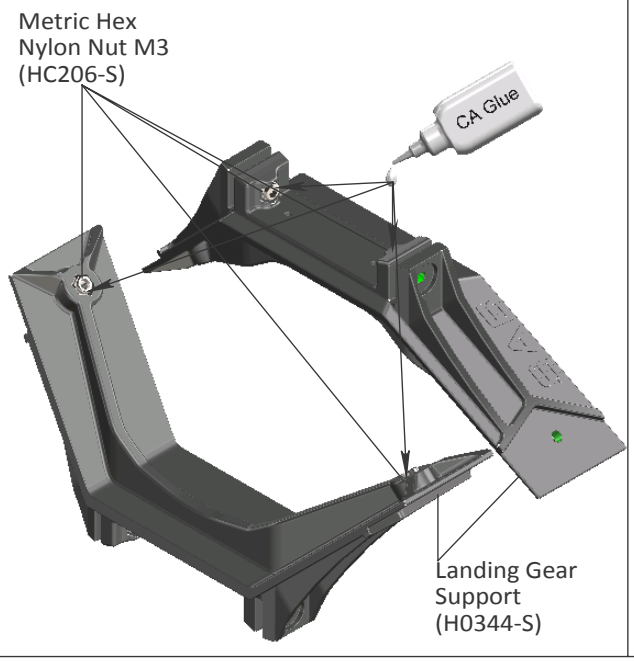


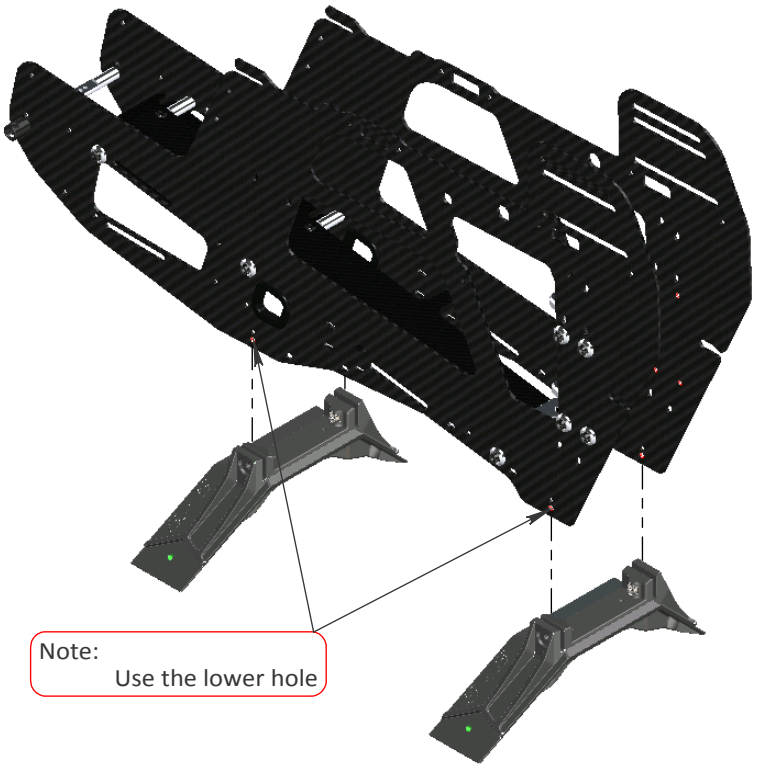
Back Position for Battery Support
(Heavy Batteries > 1600-1700g)

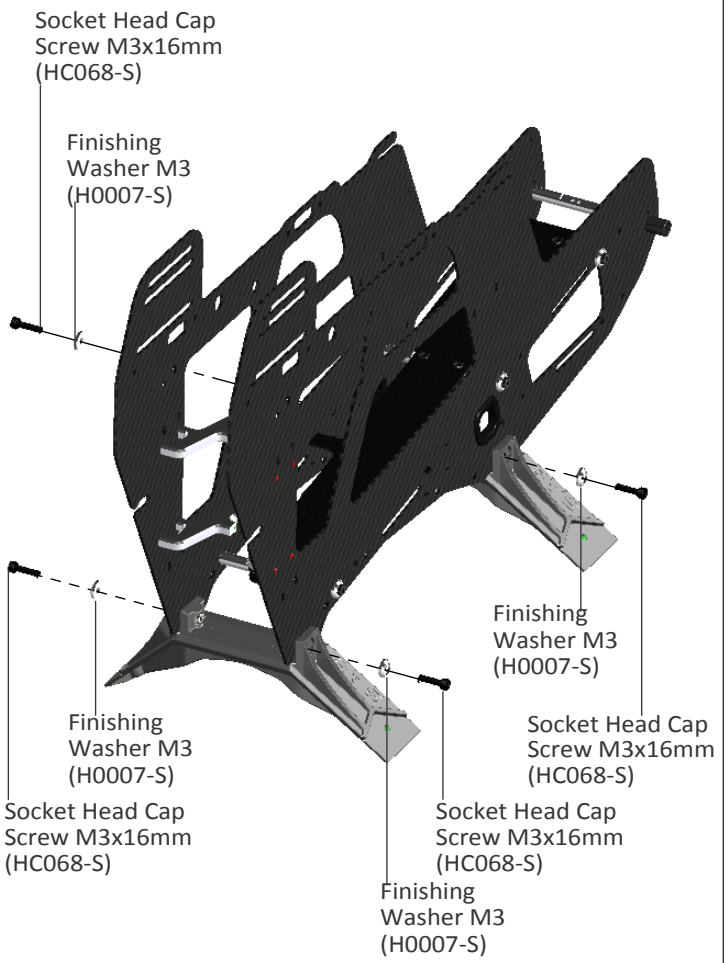


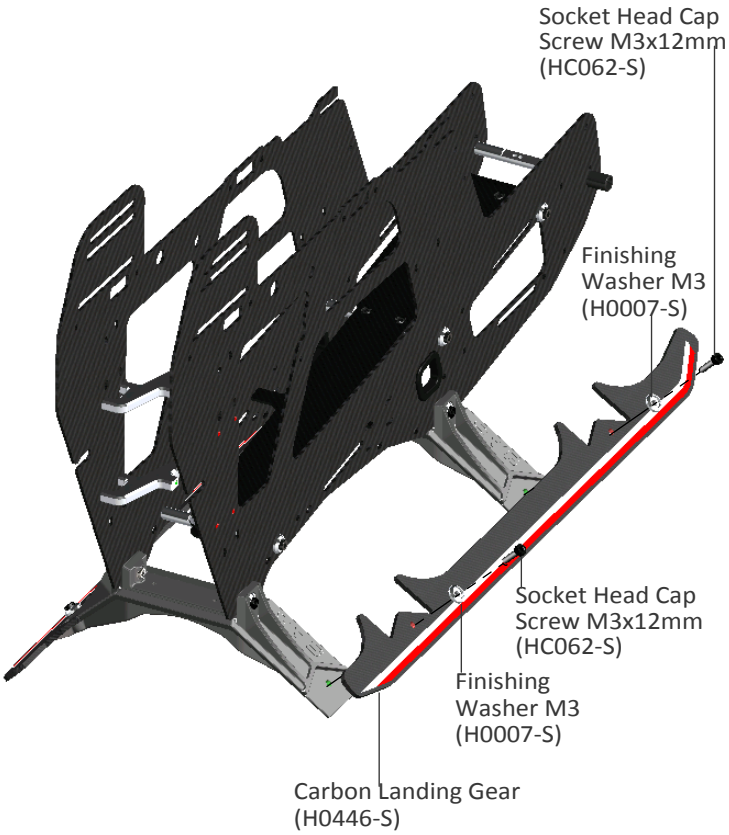

Left Main Frame
Assembly
Main Frame
(H0445-S)
243
Finishing
Washer M3
(H0007-S)
Socket Head Cap
Screw M3x10mm
(HC056-S)
Socket Head Cap
Screw M3x10mm
(HC056-S)
Canopy Positioner
(HA106-S)
Washer
Ø3,2xØ6x0.5mm
(HC180-S)

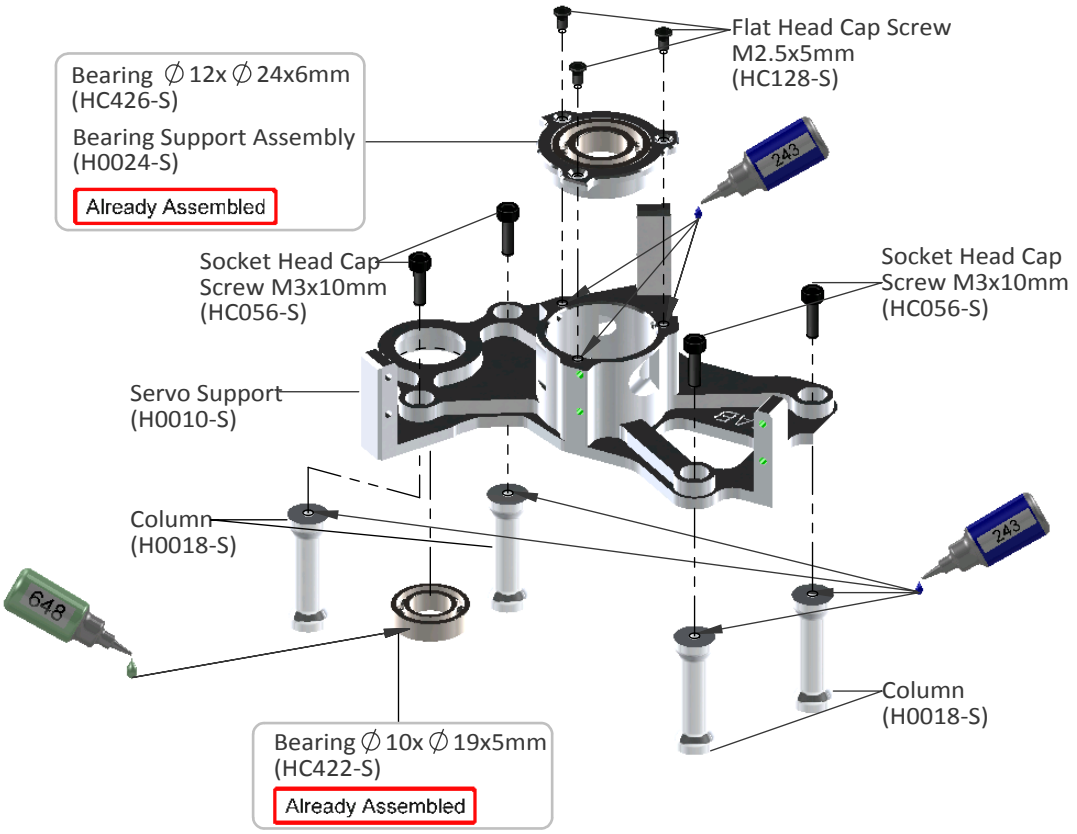
Note:
You can use Super Glue for block the nuts in correct position

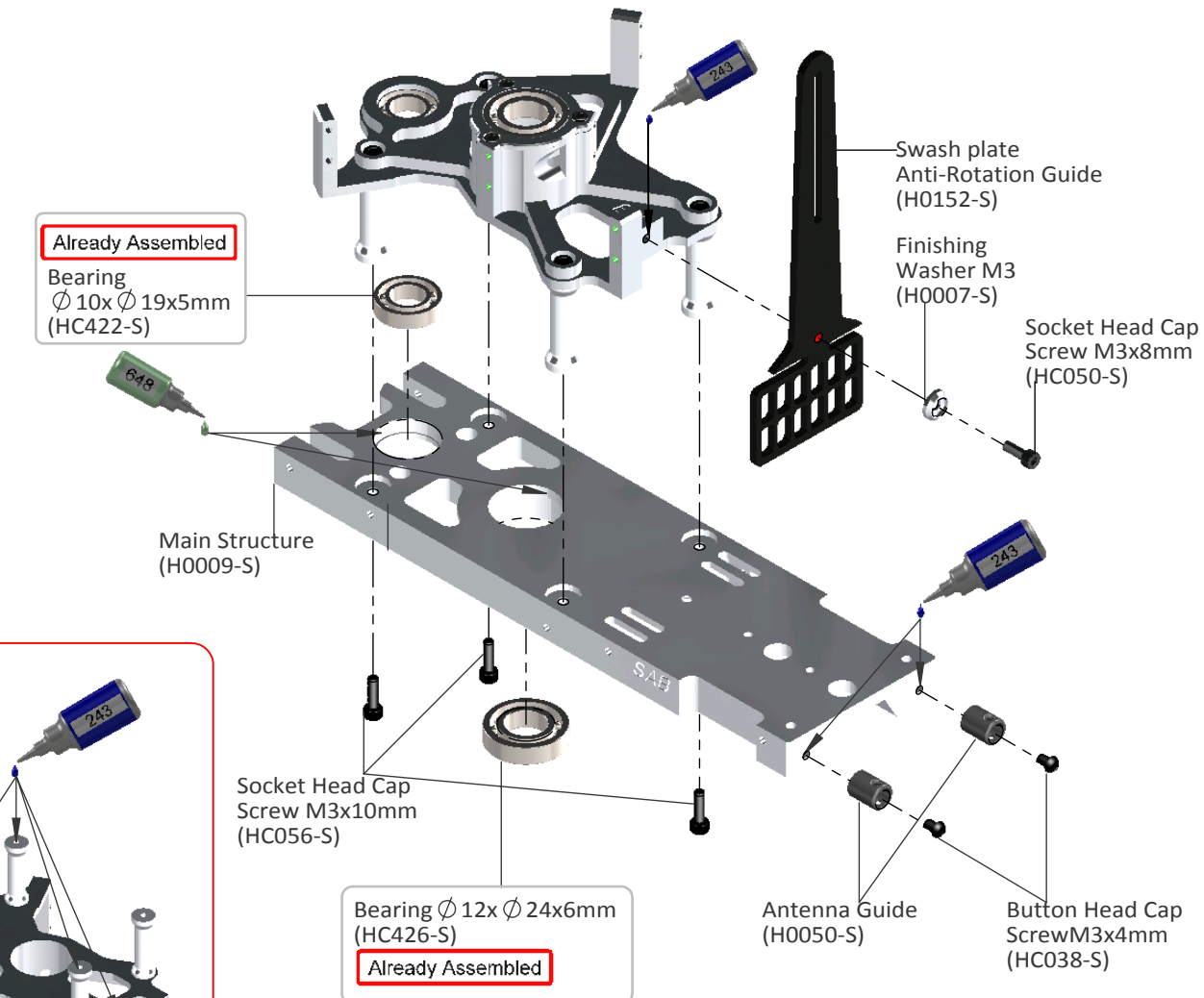




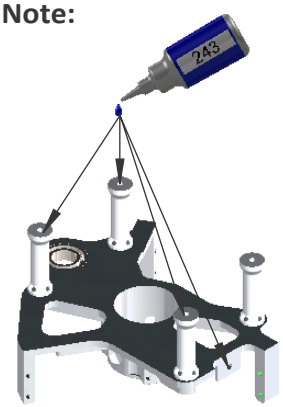





Bearing ∅12x∅24x6mm
(HC426-S)
Bearing Support Assembly
(H0024-S)
Already Assembled
Flat Head Cap Screw
M2.5x5mm
(HC128-S)
243
Socket Head Cap
Screw M3x10mm
(HC056-S)
Socket Head Cap
Screw M3x10mm
(HC056-S)
Servo Support
(H0010-S)
Column
(H0018-S)
243
648
Column
(H0018-S)
Bearing ∅10x∅19x5mm
(HC422-S)
Already Assembled


Already Assembled
Bearing
∅10x∅19x5mm
(HC422-S)
243
Swash plate
Anti-Rotation Guide
(H0152-S)
Finishing
Washer M3
(H0007-S)
Socket Head Cap
Screw M3x8mm
(HC050-S)
648
Main Structure
(H0009-S)
243
Socket Head Cap
Screw M3x10mm
(HC056-S)
Bearing ∅12x∅24x6mm
(HC426-S)
Already Assembled
Antenna Guide
(H0050-S)
Button Head Cap
ScrewM3x4mm
(HC038-S)

Note:


243

Note 1:

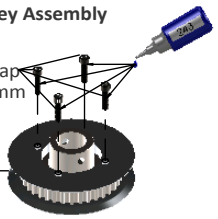
When you tighten the collar (**H0121-S**) on the main shaft, ensure there is no axial play. Push down the main shaft while pulling up the locking collar. Tighten the screw **M4x22** at this time.

Note 2:

The pinion and gear are designed to have zero backlash. This leads to initial "rough" rotation. After some run in flights (**3-5 flights**) it will begin to rotate freely, ensuring perfect contact and the ability to transmit maximum power.

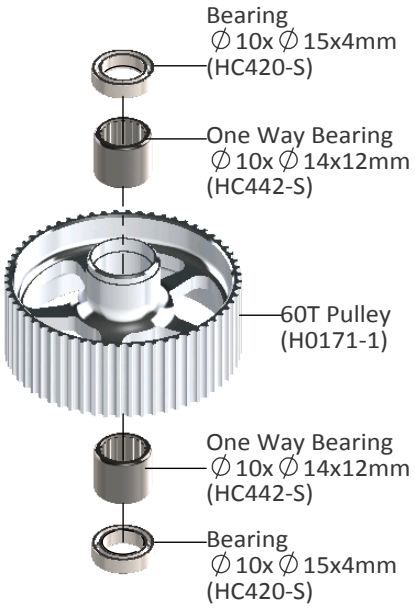
It is very important to lubricate these two elements with a lubricant (Dry Fluids Gear or similar). ⚠

Front Tail Pulley Assembly (H0172-S)



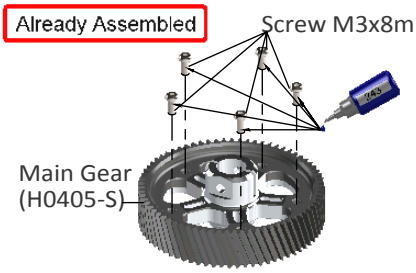
60T Pulley Assembly (H0171-S)

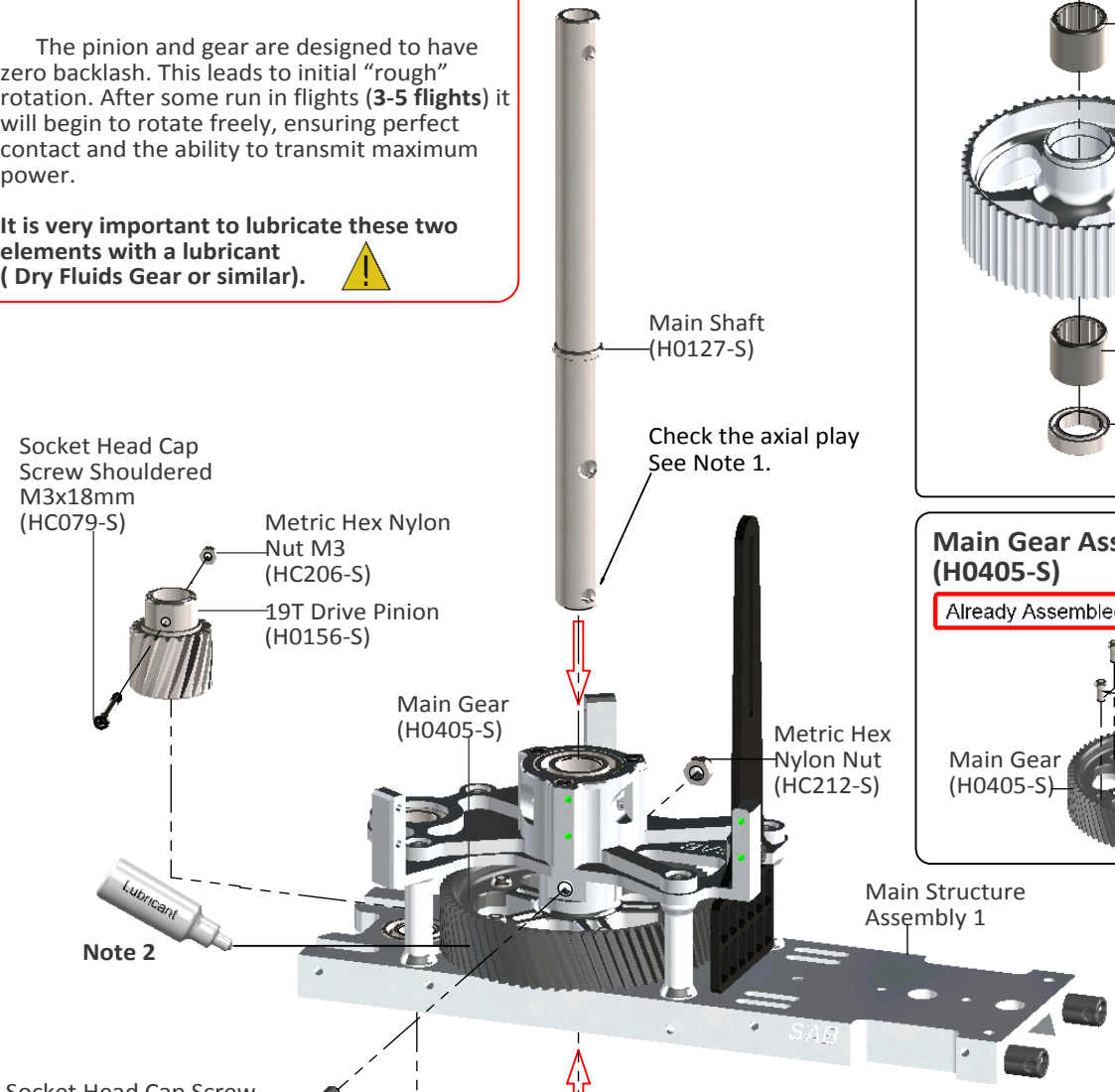
Already Assembled



Main Gear Assembly (H0405-S)

Already Assembled

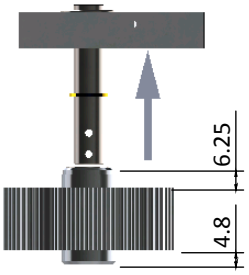




⚠ Grease

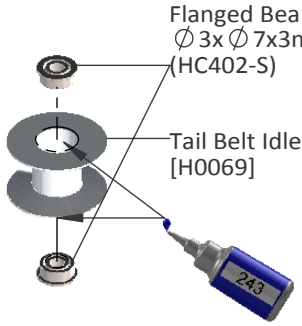
eg: Microlube GL261

Note: Correct insertion of the one-way pulley



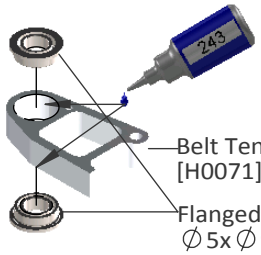
Tail Belt Idler Assembly (H0174-S)

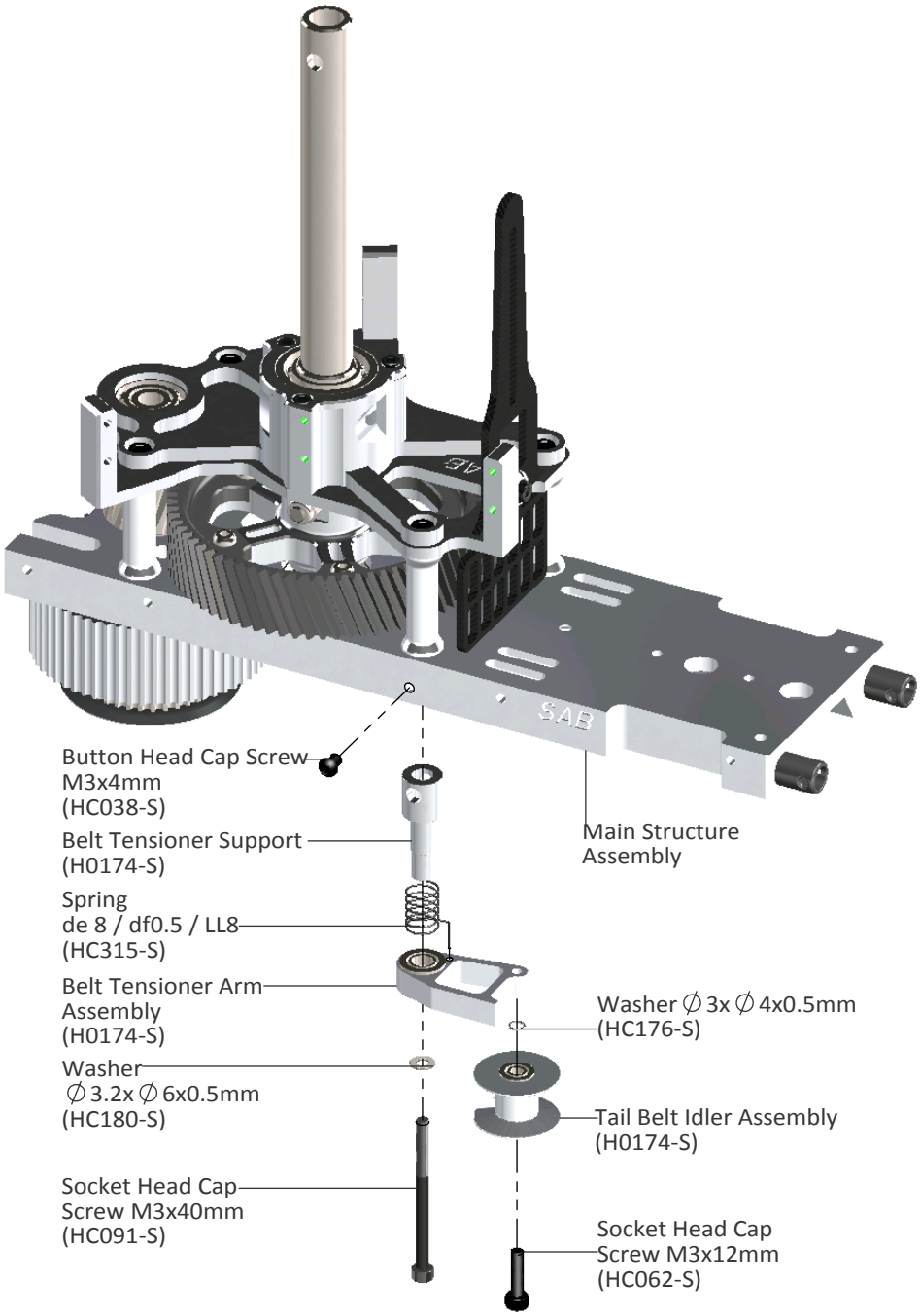
Already Assembled

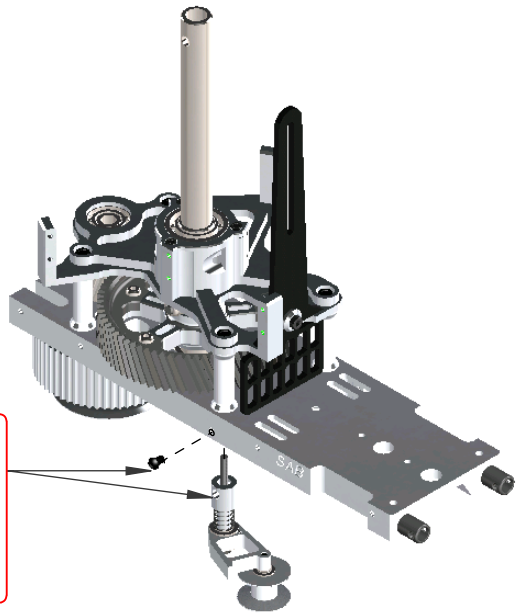


Belt Tensioner Arm Assembly (H0174-S)

Already Assembled

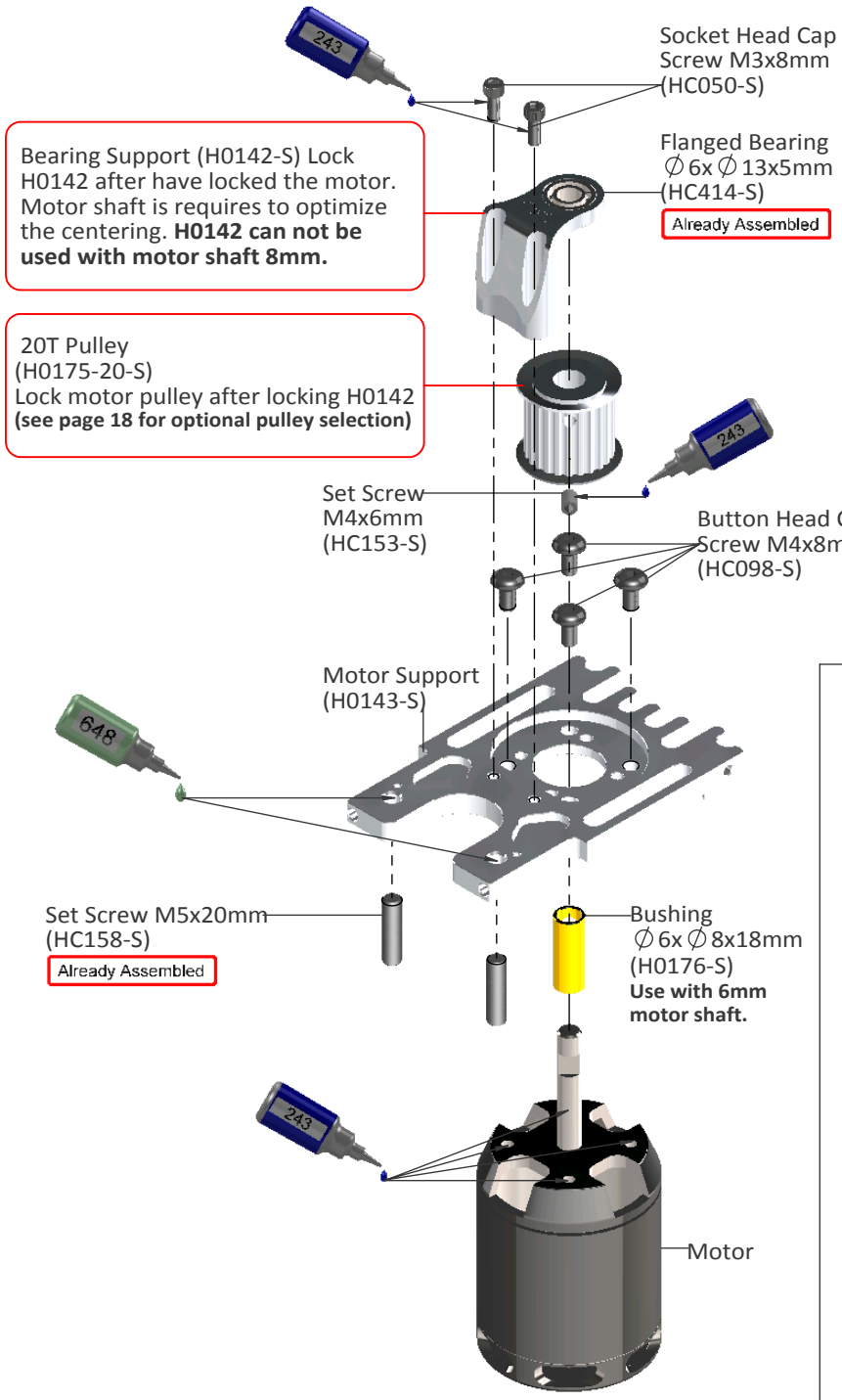


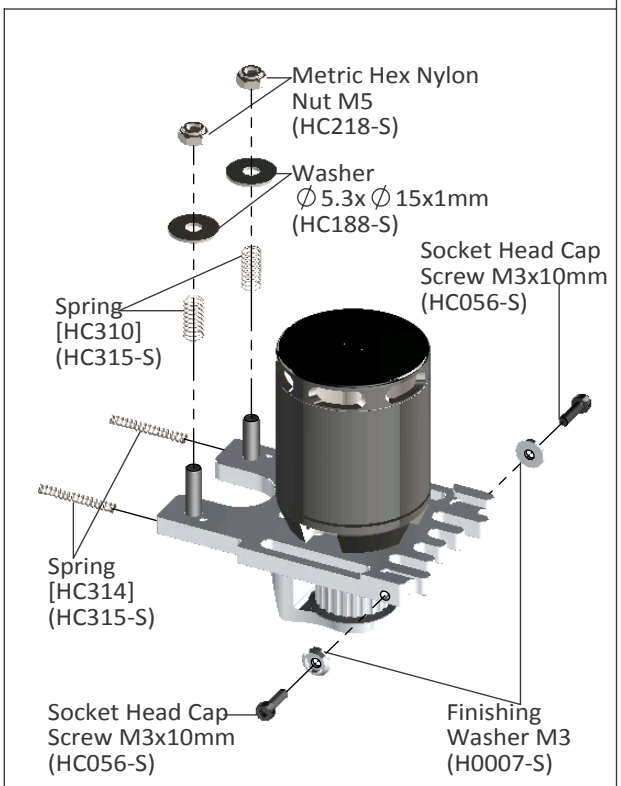




Note:

Position without preload. Insert the screw in the hole through the aluminum support as in the picture.

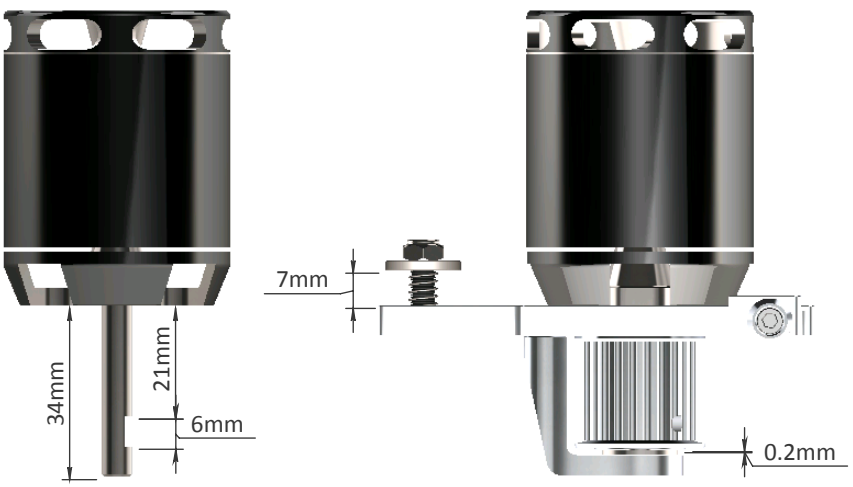




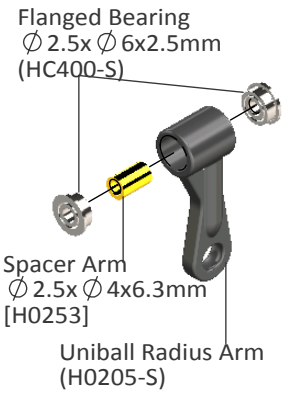
Note

To maximize space for the batteries, it is advisable to shorten the motor shaft. Follow the dimensions given in this drawing. For the cut, you can use an electric tool like a “Dremel” with a cut-off disc.

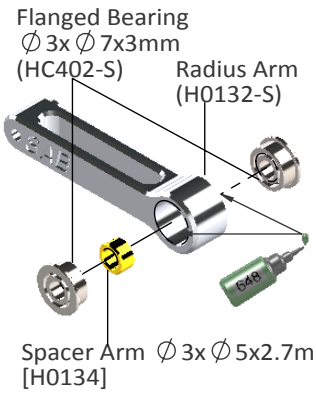
Additionally, ensure the motor shaft has an appropriate 'flat' for one of the set screws.



Uniball Radius Arm Assembly ... x 2

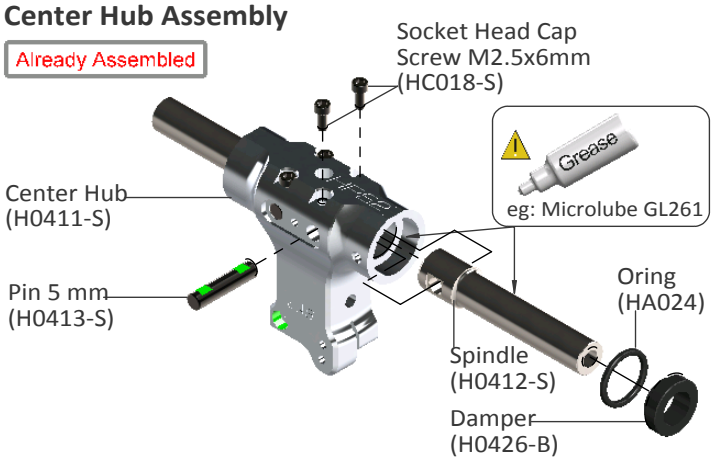


Radius Arm Assembly ... x 2



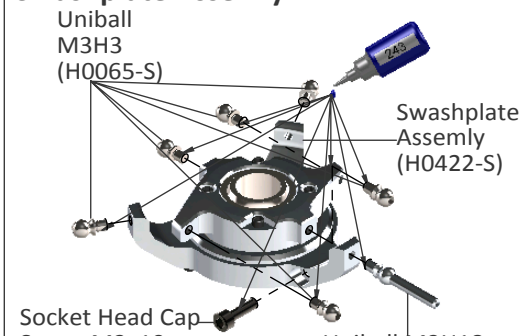
Center Hub Assembly

Already Assembled

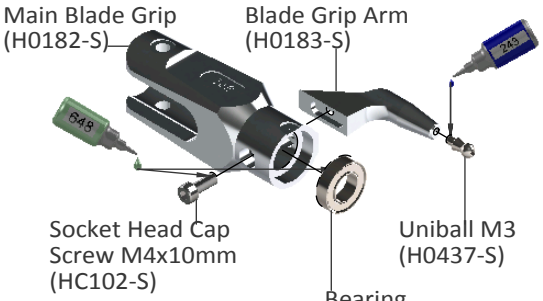


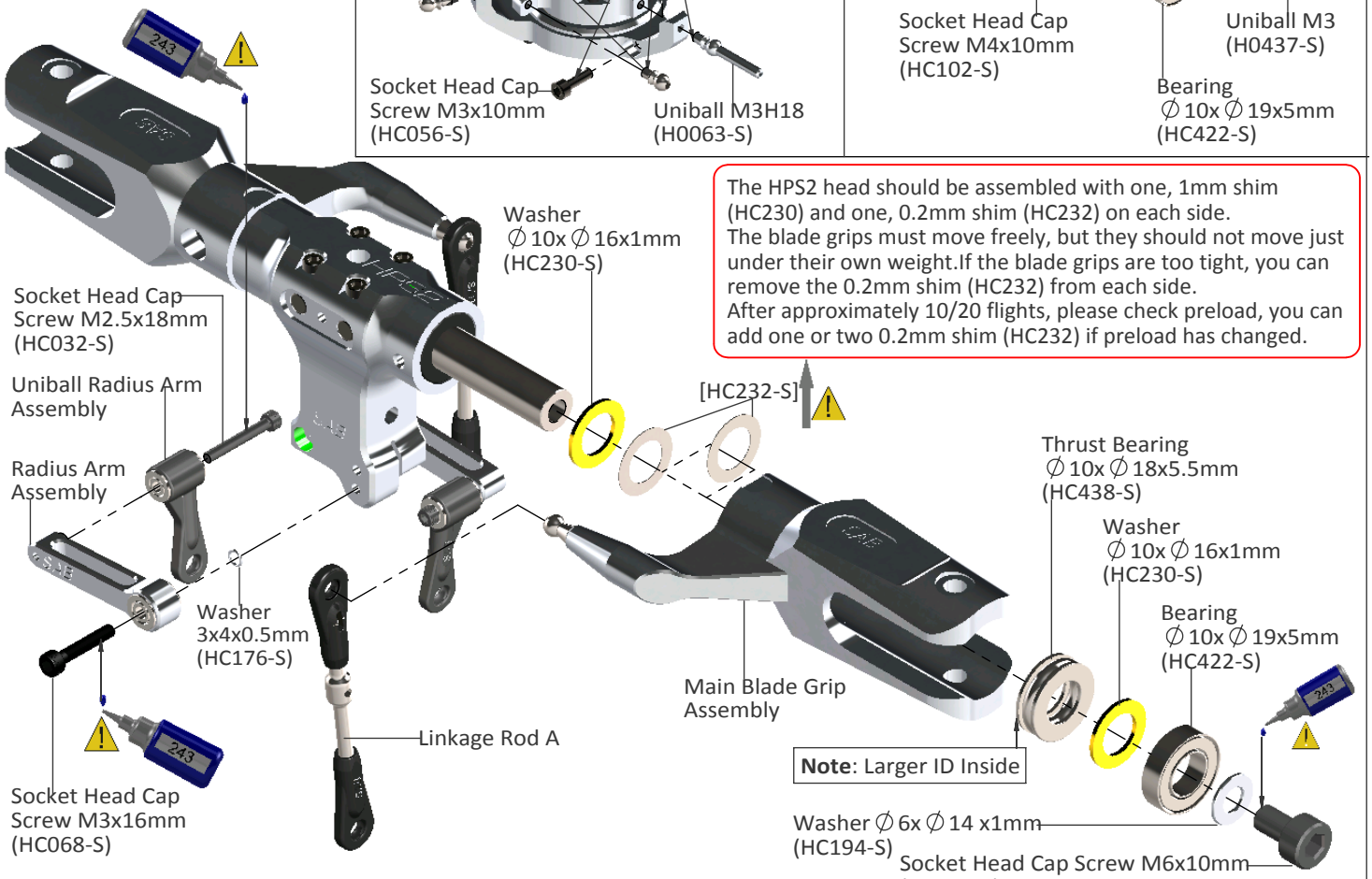
Head HPS2 Assemly

Swashplate Assemly



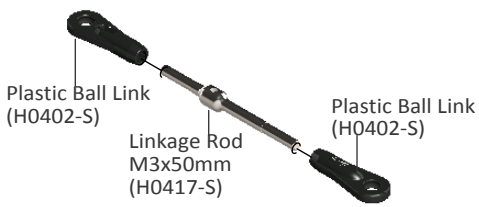
Main Blade Grip Assembly x2





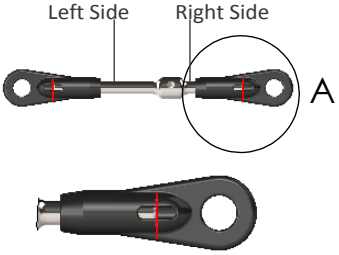
The HPS2 head should be assembled with one, 1mm shim (HC230) and one, 0.2mm shim (HC232) on each side.
The blade grips must move freely, but they should not move just under their own weight.If the blade grips are too tight, you can remove the 0.2mm shim (HC232) from each side.
After approximately 10/20 flights, please check preload, you can add one or two 0.2mm shim (HC232) if preload has changed.

Linkage Rod A Assembly x2

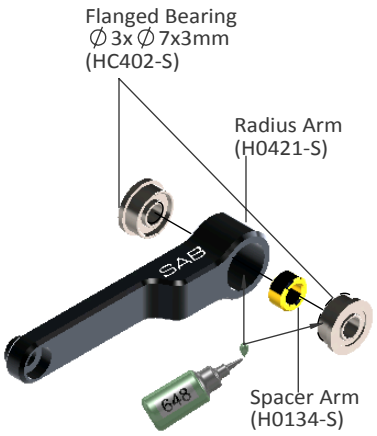


(Initial length for the rods from the swashplate to the Blade Grip.)

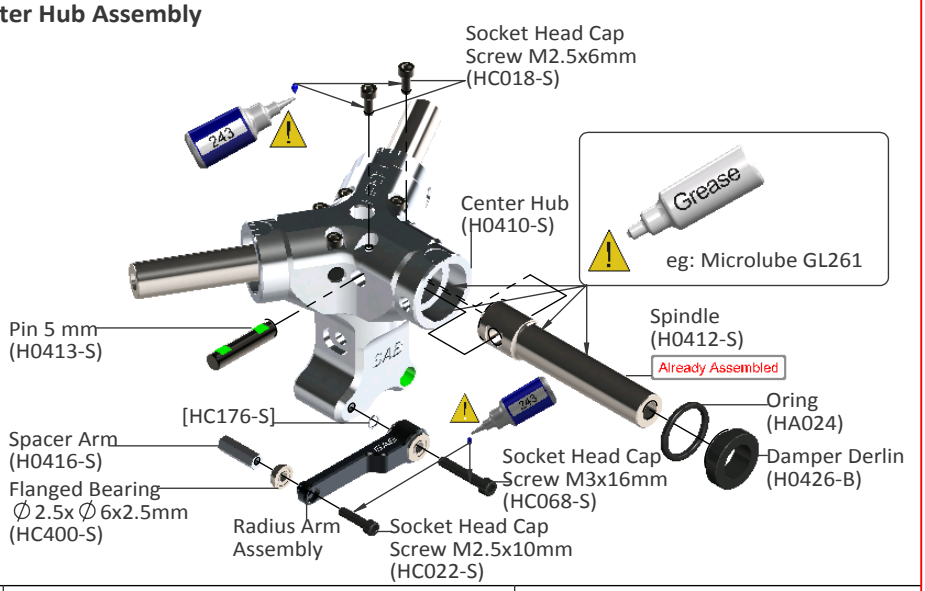
* Clock-wise, counter clock-wise thread
* By turning the linkages you can adjust tracking. If tracking is adjusted correctly, you'll see the metal part line up around in the center of the opening.



Radius Arm Assembly ... x 2

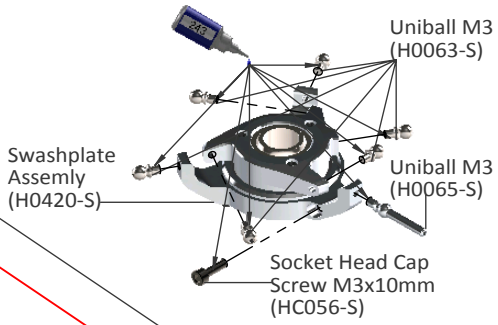


Center Hub Assembly

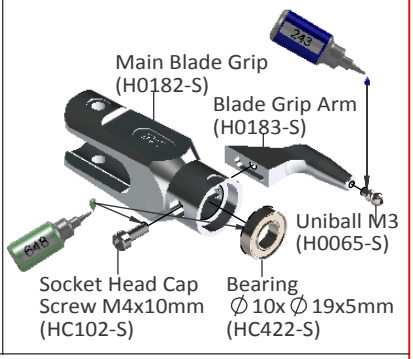


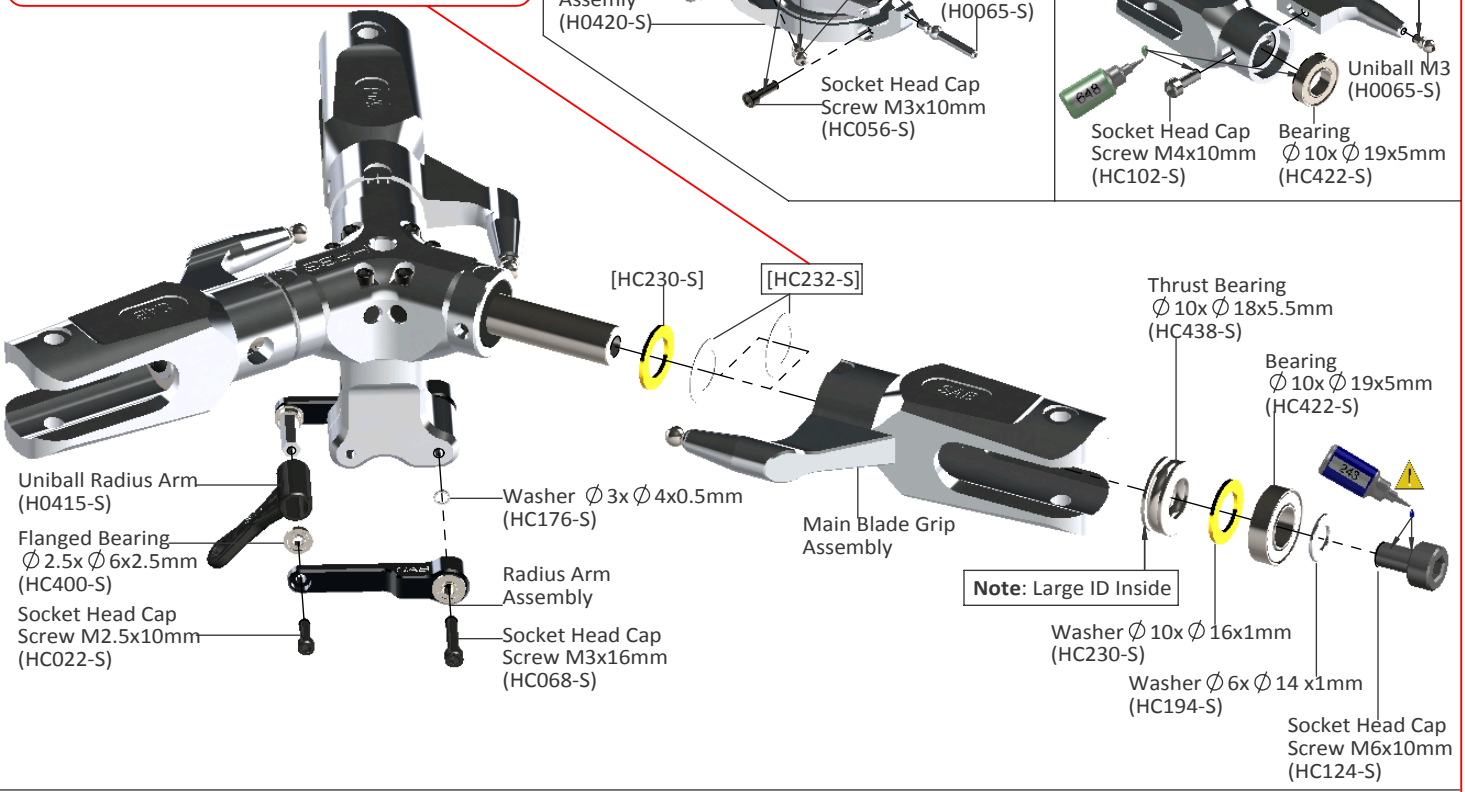
Note:
The HPS3 head should be assembled with one, 1mm shim (HC230) and one, 0.2mm shim (HC232) on each side.
The blade grips must move freely, but they should not move just under their own weight.
If the blade grips are too tight, you can remove the 0.2mm shim (HC232) from each side.
After approximately 10/20 flights, please check preload, you can add one or two 0.2mm shim (HC232) if preload has changed.

Swashplate Assembly

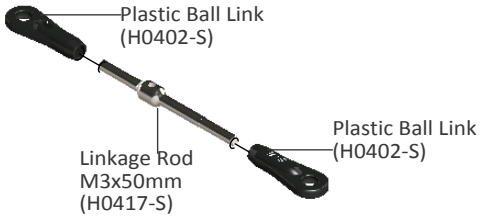


Main Blade Grip Assembly x2



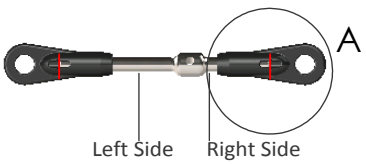


Linkage Rod A Assembly x3

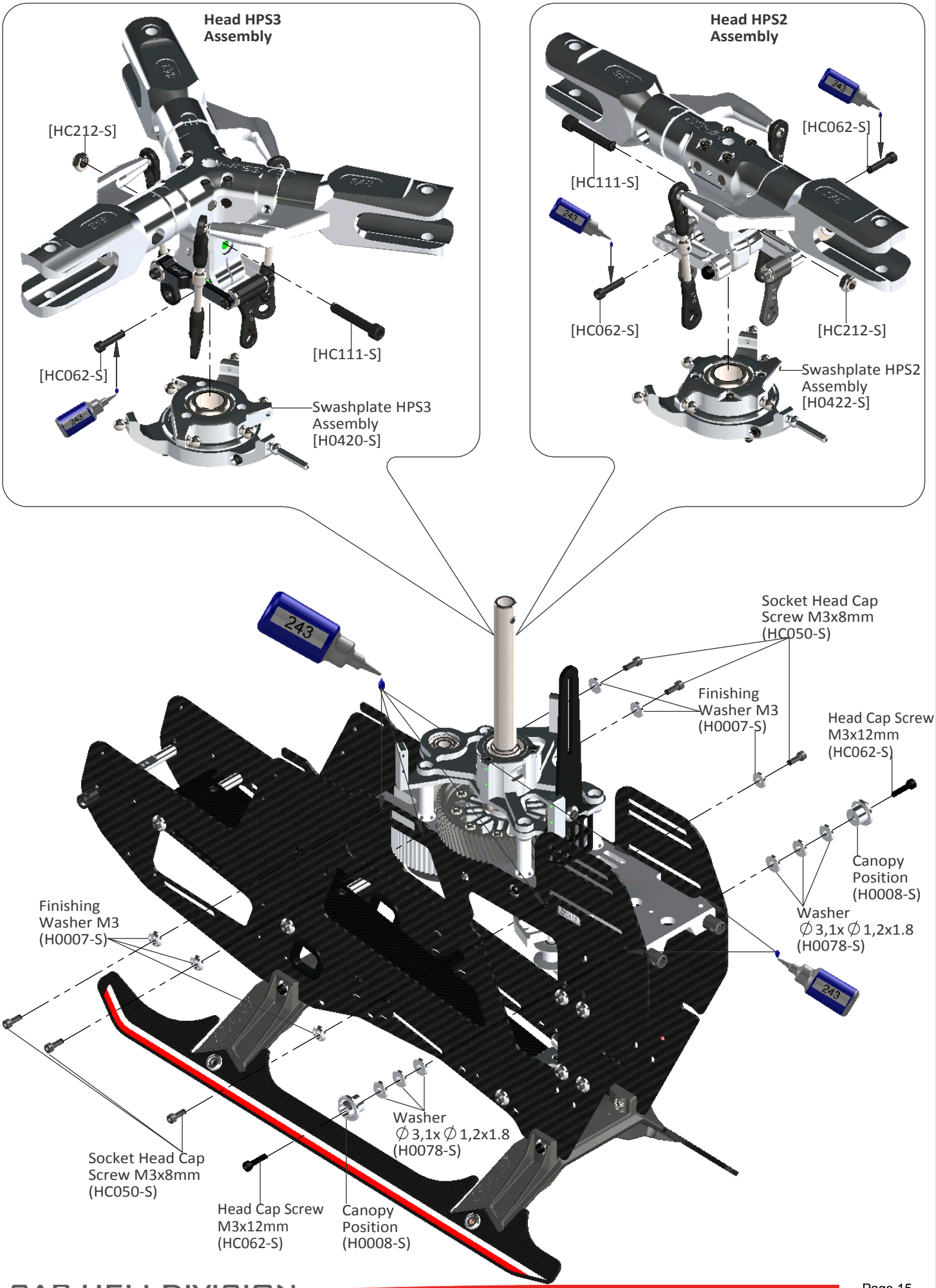


(Initial length for the rods from the swashplate to the Blade Grip.)

* Clock-wise, counter clock-wise thread
* By turning the linkages you can adjust tracking. If tracking is adjusted correctly, you'll see the metal part line up around in the center of the opening.



DETAIL A


Head HPS3 Assembly
[HC212-S]
[HC111-S]
[HC062-S]
Swashplate HPS3 Assembly [H0420-S]
Head HPS2 Assembly
[HC062-S]
[HC111-S]
[HC062-S]
[HC212-S]
Swashplate HPS2 Assembly [H0422-S]
243
Socket Head Cap Screw M3x8mm (HC050-S)
Finishing Washer M3 (H0007-S)
Head Cap Screw M3x12mm (HC062-S)
Canopy Position (H0008-S)
Washer ∅3,1x∅1,2x1.8 (H0078-S)
Finishing Washer M3 (H0007-S)
Washer ∅3,1x∅1,2x1.8 (H0078-S)
Socket Head Cap Screw M3x8mm (HC050-S)
Head Cap Screw M3x12mm (HC062-S)
Canopy Position (H0008-S)

INSTALLATION OF SWASHPLATE SERVOS

The linkage ball must be positioned between **17-19 mm** out on the servo arm (**figure 1**), recommended servo arm SAB p/n [HA050/HA051]. The 120° placement of the servos inside Goblin means the arms are difficult to access. For this reason it is advisable to ensure alignment of the servo arms (and sub trim set) before installation of the servos in the model (**figure 2**). Proceed with installation following the instructions below. **Figure 3** shows a completed installation.

Fig. 1

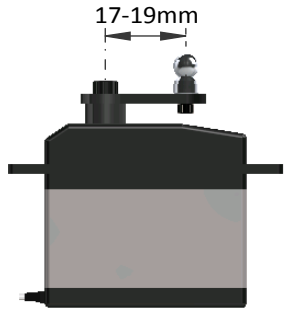


Fig 2

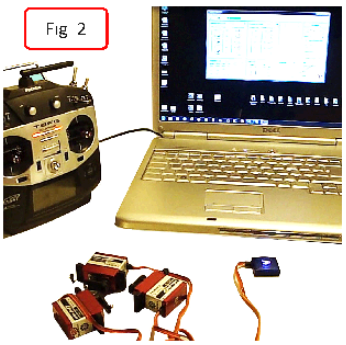
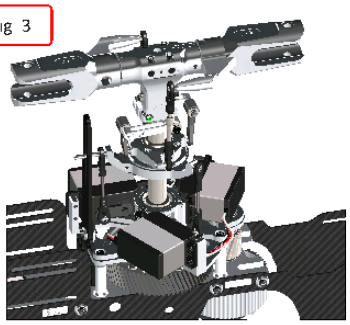


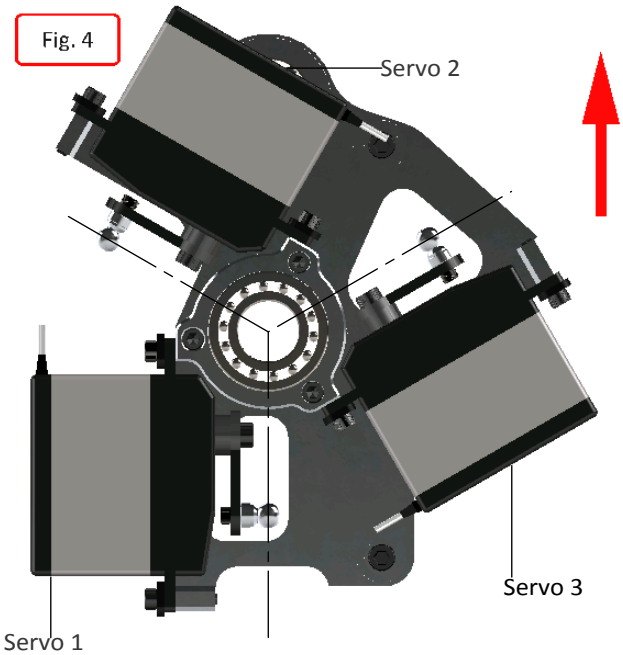
Fig 3



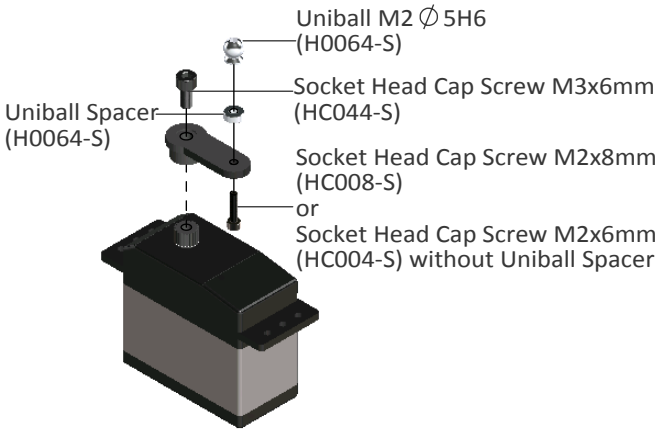
ASSEMBLY OF THE BALL ON THE HORN

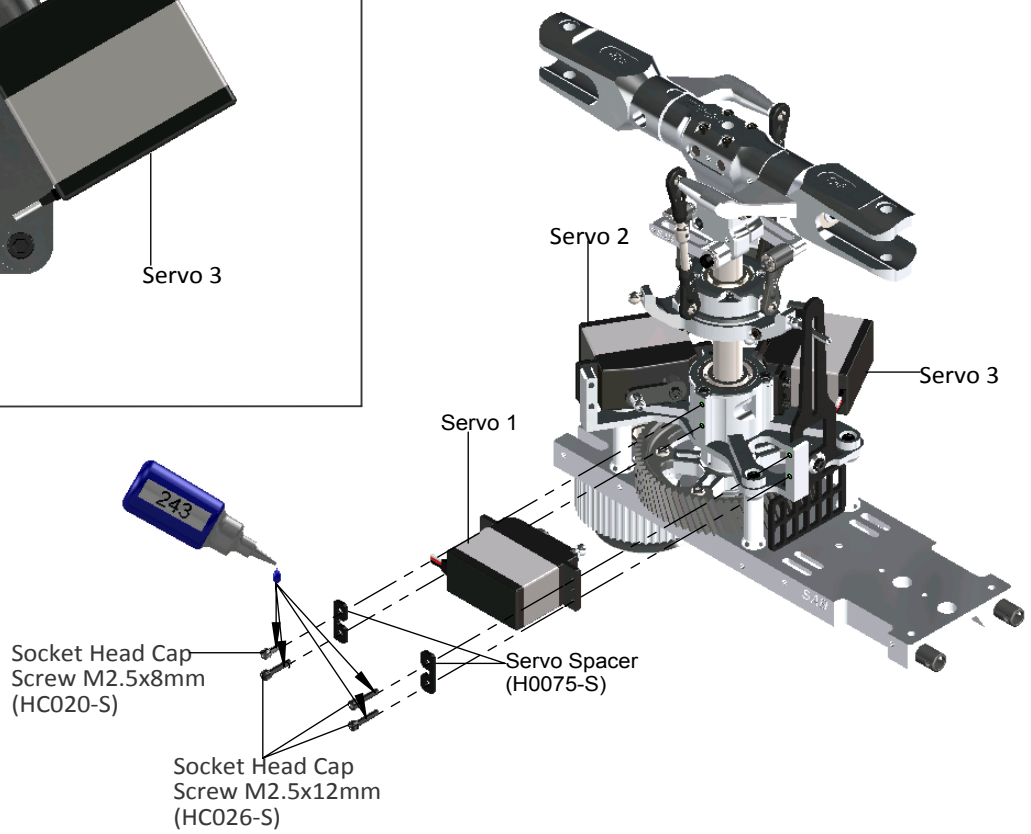
The rods going from the servos to the swash plate must be as vertical as possible. Not all servos are equal, so to better align them you can choose to use the supplied spacer H0031. Figure 4 illustrates this.

Fig. 4



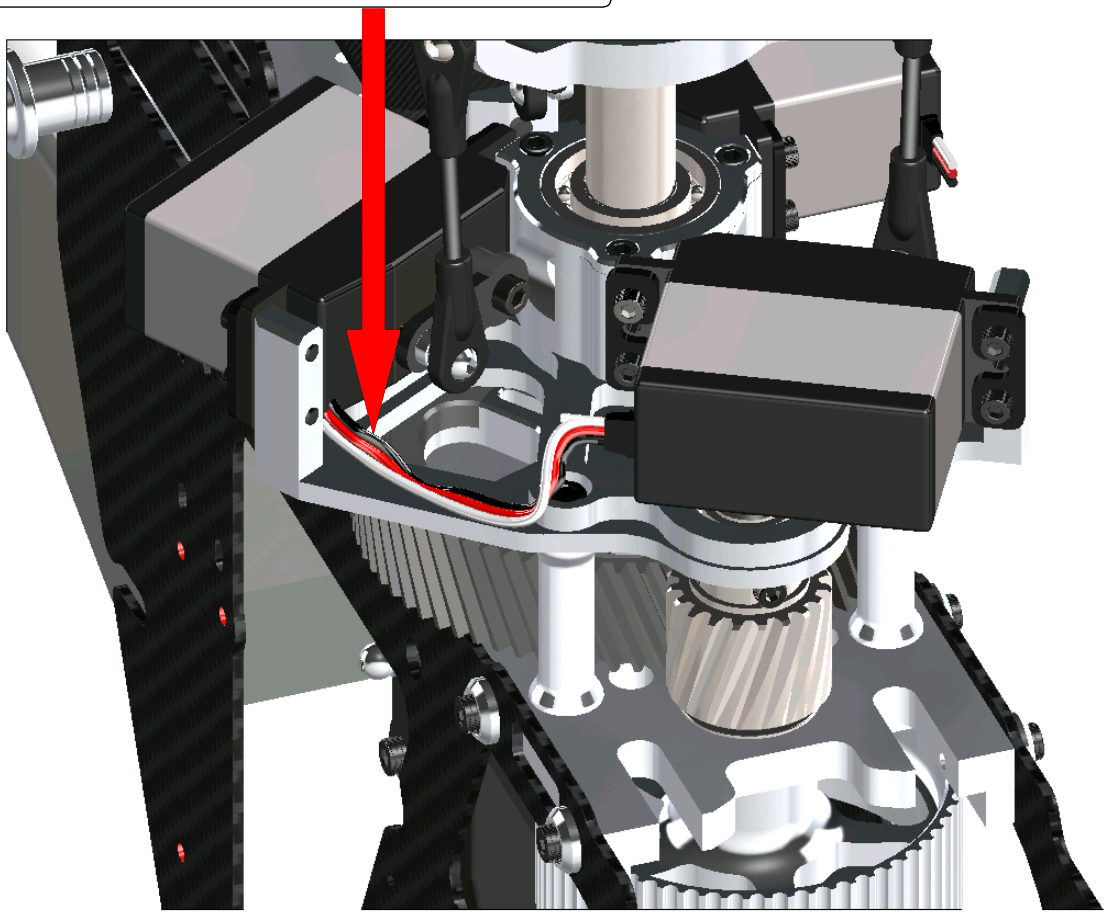
SERVO ASSEMBLY 1, 2, 3





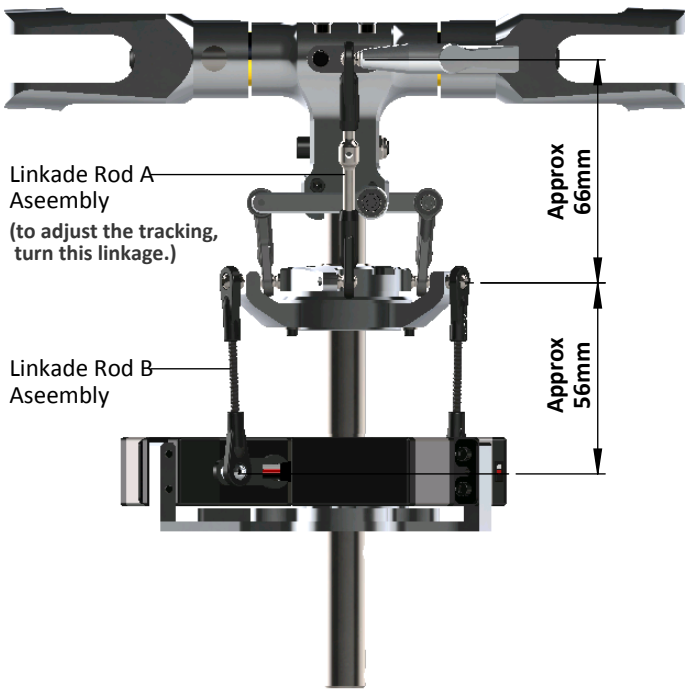
The wire for the front servo must be positioned here. Use zip ties.

Fig. 5

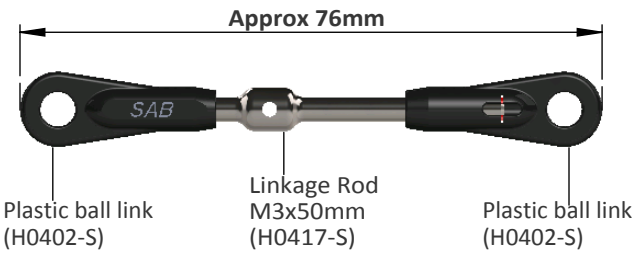


Head HPS Version Preliminary Setup

Adjust the linkage as shown. The linkage Rod A has thead right/left. Turning, you can change the tracking without disconnecting the plastic ball link.

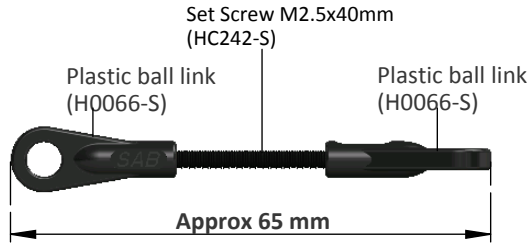


Linkage Rod A Assembly ... x2



Initial length for the rods from the swashplate to the blade grips.

Linkage Rod B Assembly ... x3



Initial length for the rods from the servos to the swash plate.

TRANSMISSION SETUP

It is important to choose the right reduction ratio to maximize efficiency based on your required flight performance.
The Goblin has many possible reduction ratios at your disposal. It is possible to optimize any motor and battery combination.
It is recommended to use wiring and connectors appropriate for the currents generated in a helicopter of this class.

If you are using a head speed calculator which requires a main gear and pinion tooth count, use **214** teeth for the main gear (this takes into account the two stage reduction) and the tooth count of your pulley as the pinion count.

Below is a list of available reduction ratios:

H0175-18-S - 18T Pinion = ratio 11.9:1	H0175-22-S - 22T Pinion = ratio 9.8:1
H0175-19-S - 19T Pinion = ratio 11.3:1	H0175-23-S - 23T Pinion = ratio 9.3:1
H0175-20-S - 20T Pinion = ratio 10.7:1	H0175-24-S - 24T Pinion = ratio 8.9:1
H0175-21-S - 21T Pinion = ratio 10.2:1	H0175-25-S - 25T Pinion = ratio 8.6:1

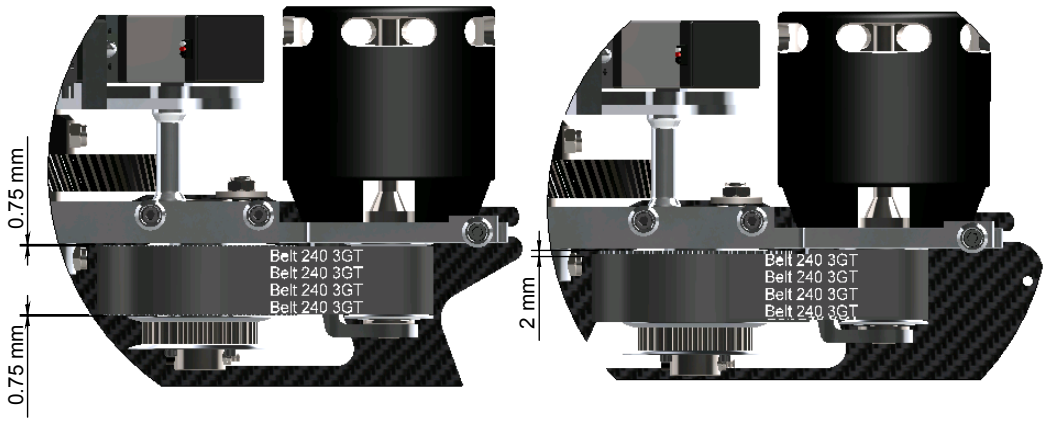
Some example configurations:

Battery	Motor	ESC	Pinion	RPM Max	Pitch
					REV 01
GOBLIN URUKAY - HPS2 HEAD					
12S 5000/5500 mAh	Kontrionik Pyro 800-480	Edge 160 HV	22T	2000 rpm	± 12,5
		YGE 160 HV KOSMIK 160/200	21T		± 12,5
	Xnova 4530-500KV Quantum 4530 - 500	Edge 160 HV	21T		± 12,5
		YGE 160 HV KOSMIK 160/200	20T		± 12,5
	Scorpion HK-4526-520KV F3C Edition KDE Direct 700XF - 535 - G3	Edge 160 HV	20T		± 12,5
		YGE 160 HV KOSMIK 160/200	19T		± 12,5
GOBLIN URUKAY - HPS3 HEAD					
12S 5000/5500 mAh	Kontrionik Pyro 800-480	Edge 160 HV	21T	1900 rpm	± 12,5
		YGE 160 HV KOSMIK 160/200	20T		± 12,5
	Xnova 4530-500KV Quantum 4530 - 500	Edge 160 HV	20T		± 12,5
		YGE 160 HV KOSMIK 160/200	19T		± 12,5
	Scorpion HK-4526-520KV F3C Edition KDE Direct 700XF - 535 - G3	Edge 160 HV	19T		± 12,5
		YGE 160 HV KOSMIK 160/200	18T		± 12,5

Note: Although the Goblin can fly at high rpm, for safety reasons we suggest to not exceed 2100 rpm.

MOTOR BELT TENSION

*Assemble the motor and pinion to its mounting plate.
*Fit the motor assembly into position.
*Compress the springs by pushing the motor toward the main shaft.
*At maximum compression, temporarily tighten one of the slide screws.
*With the minimum centre distance it is easy to install the belt. First put the belt on the motor pinion.
*Then put the belt around the big pulley.
*Rotate the motor several times by hand.
*Release the screw that locks the slide.
*The springs keep the belt in tension.
*Help the springs by pulling the motor slightly.
***The belt must be very tight.**
*Lock all screws.



Correct **Incorrect**

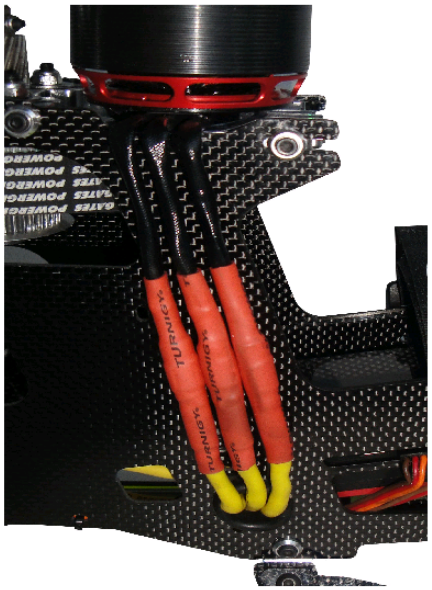
Note:

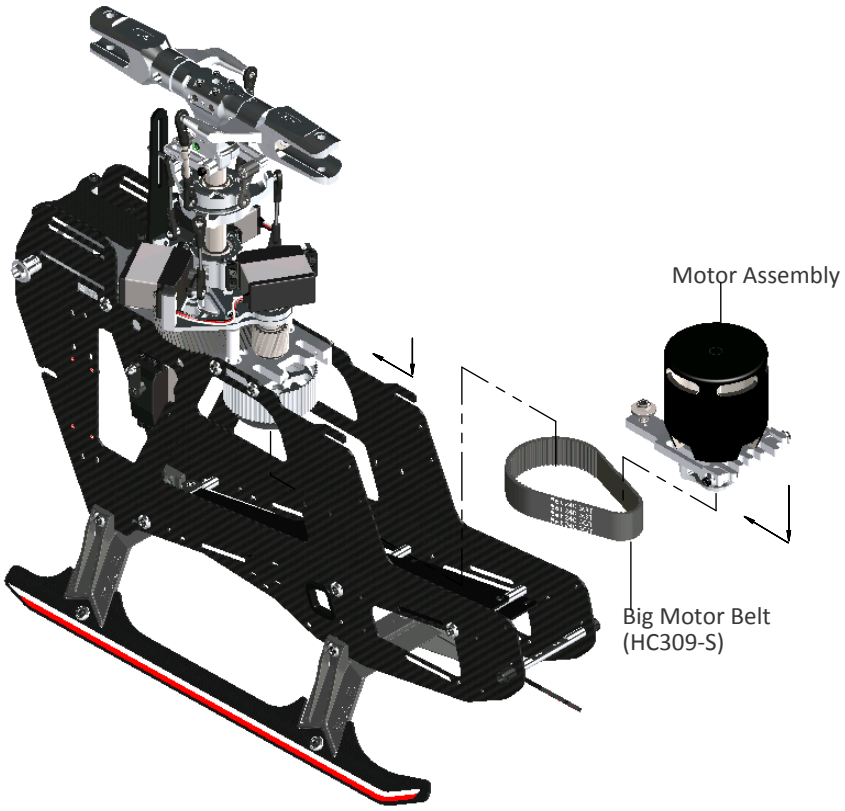
Check for vertical alignment of the motor pulley. To do this, simply turn the motor several time and check to you see if the belt is aligned with the big pulley
(one way bearing pulley).
If the belt is riding too high, simply loosen up the motor pulley and drop it just a little bit, if it is riding too low, loosen up the motor pulley and raise it a bit.

Fig 1:

Fig. 1

Figure 1 shows the motor correctly wired. It is advisable to cover the wire joints between the motor and the ESC with heat shrink tubing.





DE-BURR THE SIDE FRAMES

We recommend de-burring the edges of the carbon parts in areas where electrical wires run.

ESC INSTALLATION

The speed controller (ESC) is installed in the front of the helicopter.
Figure 1 shows the mounting area. Figure 2 shows the installation of the Kosmik ESC from Kontronik.
You can also use the heat sink (H0165-S) if you wish for improved cooling (Figure 3,4)

Fig. 1

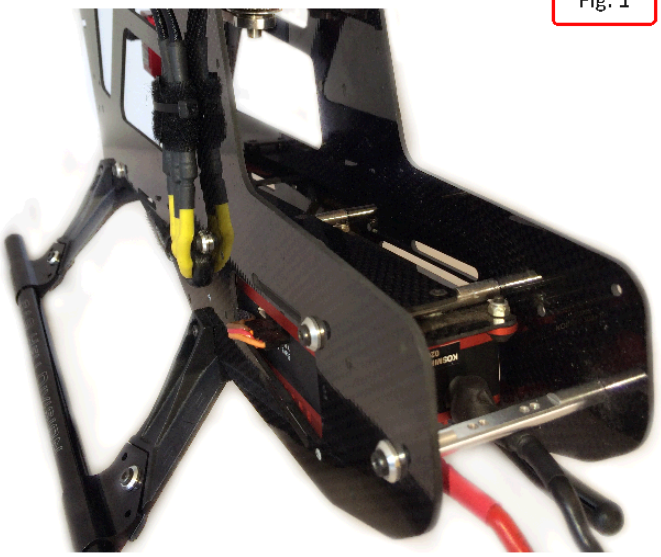


Fig. 2

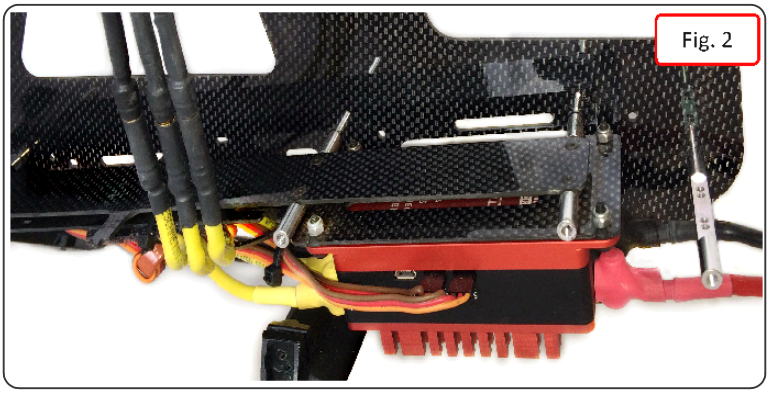


Fig. 3

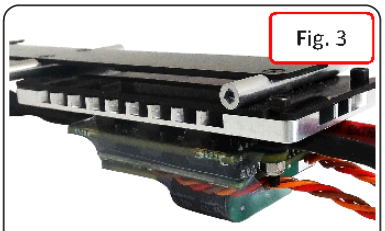


Fig. 4

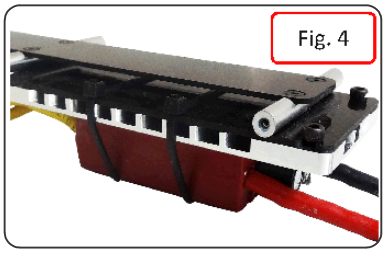


Figure 5: Shows the wiring which connects the receiver and ESC (in this picture one frame has been removed).
If the BEC used is combined with the ESC, it is recommended to use a dual wire connection and a unit battery backup.

Figure 6: The passage of the controller wires to the motor is highlighted.

Fig. 5

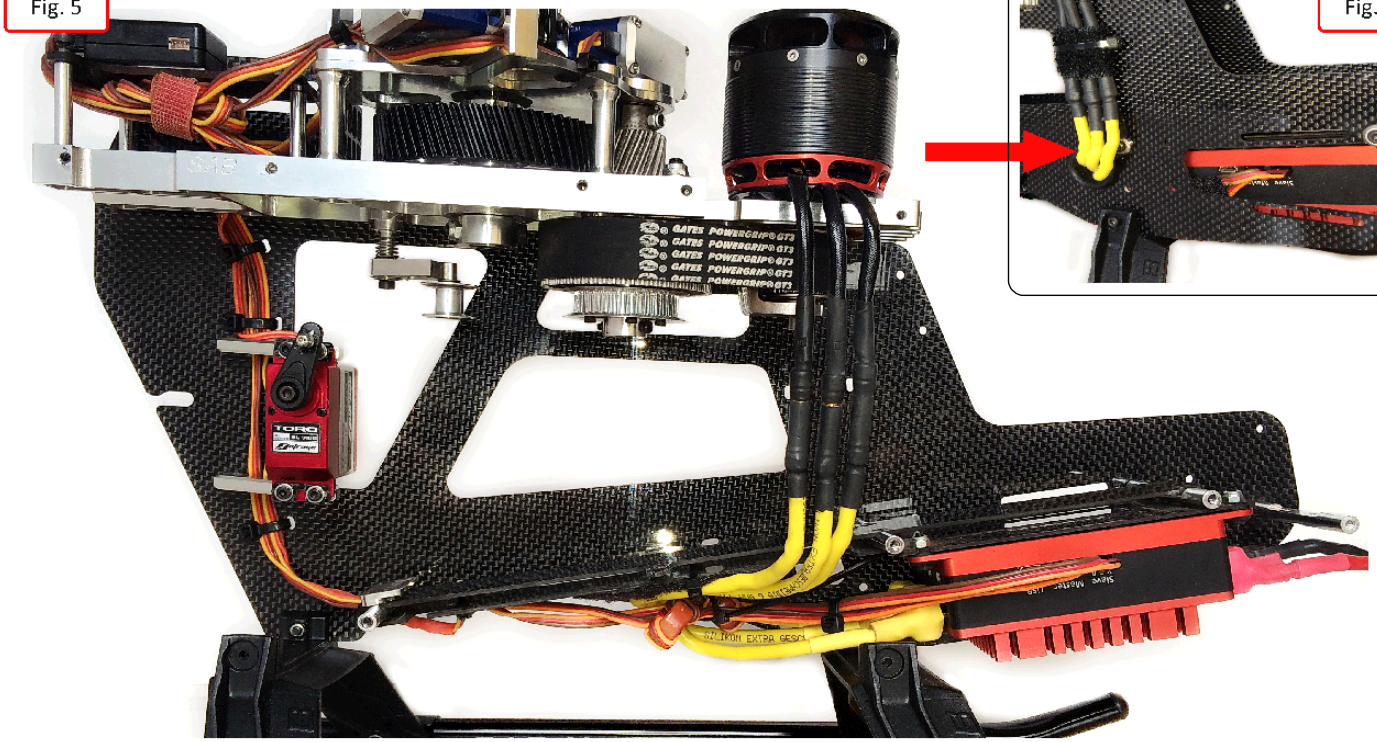
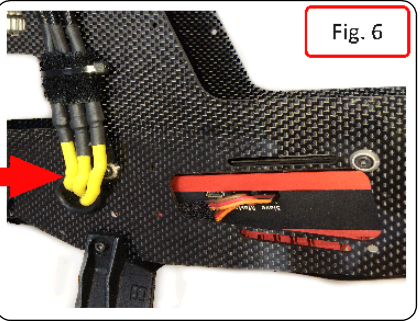


Fig. 6



FLYBARLESS CONTROL UNIT AND RX INSTALLATION

It is possible to install any commercially available Flybarless control unit in the goblin.
For Flybarless systems with a separate sensor, the sensor must be installed under the plate (**Figure 1**).

Figure 2 and Figure 3 shows an example of installation of the receiver and flybarless control unit.

Fig. 1

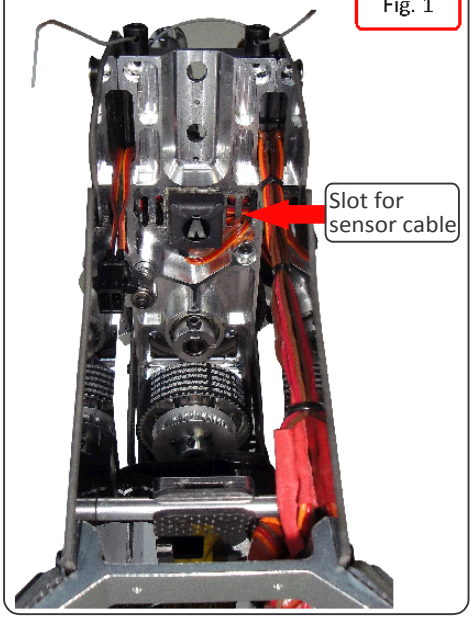
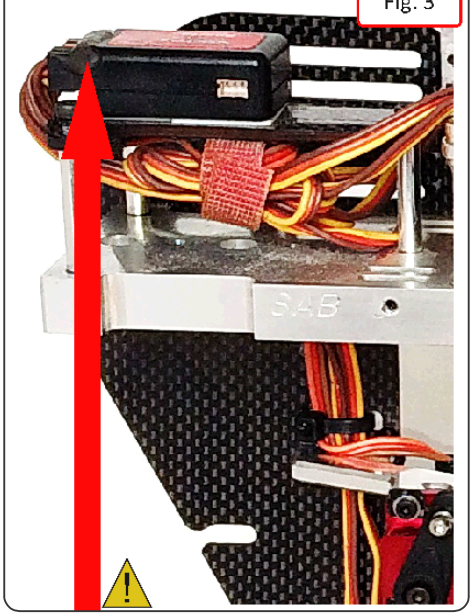


Fig. 2

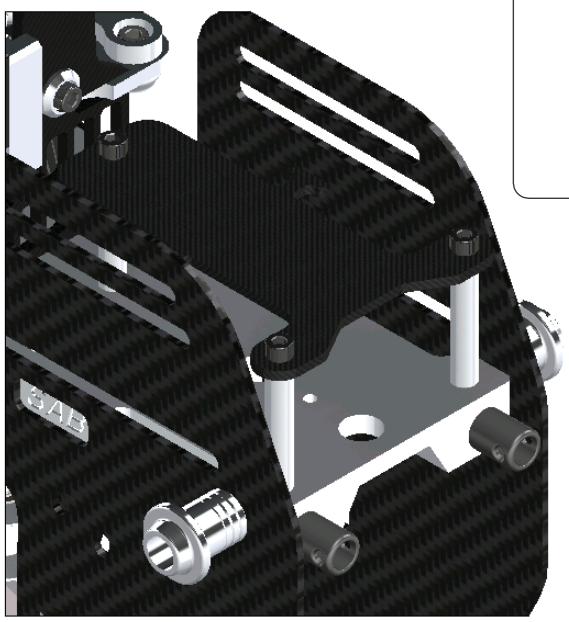
Fig. 3

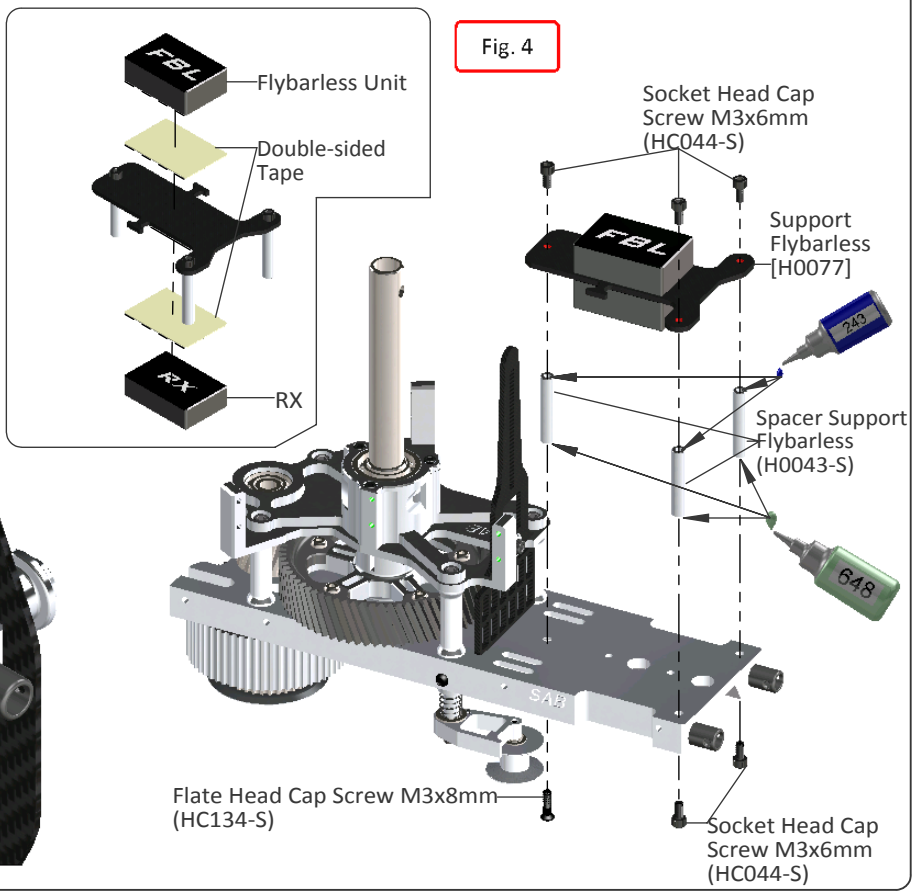


It is important to lock the plugs of the flybarless unit with an adhesive - for example hot glue.

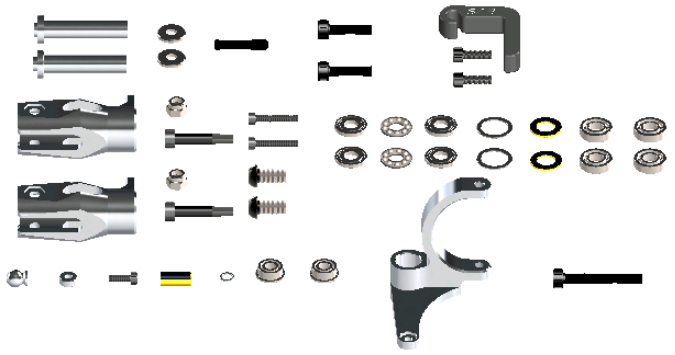
To install a one piece Flybarless system it is necessary to add the support shown in these figures. Figure 3 shows the installed support. Figure 4 shows the control unit and the receiver installed on the support.

Fig. 4

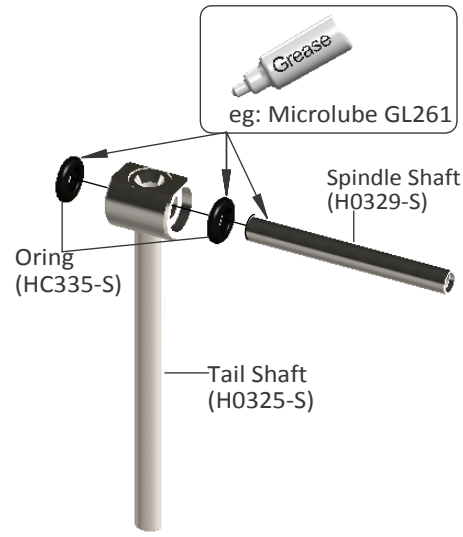




7-Boom and Tail

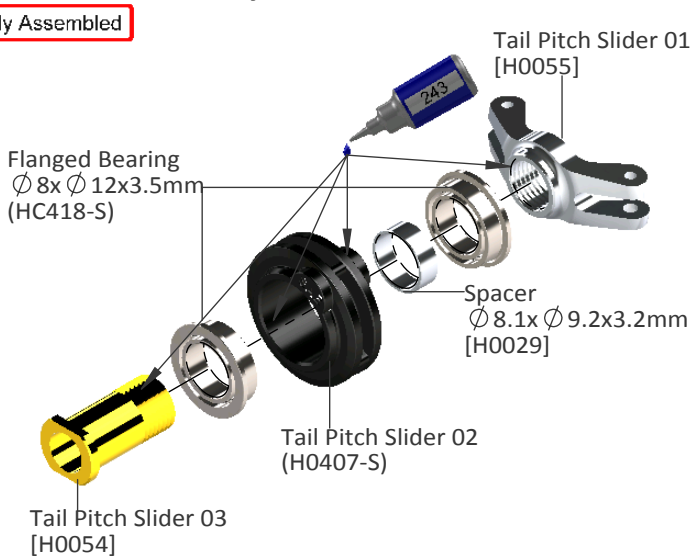


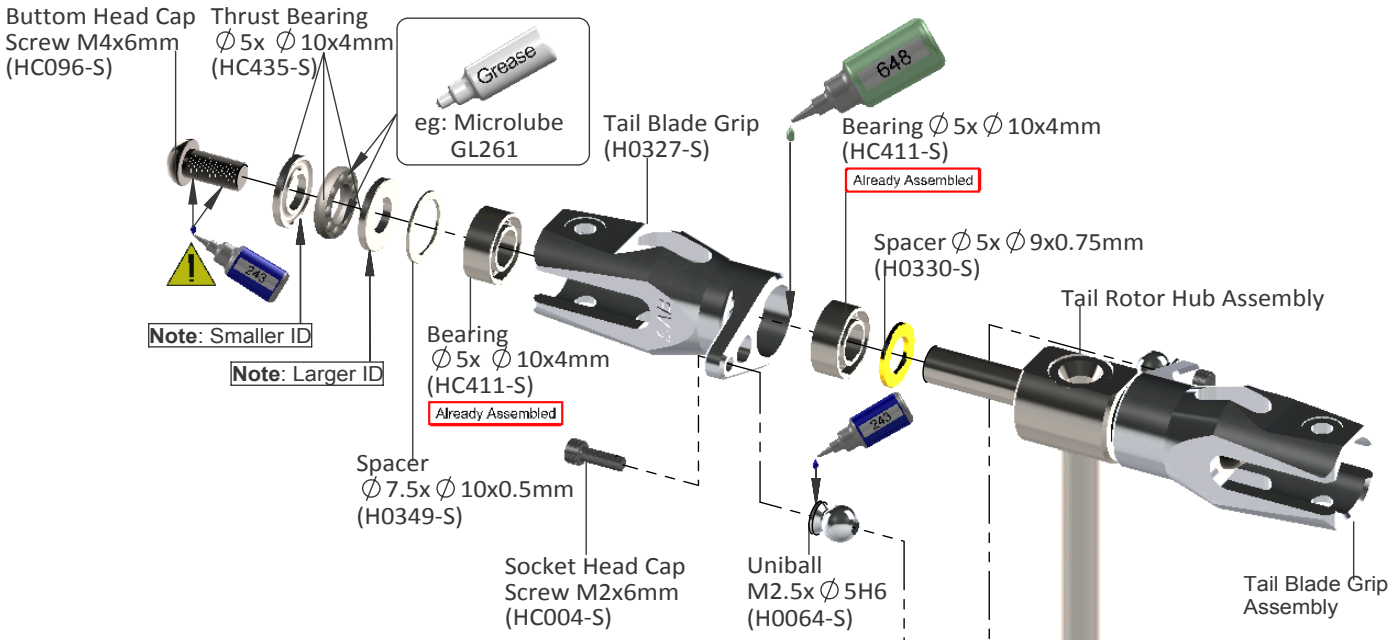
Tail Rotor Hub Assembly



Tail Pitch Slider Assembly

Already Assembled

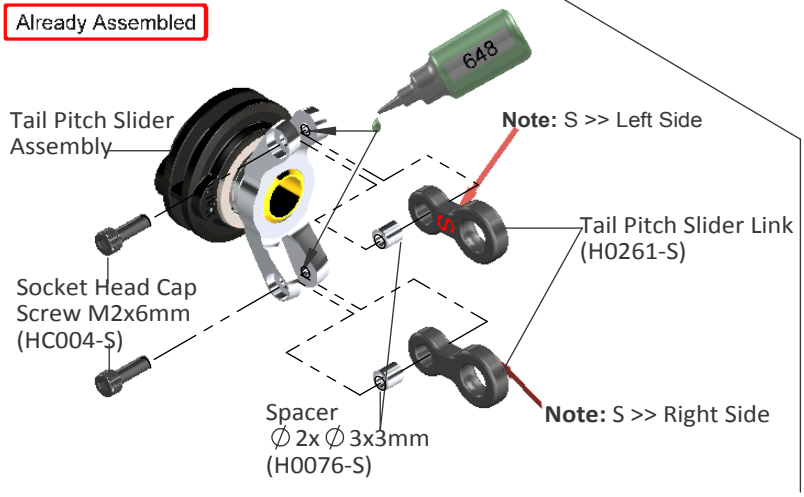


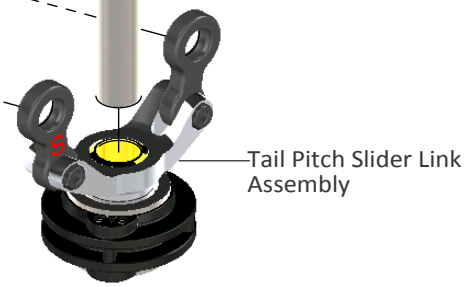


Note:
It is a normal for the tail to feel a bit tight after initial assembly as the tail spindle preload is ussually high when the helicopter is brand new. The preload will loosen up after 2-5 flights allowing the system to become smooth.

Tail Pitch Slider Link Assembly

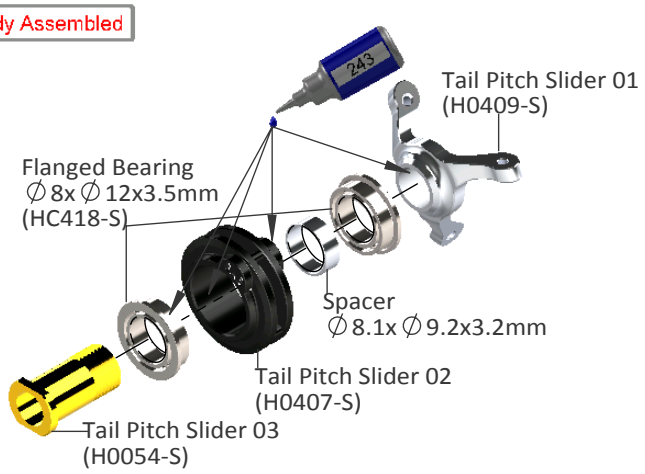
Already Assembled





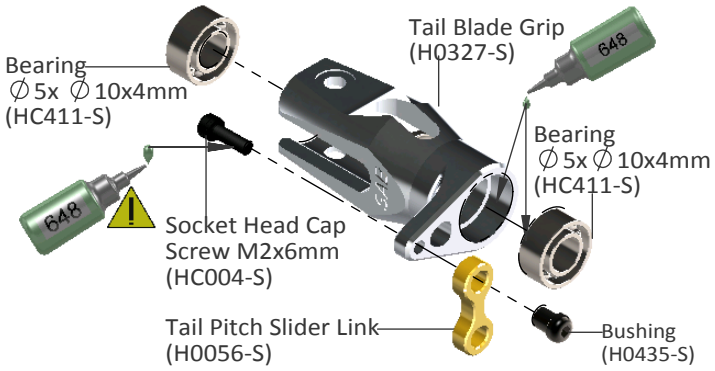
Tail Pitch Slider Assembly

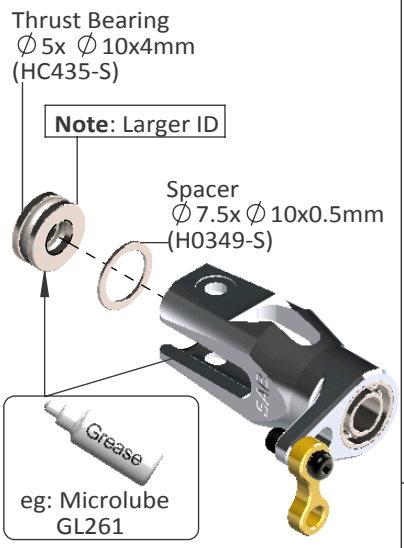
Already Assembled

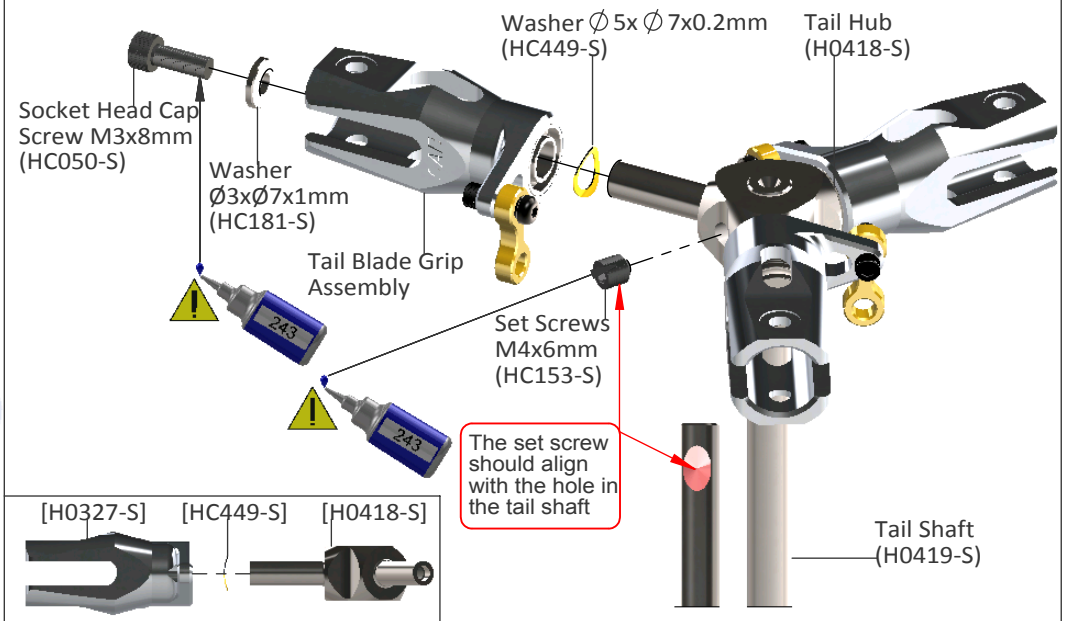


Tail Blade Grip Assembly x3

Bearing Already Assembled



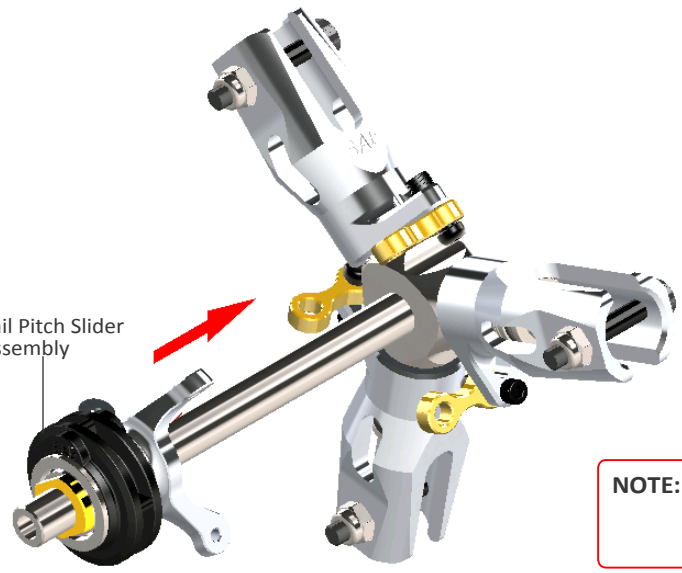


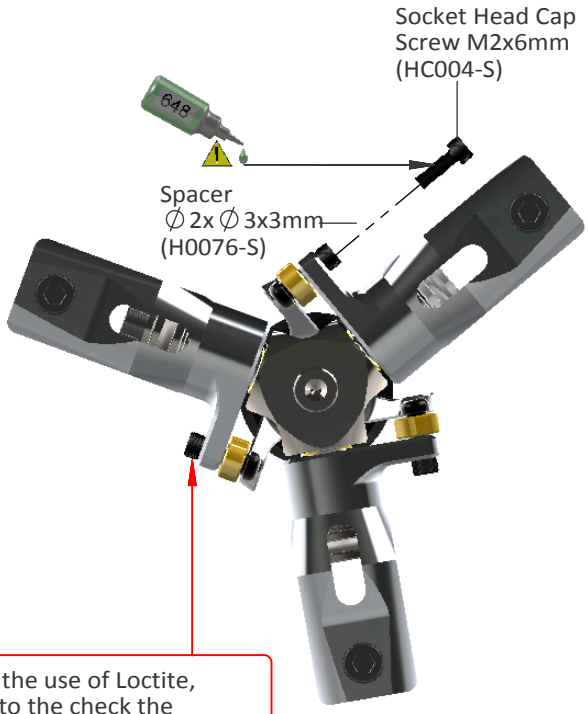


Tail System Assembly

Note:

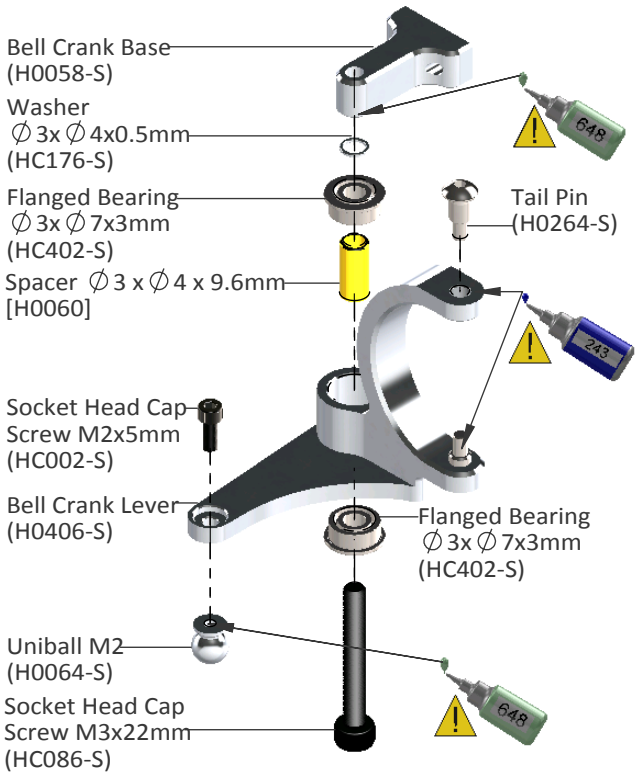
It is a normal for the tail to feel a bit tight after initial assembly.
After 2-5 flights allowing the system to become smooth.



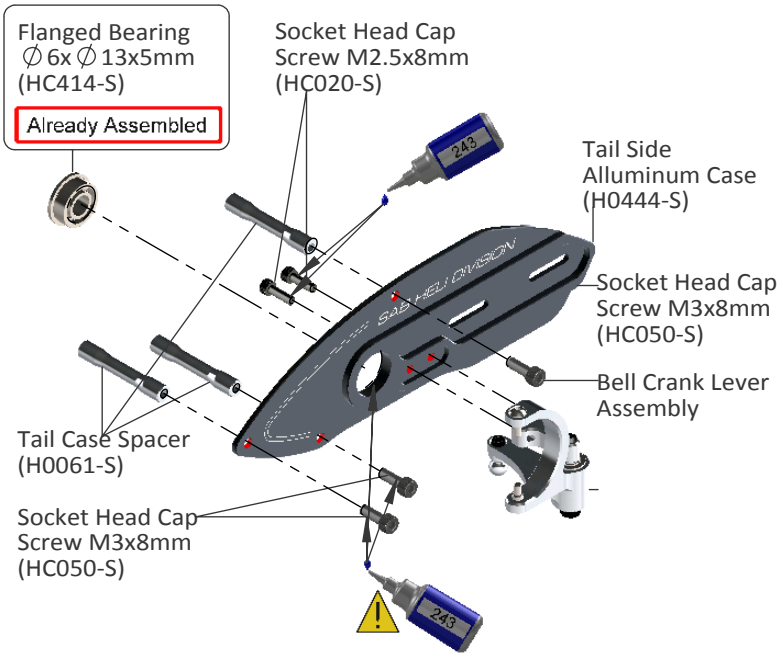


NOTE: After the use of Loctite, need to the check the proper sliding off all command

Bell Crank Lever Assembly

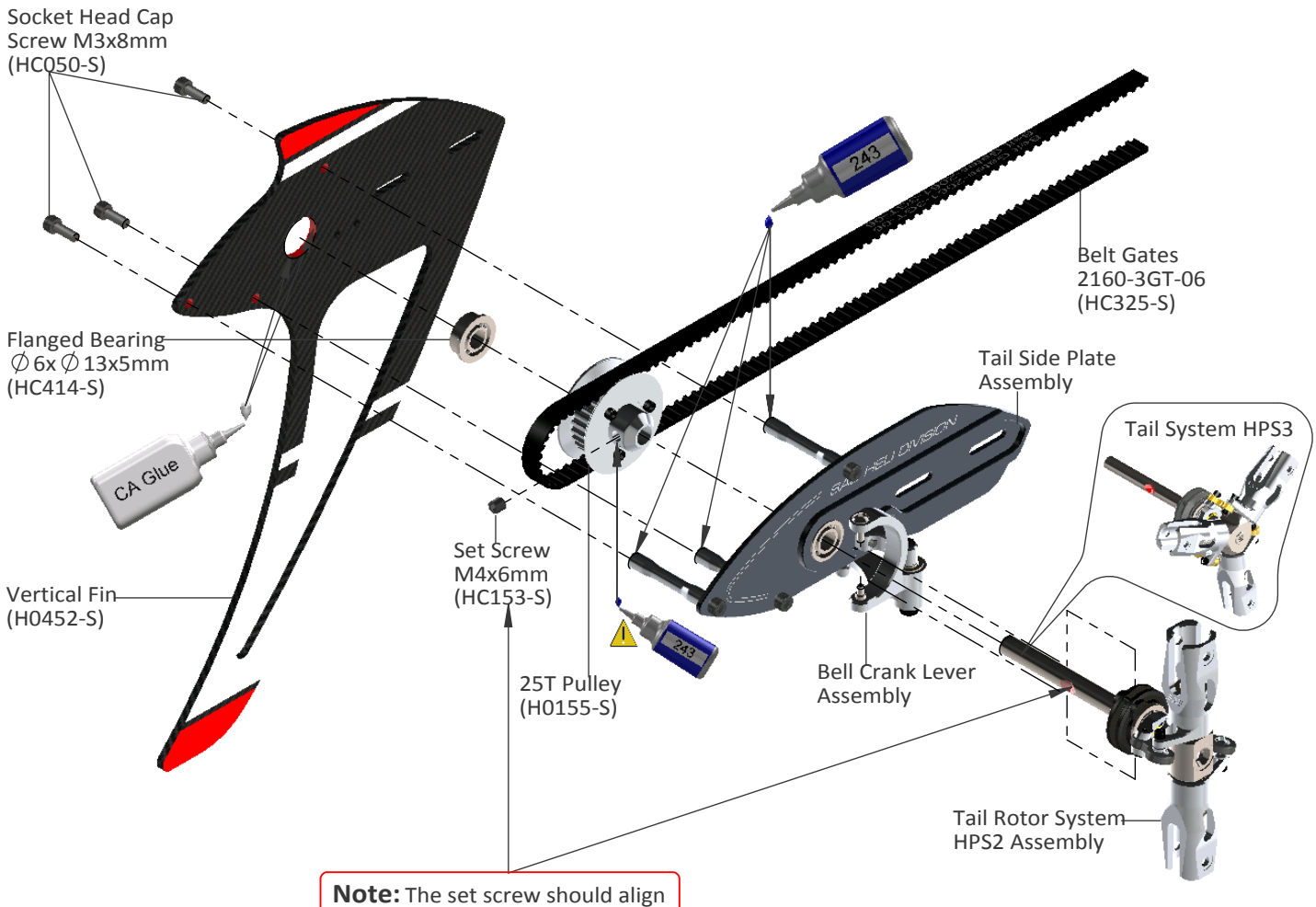


Tail Side Plate Assembly



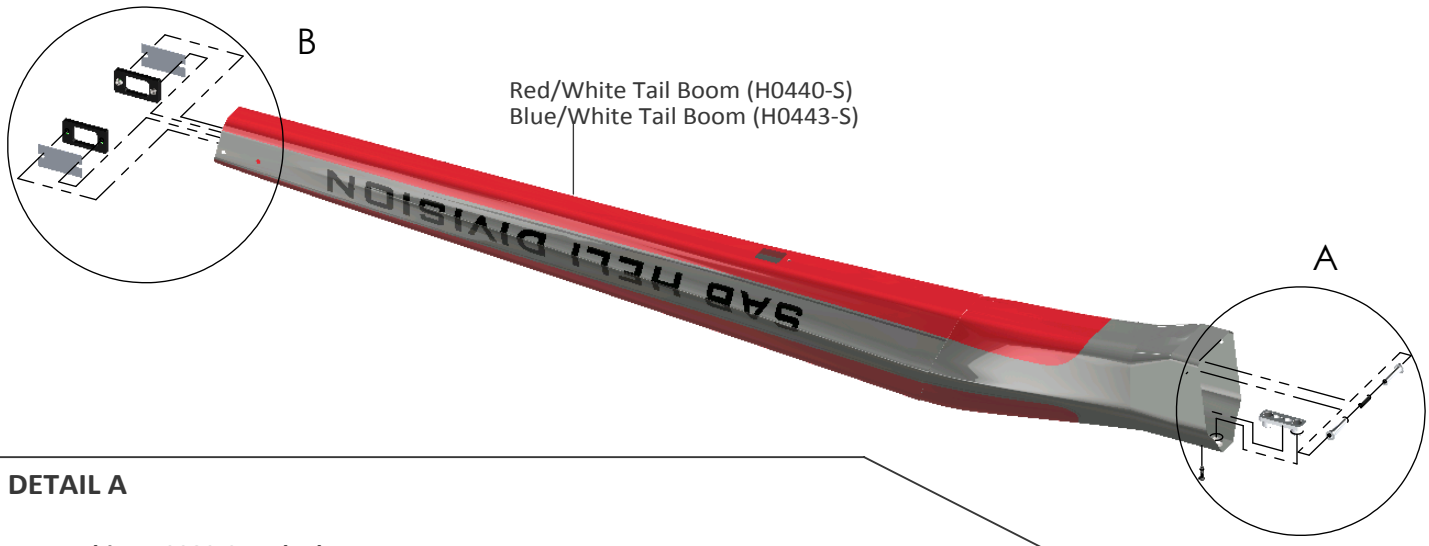
Tail System Assembly

Box 6, Bag 12, Tray 3



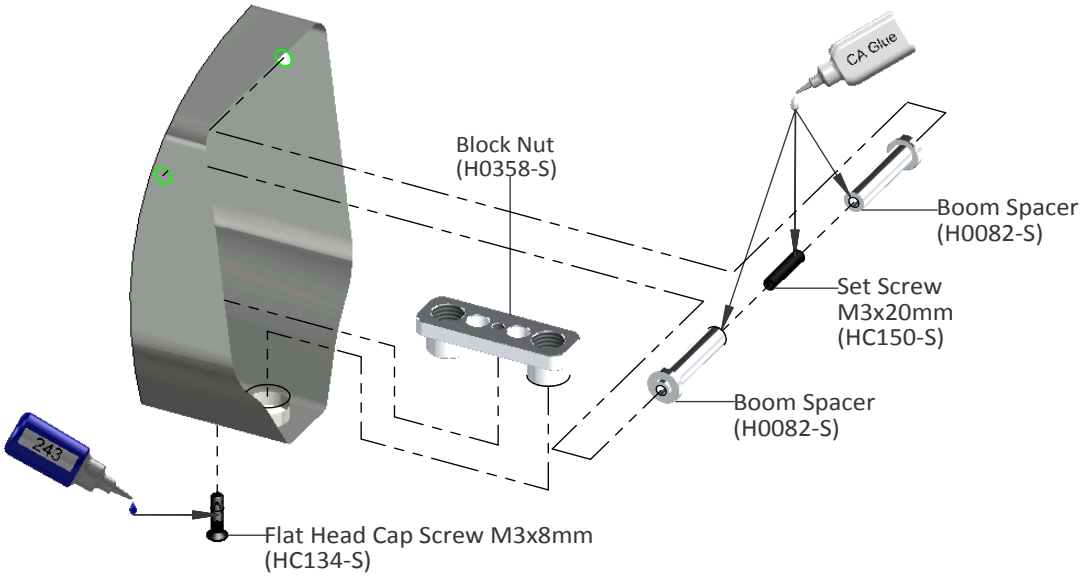
Note: The set screw should align with the hole in the tail shaft

Tail Boom Assembly

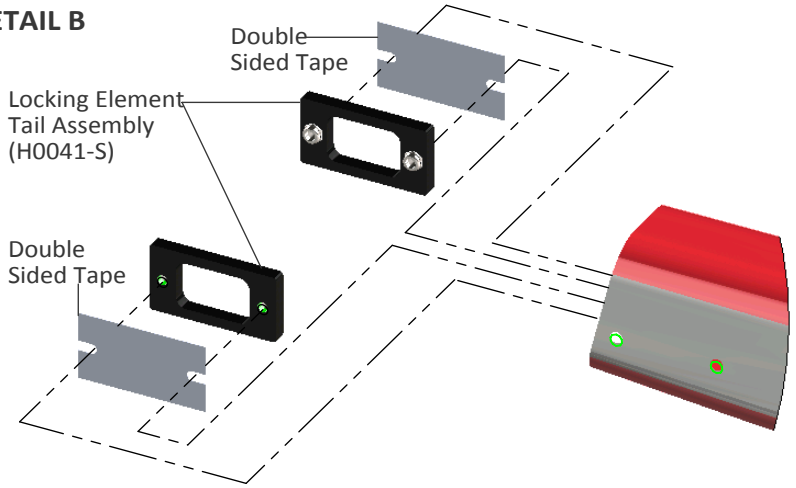


DETAIL A

Attaching H0082-S to the boom:
Pre-assemble the two boom spacers H0082-S with the M3x20 socket set screw.
Insert into the boom tube completely done up.
Center the holes, then unscrew until there is contact with the walls
Lock everything with the adhesive.

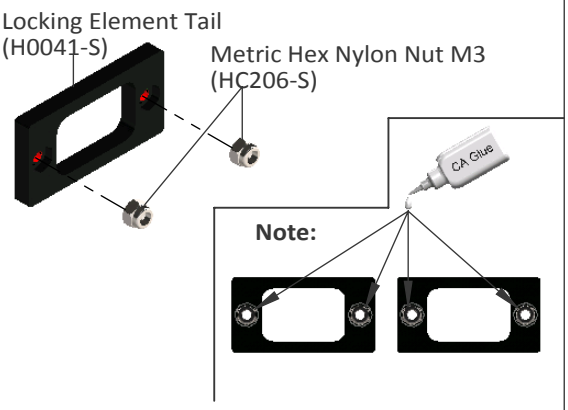


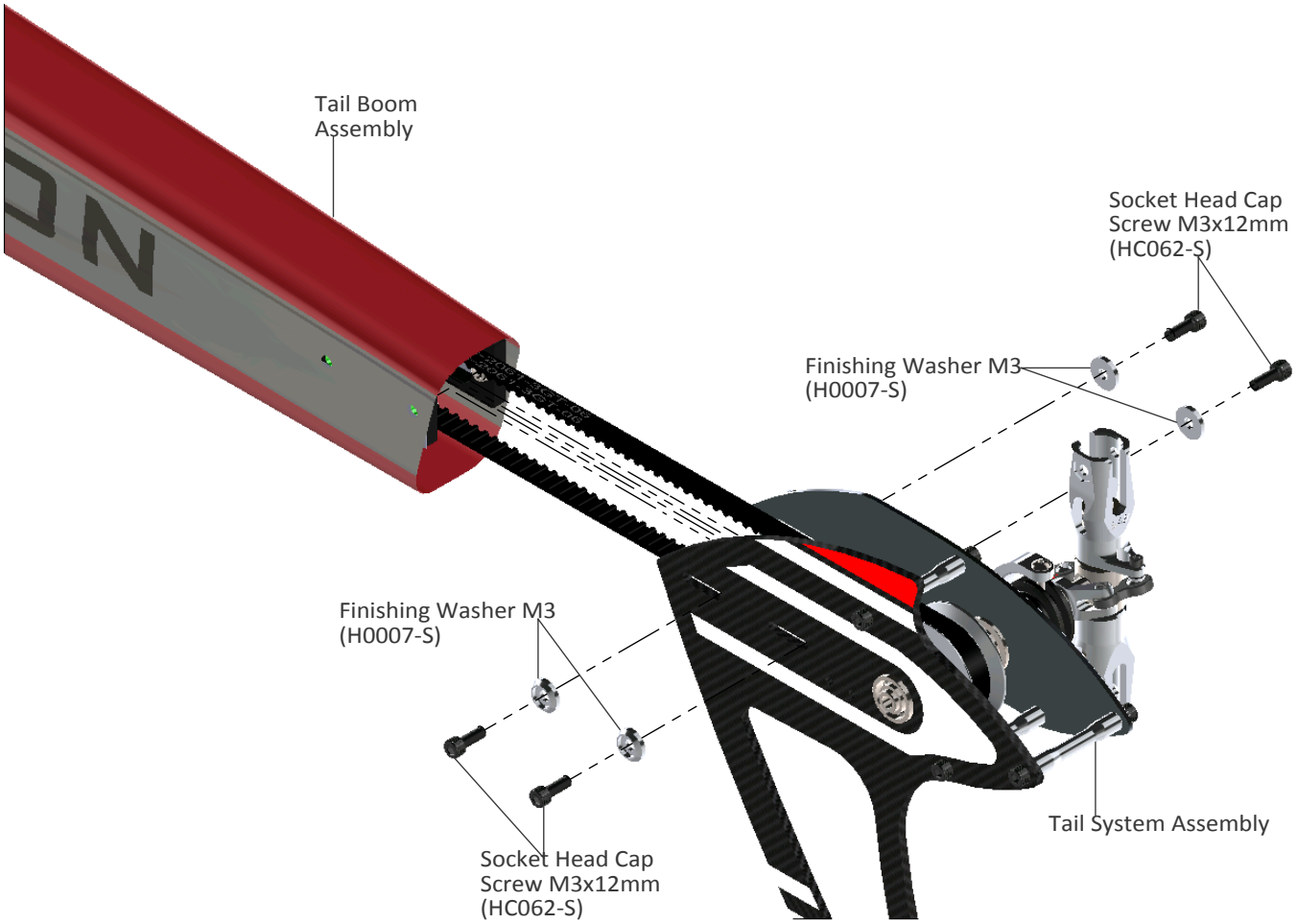
DETAIL B



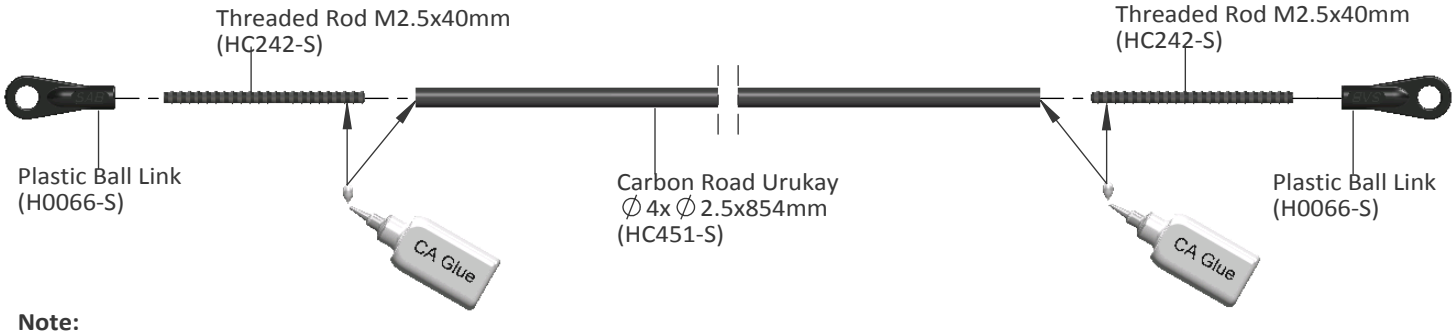
Locking Element Tail Assembly .... X 2

Already Assembled

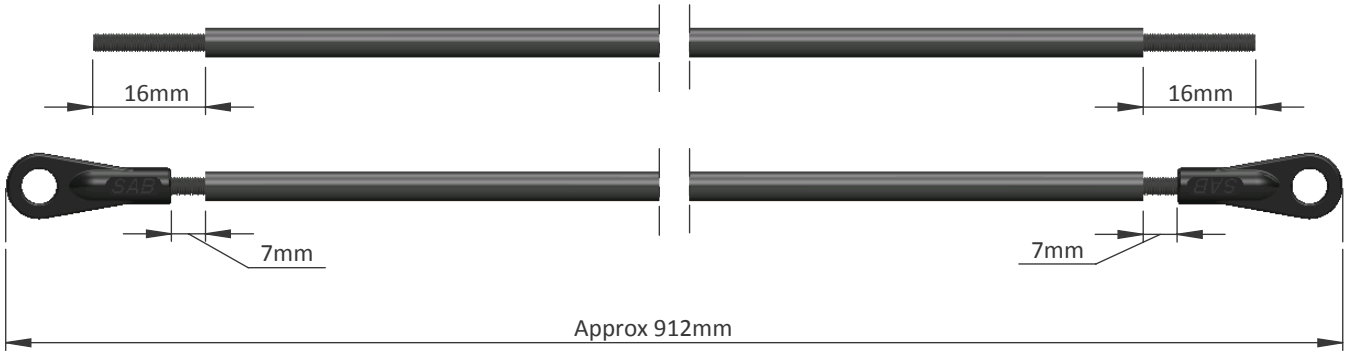




Note: Before put plastic ball in threaded rod, please wait 12 hours after bonding

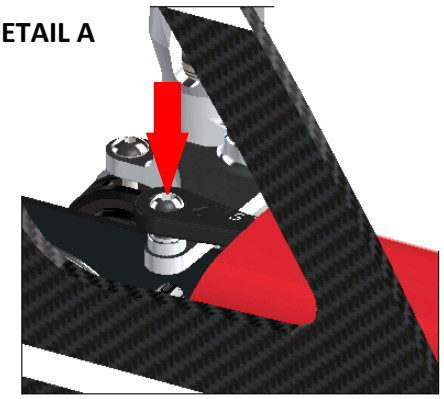


Note:

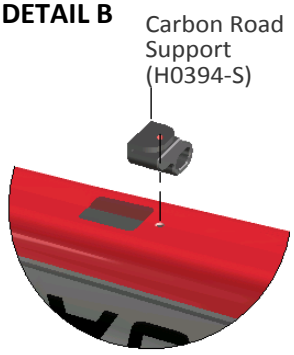


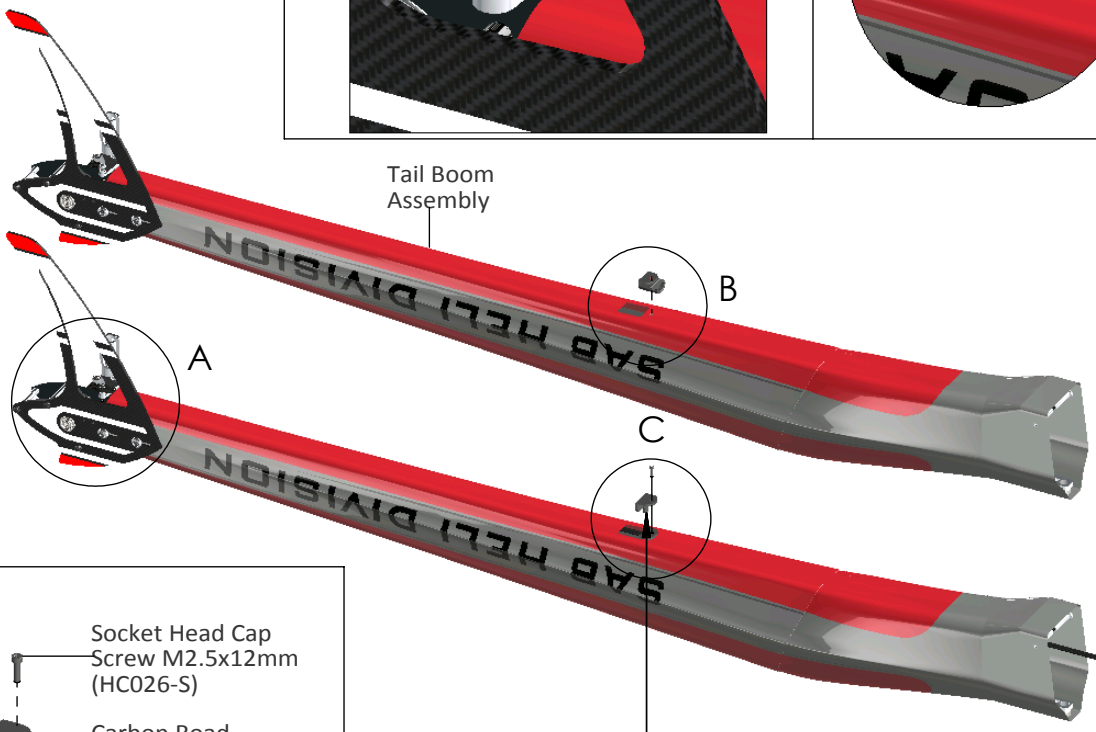
Note:
* Install H0394 to the boom
* Insert carbon rod through the boom making sure it is inserted through H0394
* Install H0395 making sure to reduce slop (side play) on the carbon rod

DETAIL A

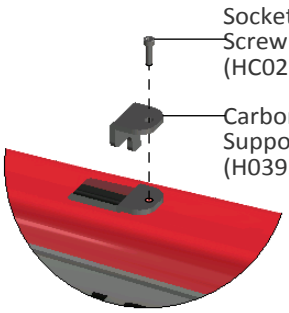


DETAIL B



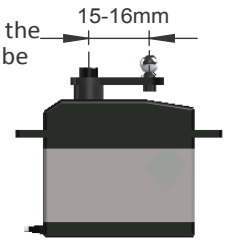


DETAIL C

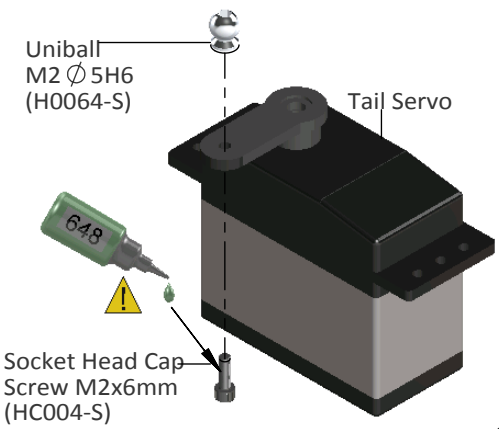


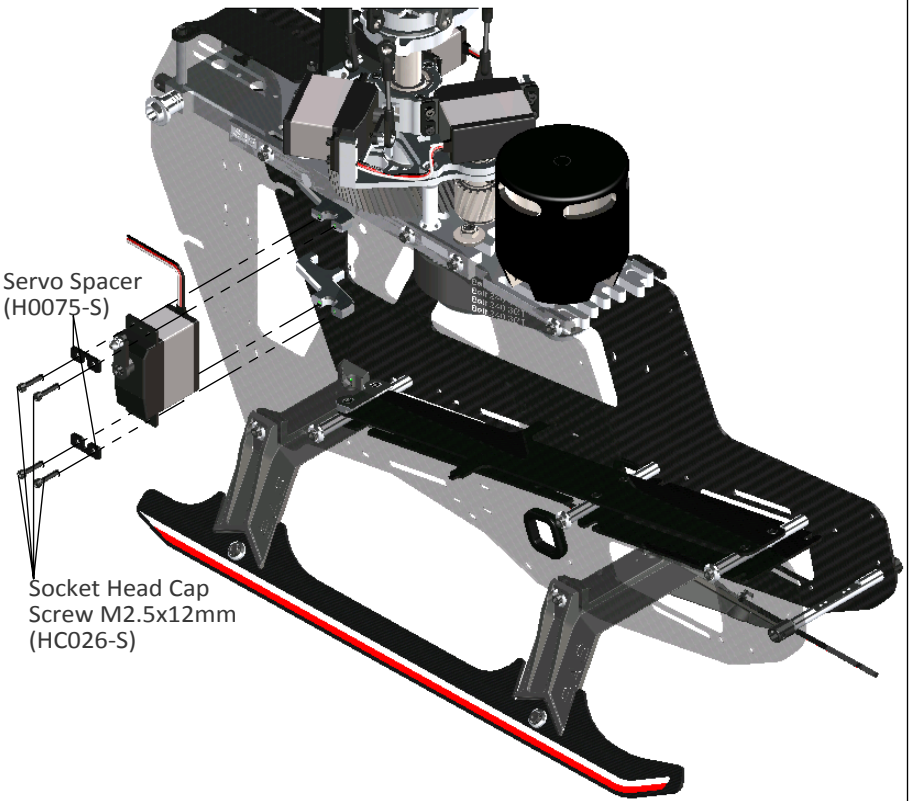
Note: Lubricate this zone
Lock H0395, doing attention to the maximum smoothness of the carbon road

The distance between the axis and the ball must be between 15-16 mm



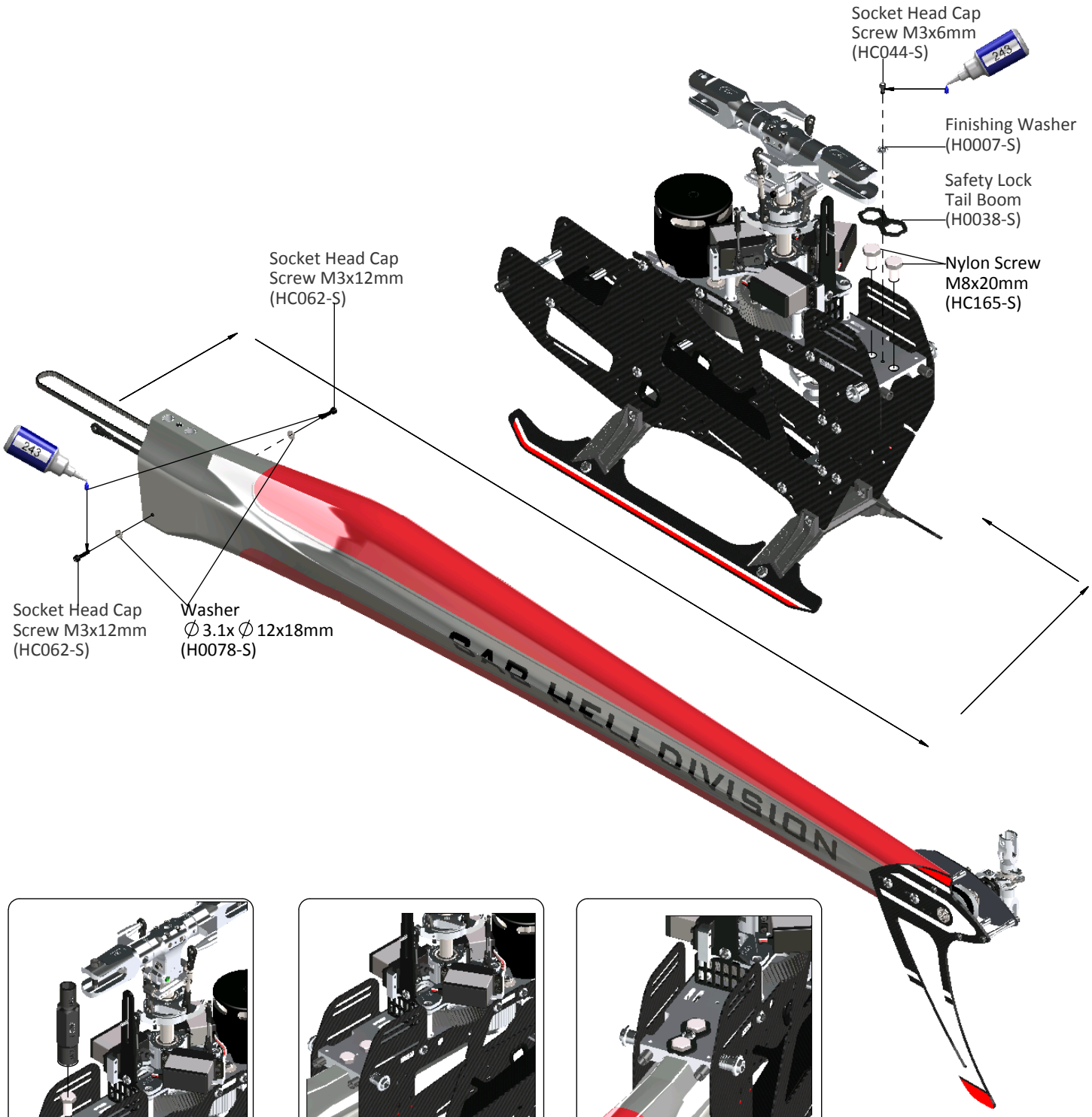
Tail Servo Assembly





BOOM ASSEMBLY

*Insert the tail boom assembly .
*Lock the M8 nuts with the HA016 special tool supplied (Tray 2).
*Firmly lock the lateral srews M3x12. Use Loctite for this screw and make sure you remain tight.
*Assemble the H0038 carbon security plate .
*Connect the Carbon Road.



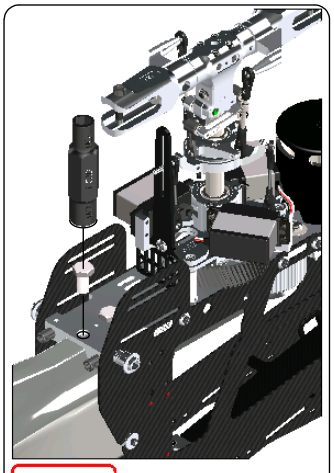


Fig. 3


Fig. 4

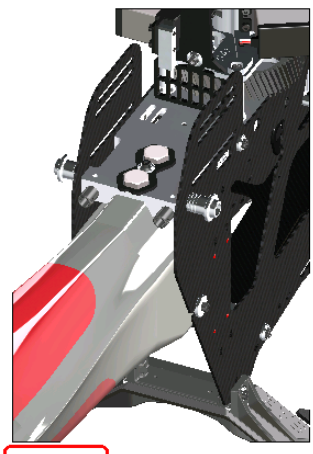


Fig. 5

TAIL BELT TENSION

*Check the proper assembly of the tail boom.
*Check that the aluminum part of the tube is against the M3 stop screw.
*Loosen the tail group by loosening the 4 M3 screws.
*Install the belt onto the pulley, taking care to respect the direction of rotation (**figure 1**).
*Rotate the tail drive several times by hand.
*Load the spring by a rotation of **270°** the tensioning arm (**clockwise**)
*Tension the boom until the tensioning arm is aligned with the frame.
*Tighten the 4 screws.
*Check that the tail output shaft is perpendicular to the tube. (**figure 2**)
*In **figure 3,4,**5 you can see the three conditions, ok, too loose and too tight.

NOTE. To disassemble the tail boom it is possible to remove the pulley H0101-S without loosening the tail unit.
Remove the locking screw and pull down.

Fig. 2

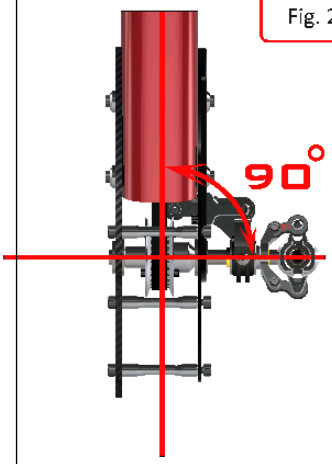
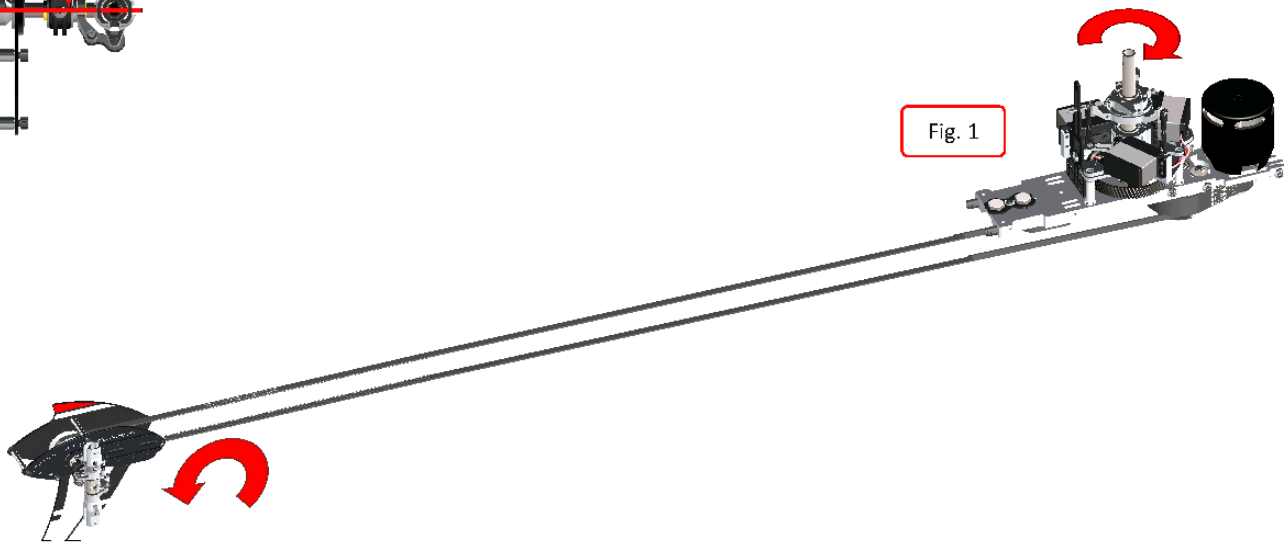


Fig. 3

Fig. 4

Fig. 5

Fig. 1



CANOPY

Fig. 9

The Goblin Urukay canopy has a very effective locking system in order to eliminate vibrations and optimize aerodynamics.
You must install the following to complete the canopy assembly:
· Canopy grommets (Fig 6), Canopy edge protection (Fig 7).

The canopy hole must be 12 to 12.5 mm in diameter. Initially is 9 mm. You can enlarge the hole slightly to optimize the vertical position of the canopy itself.

To install the canopy:
· Insert the canopy from the front up to the area of the block shown in Fig. 8
· Join the edges.
· Insert the H0036 knobs (Fig.9)

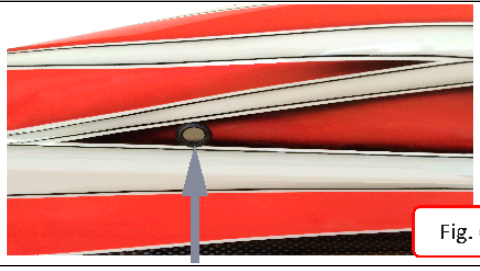


Fig. 6

Fig. 7

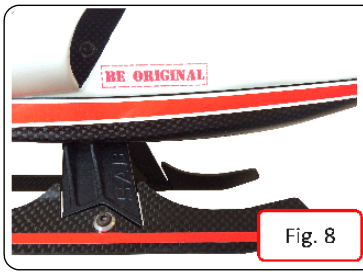


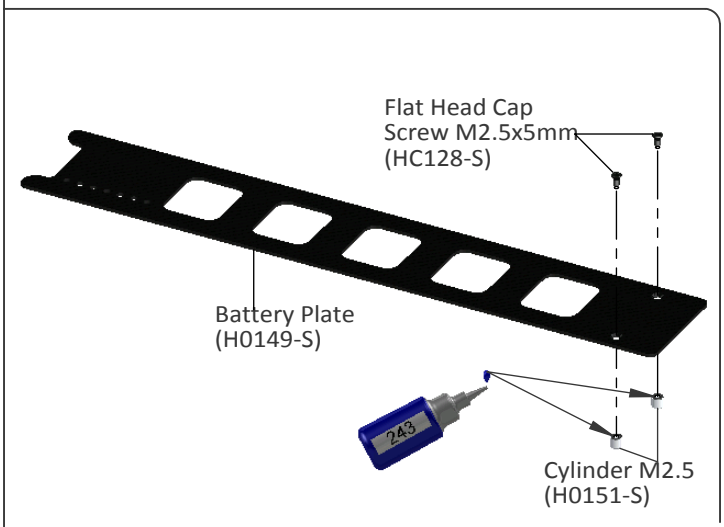
Fig. 8

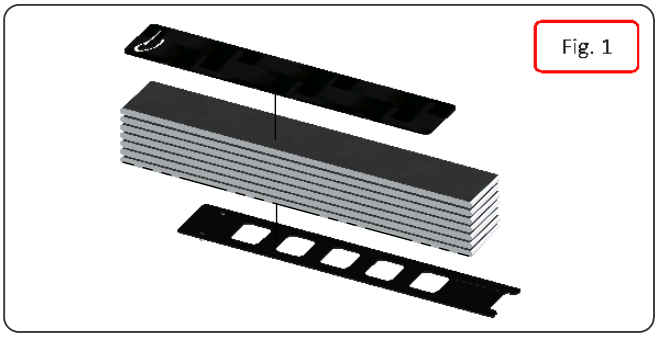
BATTERIES

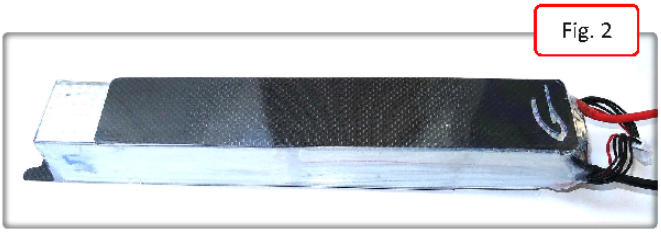
The battery tray system in the Goblin URUKAY is simple, but very effective.
The battery should be attached to the tray (Part **H0149**) with heat shrink, tape or velcro.
You can optionally use the battery protection tray (Part **H0151**) see **Fig. 1, 2**.
Before permanently mounting the batteries onto the battery tray, check the ideal position for the best center of gravity.
Cut the heat shrink around the carbon fiber tray locking pins. Fig. 3.

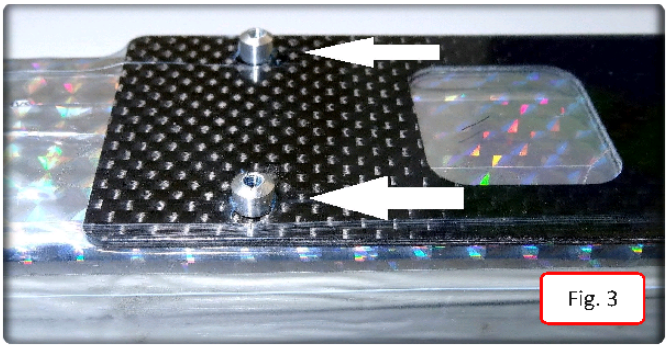
Battery Pack:

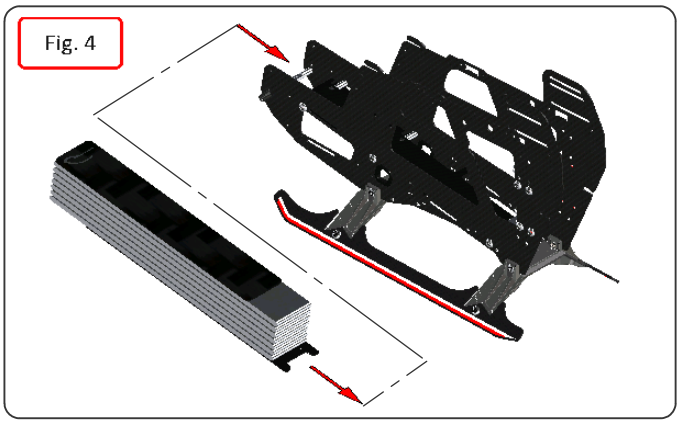
Slide the tray until it locks into the CNC stopper. **Fig. 4, 5**.
Using the velcro straps, making sure that the two locking pins are stopped against the frame spacer
(P/n **#H0003** and **#H0151**) **Fig.6, 7**.

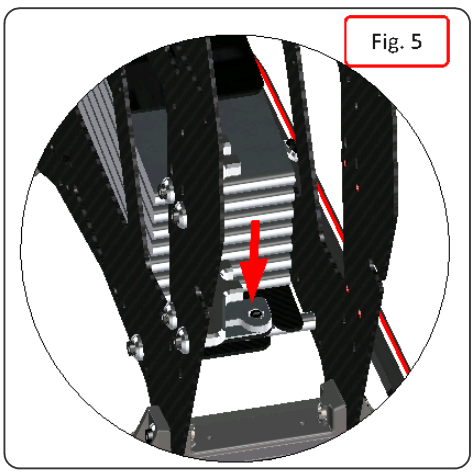


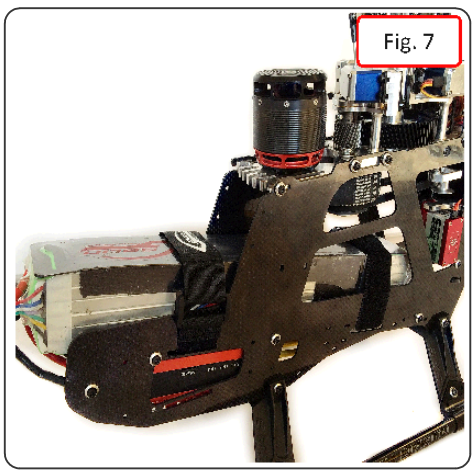








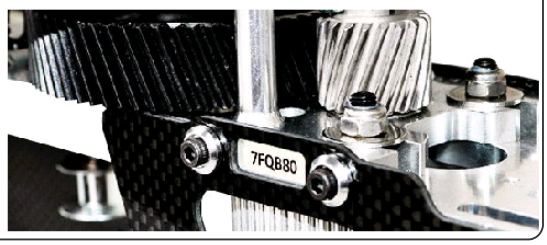




SERIAL NUMBER

In Bag 21, i will find the serial number tag for your Helicopter

⚠ Sticking the tag as show. Please remember to register your product. (See page 1)



OPERATIONS BEFORE FLIGHT

*Set up the remote control and the flybarless system with utmost care.
*It is advisable to test the correct settings of the remote and flybarless system without main blades and tail blades fitted.
*Check that all wiring is isolated from the carbon/aluminum parts. It is good practice to protect them at the points where they are at most risk.
⚠ *Be sure of the gear ratio, verifying carefully the motor pulley in use. The forces acting on the mechanics increase enormously with increasing of rpm. Although the Goblin can fly at high rpm, for safety reasons we suggest to not exceed 2100 rpm.

*Check the correct tension of the tail belt through the belt tensioner.
*Fit the main blades and tail blades. (Fig.1 and Fig.2)
*Please make sure the main blades are tight on the blade grips, you should be able to violently jerk the head in both directions and the blades should not fold. Failure to tighten the blades properly can result in a boom strike. To fold the blades for storage, it is advisable to loosen them.
*Check the collective and cyclic pitch. For 3D flight, set about +/- 12°.
*It is important to check the correct tracking of the main blades.
*On the Goblin, in order to correct the tracking, adjust the main link rod as shown in figure 3. This is provided with a right/left thread system that allows continuous fine adjustments of the length of the control rod; for this adjustment it is not necessary to detach the ball link.

⚠ *Perform the first flight at a low headspeed, 1500/1600 RPM.
After this first flight, do a general check of the helicopter. Verify that all screws are correctly tightened.

Fig. 1

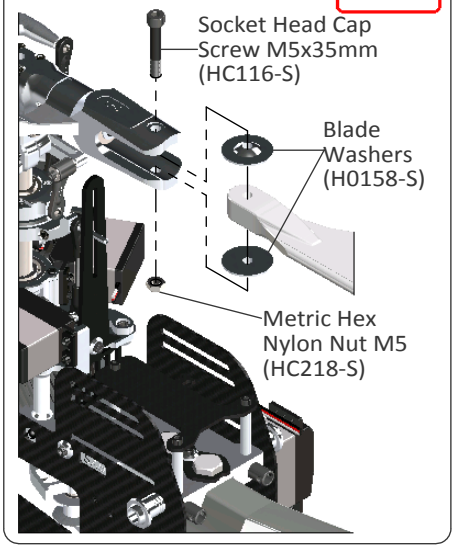


Fig. 2

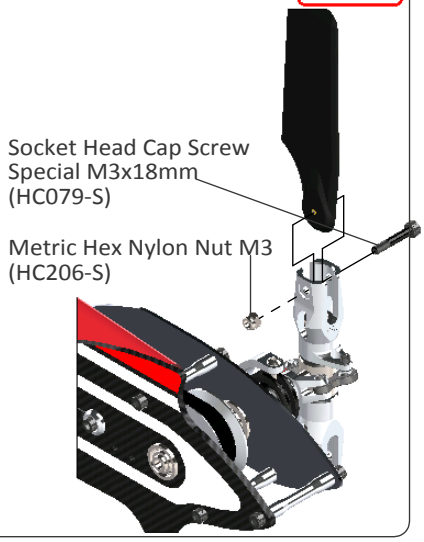
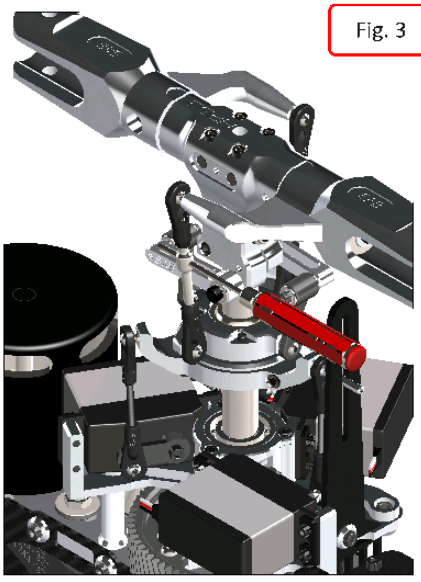


Fig. 3



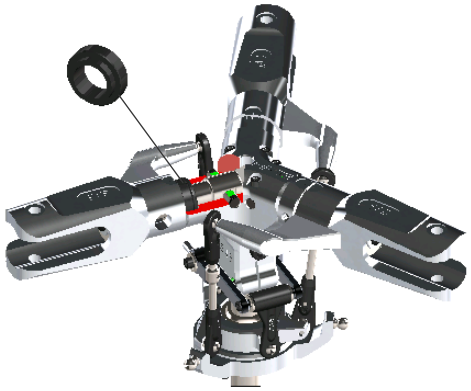
IN FLIGHT

During its first flights the Goblin has to be “run in”.
The Damper, the main gear, the uniball and other parts must undergo some slight wear to operate smoothly. It is likely that during the very first flights the model may exhibit a swaying phenomena, particularly at low head speed.
This phenomena disappears after a few flights.

If you want to fly in a generic way, using both low headspeed and high headspeed, the standard setting is the best compromise.

However, if you prefer flying at low speed [< **1900** rpm], for best results we recommend changing the tail pulley for a smaller one to increase tail rotor rpm. In this way, you will have extremely precise tail control even at low RPM. This pulley is available in the upgrade list [**H0154-S**]

ABOUT HPS2 and HPS3



The new HPS head offers an independent dampening system for each blade grip, there are three dampening settings:

A = Soft for smooth response.
B = Medium.
C = Firm for direct and precise response.

In the kit, there is the damper for medium setting H0426-B
Other Setting >> p/n H0426-S

ABOUT HPS3 SETUP

3 blade rotor heads require a much lower cyclic gain on flybarless systems.
We recommend that you set your gain at least 30% lower than the gain you normally use on your 2 blade rotor head helicopters.
You can start increasing the gain after you complete your first flight.
Running too high of a gain can induce a violent oscillation that can potentially cause damage to your helicopter in flight.

With 3 blades rotor head, it is very important to have a perfect tracking
Often, unusual vibration are determined by wrong tracking

TIPS:

To remove the dampeners, you can use a flathead screwdriver through the hole as shown.

MAINTENANCE

*On the Goblin, areas to look for wear include:

* Motor belt
* Tail belt
* Damper
* Main gear and pinion

The lifespan of these components varies according to the type of flying. On average it is recommended to replace these special parts every **100** flights.
*The head tends to lose rigidity after a while. Check this condition every **20** flights. Preloading with precision shim washers, it is possible to vary the rigidity of the head.
*Check all uniballs often.
*The most stressed bearings are definitely those of the tail shaft. Check them frequently. All other parts are not particularly subject to wear.
*Periodically lubricate the tail slide movement and its linkages as well as the swashplate movement and its linkages.
*Lubricate the main gear with proper Lubricant every 20 flights.
*Check the screws that are highlighted in the following images frequently, make sure you remain tight (**fig.2** and **fig.3**).
*To ensure safety you should do a general inspection of the helicopter after each flight. You should check:

* The maintenance of proper belt tension.
* The proper isolation of wires from the carbon and aluminum parts.
* That all screws remain tight.

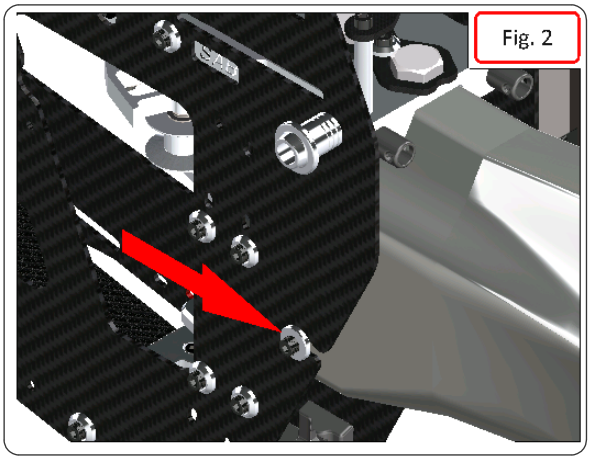


Fig. 2

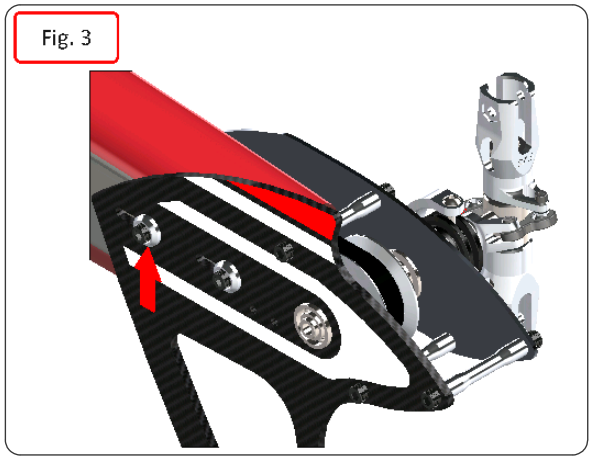
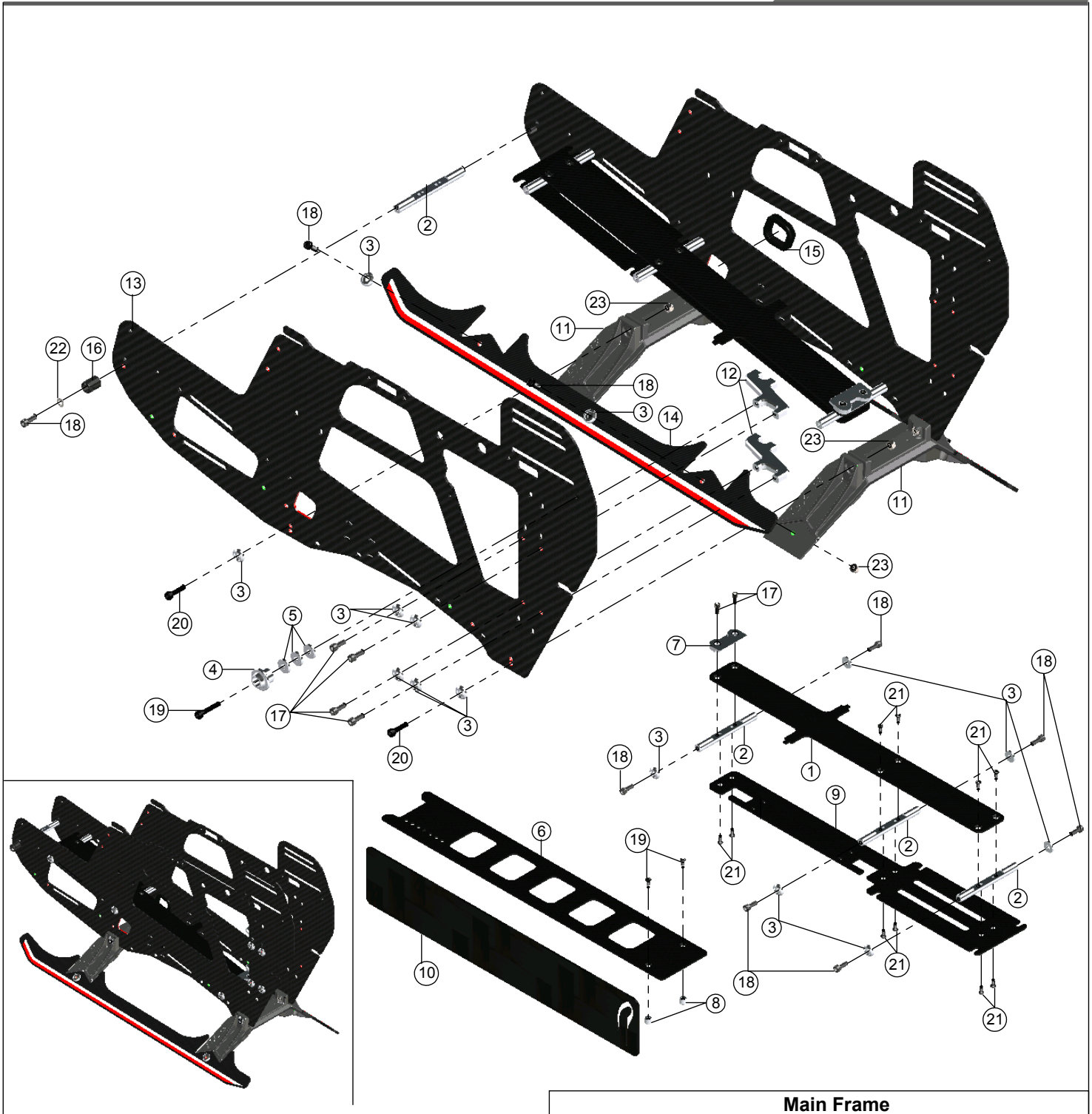
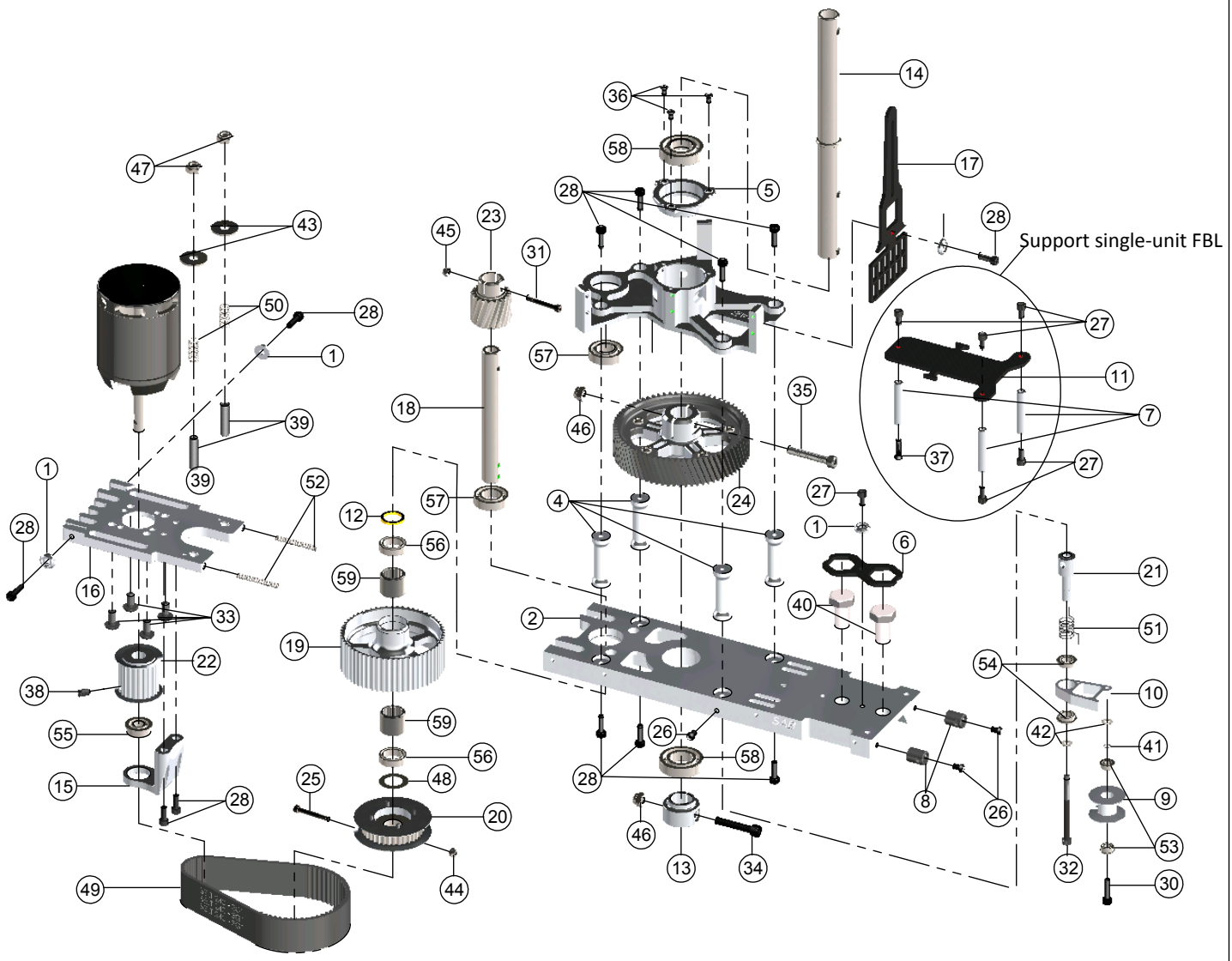


Fig. 3



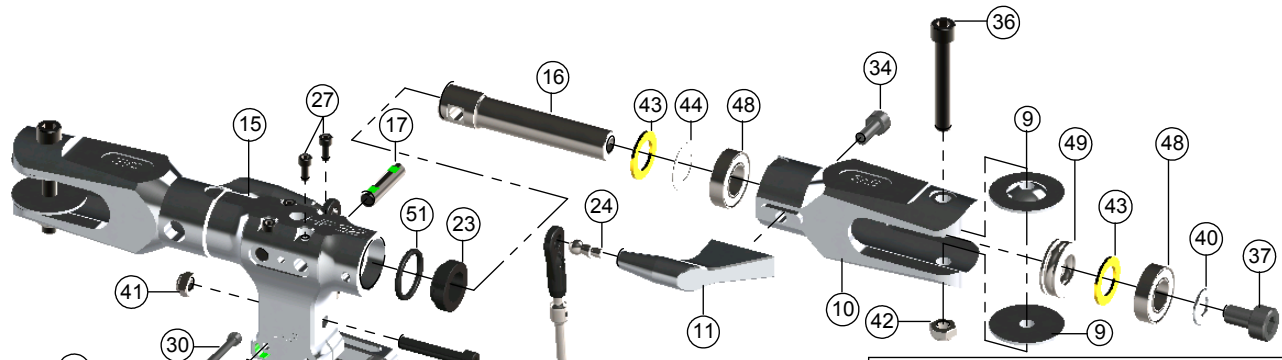
Main Frame				
POS	COD	Name	Specification	Quantity
1	H0002	Battery Tray	Carbon Fiber	1
2	H0003	Frame Spacers	Aluminum	4
3	H0007	Finishing Washers M3	Aluminum	14
4	H0008	Canopy Poitioner	Aluminum	2
5	H0078	Washer ∅3,1x ∅1,2x1.8	Aluminum	6
6	H0149	Battery Plate	Carbon Fiber	1
7	H0150	Stop Battery Plate	Aluminum	1
8	H0151	Cylinder M2.5	Aluminum	2
9	H0153	Battery Support	Carbon Fiber	1
10	H0153-1	Battery Protection	Carbon Fiber	1
11	H0344	Landing Gear Support	Plastic	2

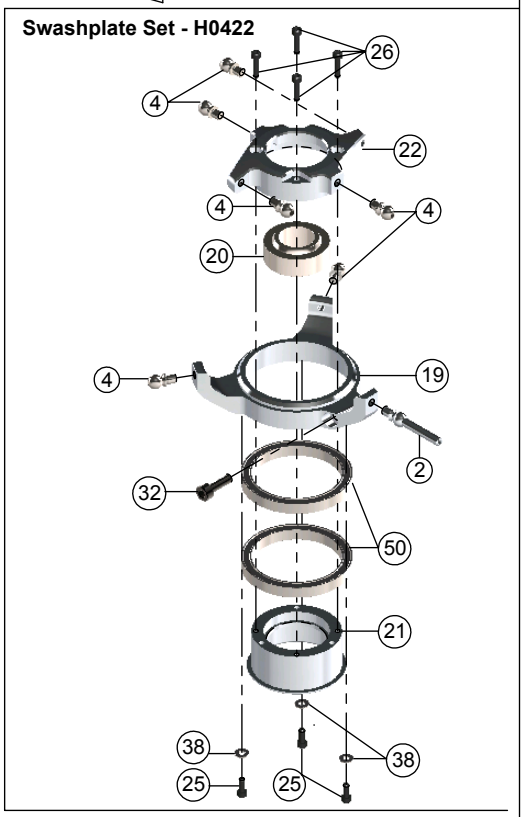
Main Frame				
POS	COD	Name	Specification	Quantity
12	H0436	Tail Servo Support	Aluminum	2
13	H0445	Main Frames	Carbon Fiber	2
14	H0446	Yellow Landing Gear	Carbon Fiber	2
15	HA010	Cable Pass	∅16 x∅24 x 2mm	1
16	HA016	Canopy Positioners	Rubber	2
17	HC020	Socket Head Cap Screws	M2.5 x 8mm	6
18	HC056	Socket Head Cap Screws	M3 x 10mm	16
19	HC062	Socket Head Cap Screws	M3 x 12mm	2
20	HC068	Socket Head Cap Screws	M3 x 16mm	4
21	HC128	Flat Head Cap Screws	M2.5 x 5mm	12
22	HC180	Washer	∅3,2x ∅6x0.5	2
23	HC206	Metric Hex Nylon Nut	M3	8

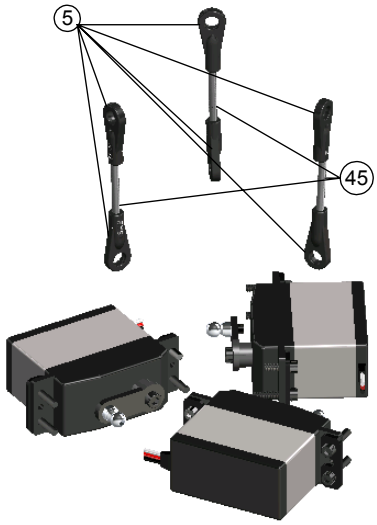


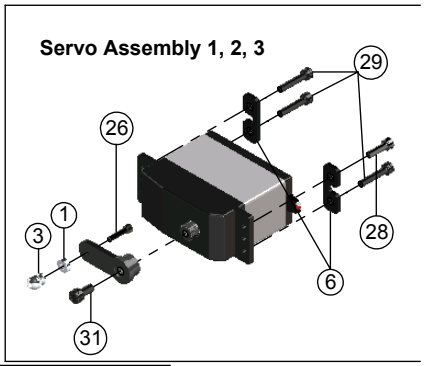
TRANSMISSION ASSEMBLY				
POS	COD	Name	Specification	Quantity
1	H0007	Finishing Washers M3	Aluminum	4
2	H0009	Main Structure	Aluminum	1
3	H0010	Servo Support	Aluminum	1
4	H0018	Columns	Aluminum	4
5	H0024	Main Shaft Bearing Support		1
6	H0038	Safety Locking Tail Boom	Carbon Fiber	1
7	H0043	Spacers Flybarless		3
8	H0050	Antenna Guide	Plastic	2
9	H0069	Tail Belt Idler		1
10	H0071	Belt Tensioner Arm		1
11	H0077	Flybarless Support	Carbon Fiber	1
12	H0110	Bush-One Ways	Ø10 x Ø13 x 1.4mm	2
13	H0121	M4 Locking Collar		1
14	H0127	Main Shaft		1
15	H0142	Support Bearing	Aluminum	1
16	H0143	Motor Support	Aluminum	1
17	H0152	Swash plate Anti-Rotation Guide	Carbon Fiber	1
18	H0157	Secondary Shaft		1
19	H0171	One Way Double Bearing	60T	1
20	H0172	Front Tail Pulley Low	37T	1
21	H0174	Column Belt Tensioner		1
22	H0175-20	Motor Pulley 20mm	20T	1
23	H0156	Drive Pinion	19T M1	1
24	H0404	Main Gear	68T M1	1
25	HC033	Socket Head Cap Screw Shouldereds	M2.5 x 19mm	1
26	HC038	Button Head Cap Screws	M3 x 4mm	3
27	HC044	Socket Head Cap Screws	M3 x 6mm	6
28	HC050	Socket Head Cap Screws	M3 x 8mm	4
29	HC056	Socket Head Cap Screws	M3 x 10mm	9
30	HC062	Socket Head Cap Screw	M3 x 12mm	1

TRANSMISSION ASSEMBLY				
POS	COD	Name	Specification	Quantity
31	HC079	Socket Head Cap Screws	M3 x 18mm	1
32	HC091	Socket Head Cap Shoudered	M3 x 40mm	1
33	HC098	Button Head Cap Screws	M4 x 8mm	4
34	HC104	Socket Head Cap Screw	M4 x 22mm	1
35	HC111	Socket Head Cap Screw	M4 x 24mm	1
36	HC128	Flat Head Cap Screws	M2.5 x 5mm	3
37	HC134	Flat Head Cap Screw	M3 x 8mm	1
38	HC153	Set Screws	M4 x 6mm	1
39	HC158	Set Screws	M5 x 20mm	2
40	HC165	Vite Nylon Esa	M8 x 20mm	2
41	HC176	Washer	Ø3 x Ø4x0.5mm	1
42	HC180	Washers	Ø3.2 x Ø6 x 0.5mm	2
43	HC188	Washers	Ø5.3 x Ø15 x 1mm	2
44	HC200	Metric Hex Nylon Nuts	M2.5 H3.5mm	1
45	HC206	Metric Hex Nylon Nuts	M3 H4mm	1
46	HC212	Metric Hex Nylon Nuts	M4 H5mm	2
47	HC218	Metric Hex Nylon Nuts	M5 H4.8mm	2
48	HC232	Washer	Ø10 x Ø16 x 0.2mm	1
49	HC309	Big Motor Belt	240-3MGT	1
50	HC310	Springs	De 5.8-df0.3-LL9	2
51	HC312	Spring	De 8-df0.5-LL8	1
52	HC315	Springs	De 8-df0.5-LL12	2
53	HC402	Flanged Bearings	Ø3 x Ø7 x 3mm	2
54	HC410	Flanged Bearings	Ø5 x Ø9 x 3mm	2
55	HC414	Flanged Bearings	Ø6 x Ø13 x 5mm	1
56	HC420	Bearings	Ø10 x Ø15 x 4mm	2
57	HC422	Bearings	Ø10 x Ø19 x 5mm	2
58	HC426	Bearings	Ø12 x Ø24 x 6mm	2
59	HC442	One Way Bearing	Ø10 x Ø14 x 12mm	2







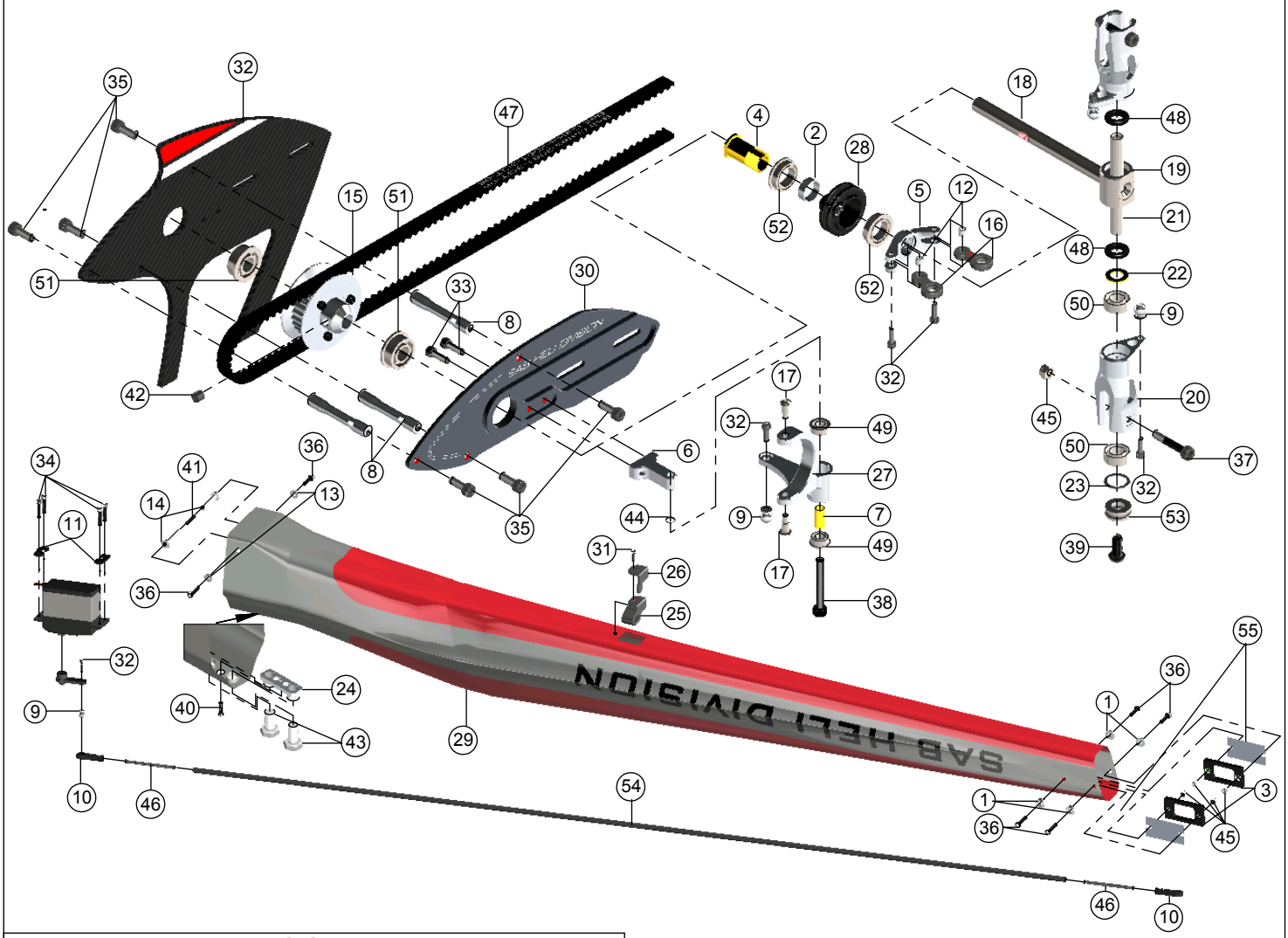


HEAD SYSTEM

POS	COD	Name	Specification	Quantity
1	H0031	Uniball Spacers	Aluminum	3
2	H0063	Uniballs	M3 x 4 Ø5 H18	1
3	H0064	Uniballs	M2.5 Ø5 H6	3
4	H0065	Uniballs	M3 x 4 Ø5 H3	6
5	H0066	Plastic Ball Linkages	Plastic	6
6	H0075	Servo Spacers	Carbon Fiber	6
7	H0132	Radius Arms	Aluminum	2
8	H0134	Spacer Arm	Ø3 x Ø5 x 2.7mm	2
9	H0158	Blade Washers	Ø5 x Ø24 x 1mm	4
10	H0182	Main Blade Grips	Aluminum	2
11	H0183	Blade Grip Arms	Aluminum	2
12	H0205	Unibal Radius Arms	Plastic	2
13	H0235	Spacer Arm	Ø2.5 x Ø4 x 6.3mm	2
14	H0402	Ball Linkages	Plastic	4
15	H0411	Center Hub	Aluminum	1
16	H0412	Spindle	Carbon Steel	2
17	H0413	Pin 5 mm	Carbon Steel	2
18	H0417	Linkages Rod	Carbon Steel	2
19	H0420-01	Swashplate 01	Aluminum	1
20	H0420-03	Swashplate 03	Carbon Steel	1
21	H0420-04	Swashplate 04	Aluminum	1
22	H0422-02	Swashplate 02	Aluminum	1
23	H0426	Damper Derlin	POM Black	2
24	H0437	Uniball M3	Carbon Steel	2
25	HC002	Socket Head Cap Screws	M2 x 5mm	3
26	HC008	Socket Head Cap Screws	M2 x 8mm	7

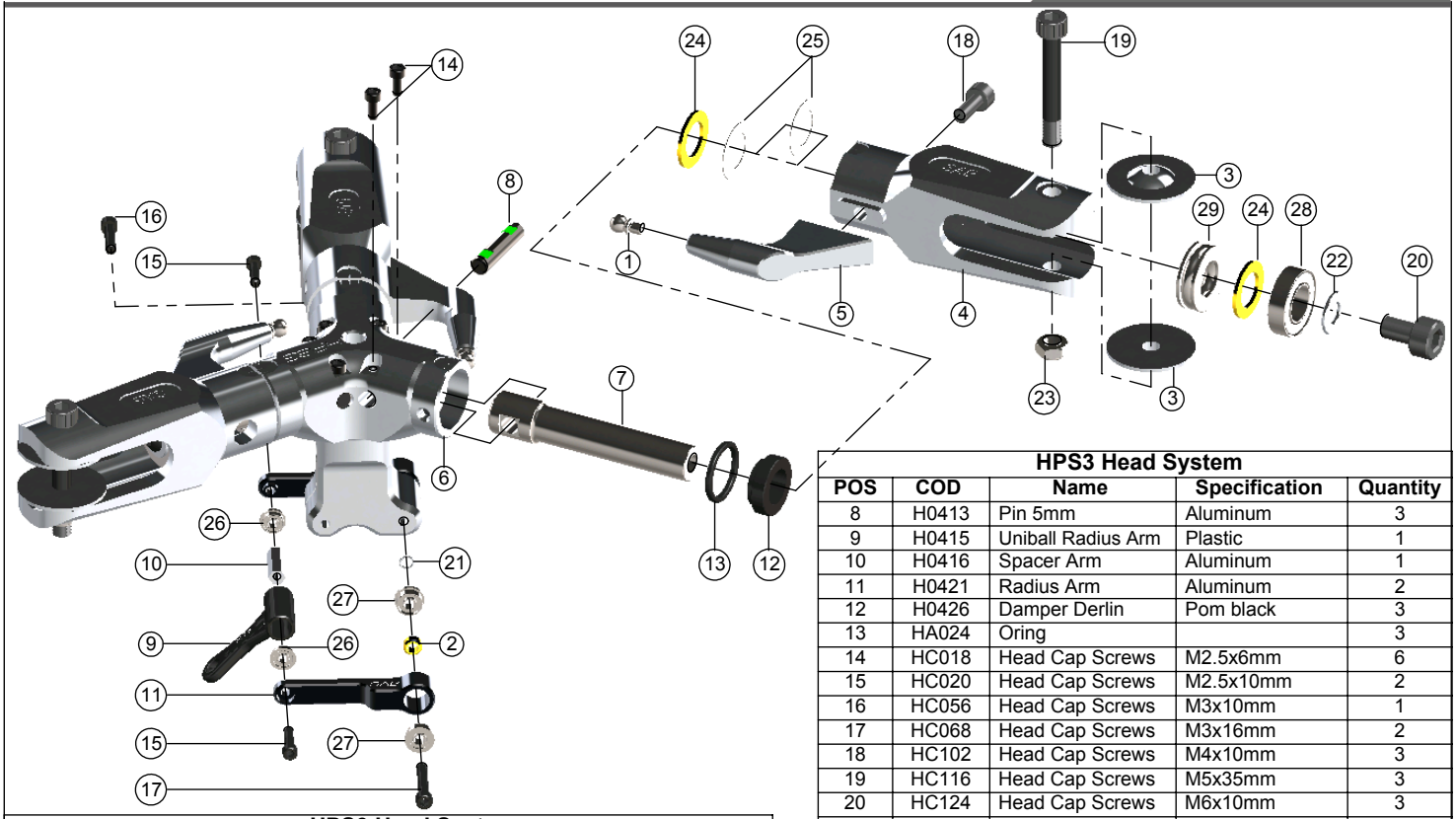
HEAD SYSTEM

POS	COD	Name	Specification	Quantity
27	HC018	Socket Head Cap Screws	M2.5 x 6mm	4
28	HC020	Socket Head Cap Screws	M2.5 x 8mm	3
29	HC026	Socket Head Cap Screws	M2.5 x 12mm	9
30	HC032	Socket Head Cap Screws	M2.5 x 18mm	2
31	HC044	Socket Head Cap Screws	M3 x 6mm	3
32	HC062	Socket Head Cap Screws	M3 x 12mm	3
33	HC068	Socket Head Cap Screws	M3 x 16mm	2
34	HC102	Socket Head Cap Screws	M4 x 10mm	2
35	HC111	Socket Head Cap Screw Shouldereds	M4 x 24mm	1
36	HC116	Socket Head Cap Screw Shouldereds	M5 x 35mm	2
37	HC124	Socket Head Cap Screws	M6 x 10mm	2
38	HC170	Washers	Ø2 x Ø5 x 0.5mm	3
39	HC176	Washers	Ø3 x Ø4 x 0.5mm	2
40	HC194	Washers	Ø6 x Ø14 x 1.5mm	2
41	HC212	Metric Hex Nylon Nuts	M4 H5	1
42	HC218	Metric Hex Nylon Nuts	M5 H4.8	2
43	HC230	Washers	Ø10 x Ø16 x 1mm	4
44	HC232	Washers	Ø10 x Ø16 x 0.2mm	2
45	HC242	Threaded Rods	M2.5 x 40mm	3
46	HC400	Flanged Bearings	Ø2.5 x Ø6 x 2.5mm	4
47	HC402	Flanged Bearings	Ø3 x Ø7 x 3mm	4
48	HC422	Bearings	Ø10 x Ø19 x 5mm	4
49	HC438	Thrust Bearings	Ø10 x Ø18 x 5.5mm	2
50	HC430	Bearing Rads	Ø30 x Ø37 x 4mm	2
51	HA024	Oring	3050	2



TAIL SYSTEM				
POS	COD	Name	Specification	Quantity
1	H0007	Finishing Washer M3	Aluminum	4
2	H0029	Spacer	∅8.1 x ∅9.2 x 3.2mm	1
3	H0041	Locking Element Tails	Carbon Fiber	2
4	H0054	Tail Pitch Slider 02	Aluminum	1
5	H0055	Tail Pitch Slider 03	Aluminum	1
6	H0058	Bell Crank Base	Aluminum	1
7	H0060	Spacer	∅3 x ∅4 x 9.6mm	1
8	H0061	Tail Case Spacers	Aluminum	3
9	H0064	Uniballs	M2.5 ∅5H6	3
10	H0066	Plastic Ball Links	Plastic	2
11	H0075	Servo Spacer	Carbon Fiber	2
12	H0076	Grip Link Bushs	Aluminum	2
13	H0078	Washers	∅3.1 x ∅12 x 1.8mm	2
14	H0082	Boom spacers	Aluminum	2
15	H0155	Tail Pulley	25t	1
16	H0261	Tail Pitch Slider Link	Plastic	2
17	H0264	Tail Pin		2
18	H0325	Tail Rotor Shaft		1
19	H0326	Tail Rotor Hub		1
20	H0327	Tail Blade Grip		2
21	H0329	Tail Spindle		1
22	H0330	Washer	∅5x ∅9x0.75mm	2
23	H0349	Washer	∅7.5x ∅10x0.5mm	2
24	H0358	Block Nut		1
25	H0394	Carbon Road Support		1
26	H0395	Carbon Road Support B		1
27	H0406	Bell Crank Lever	Aluminum	1
28	H0407	Tail Pitch Slider 01	Black Derlin	1

TAIL SYSTEM				
POS	COD	Name	Specification	Quantity
29	H0440	Tail Boom		1
30	H0444	Tail Side Plate	Aluminum	1
31	H0452	Vertical Fin	Carbon Fiber	1
32	HC004	Socket Head Cap Screws	M2 x 6mm	6
33	HC020	Socket Head Cap Screws	M2.5 x 8mm	3
34	HC026	Socket Head Cap Screws	M2.5 x 12mm	4
35	HC050	Socket Head Cap Screws	M3 x 8mm	8
36	HC062	Socket Head Cap Screws	M3 x 12mm	6
37	HC079	Socket Head Cap Shoudered	M3 x 18mm	2
38	HC086	Socket Head Cap Screws	M3 x 22mm	1
39	HC096	Button Head Cap Screws	M4 x 6mm	2
40	HC134	Flat Head Cap Screws	M3x8mm	1
41	HC150	Set Screws	M3 x 20mm	1
42	HC153	Set Screws	M4 x 6mm	1
43	HC165	Nylon Screw	M8x20mm	2
44	HC176	Washer		1
45	HC206	Metric Hex Nylon Nuts	M3	6
46	HC242	Threaded Rods	M2.5 x 40mm	2
47	HC325	Belt Gates		1
48	HC335	Oring	Rubber	2
49	HC402	Flanged Bearings	∅3 x ∅7 x 3mm	2
50	HC411	Bearings	∅5x ∅10x4mm	4
51	HC414	Flanged Bearings	∅6 x ∅13 x 5mm	2
52	HC418	Flanged Bearings	∅8 x ∅12 x 3.5mm	2
53	HC435	Thrust Bearings	∅5x ∅10x4mm	2
54	HC451	Carbon Rod		1
55	HA015	Double-sided Tapes		2

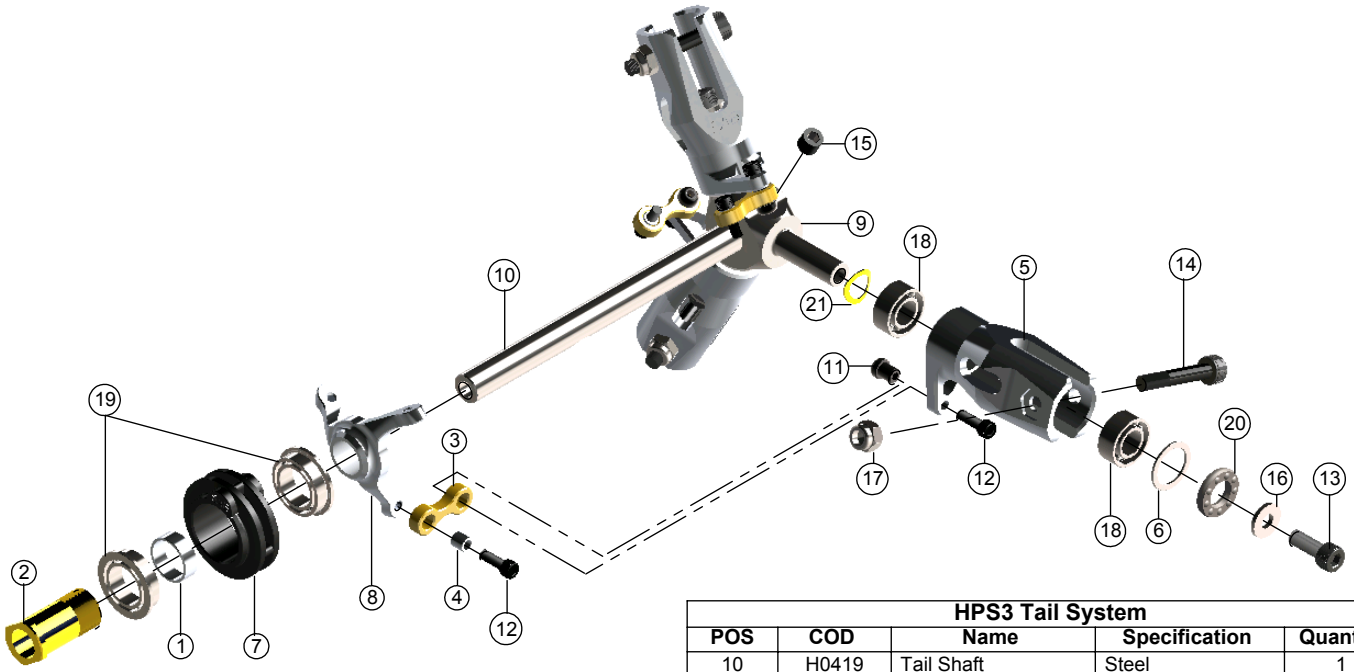


HPS3 Head System

POS	COD	Name	Specification	Quantity
1	H0065	Uniball M3	Steel	3
2	H0134	Spacer Arm	Aluminum	2
3	H0158	Blade Washers	Aluminum	6
4	H0182	Main Blade Grip	Aluminum	3
5	H0183	Blade Grip Arm	Aluminum	3
6	H0410	Center Hub	Aluminum	1
7	H0412	Spindle	Steel	3

HPS3 Head System

POS	COD	Name	Specification	Quantity
8	H0413	Pin 5mm	Aluminum	3
9	H0415	Uniball Radius Arm	Plastic	1
10	H0416	Spacer Arm	Aluminum	1
11	H0421	Radius Arm	Aluminum	2
12	H0426	Damper Derlin	Pom black	3
13	HA024	Oring		3
14	HC018	Head Cap Screws	M2.5x6mm	6
15	HC020	Head Cap Screws	M2.5x10mm	2
16	HC056	Head Cap Screws	M3x10mm	1
17	HC068	Head Cap Screws	M3x16mm	2
18	HC102	Head Cap Screws	M4x10mm	3
19	HC116	Head Cap Screws	M5x35mm	3
20	HC124	Head Cap Screws	M6x10mm	3
21	HC176	Washer	∅3x∅4x0.5	2
22	HC194	Washer	∅6x∅14x1	3
23	HC218	Metrix Nylon Nut	M5	3
24	HC230	Washer	∅10x∅16x1	6
25	HC232	Washer	∅10x∅16x0.2	3
26	HC400	Flanged Bearing	∅2.5x∅6x2.5	2
27	HC402	Flanged Bearing	∅3x∅7x3	4
28	HC422	Bearing	∅10x∅19x5	6
29	HC438	Thrust Bearing	∅10x∅18x5.5	3



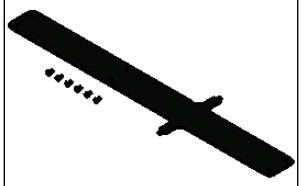
HPS3 Tail System

POS	COD	Name	Specification	Quantity
1	H0029	Spacer	∅8.1x∅9.2x3.2	1
2	H0054	Tail Pitch Slider 03	Aluminum	1
3	H0056	Tail Pitch Slider Link	Aluminum	3
4	H0076	Spacer	∅2x∅2x3	3
5	H0327	Tail Blade Grip	Aluminum	3
6	H0349	Spacer	∅7.5x∅10x0.5	3
7	H0407	Tail Pitch Slider 02	Plastic	1
8	H0409	Tail Pitch Slider 01	Aluminum	1
9	H0418	Tail Hub	Steel	1

HPS3 Tail System

POS	COD	Name	Specification	Quantity
10	H0419	Tail Shaft	Steel	1
11	H0435	Bushing	Aluminum	3
12	HC004	Head Cap Screws	M2x6mm	6
13	HC050	Head Cap Screws	M3x8mm	3
14	HC079	Head Cap Screws	M3x18mm	3
15	HC153	Set Screws	M4x6mm	1
16	HC181	Washer	∅3x∅7x1	3
17	HC206	Metrix Nylon Nut	M3	3
18	HC411	Bearing	∅5x∅10x4	6
19	HC418	Flanged Bearing	∅8x∅12x3.5	2
20	HC435	Thrust Bearing	∅5x∅10x4	3
21	HC449	Washer	∅5x∅7x0.2	3

Battery Tray
[H0002-S]



- 1 x CF Battery Tray.
- 6 x Flat Head Cap Screws M2.5x5mm.

Frame Spacer
[H0003-S]

- 3 x Frame Spacers.

Finishing Washer M3
[H0007-S]

- 10 x Finishing Washers .

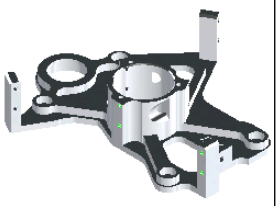
Canopy Positioner
[H0008-S]

- 2 x Canopy Positioner .

Main Structure
[H0009-S]

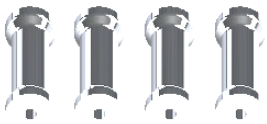
- 1 x Main Structure.

Servo Support
[H0010-S]



- 1 x Servo Support.

Column
[H0018-S]



- 4 x Columns.

Bearing Support
[H0024-S]

- 1 x Bearing Support.
- 1 x Bearing ∅12x∅24x6mm.
- 3 x Flat Head Cap Screws M2.5x5mm.

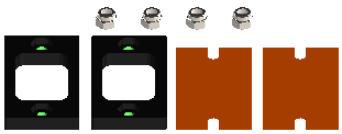
Canopy Knobs
[H0036-S]

- 2 x Canopy Knobs.

Safety Lock Tail Boom
[H0038-S]

- 1 x Safety Lock Tail Boom.
- 1 x Finishing Washer M3.
- 1 x Socket Head Cap Screws M3x8mm.

Locking Element Tail
[H0041-S]



- 2 x Locking Element Tails.
- 4 x Metric Hex Nylon Nuts M3.
- 2 x Double Sided Tapes.

Spacer Flybarless
[H0043-S]

- 3 x Spacer Flybarless.
- 1 x Supporto Flybarless.
- 1 x Flat Head Cap Screws M3x8mm.
- 5 x Socket Head Cap Screws M3x6mm.

Antenna Guide
[H0050-S]

- 2 x Antenna Guide.
- 2 x Button Head Cap Screws M3x4mm.

Bell Crank Base
[H0058-S]

- 1 x Bell Crank Base.

Tail Case Spacer
[H0061-S]

- 2 x Tail Case Spacers.
- 4 x Socket Head Cap Screws M3x8mm.

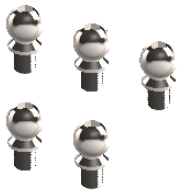
Uniball M3x4 ∅5H18
[H0063-S]

- 1 x Uniball M3x4 ∅5H18.

Uniball M2 ∅5H6
[H0064-S]

- 5 x Uniballs M2 ∅5H6.
- 5 x Uniball Spacers.
- 5 x Socket Head Cap Screws M2x8mm.
- 5 x Socket Head Cap Screws M2x6mm.

Uniball M3x4 ∅5H3
[H0065-S]

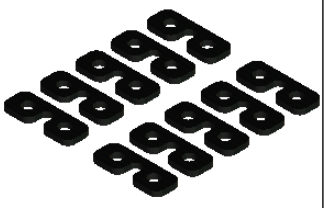


- 5 x Uniballs M3x4 ∅5H3.5.

Plastic Ball Link
[H0066-S]

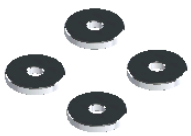
- 10 x Plastic Ball Link.

Servo Spacer
[H0075-S]



- 10 x Servo Spacers.

Washer ∅3.1x∅12x1.8mm
[H0078-S]

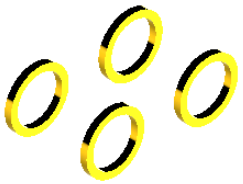


- 10 x Washers ∅3.1x∅12x1.8mm.

Boom Spacer
[H0082-S]

- 2 x Boom Spacer.
- 1 x Set Screw M3x20mm.

Bush One Way
[H0110-S]



- 4 x Bush One Ways.

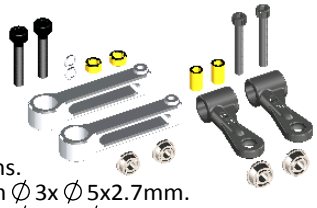
M4 Locking Collar
[H0121-S]

- 1 x M4 Locking Collar.
- 1 x Socket Head Cap Screw M4x22mm.
- 1 x Metric Hex Nylon Nut M4.

Main Shaft
[H0127-S]

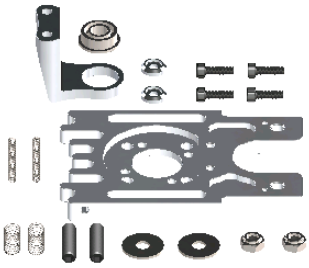
- 1 x Main Shaft.
- 1 x M4 Locking Collar.
- 1 x Socket Head Cap Screw Shouldered M4x24mm.
- 2 x Socket Head Cap Screws M4x22mm.
- 3 x Metric Hex Nylon Nuts M4.

Radius Arm
[H0132-S]



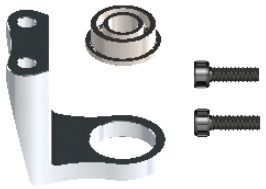
-2 x Radius Arms.
-2 x Spacer Arm ∅ 3x ∅ 5x2.7mm.
-2 x Spacer Arm ∅ 2.5x ∅ 4x6.3mm.
-2 x Uniball Radius Arms.
-2 x Socket Head Cap Screws M3x16mm.
-2 x Socket Head Cap Screws M2.5x18mm.
-2 x Washers ∅ 3x ∅ 4x0.5mm.
-2 x Flanged Bearings ∅ 2.5x ∅ 6x2.5mm.
-2 x Flanged Bearings ∅ 3x ∅ 7x3mm.

Motor Mount
[H0142-S]



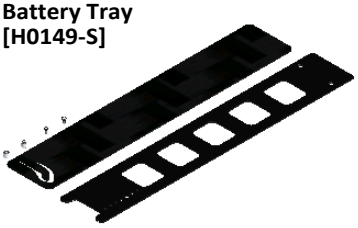
- 1 x Bearing 3° Support.
- 1 x Motor Support.
- 1 x Flanged Bearing ∅ 6x ∅ 13x5mm.
- 2 x Socket Head Cap Screws M3x8mm.
- 2 x Set Screws M5x20mm.
- 2 x Washers ∅ 5.3x ∅ 15x1mm.
- 2 x Metric Hex Nylon Nuts M5H4.8.
- 2 x Finishing Washers M3.
- 2 x Socket Head Cap Screws M3x10mm.
- 2 x Metric Hex Nylon Nut M3 H4.
- 2 x Springs de 5.8/ df0.5 / LL9.
- 2 x Springs de 3/ df0.5 / LL12.

Bearing Support
[H0143-S]



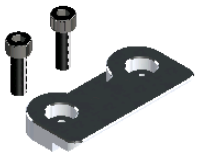
- 1 x Bearing 3° Support.
- 1 x Flanged Bearing ∅ 6x ∅ 13x5mm.
- 2 x Socket Head Cap Screws M3x8mm.

Battery Tray
[H0149-S]



- 1 x Battery Plate.
- 1 x Battery Protection.
- 2 x Cylinder M2.5.
- 2 x Flat Head Cap Screw M2.5x5mm.
- 1 x Heat Shrink.

Stop Battery Tray
[H0150-S]



- 1 x Stop Battery Tray.
- 2 x Socket Head Cap Screws M2.5x8mm.

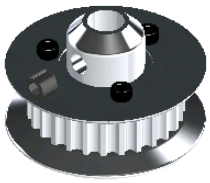
Swashplate Anti-Rotation Guide
[H0152-S]

- 1 x CF Swashplate Anti-Rotation Guide.
- 1 x Finishing Washer M3.
- 1 x Socket Head Cap Screw M3x8mm.

Carbon Fiber ESC Support
(H0153-S)

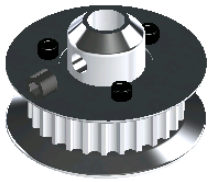
- 1 x ESC Support.
- 6 x Flat Head Socket Cap M2,5x5mm.

24T Tail Pulley
[H0154-S]



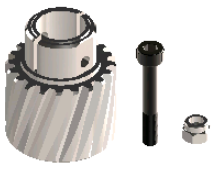
- 1 x 24T Tail Pulley.
- 1 x Set Screw M4x4mm.
- 6 x Socket Head Cap Screws M2x5mm.

25T Tail Pulley
[H0155-S]



- 1 x 25T Tail Pulley.
- 1 x Set Screw M4x4mm.
- 6 x Socket Head Cap Screws M2x5mm.

Steel Pinion Z19
[H0156-S]



- 1 x Steel Pinion Z19.
- 1 x Socket Head Cap M3x22 Shoulder.
- 1 x Metric hex locknut Nuts M3H4.

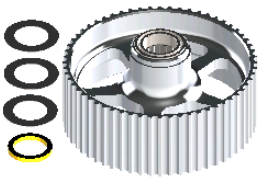
Secondary Shaft
[H0157-S]

- 1 x Secondary Shaft M3.
- 1 x Head Cap Shouldered M2.5x19mm.
- 1 x Metric Nylon Nut M2,5
- 1 x Head Cap Shouldered M3x22mm.
- 1 x Metric Nylon Nuts M3.

Aluminum Blade Spacer
[H0158-S]

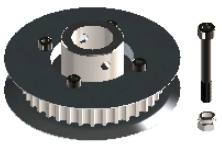
- 4 x Aluminum Blade Spacer.

One Way Pulley
[H0171-S]



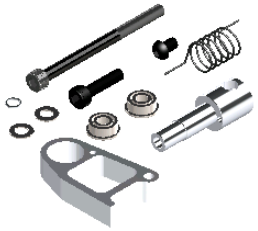
- 1 x Double Bearing One Way Pulley.
- 3 x Shims ∅ 10x ∅ 16x0,2mm.
- 1 x One Way Bushing.

Front Tail Pulley
[H0172-S]



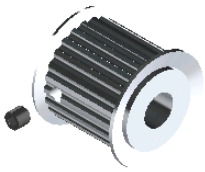
- 1 x Front Tail Pulley.
- 1 x Socket Head M2.5x19mm.
- 1 x Metric Nylon Nuts M2,5.

Belt Tensioner Support
[H0174-S]



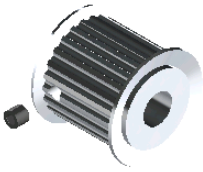
- 1 x Column Belt Tensioner.
- 1 x Tail Belt Idler.
- 1 x Belt Tensioner Arm.
- 2 x Flanged Bearings ∅ 3x ∅ 7x3mm.
- 2 x Flanged Bearings ∅ 5x ∅ 9x3mm.
- 1 x Socket Head Cap Screw M3x50mm.
- 1 x Washer ∅ 3x ∅ 4x0.5mm.
- 1 x Socket Head Cap Screw M3x12mm.
- 2 x Washers ∅ 3.2x ∅ 6x0.5mm.
- 1 x Button Head Cap Screw M3x4mm.
- 1 x Spring De8/df0.5/LL8.

18T Pulley
[H0175-18-S]



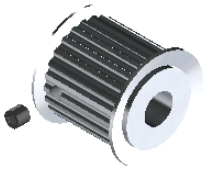
- 1 x 18T Pulley.
- 1 x Set Screws M4x4mm.

19T Pulley
[H0175-19-S]



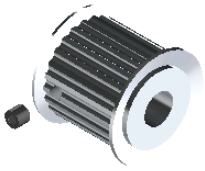
- 1 x 19T Pulley.
- 1 x Set Screws M4x4mm.

20T Pulley
[H0175-20-S]



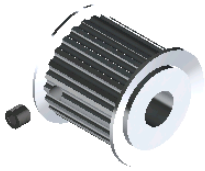
- 1 x 20T Pulley.
- 1 x Set Screws M4x4mm.

21T Pulley
[H0175-21-S]



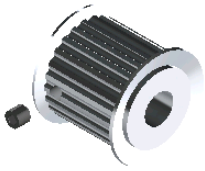
- 1 x 21T Pulley.
- 1 x Set Screws M4x4mm.

22T Pulley
[H0175-22-S]



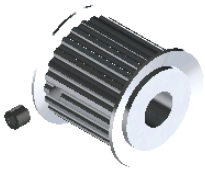
- 1 x 22T Pulley.
- 1 x Set Screws M4x4mm.

23T Pulley
[H0175-23-S]



- 1 x 23T Pulley.
- 1 x Set Screws M4x4mm.

24T Pulley
[H0175-24-S]

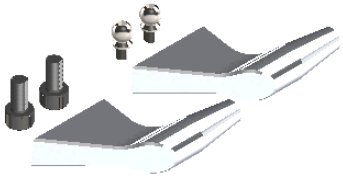


- 1 x 24T Pulley.
- 1 x Set Screws M4x4mm.

Blade Grip
[H0182-S]

- 2 x Blade Grip.
- 2 x Thrust Bearing ∅10x ∅18x5.5mm.
- 4 x Bearing ∅10x ∅19x5mm.
- 2 x Washer ∅10x ∅16x1mm.
- 2 x Button Head Socket Cap M4x10mm.

Blade Grip Arm
[H0183-S]

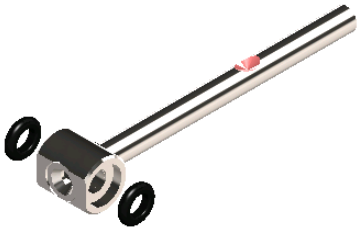


- 2 x Blade Grip Arm.
- 2 x Socket Head Cap Screw M4x10mm.
- 2 x Uniball M3x4 Ø5 H3.5.

Plastic Tail Linkage
[H0261-S]

- 1 x Plastic Tail Linkage.
- 1 x Grip Link Bushing.
- 1 x Socket Head Cap Screws M2x6mm.

Steel Tail Shaft
[H0325-S]



- 1 x Steel Tail Shaft Assembly.
- 1 x Tail Oring Damperner.

Aluminum Tail Blade Grip
[H0327-S]

- 2 x Aluminum Tail Blade Grip.
- 4 x Bearing Ø5xØ10x4mm.
- 2 x Thrust bearing Ø5xØ10x4mm.
- 2 x Button Head Cap M4x8mm.
- 2 x Socket Head Cap M2x6mm.
- 2 x Washer Ø5xØ8.9x0,75mm.
- 2 x Washer Ø7.5xØ10x0,5mm.

Tail Spilde Shaft
[H0329-S]

- 1 x Tail Spilde Shaft.
- 2 x Button Head Cap Screws M4x6mm.

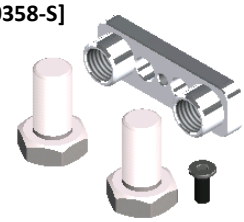
Spacer Set For Tail Rotor
[H0330-S]

- 2 x Washer Ø5xØ8.9x0,75mm.
- 2 x Washer Ø7.5xØ10x0,5mm.
- 2 x Tail Oring Damperner.

Lading Gear Plastic Support
[H0344-S]

- 2 x Landing Gear Plastic Support.
- 4 x Finishing Washer.
- 4 x Head Cap Screw M3x10mm.
- 4 x Metrix Head Nylon Nut M3.

Tail Boom Support
[H0358-S]



- 1 x Tail Boom Support.
- 1 x Nylon screw M8x20mm.
- 1 x Flat Head Cap ScrewsM3x8mm.

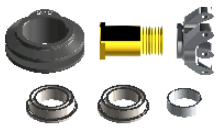
Ball Link
[H0402-S]

- 5 x Ball Link.

Bell Crank Lever
[H0406-S]

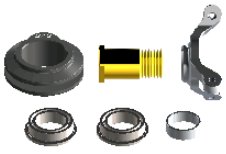
- 2 x Tail Pin.
- 1 x Uniball M2.
- 1 x Uniball Spacer.
- 1 x Bell Crank Lever.
- 2 x Flanged Bearing ∅3x∅7x3mm.
- 1 x Head Cap Screws M3x22mm.
- 1 x Head Cap Screws M2x8mm.
- 1 x Washer ∅3x∅4x0.5mm.
- 1 x Spacer 3 x 4 x 9.6mm.

Tail Pitch Slider
[H0407-S]



- 1 x Tail Pitch Slider 01.
- 1 x Tail Pitch Slider 02.
- 1 x Tail Pitch Slider 03.
- 1 x Spacer ∅8x∅9x3.2mm.
- 2 x Flanged Bearings ∅8x∅12x3.5mm

Tail Pitch Slider 3 Blade
[H0409-S]



- 1 x Tail Pitch Slider 01.
- 1 x Tail Pitch Slider 02.
- 1 x Tail Pitch Slider 03.
- 1 x Spacer ∅8x∅9x3.2mm.
- 2 x Flanged Bearings ∅8x∅12x3.5mm

Center Hurb
[H0410-S]

- 1 x Center Hub.
- 1 x Socket Head Cap Screws M3x12mm.
- 1 x Socket Head Cap Screw Shouldered M4x25mm.
- 1 x Metric Hex Nylon Nut M4.

Center Hurb
[H0411-S]

- 1 x Center Hub.
- 1 x Shoulder Cap Screw M4x24mm.
- 1 x Metric Hex Locknut Nuts M4.
- 2 x Socket Head Cap M3x12mm.

Spindle Shaft
[H0412-S]

- 2 x Spindle Shaft.
- 2 x Pin 5mm.
- 4 x Socket Head Cap Screw M2.5x6mm.
- 2 x Socket Head Cap Screw M4x10mm
- 2 x Washer Ø6,3 x Ø15 x 1mm

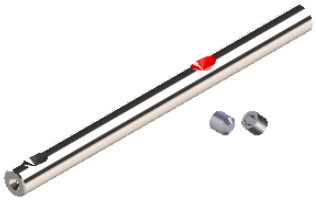
Main Linkage
[H0417-S]

- 2 x Linkage Rod M3x50mm.
- 4 x Plastic ball linkages.

Tail Hub
[H0418-S]

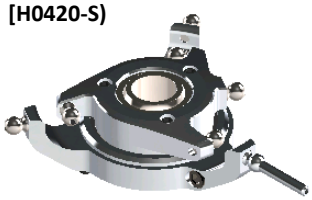
- 1 x Tail Hub.
- 1 x Set Screw M4x6mm.
- 3 x Head Cap Screws M3x8mm.
- 3 x Washer Ø3xØ7x1mm.
- 3 x Washer Ø5xØ7x0,2mm.

Tail Shaft
[H0419-S]



- 1 x Tail Shaft.
- 2 x Set Screws M4x6mm.

SwashPlate Set HPS3
[H0420-S]

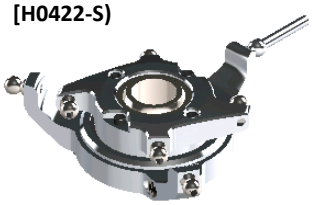


- 1 x Swashplate Assembly.
- 2 x Bearings 30x ∅ 37x4mm.
- 6 x Uniballs M3x4 ∅ 5 H3.
- 1 x Uniball M3x4 ∅ 5 H18.
- 3 x Head Cap Screws M2x5mm.
- 3 x Swasher ∅ 2x ∅ 5x0.5mm

Radius Arm
[H0421-S]

- 2 x Radius Arms.
- 2 x Spacer Arm ∅ 3x ∅ 5x2.7mm.
- 1 x Spacer Hex.
- 1 x Uniball Radius Arms.
- 2 x Head Cap Screws M3x16mm.
- 2 x Head Cap Screws M2.5x10mm.
- 2 x Flanged Bearings ∅ 2.5x ∅ 6x2.5mm.
- 4 x Flanged Bearings ∅ 3x ∅ 7x3mm.

SwashPlate Set HPS2
[H0422-S]



- 1 x Swashplate Assembly.
- 2 x Bearings 30x ∅ 37x4mm.
- 6 x Uniballs M3x4 ∅ 5 H3.
- 1 x Uniball M3x4 ∅ 5 H18.
- 3 x Head Cap Screws M2x5mm.
- 3 x Swasher ∅ 2x ∅ 5x0.5mm

Damper
[H0426-S]

- 3 x H0426-A.
- 3 x H0426-B.
- 3 x H0426-C.
- 3 x Washers 10x 16x1mm.
- 3 x Washers 10x 16x0.2mm.
- 3 x Orings 3050.

Pin M2
[H0435-S]

- 3 x Pin M2.
- 3 x Spacer ∅ 2x ∅ 3x3mm.
- 3 x Tail Pitch Slider Link.
- 6 x Head Cap Screws M2x6mm.

Tail Servo Support
[H0436-S]

- 2 x Tail Servo Support.

Uniball M3xH5.5
[H0437-S]

- 2 X Uniball M3H5.5.

Red Canopy / Tail Boom
[H0438-S]

- 1 x White/Red Canopy.
- 2 x Canopy Grommet.
- 1 x Canopy mousse.
- 1 x Canopy Edge Protection.

- 1 x Red/White Tail Boom.
- 2 x Locking Element Tails.
- 2 x Double-Sided Tapes.
- 1 x Set Screws M3 x 20mm.
- 2 x Washers 3.1 x 12 x 1.8mm.
- 4 x Metric Hex Nylon Nuts M3.
- 2 x Boom spacers.
- 2 x Head Cap Screws M3 x 12mm.
- 2 x Nylon Screw M8x20mm.
- 1 x Flat Head Cap Screws M3x8mm.

White Canopy / Tail Boom
[H0439-S]

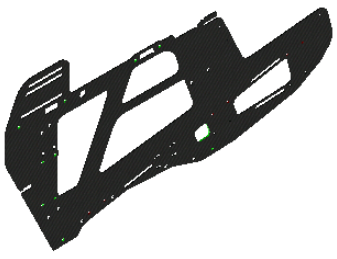
- 1 x Blue/White Canopy.
- 2 x Canopy Grommet.
- 1 x Canopy mousse.
- 1 x Canopy Edge Protection.

- 1 x Blue/White Tail Boom.
- 2 x Locking Element Tails.
- 2 x Double-Sided Tapes.
- 1 x Set Screws M3 x 20mm.
- 2 x Washers 3.1 x 12 x 1.8mm.
- 4 x Metric Hex Nylon Nuts M3.
- 2 x Boom spacers.
- 2 x Head Cap Screws M3 x 12mm.
- 2 x Nylon Screw M8x20mm.
- 1 x Flat Head Cap Screws M3x8mm.

Tail Side Plate
[H0444-S]

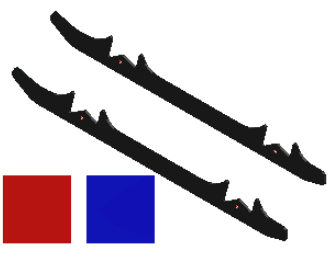
- 1 x Tail Side Plate.
- 1 x Flanged bearing Ø6xØ13x5mm.

Main Frame
[H0445-S]



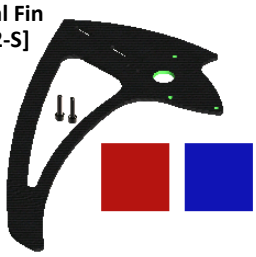
- 1 x Main Frame.

Landing Gear
[H0446-S]



- 2 x Landing Gear.
- 2 x Sticker.

Vertical Fin
[H0452-S]



- 1 x Vertical Fin.
- 2 x Head Cap Screws M3x12mm.
- 2 x Finishing Washer M3.
- 2 x Sticker.

[HC002-S]

- 5 x Socket Head Cap Screws M2x5mm.

[HC004-S]

-5 x Socket Head Cap Screws M2x6mm.

[HC008-S]

-5 x Socket Head Cap Screws M2x8mm.

[HC010-S]

-5 x Socket Head Cap Screws M2x10mm.

[HC018-S]

- 5 x Socket Head Cap Screws M2.5x6mm.

[HC020-S]

-5 x Socket Head Cap Screws M2.5x8mm.

[HC026-S]

- 5 x Socket Head Cap Screw M2.5x12mm.

[HC033-S]

- 4 x Socket Head Shouder M2.5x19mm.
- 4 x Metrix Hex Nylon Nut M2.5.

[HC038-S]

- 5 x Button Head Cap Screws M3x4mm.

[HC044-S]

- 5 x Socket Head Cap Screws M3x6mm.

[HC050-S]

- 5 x Socket Head Cap Screws M3x8mm.

[HC056-S]

- 5 x Socket Head Cap Screws M3x10mm.

[HC062-S]

- 5 x Socket Head Cap Screws M3x12mm.

[HC068-S]

- 5 x Socket Head Cap Screws M3x16mm.

[HC079-S]

- 5 x Socket Head Cap Shouder M3x18mm.

[HC086-S]

-5 x Socket Head Cap Screws M3x22mm.

[HC091-S]

- 2 x Socket Head Shoulder M3x40mm.

[HC096-S]

- 5 x Buttom Head Cap Screws M4x6mm.

[HC098-S]

- 5 x Button Head Cap Screws M4x8mm.

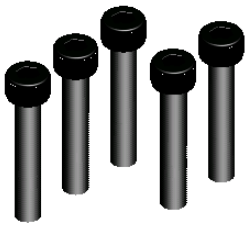
[HC100-S]

- 5 x Button Head Cap Screws M4x10mm.

[HC102-S]

- 5 x Socket Head Cap Screws M4x10mm.

[HC104-S]



- 5 x Socket Head Cap Screws M4x22mm.

[HC116-S]

- 2 x Socket Head Cap Shouder M5x35mm.
- 2 x Metrix Hex Nut M5.

[HC122-S]

- 5 x Button Head Cap Screws M6x10mm.

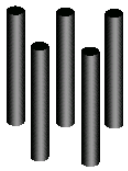
[HC128-S]

- 5 x Flat Head Cap Screws M2.5x5mm.

[HC134-S]

- 5 x Flat Head Cap Screws M3x8mm.

[HC140-S]



- 5 x Cup Poin Set Screws M2.5x20mm.

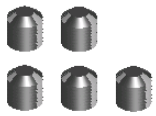
[HC150-S]

- 5 x Cup Poin Set Screws M3x20mm.

[HC152-S]

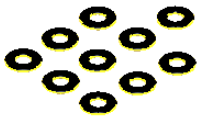
- 5 x Cup Poin Set Screws M4x4mm.

[HC153-S]



- 5 x Cup Poin Set Screws M4x6mm.

[HC170-S]



- 10 x Washer Ø2,2xØ5x0,3mm.

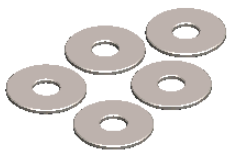
[HC176-S]

- 5 x Washer Ø3xØ4x0,5mm.

[HC181-S]

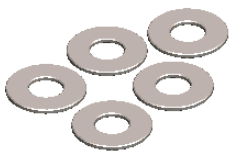
- 10 x Washer Ø3xØ7x1mm.

[HC188-S]



- 5 x Washer Ø5.3xØ15x1mm.

[HC194-S]



- 5 x Washer Ø6.3xØ15x1mm.

[HC200-S]

- 10 x Metric Hex Nylon Nuts M2,5H3,5.

[HC206-S]

- 10 x Metric Hex Nylon Nuts M3H4.

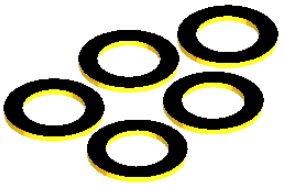
[HC212-S]

- 10 x Metric Hex Nylon Nuts M4H5.

[HC218-S]

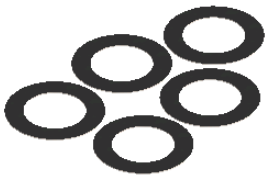
- 5 x Metric Hex Nylon Nuts M5H4.5.

[HC230-S]



- 5 x Shims Ø10xØ16x1mm.

[HC232-S]

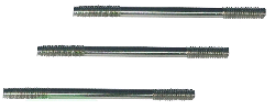


- 5 x Shims Ø10xØ16x0.2mm.

[HC451-S]

- 1 x Carbon Rod Ø4xØ2,5x752mm.
- 2 x Plastic Ball Linkage.
- 2 x Thread Rod M2.5x40mm.

[HC242-S]



- 3 X Thread Rods M2.5x40mm.

[HC325-S]

- 1 x Main Belt.

[HC309-S]

- 1 x Motor Belt 240-3MGT 19mm.

[HC315-S]

- 2 x Spring 5,8/df 0,3/LL 9.
- 1 x Spring 8 /df 0,5 / LL 8.
- 2 x Spring 3 /df 5 / LL 12.

[HC335-S]

- 4 x Tail Oring Damperner.

[HC400-S]

- 4 x Flanged Bearings Ø2.5x Ø6x2.6mm.

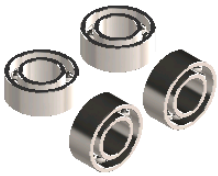
[HC402-S]

- 4 x Flanged Bearings Ø3x Ø7x3mm.

[HC410-S]

- 4 x Flanged Bearings Ø5x Ø9x3mm.

[HC411-S]



- 4 x Bearings Ø5x Ø10x4mm.

[HC414-S]

- 2 x Flanged Bearings Ø6x Ø13x4mm.

[HC418-S]

- 2 x Flanged Bearings Ø8x Ø12x3.5mm.

[HC420-S]

- 2 x Bearings Ø10x Ø15x4mm.

[HC422-S]

- 4 x Bearings Ø10x Ø19x5mm.

[HC426-S]

- 2 x Bearings Ø12x Ø24x6mm.

[HC430-S]

- 2 x Rad Bearings Ø30x Ø37x4mm.

[HC435-S]

- 2 x Thrust Bearings Ø5x Ø10x4mm.

[HC438-S]

- 2 x Thrust Bearings Ø10x Ø18x5.5mm.

[HC442-S]

- 1 x One Way Bearings Ø10x Ø14x12mm.

[HA006-S]

- 1 x Canopy Mousse.

[HA010-S]

- 2 x Cable Pass.

[HA016-S]

- 2 x Wrench Tool M8,M6.

[HA024-S]

- 4 x O-ring 3050.

[HA025-S]

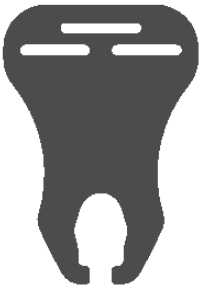
- 2 x Velcro Battery Strap.

[HA026-S]

[HA026-S]

- 8 x Heat Shrink - Clear.

[HA031-S]



- 1 x Blade Holder 3 Blades.

[HA106-S]

- 2 x Canopy Positioners.
- 2 x Washer Ø3.2xØ6x0.5mm.
- 2 x Head Cap Screw M3x10mm.

[HA112-S]

- 1 x Rubber Canopy Edge Protection.

[3BL730-2FS]

- 3 x Main Blade.

[BL730-2FS]

- 2 x Main Blade.

[3BW5115S]

- 3 x Tail Blade.

[BW5115S]

- 2 x Tail Blade.

UPGRADES and ACCESSORIES

SAB HELIDIVISION
Futaba Servo Horn
[HA050]

- 1 x Plastic Servo Horn.

SAB HELIDIVISION
JR Servo Horn
[HA050]

- 4 x JR Servo Horn.

SAB HELI DIVISION New Black T-shirt
[HM025-S-M-L-XL-XXL]

- SAB HELI DIVISION New Black T-shirt.

SAB HELI DIVISION Black Polo Shirt
[HM027-S-M-L-XL-XXL]

- SAB HELI DIVISION Black Polo Shirt.

SAB HELI DIVISION Black Hoodies
[HM029-S-M-L-XL-XXL]

- SAB HELI DIVISION Black Hoodies.

SAB HELI DIVISION Neck Strap
[HM034]

- 1 x Neck Strap.

SAB HELI DIVISION Decal
[HM042 - HM043]

- 1 x SAB HELI DIVISION Decal (set).

SAB HELI DIVISION Keychain [HM037]

- 1 x SAB HELI DIVISION Keychain.

SAB HELI DIVISION Stand [HM038]

- 1 x SAB HELI DIVISION Stand (Set).

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