MANUAL

IL GOBLIN SD

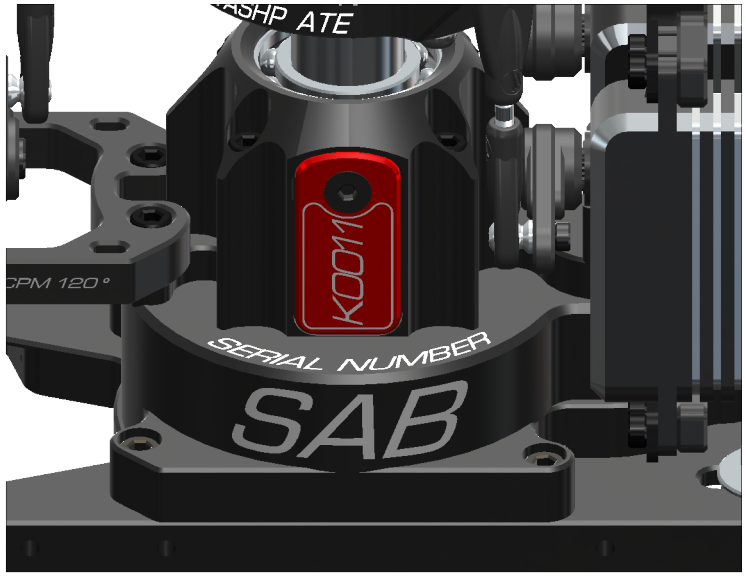
IL GOBLIN

THE ITALIAN HELI

SAB HELI DIVISION

Please read this user manual carefully, it contains instructions for the correct assembly of the model.
Please refer to the web site *www.goblin-helicopter.com* for updates and other important information.

VERY IMPORTANT



You will find your serial number on the RED plate of the transmission module and on the product card included with your kit.
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 any issues with your model and will not provide support unless you register your model.

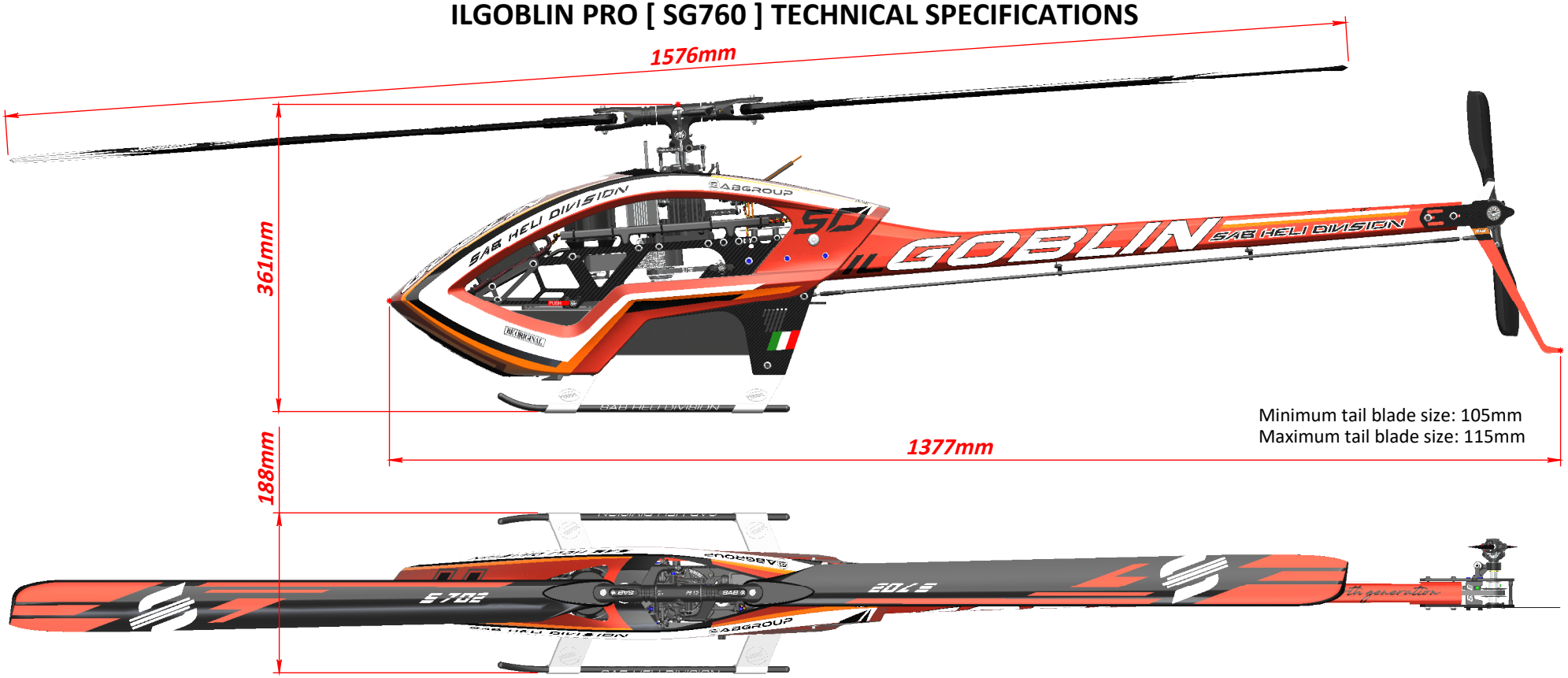
The Serial number is also engraved in the Aluminum part.

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

SAB Heli Division

INDEX

ILGOBLIN PRO [SG760] TECHNICAL SPECIFICATIONS



- **AIRFRAME weight:** 2178 gr (no blades, no battery, no electronics).
- **Main rotor diameter:** 1576 mm (with 700 mm blade).
- **Main blade length:** 650 to 730mm.
- **Tail rotor diameter:** 292 mm (with 110 mm tail blade).
- **Tail blade length:** 105 to 115 mm.
- **Main shaft: 15 mm, Tail shaft: 8 mm.**
- **Molded carbon tail boom .**

- **Cyclic Servos:** Standard size 40mm.
- **Tail Servo:** Standard size 40mm.

- **Main Rotor Ratio:** 11.8 to 8.8 (21T included: 10.1:1).
- **Tail Rotor Ratio:** 5.1-4.9:1 (26T included: 4.9:1).
- **Motor:** 12S, 480/560 KV.
- **Battery room:** 50x60x300 mm.

KIT Includes:

- 21T motor pulley (other pulley sizes available).
- 2 battery trays with integrated connectors.

- S702 Orange (700 mm main blade).
- S110 Orange (110 mm tail blade).

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.
*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 designated for 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.

DAMAGE LIMITS

SAB HELI DIVISION SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of SAB Heli Division exceed the individual price of the product on which liability is asserted. As SAB Heli Division has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly the user accepts all resulting liability. If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

LIMITED WARRANTY

SAB Heli Division reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(a) This warranty is limited to the original Purchaser (“Purchaser”) and is not transferable. REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER This warranty covers only those Products purchased from an authorized SAB Heli Division dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims.

(b) Limitations- SAB HELI DIVISION MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER’S INTENDED USE.

(c) Purchaser Remedy - SAB Heli Division’s sole obligation hereunder shall be that SAB Heli Division will, at its option, replace any product determined by SAB Heli Division to be defective In the event of a defect, this is the Purchaser’s exclusive remedy. Replacement decisions are at the sole discretion of SAB Heli Division. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance or attempted repair by anyone.

ADDITIONAL COMPONENTS REQUIRED

*Electric Motor

*Speed controller

*Batteries: 12S – 4200/5500mAh

*1 flybarless 3 axis control unit

*Radio power system.

*3 cyclic servos
*1 tail rotor servo

*6 channel radio control system on 2.4 GHz

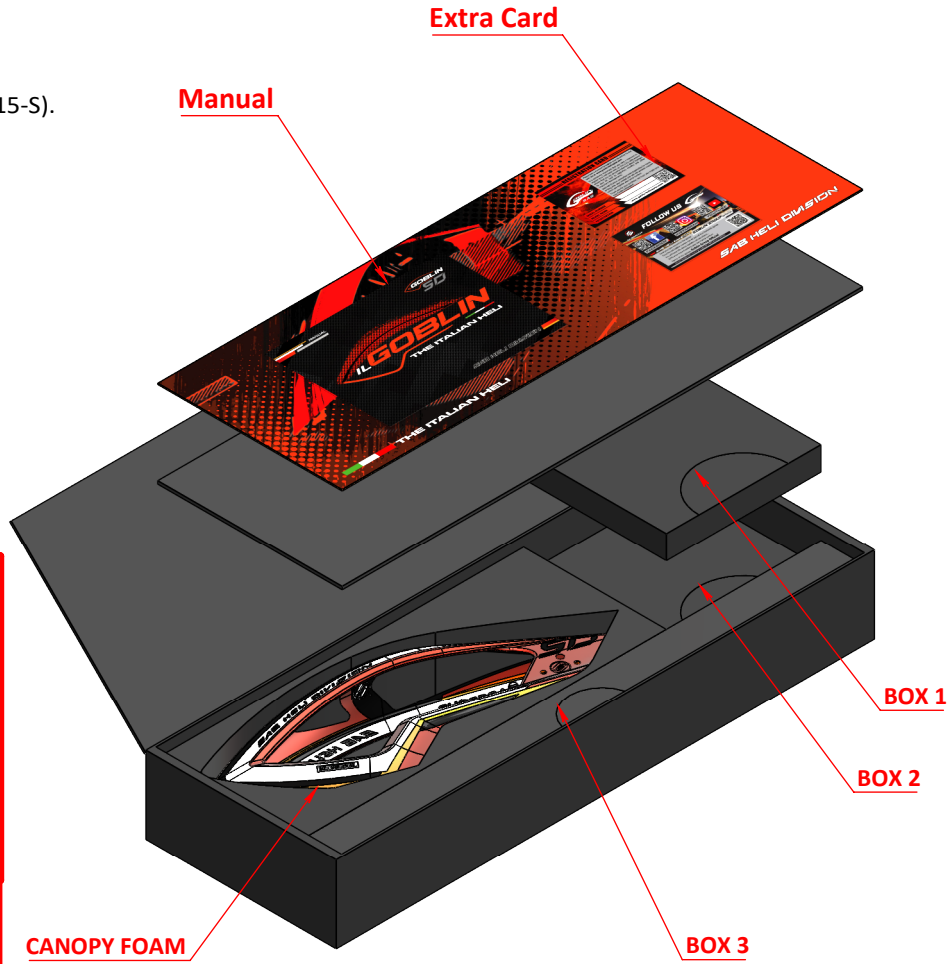
TOOLS, LUBRICANTS, ADHESIVES

*Generic pliers.
*Hexagonal driver, size 1.5, 2, 2.5, 3mm.
*4/5mm T-Wrench.
*5.5mm Socket wrench (for M3 nuts).
*8mm Hex fork wrench (for M5 nuts).

*Medium threadlocker (SAB p/n HA116-S).
*Strong retaining compound (SAB p/n HA115-S).
*Spray lubricant (eg. Try-Flow Oil).
*Synthetic grease (eg. Microlube 261).
*Cyanoacrylate adhesive.

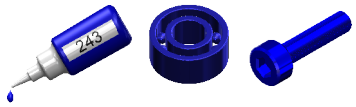
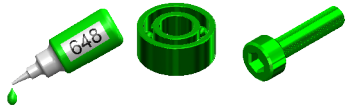
*Pitch Gauge (for set-up).
*Soldering equipment (for motor wiring).

INSIDE THE MAIN BOX THERE ARE:



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	 Blue screw and blue bearing in the illustration means you need to use: **Thread Locker Medium Strength (SAB HA116-S)**	 Green screw and Green bearing in the illustration means you need to use: **Use retaining compound (SAB HA115-S)**
BOX XX, BAGXX Indicates that for this assembly phase you need materials that are: BOX xxx, BAG xxx.	 Use CA Glue	 Use Proper Lubricant

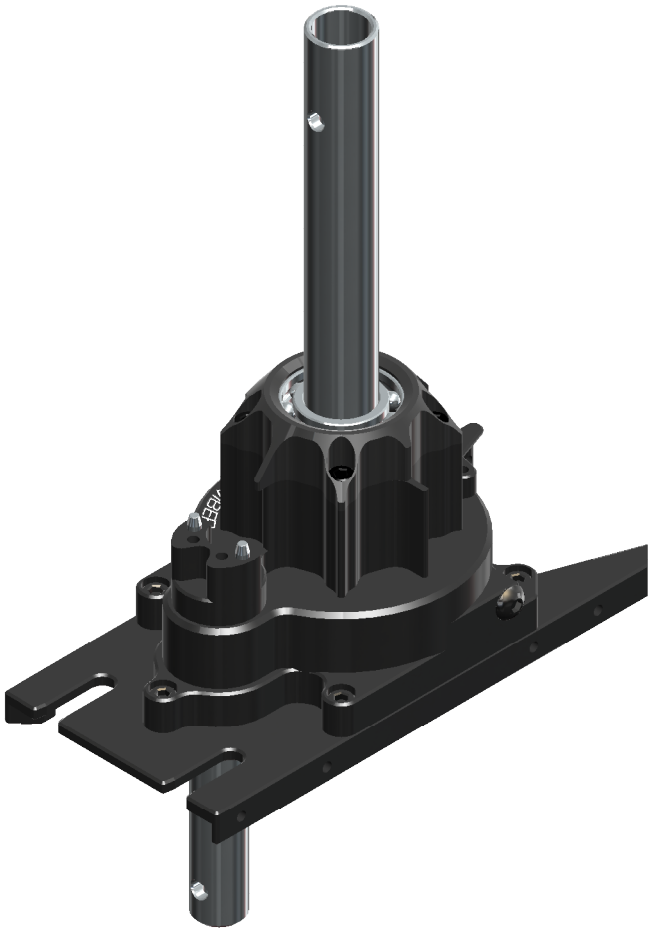
The assembly process is described in the following chapters. Each chapter provides you with the box, bag and/or foam numbers you will need for that chapter. The information is printed in a black box in the upper corner of the page.

BOXES 1-2 , BAG FOR PAGE 5

TRANSMISSION GROUP ASSEMBLED AND VERIFIED

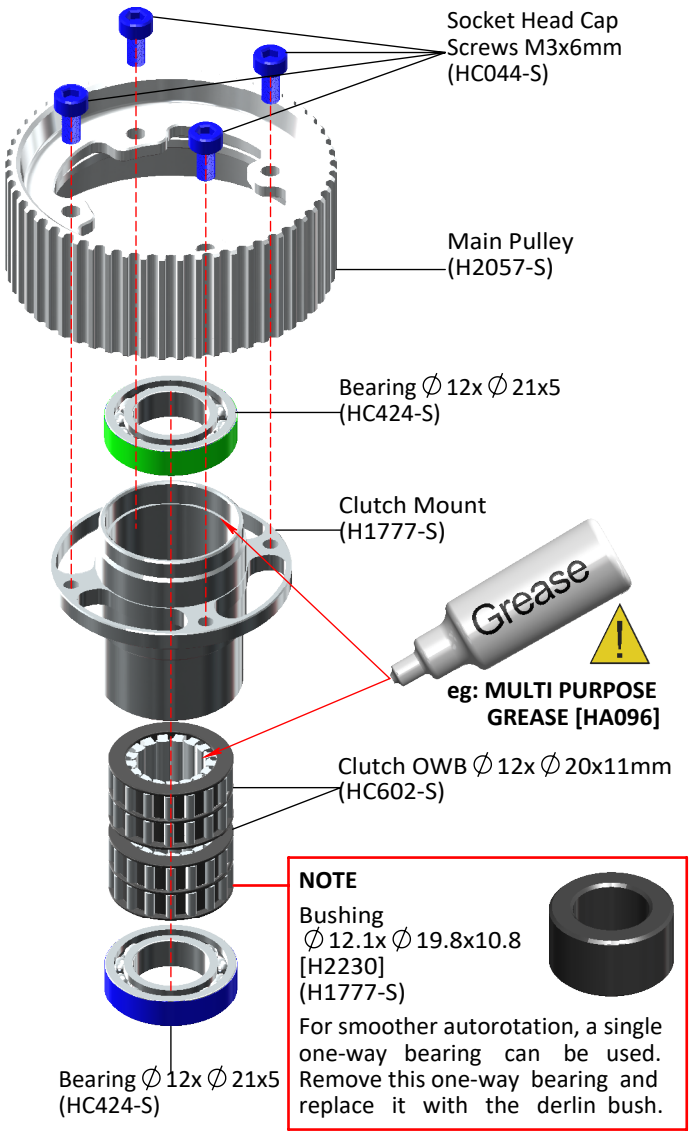
The unit is ready to use. Check **page 38** for more information.

Already Assembled With Loctite



MAIN PULLEY ASSEMBLY

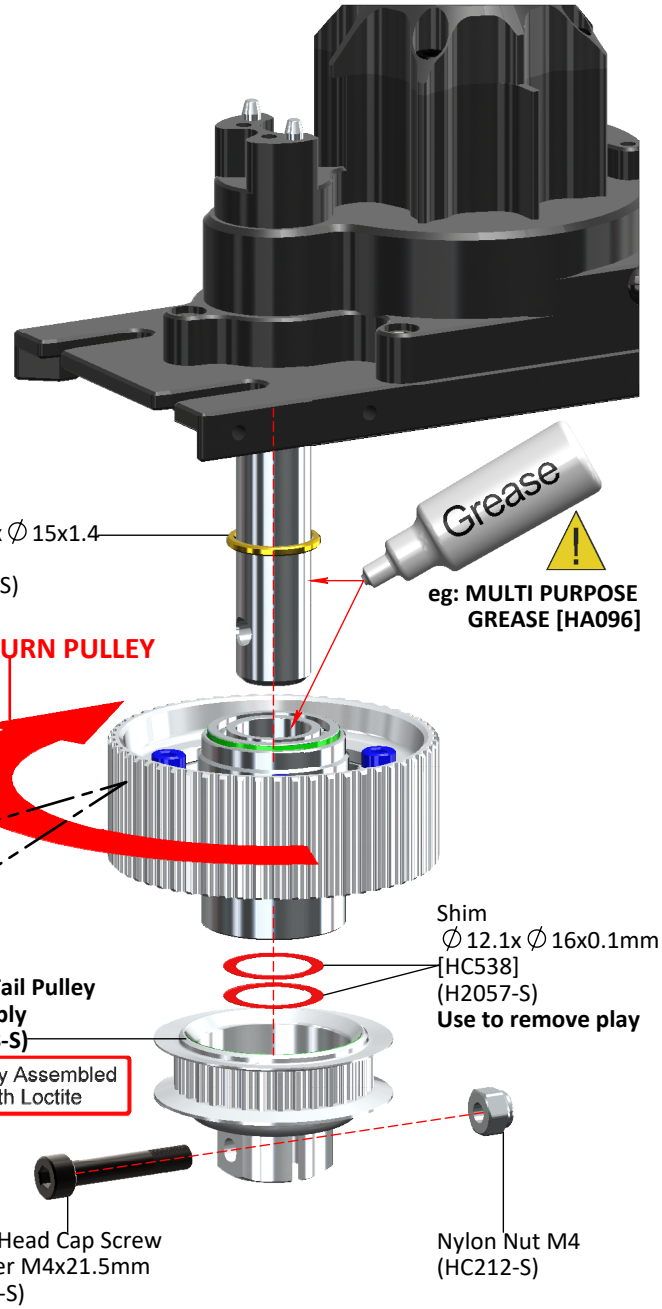
Already Assembled With Loctite



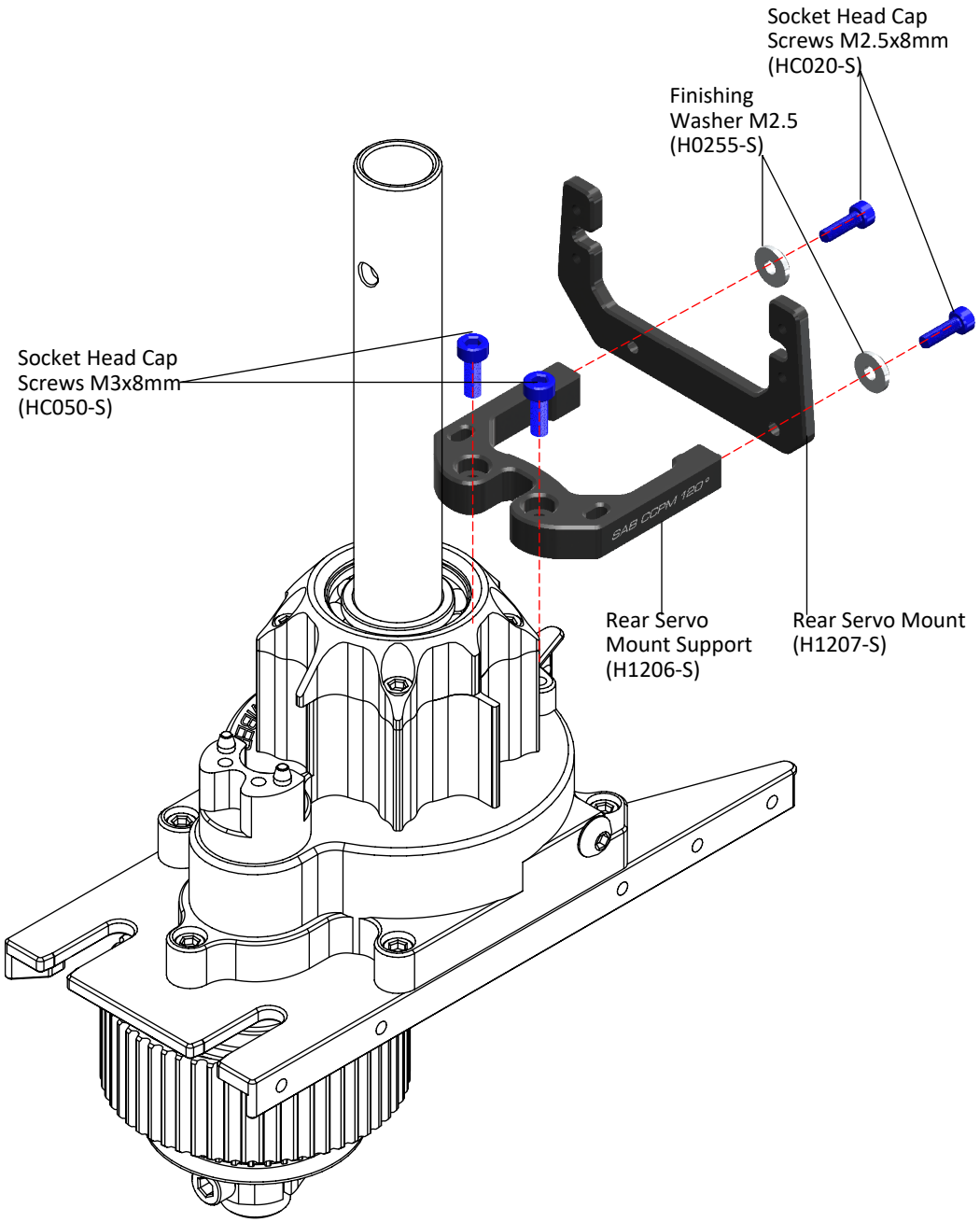
NOTE

Bushing
∅12.1x∅19.8x10.8
[H2230]
(H1777-S)

For smoother autorotation, a single one-way bearing can be used. Remove this one-way bearing and replace it with the derlin bush.



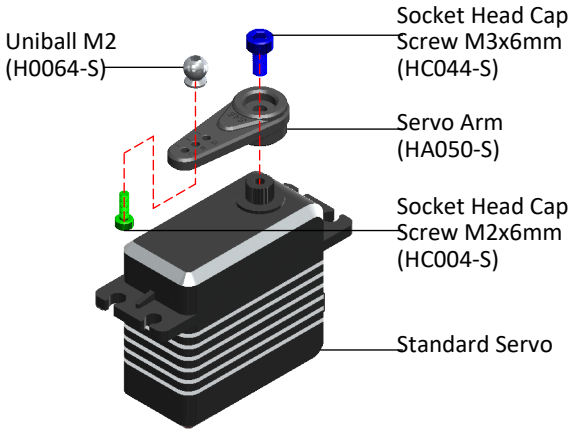
BOX 1, BAG FOR PAGE 6



SERVO ASSEMBLY

The linkage ball must be positioned 18 mm out on the servo arm. The recommended servo arm to use is: SAB p/n [HA050/HA051].

Ensure the alignment of the servo arms (and sub trim is set) before installation of the servos in the model.
Proceed with installation following the instructions below. You can use the G10 servo tool to align the front servo arms with the theoretical horizontal line. **(Figure 3)**



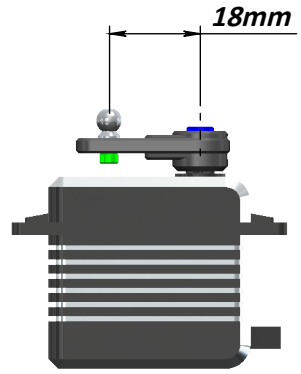
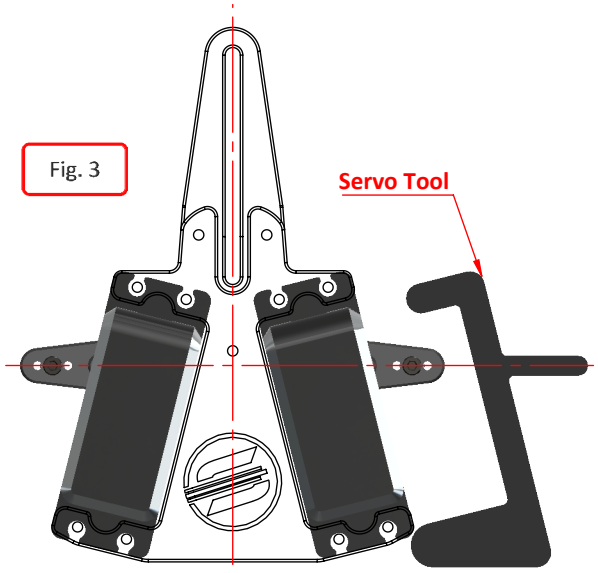
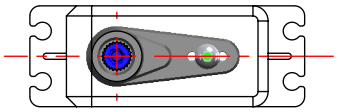


Fig. 3



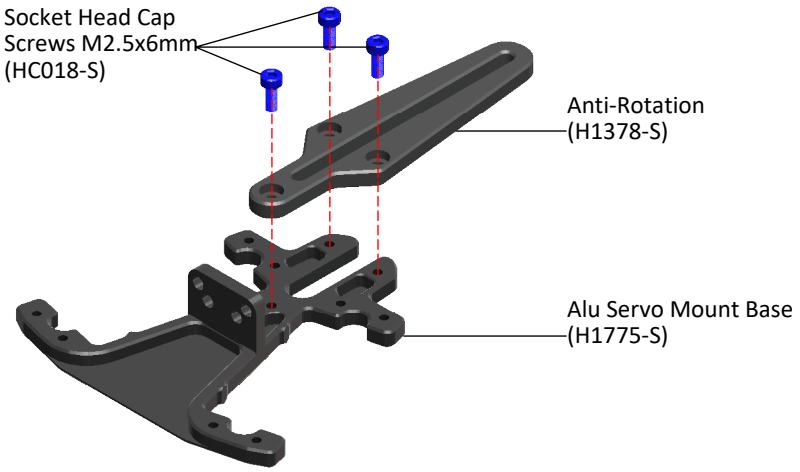
Front Servos



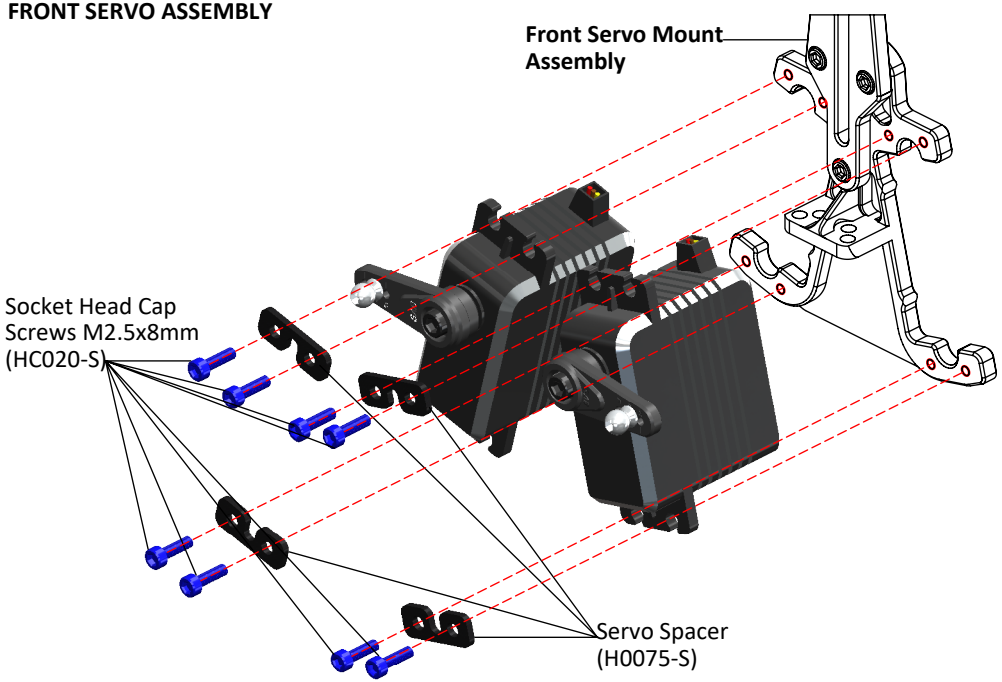
Rear Servo

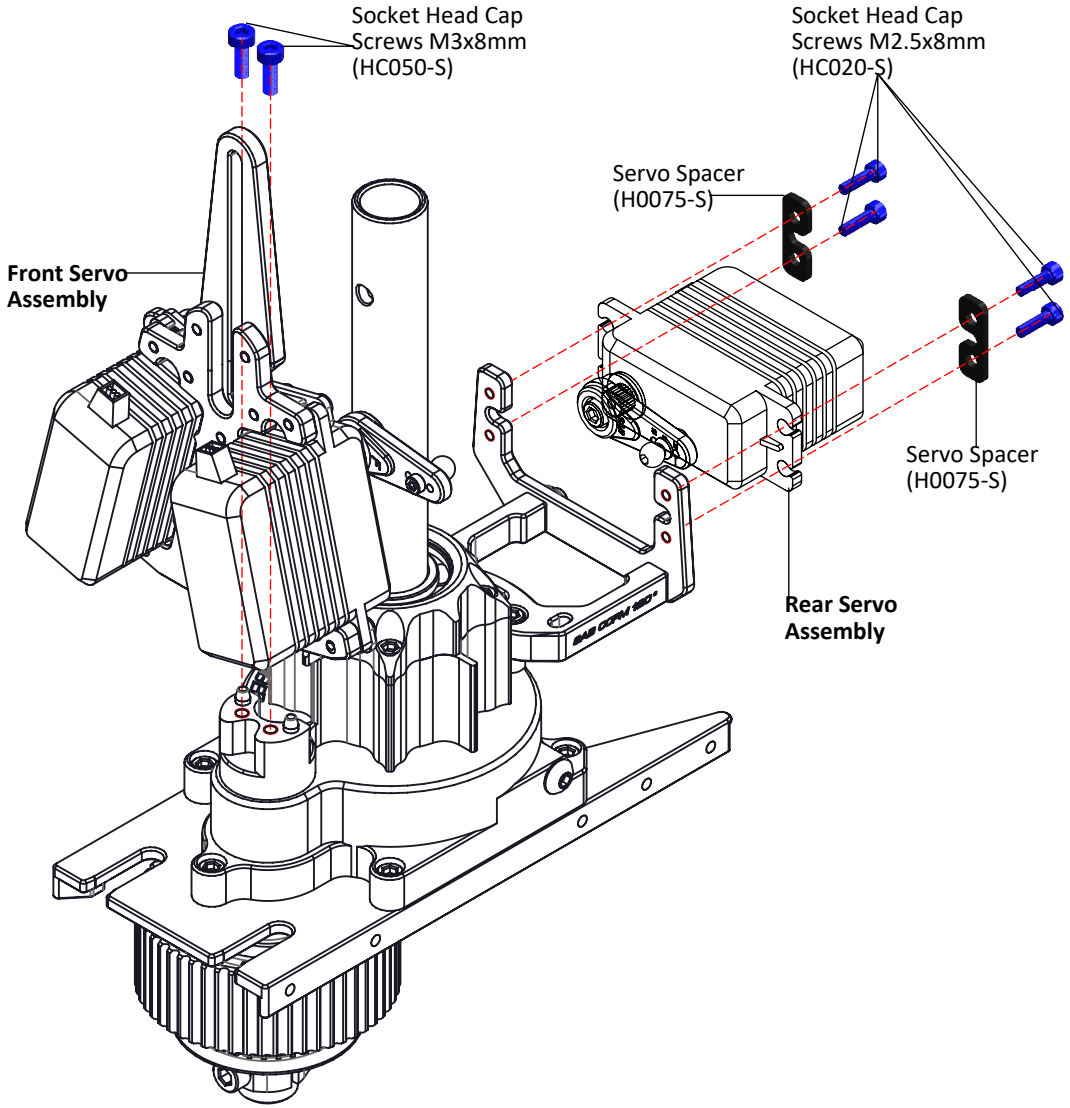
Box 1, Bag for page 7

FRONT SERVO MOUNT ASSEMBLY



FRONT SERVO ASSEMBLY

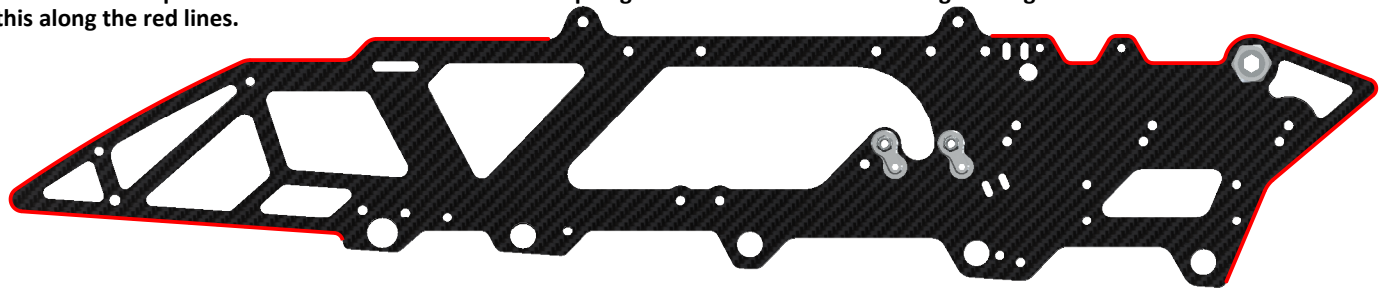




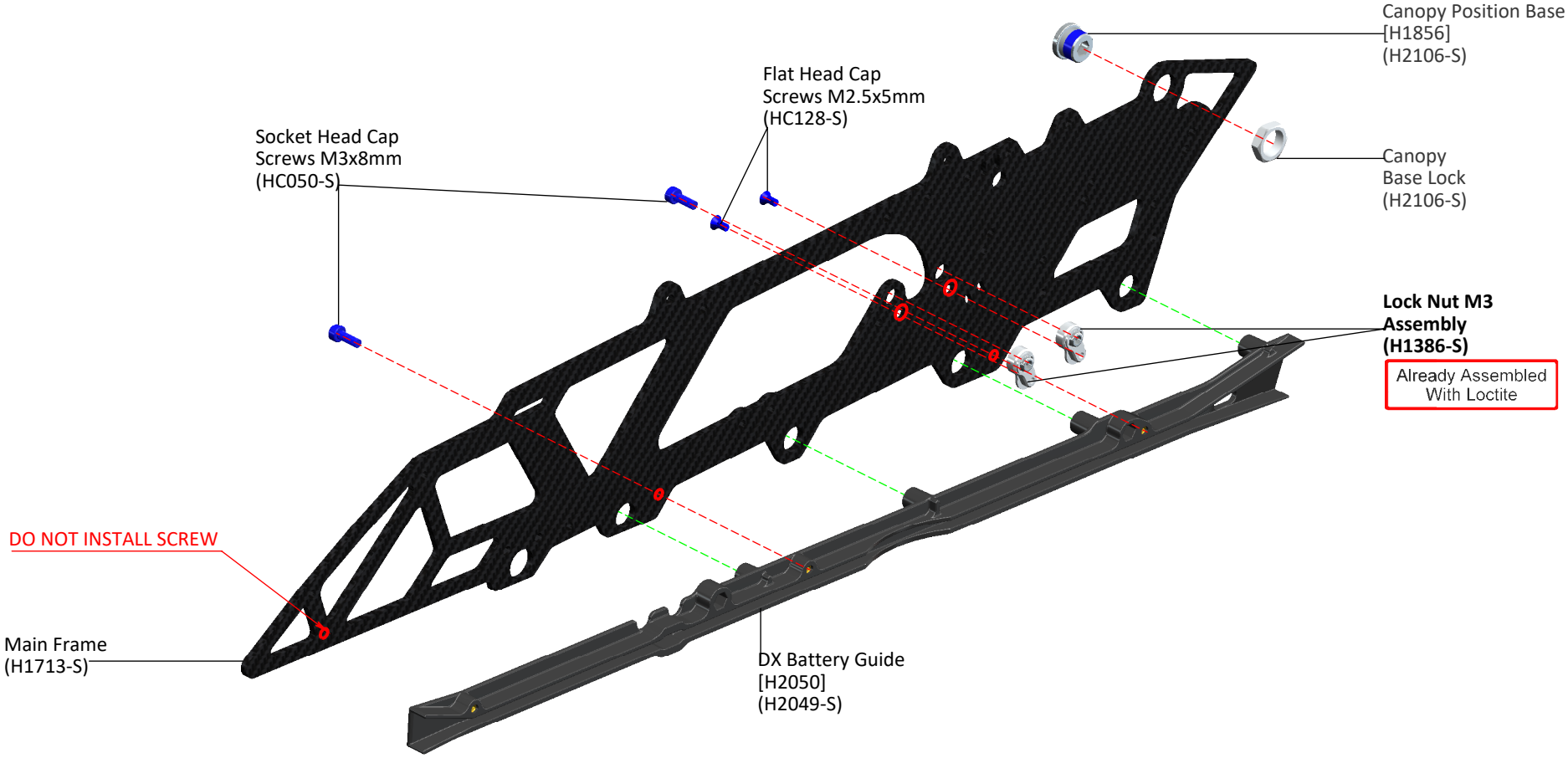
BOXES 1-3, BAG FOR PAGE 8

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. It is very important to do this along the red lines.

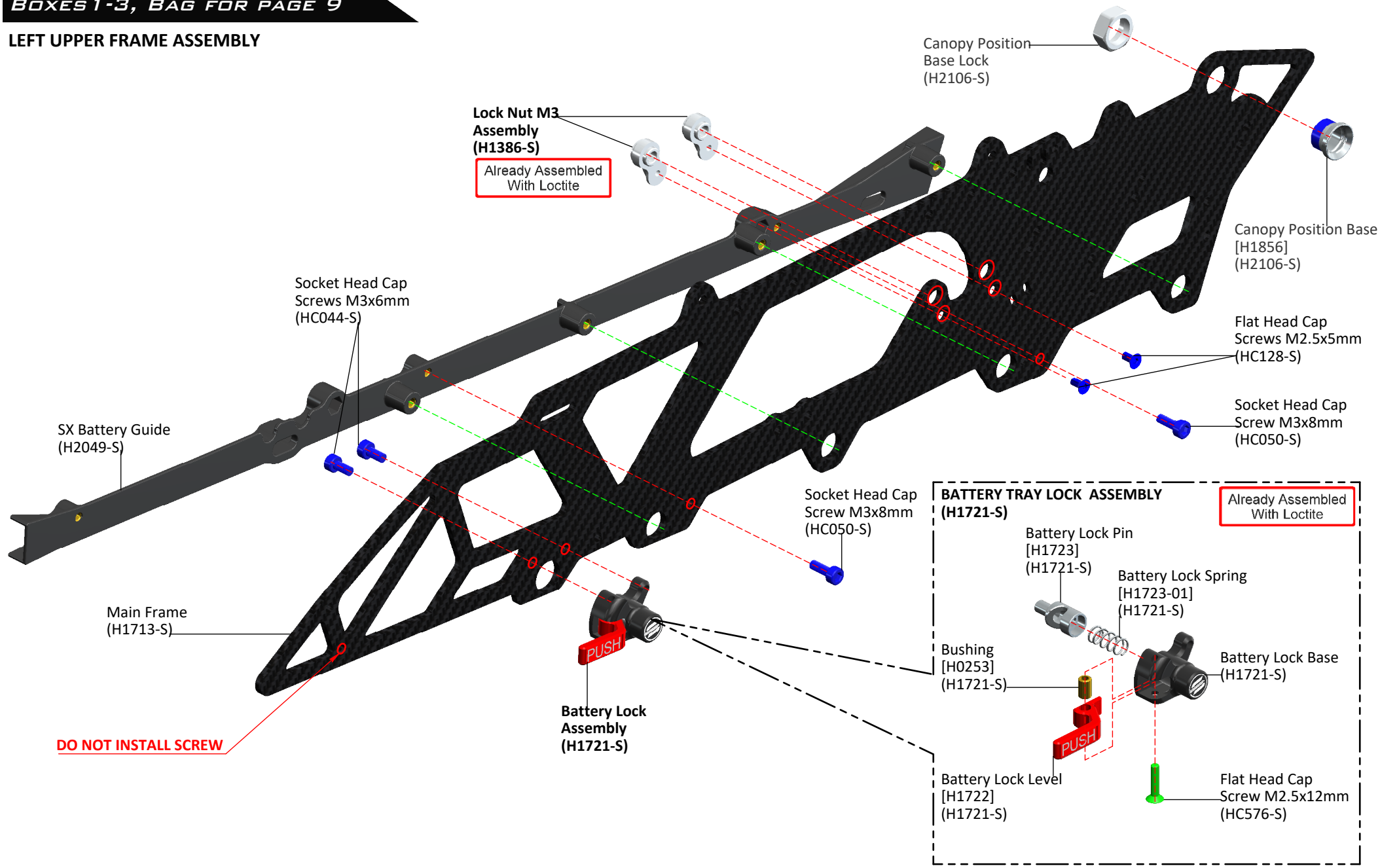


RIGHT UPPER FRAME ASSEMBLY

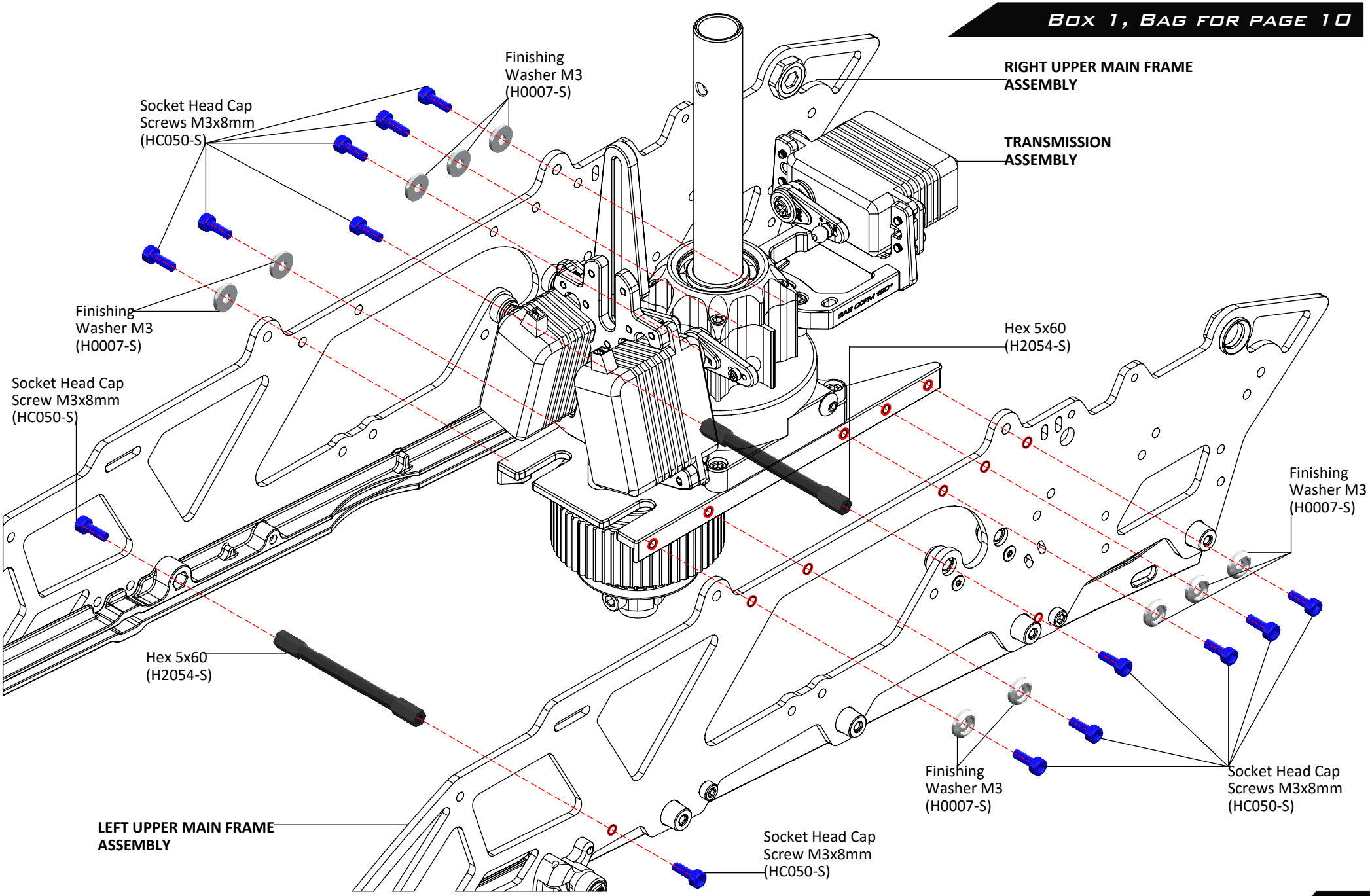


BOXES 1-3, BAG FOR PAGE 9

LEFT UPPER FRAME ASSEMBLY

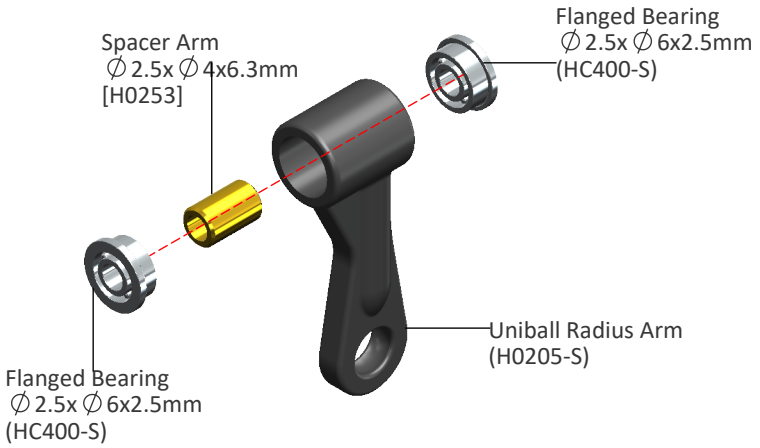


BOX 1, BAG FOR PAGE 10

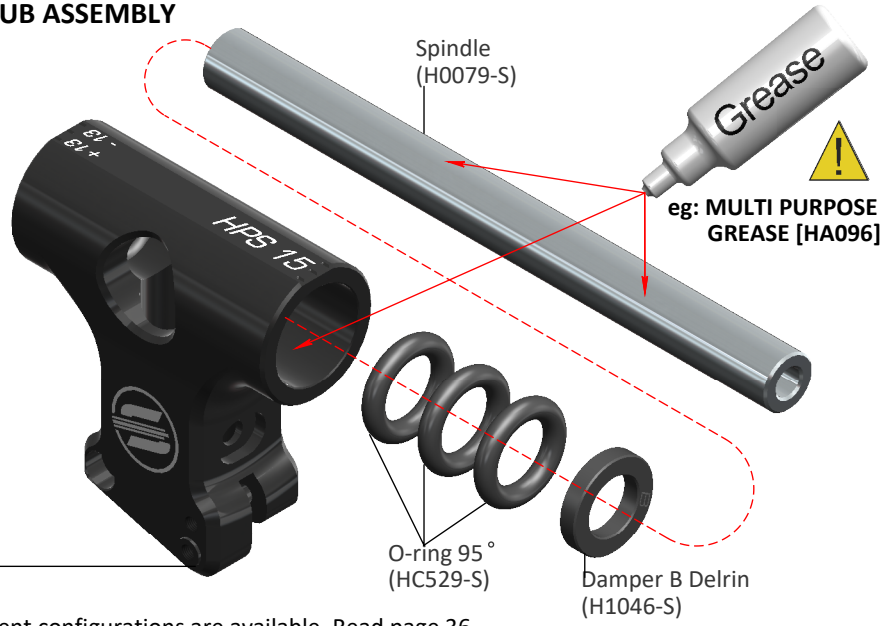


BOXES 1-2, BAG FOR PAGE 11

UNIBALL RADIUS ARM ASSEMBLY ...X2

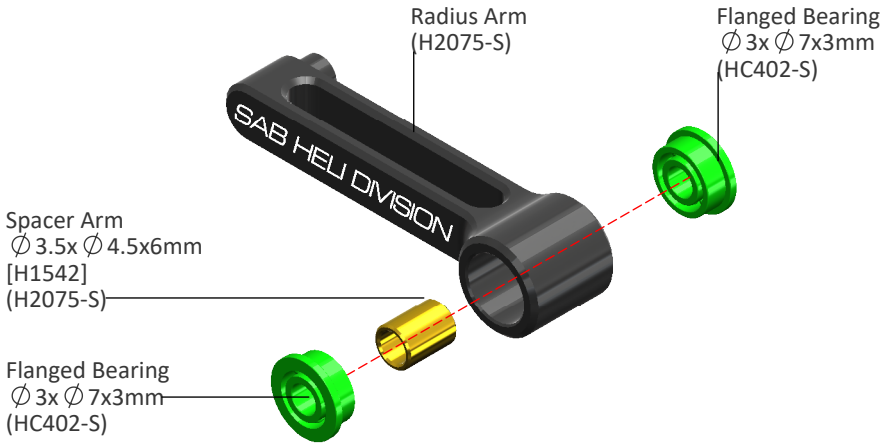


CENTER HUB ASSEMBLY



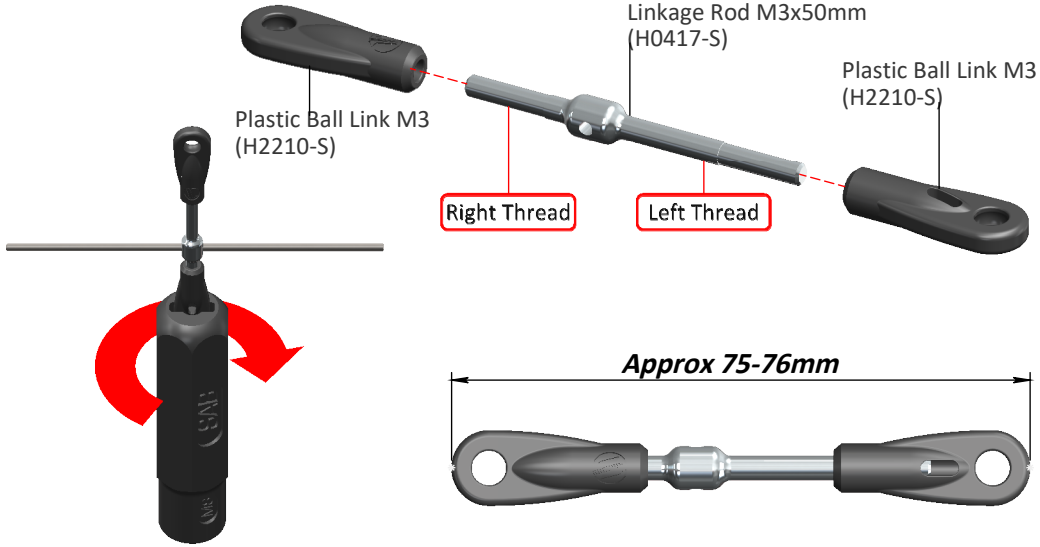
NOTE: Diffirent configurations are available. Read page 36.

RADIUS ARM ASSEMBLY ...X2



PLEASE USE GREEN THREAD LOCK to secure the bearings to the radius arms. Failure to secure the bearing will result in excessive slop/play.

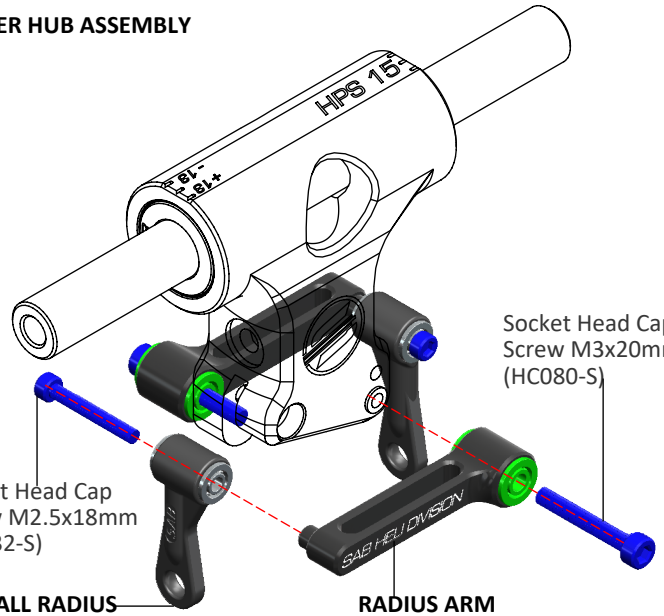
LINKAGE ROD A ASSEMBLY ...X2



Note: You can use HA016 to easily thread the plastic link onto the rods.

BOXES 1-2, BAG FOR PAGE 12

CENTER HUB ASSEMBLY



Socket Head Cap Screw M3x20mm (HC080-S)

Socket Head Cap Screw M2.5x18mm (HC032-S)

UNIBALL RADIUS ARM ASSEMBLY

RADIUS ARM ASSEMBLY

NOTE:

Shim ∅ 10x ∅ 16x0.2mm[HC232-S][Bag Shims]. After approximately 40/50 flights, please check preload, you can add one 0.2mm shim (HC232) on each side if preload has changed. However, we suggest to replace the o-rings after about 100 flights.

eg: MULTI PURPOSE GREASE [HA096]

Bearing ∅ 10x ∅ 19x5mm (HC422-S)

Washer ∅ 10x ∅ 16x1mm (HC230-S)

Socket Head Cap Screw M6x10mm (HC124-S)

Washer ∅ 6x ∅ 14 x1.5mm (HC194-S)

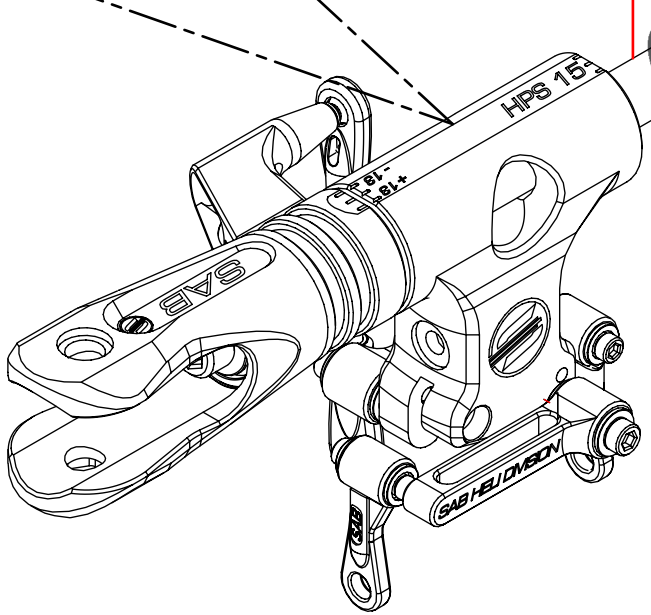
Note: Smaller ID

Thrust Bearing ∅ 10x ∅ 18x5.5mm (HC438-S)

Note: Larger ID

Blade Grip Assembly (H1790-S)

Already assembled with 1 bearing



Lip Facing Bearing Side

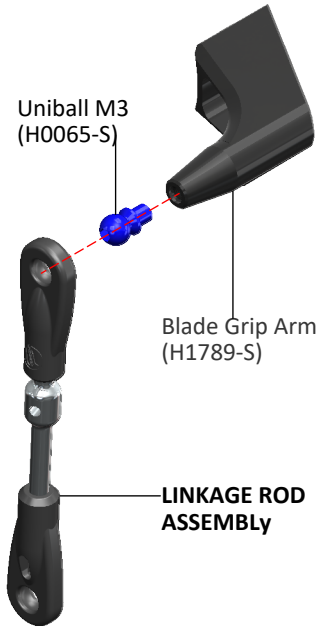
Washer with LIP ∅ 10.1x ∅ 16x1mm (H2146-S)

Suggested:
Use this hole to apply grease after several flights

Socket Head Cap Screw M4x10mm (HC102-S)

Uniball M3 (H0065-S)

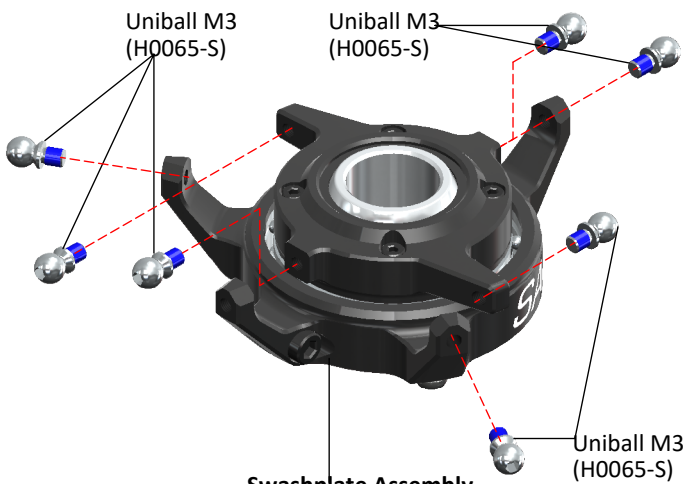
Blade Grip Arm (H1789-S)



LINKAGE ROD ASSEMBLy

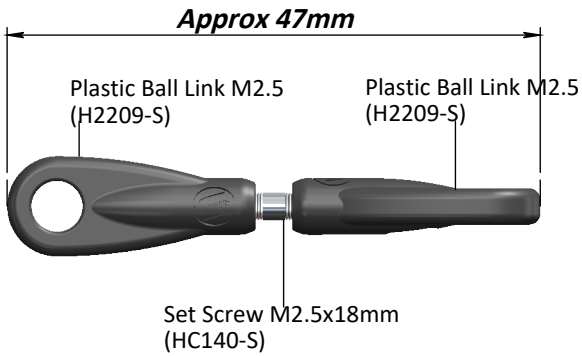
BOXES 1-2, BAG FOR PAGE 13

SWASHPLATE ASSEMBLY



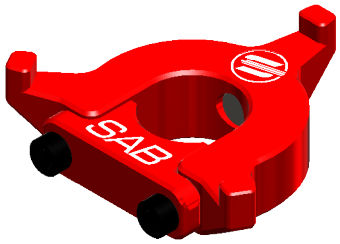
BOX 1, BAG FOR PAGE 14

LINKAGE ROD B ASSEMBLY ... X3



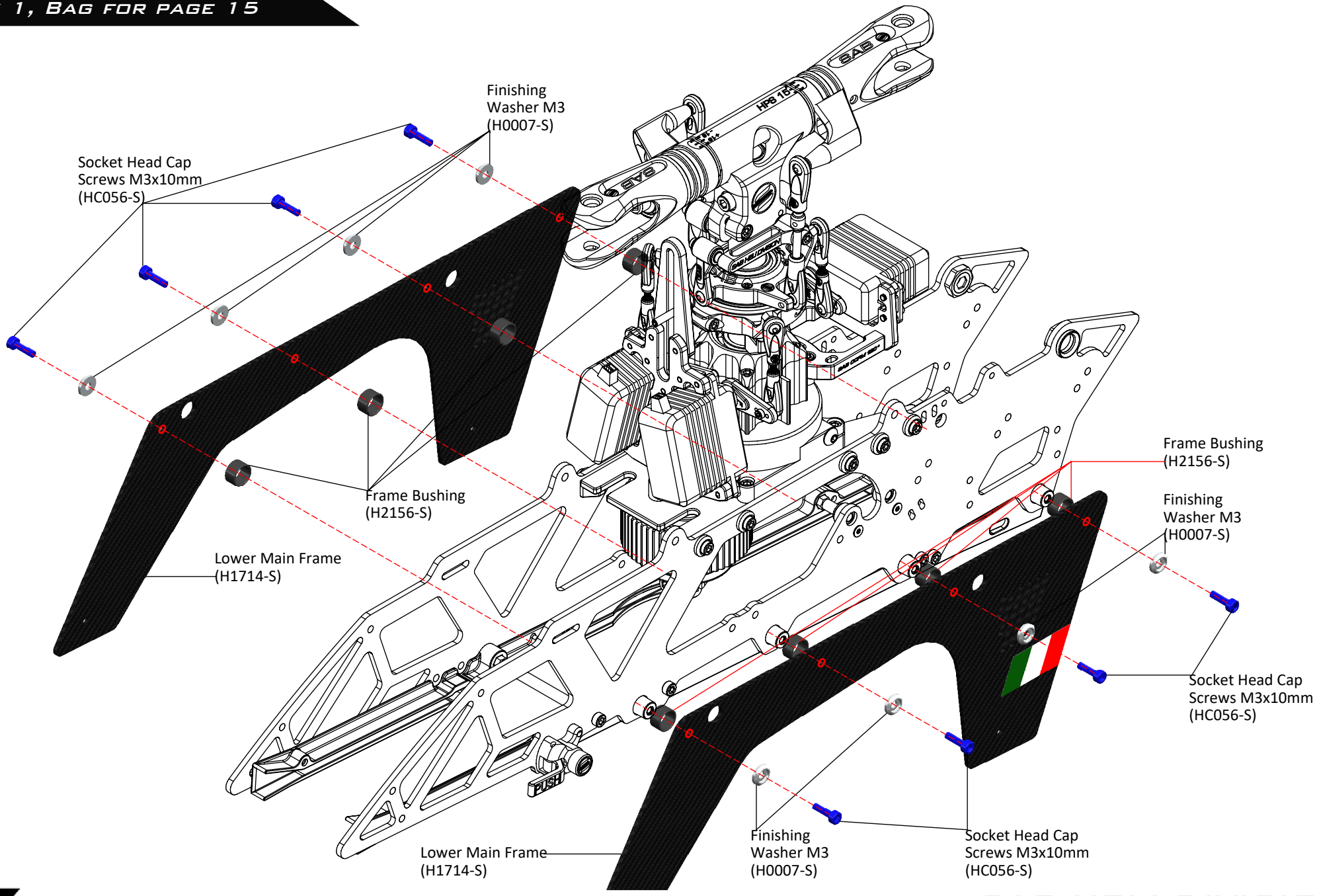
Initial length for the rods from the servos to the swash plate.

SUGGESTED:
You can use the Swashplate Leveler H2207-S
(Not included KIT)

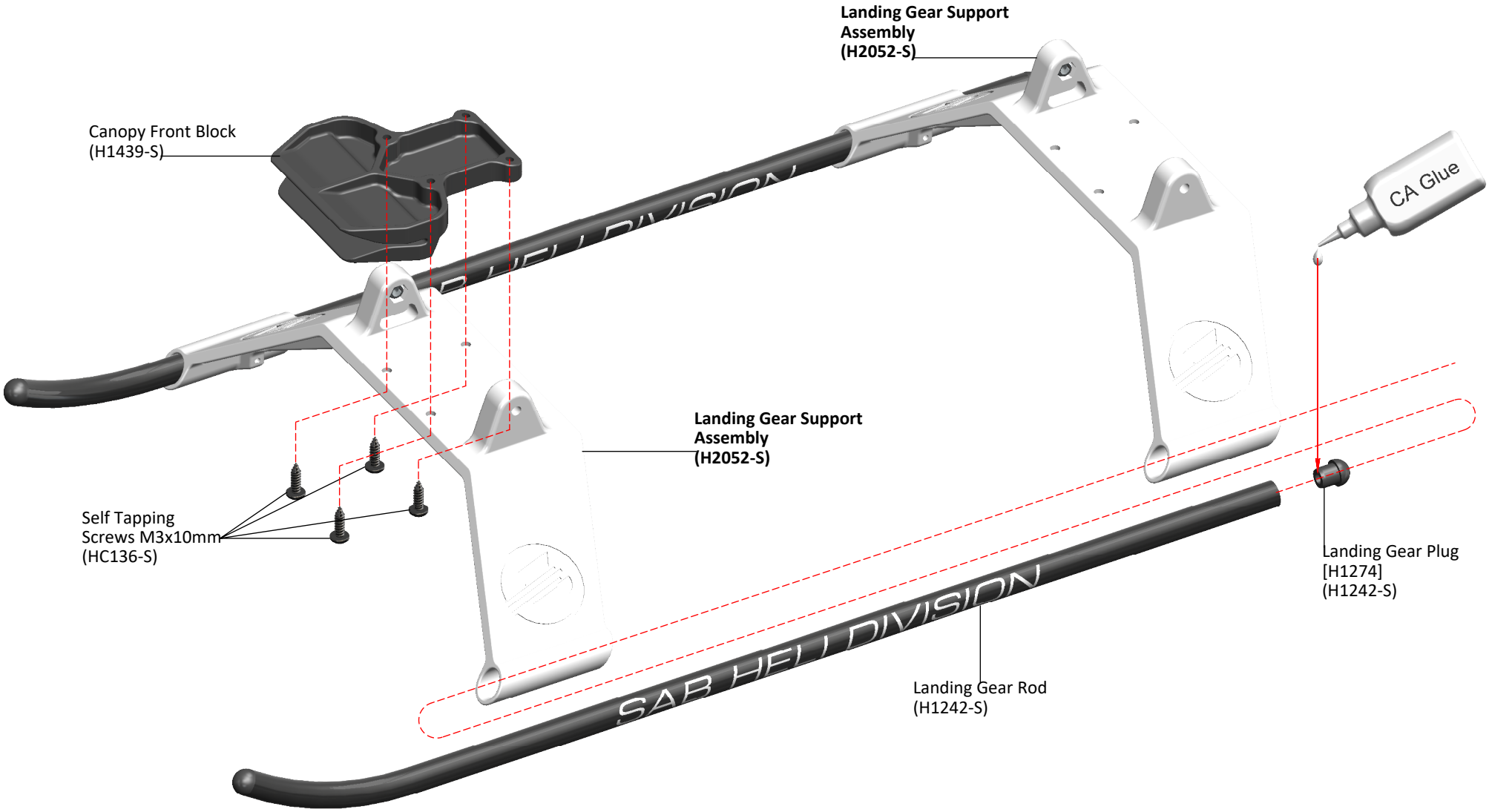


LOWER SIDE FRAME INSTALLATION

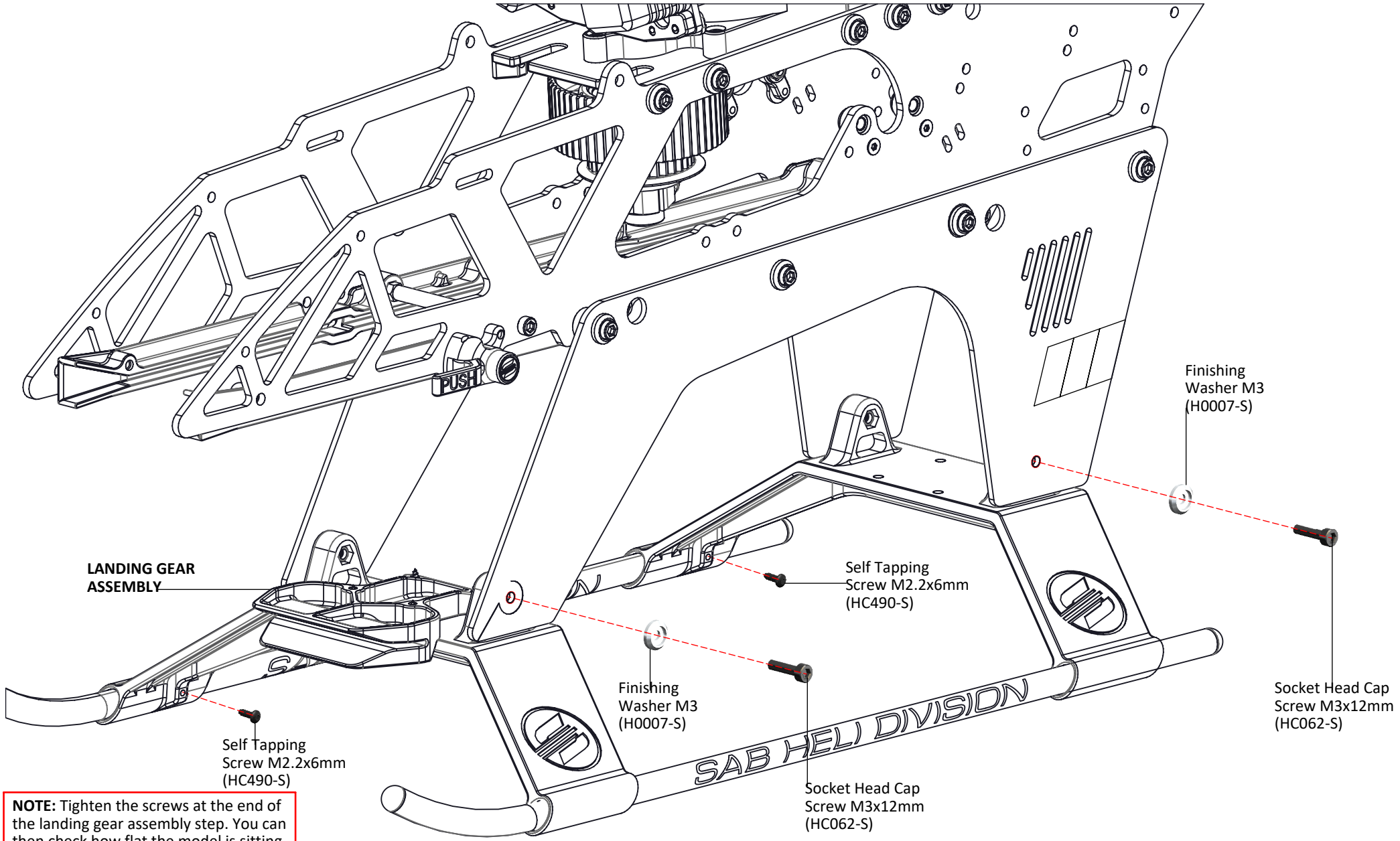
Box 1, Bag for page 15



BOXES 1-3, BAG FOR PAGE 16



Box 1, Bag for page 17



NOTE: Tighten the screws at the end of the landing gear assembly step. You can then check how flat the model is sitting.

TRANSMISSION SETUP

It is important to choose the right reduction ratio to maximize efficiency based on your required flight performance.

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 212 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 **11.8:1**

H0175-19-S - **19T** Pinion = ratio **11.2:1**

H0175-20-S - **20T** Pinion = ratio **10.6:1**

H0175-21-S - **21T** Pinion = ratio **10.1:1**

H0175-22-S - **22T** Pinion = ratio **9.6:1**

H0175-23-S - **23T** Pinion = ratio **9.2:1**

H0175-24-S - **24T** Pinion = ratio **8.8:1**

H0175-25-S - **25T** Pinion = ratio **8.4:1**

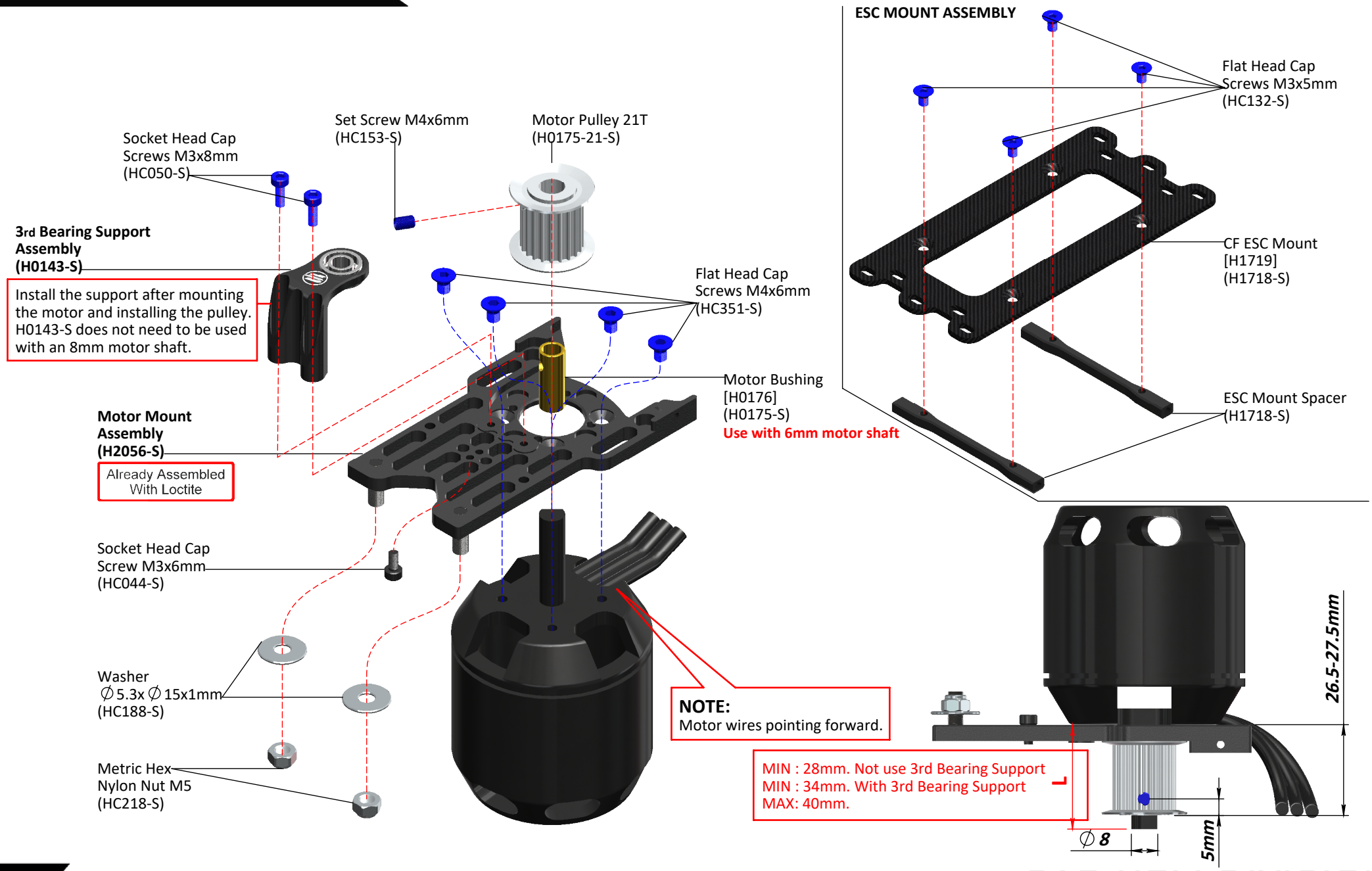
ILGOBLIN PRO CONFIGURATIONS

Rev:01

Battery	Motor	ESC	Pinion (a, b)	RPM Max (a, b)	Pitch
12S 4200/5500 mAh	Scorpion HK5-4525-535kV Xnova 4525-530kv lightning	HW HV180 V5 Kosmik 170HV YGE 205HVT	**21T / 22T**	**2100/2200**	± 12
	Pyro 750-560 TENGU 4525HT/550KV	SCORPION II 14-200A	**20T / 21T**		
12S 4500/5500 mAh	Xnova 4530-525kv lightning	HW HV260 V5 Kosmik 250HV YGE 205HVT	**22T / 23T**	**2200/2300**	± 13
	Pyro 800-480		**24T / 25T**		
	Scorpion HK5-5024-535kV	SCORPION II 14-200A	**21T / 22T**		

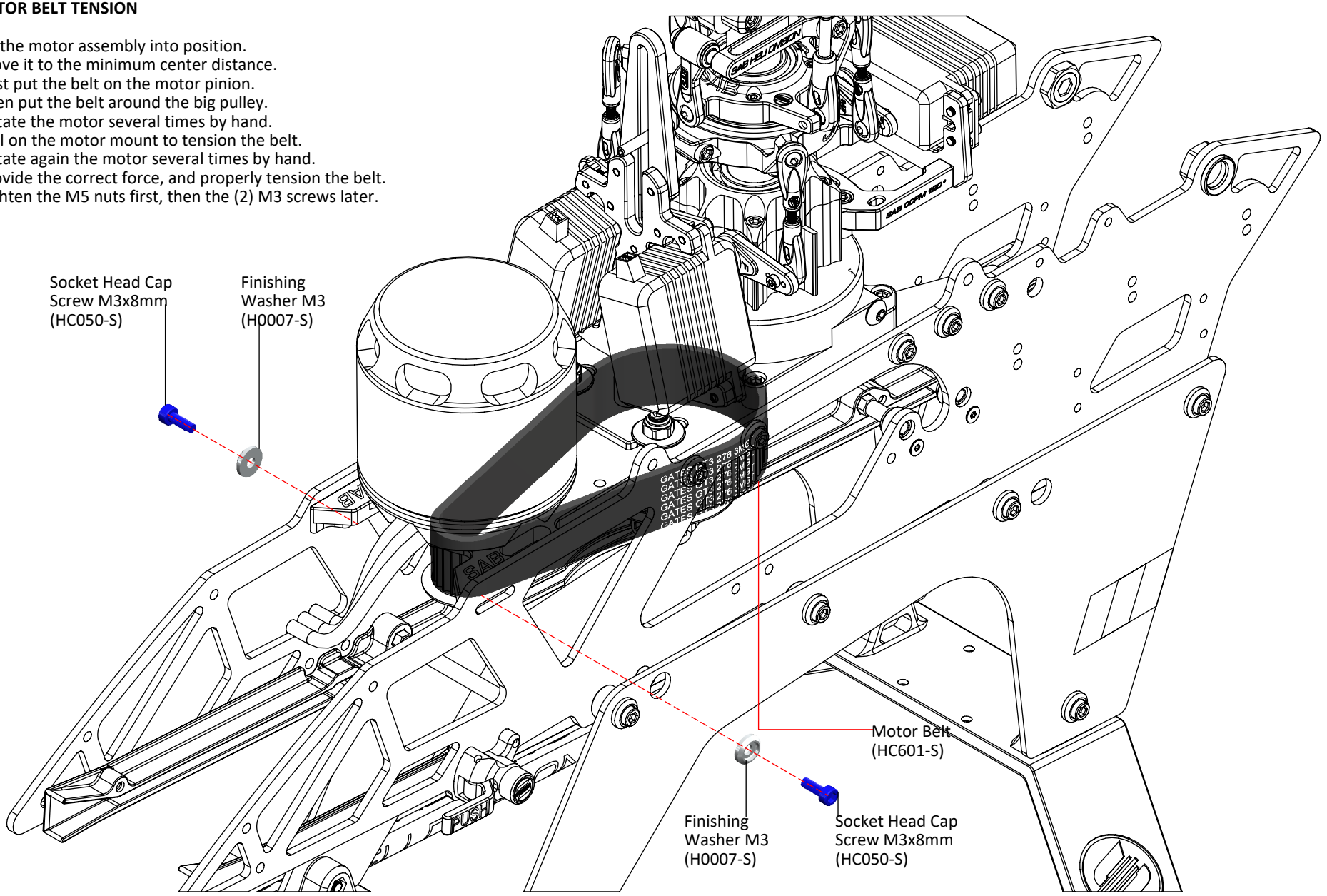
INSTALLATION OF THE MOTOR/ESC

BOXES 1-2, BAG FOR PAGE 19



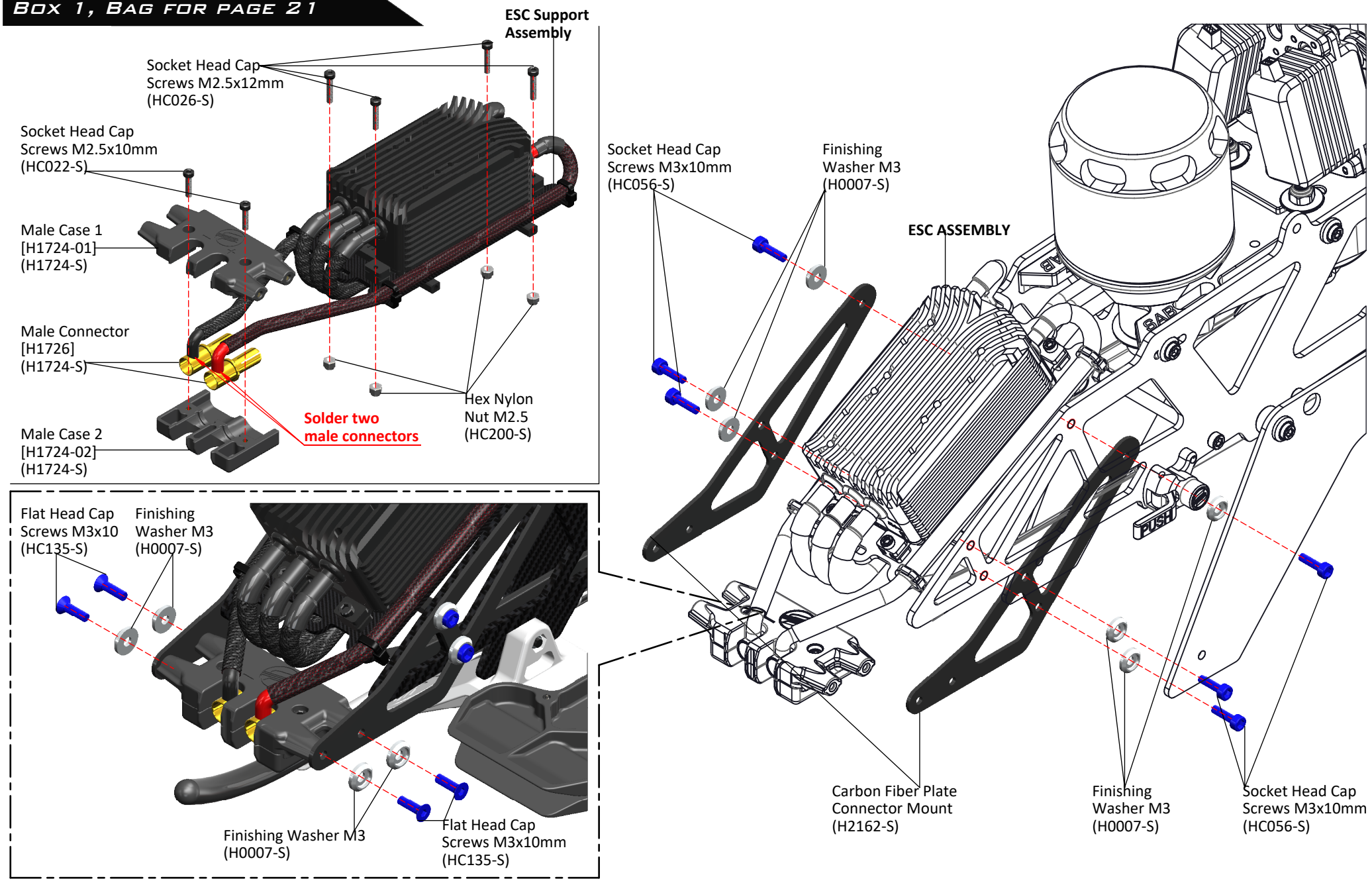
MOTOR BELT TENSION

*Fit the motor assembly into position.
*Move it to the minimum center distance.
*First put the belt on the motor pinion.
*Then put the belt around the big pulley.
*Rotate the motor several times by hand.
*Pull on the motor mount to tension the belt.
*Rotate again the motor several times by hand.
*Provide the correct force, and properly tension the belt.
*Tighten the M5 nuts first, then the (2) M3 screws later.



INSTALLATION OF THE MOTOR/ESC

BOX 1, BAG FOR PAGE 21



BOXES 1-2, BAG FOR PAGE 22

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

eg: MULTI PURPOSE GREASE [HA096]

Button Head Cap Screw M4x6mm (HC096-S)

Smaller ID

Thrust Bearing ∅5x∅10x4mm (HC435-S)

Larger ID

Spacer ∅7.5x∅10x0.5mm [H0349] (H0330-S)

Tail Blade Grip Assembly (H1893-S)

Already Assembled With Loctite

Socket Head Cap Screw M2x6mm (HC004-S)

Bearing ∅5x∅10x4mm (HC411-S)

Already Assembled

Spacer ∅5x∅8.5x0.75mm (H0330-S)

O-ring (HC335-S)

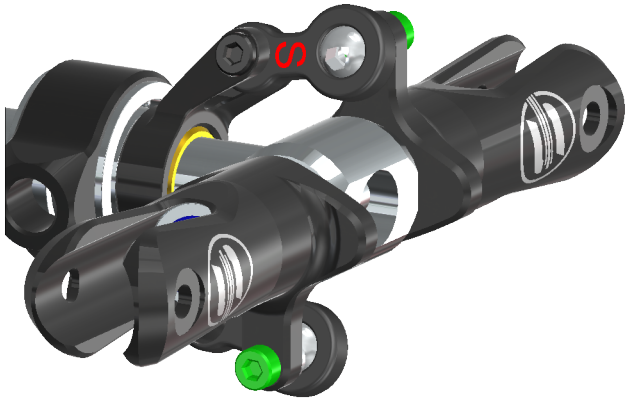
Spindle Shaft (H0329-S)

Tail Shaft (H1732-S)

eg: MULTI PURPOSE GREASE [HA096]

Uniball M2.5 (H0064-S)

TAIL PITCH SLIDER ASSEMBLY



TAIL PITCH SLIDER ASSEMBLY

Socket Head Cap Screw M2x6mm (HC004-S)

Tail Pitch Slider Link (H0261-S)

Bushing ∅2x∅3x3mm [H0076] (H0261-S)

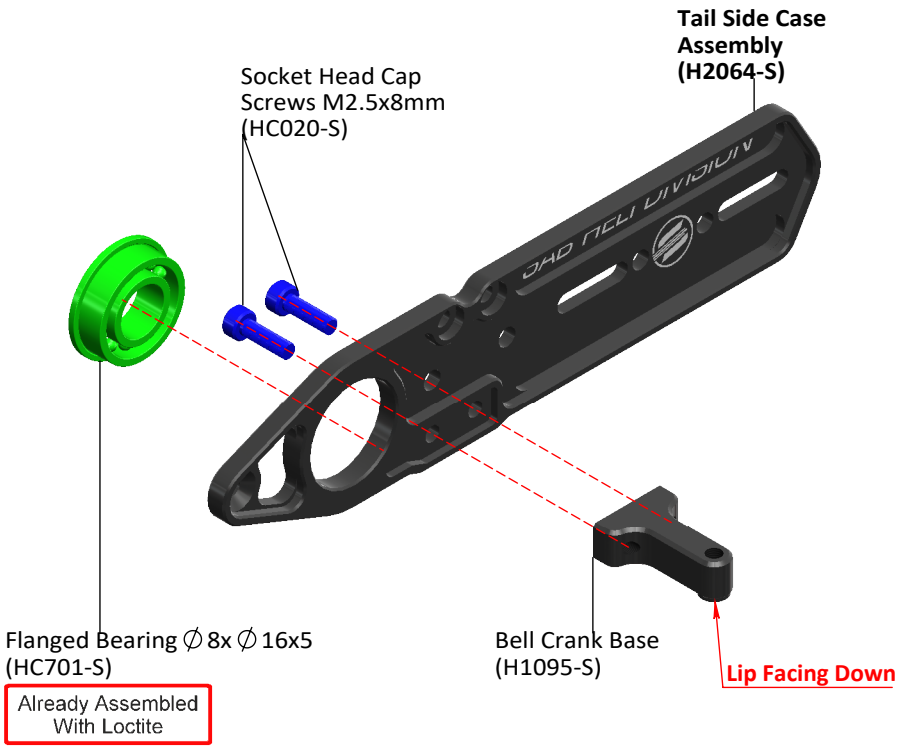
Tail Pitch Slider Assembly (H2081-S)

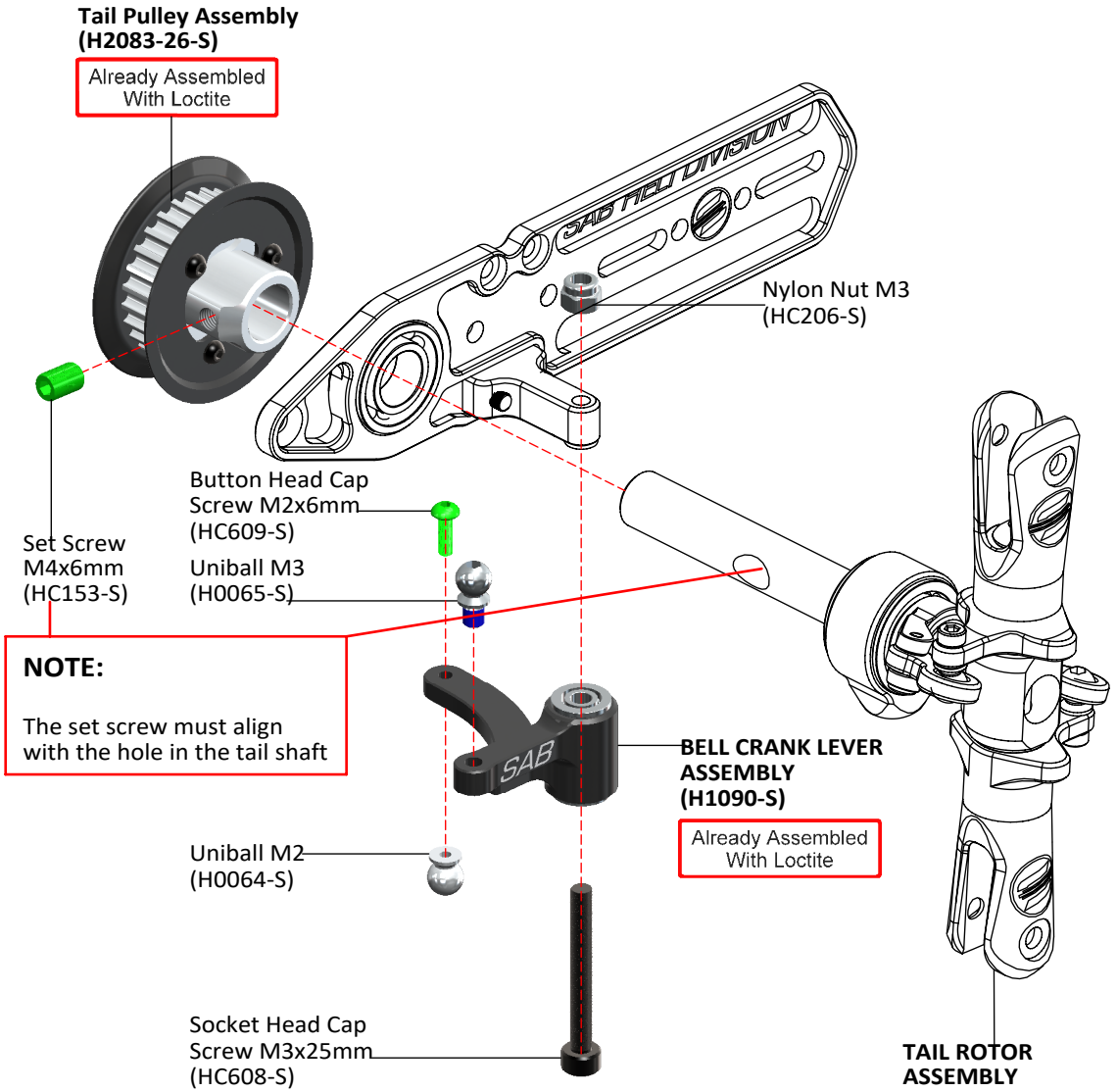
Already Assembled With Loctite

Tail Pitch Slider Link (H0261-S)

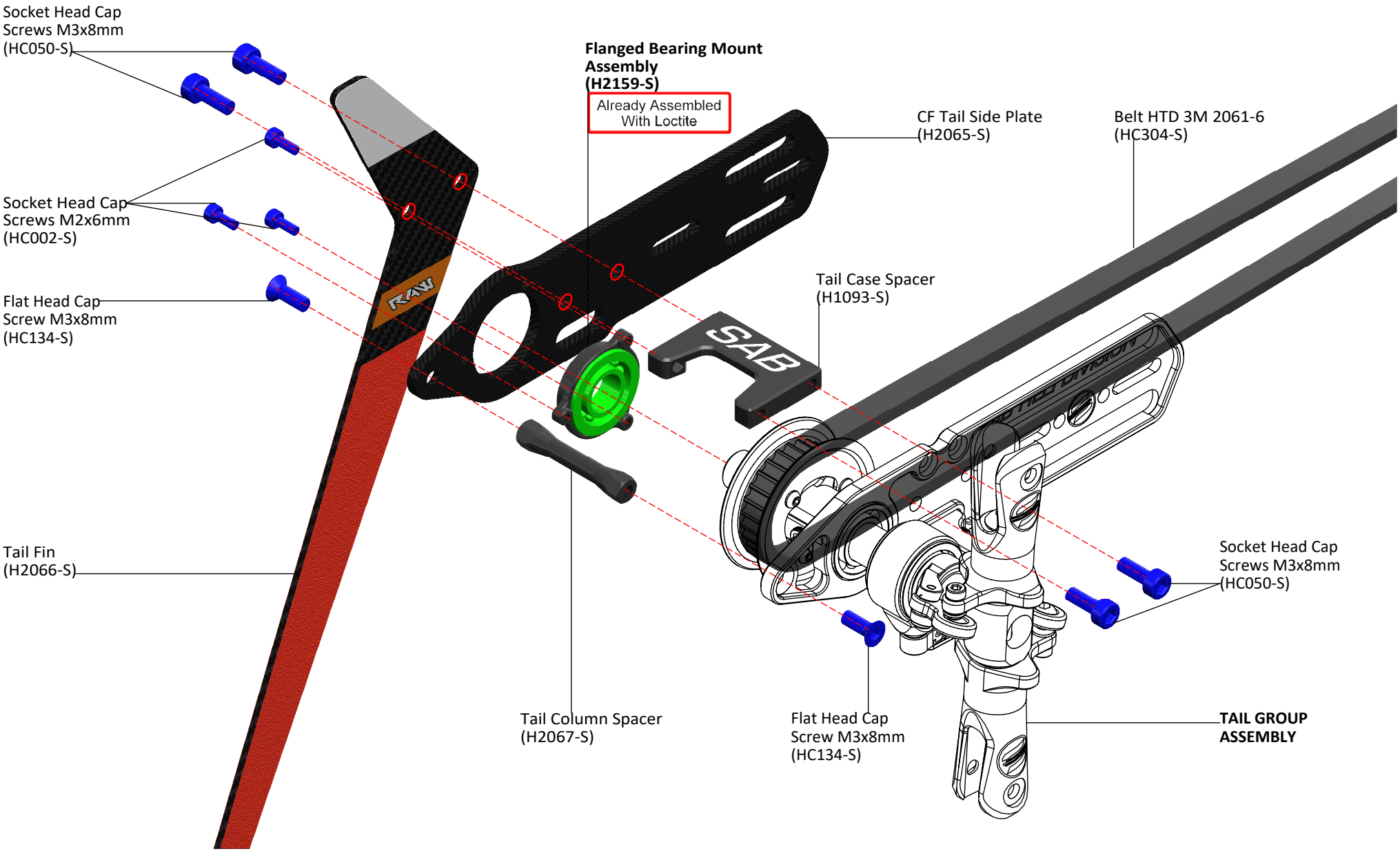
Socket Head Cap Screw M2x6mm (HC004-S)

Boxes 1-2, Bag for page 23



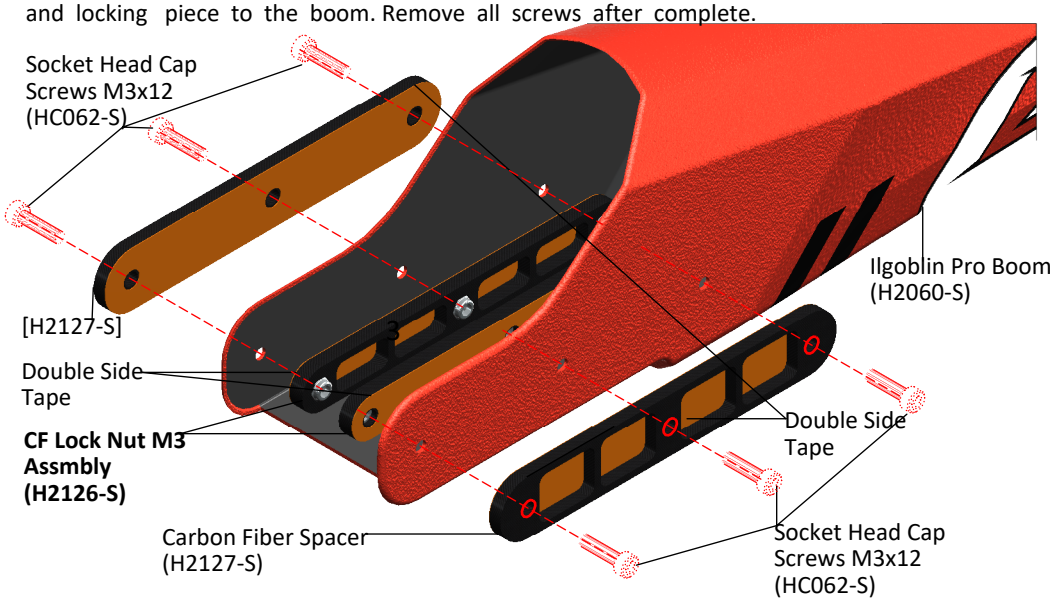


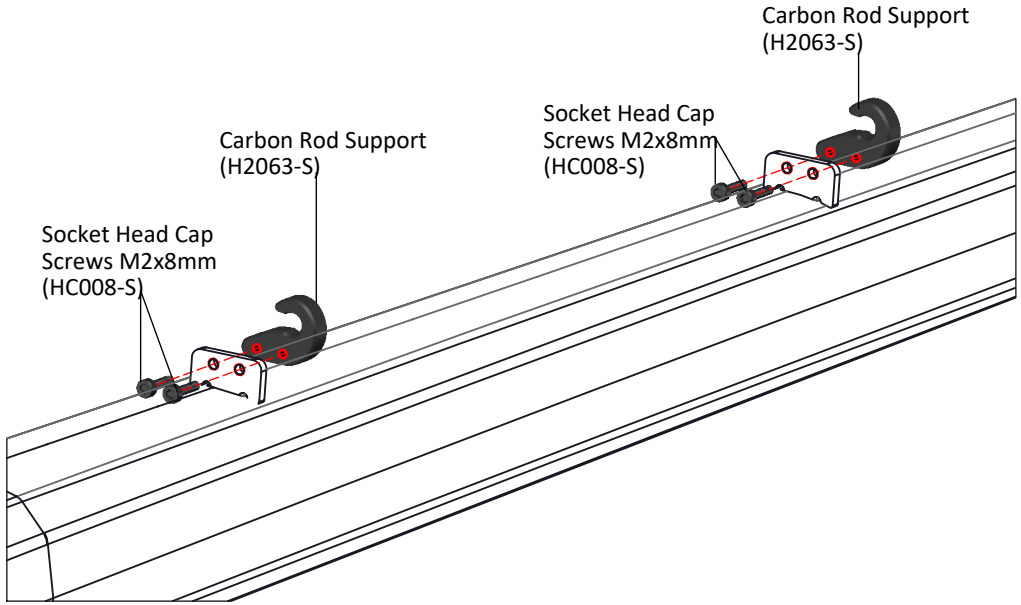
BOX 1, BAG FOR PAGE 24

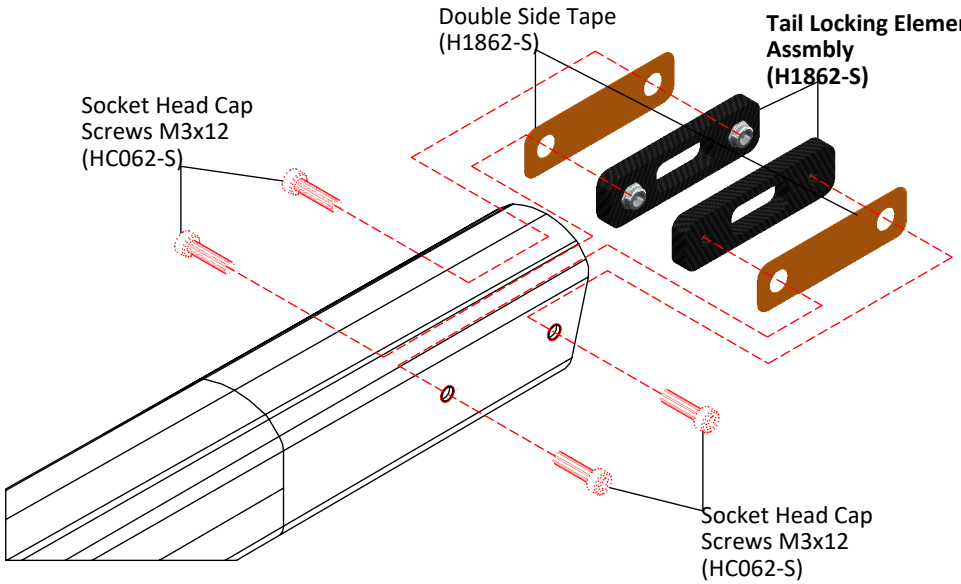


BOXES 1-3, BAG FOR PAGE 25

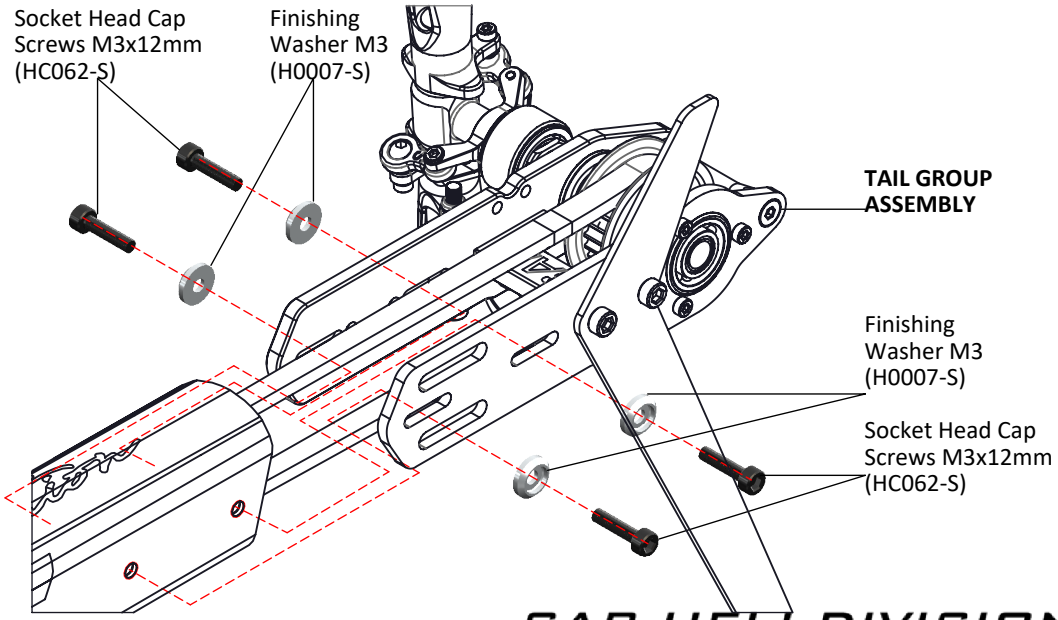
SUGGESTION: You can use M3x12 screws to aid in mounting the spacer and locking piece to the boom. Remove all screws after complete.





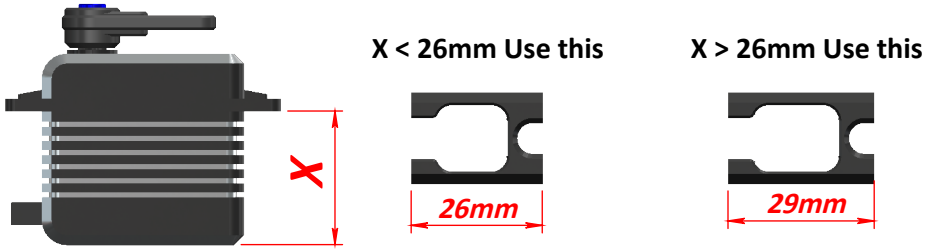


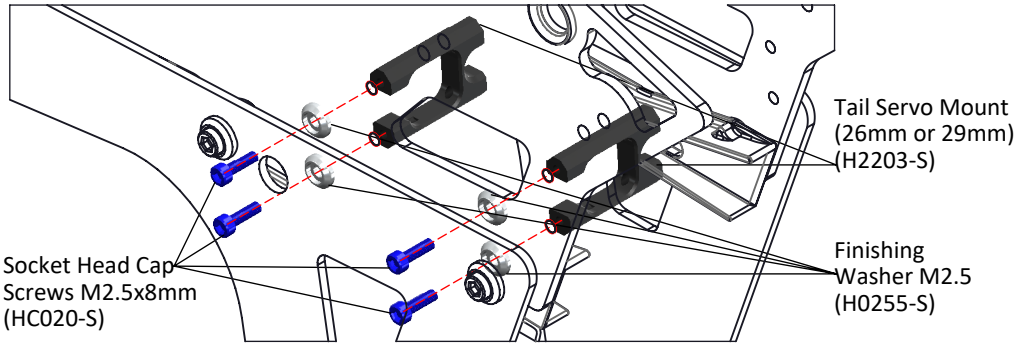
NOTE: Do not tighten the M3x12 at this moment.



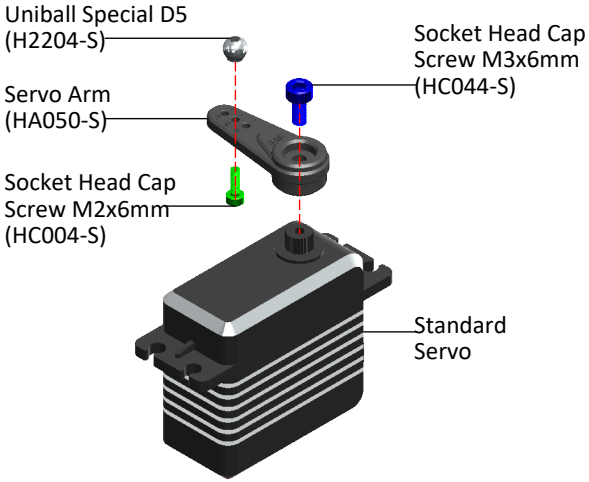
BOX 3, BAG FOR PAGE 26

CHOICE OF TAIL SERVO MOUNT

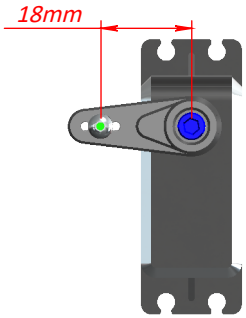


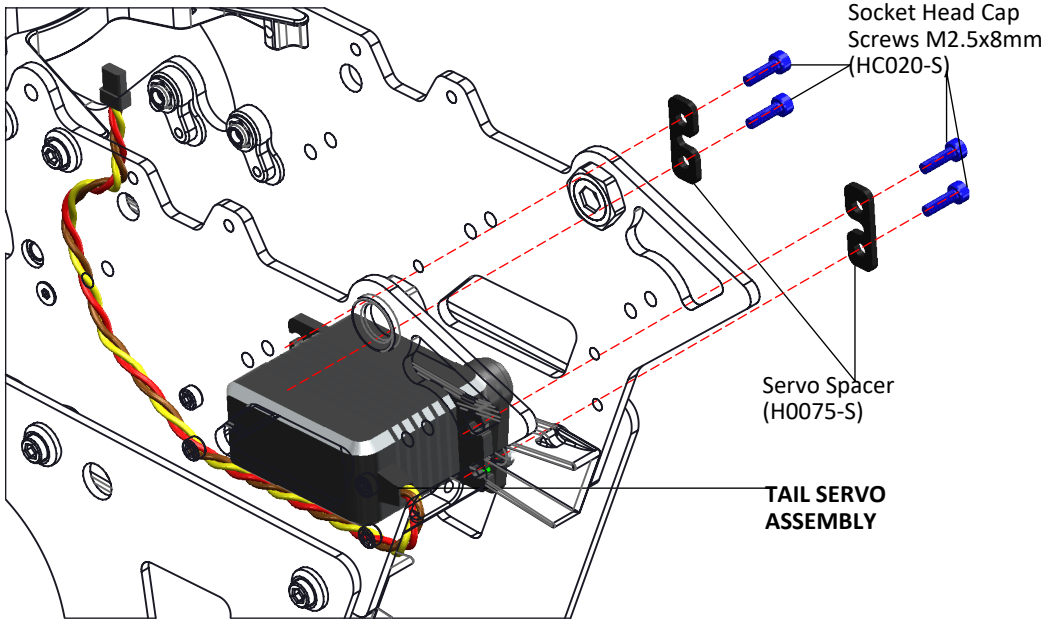


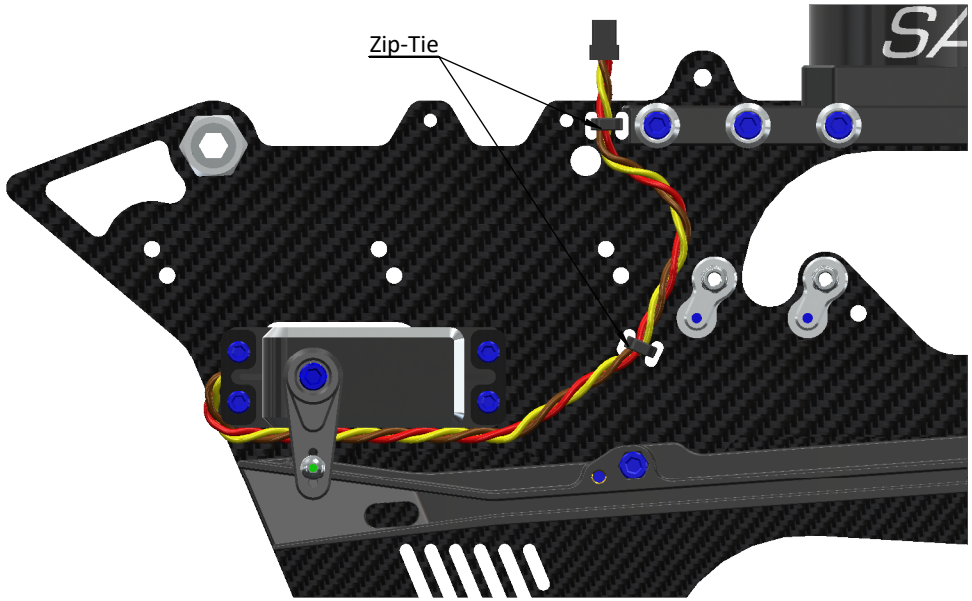
TAIL SERVO ASSEMBLY



The distance between the axis and the ball must be around 18mm







Box 1, Bag for page 27

TAIL BOOM ASSEMBLY

To fit the tail belt, loosen the tail case by loosening the 4 M3 screws (**Figure 1**).

*Install the belt onto the tail front pulley, checking the direction of rotation.

*Insert and tighten the 6 M3 screws.

*Rotate the tail drive several times by hand.

*Tension the tail case by hand and slowly tighten the 2 BLACK screws in (**Figure 2**).


Fig. 1

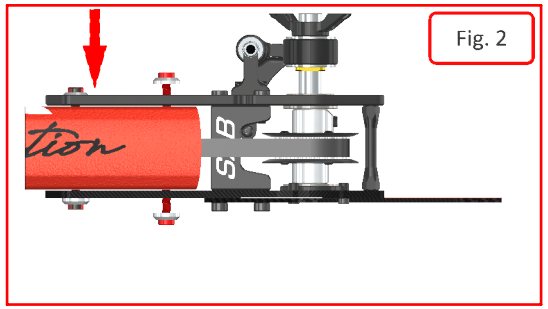
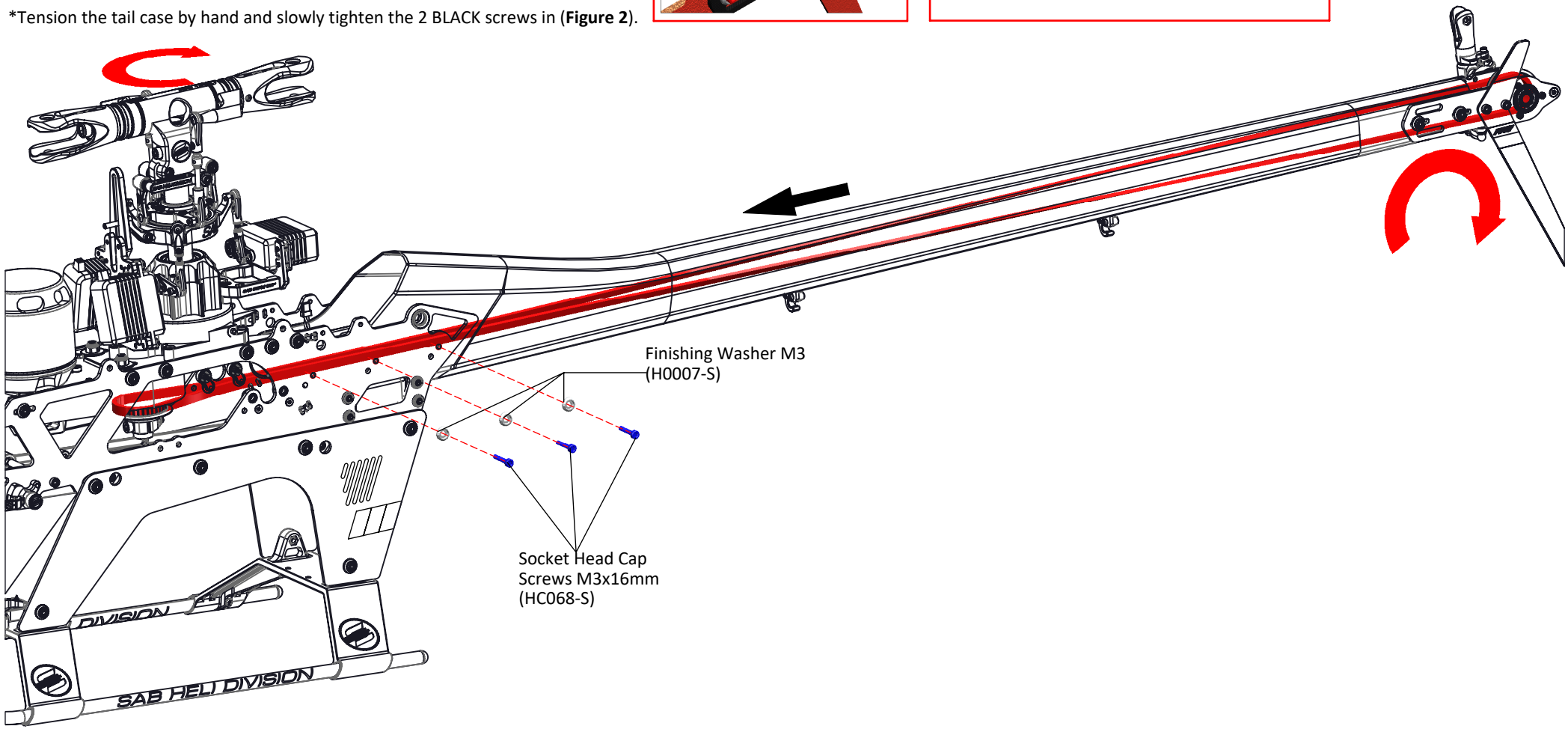
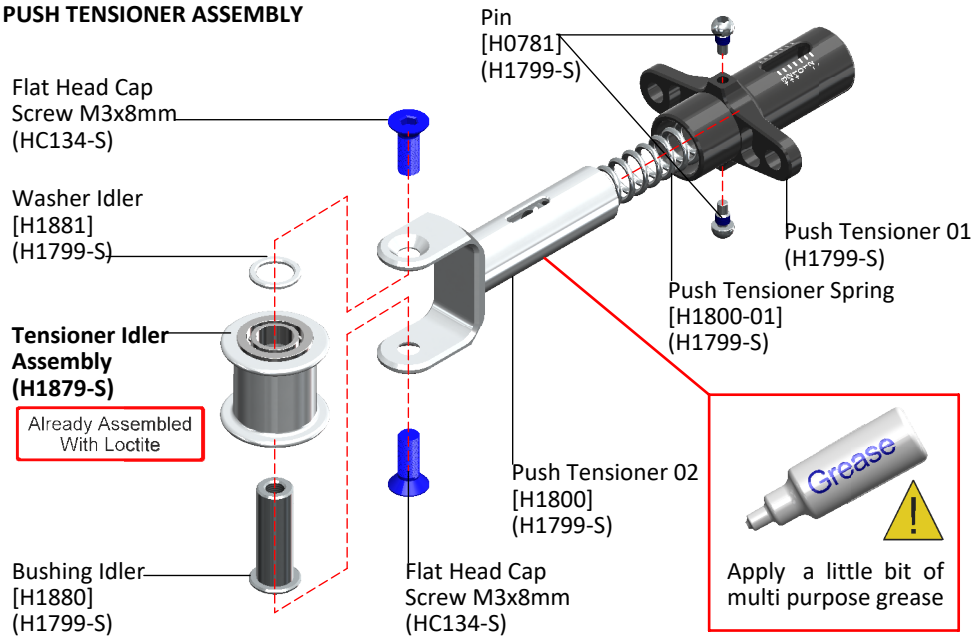


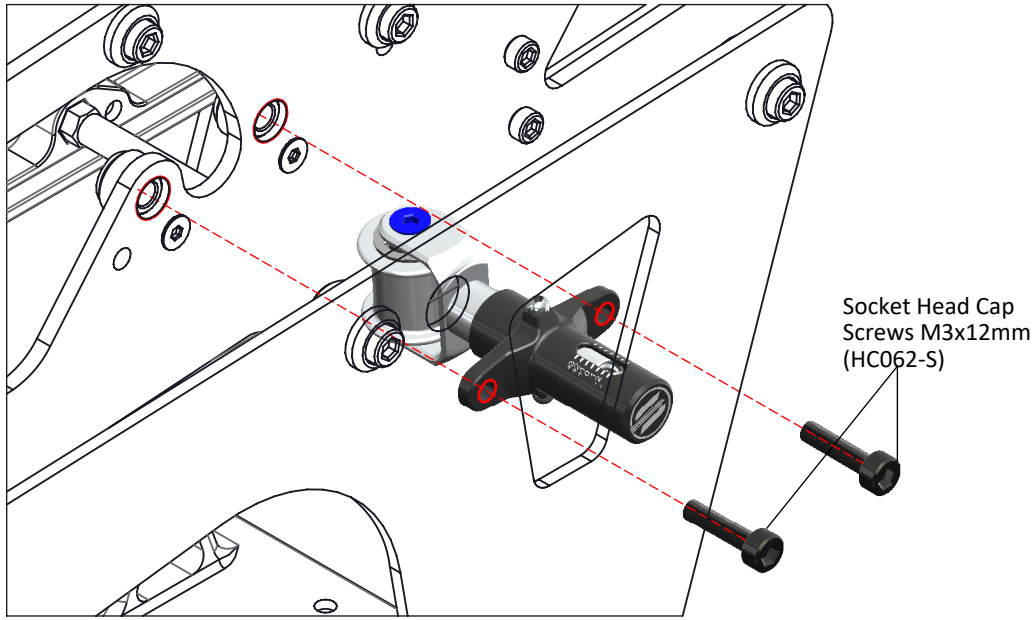
Fig. 2



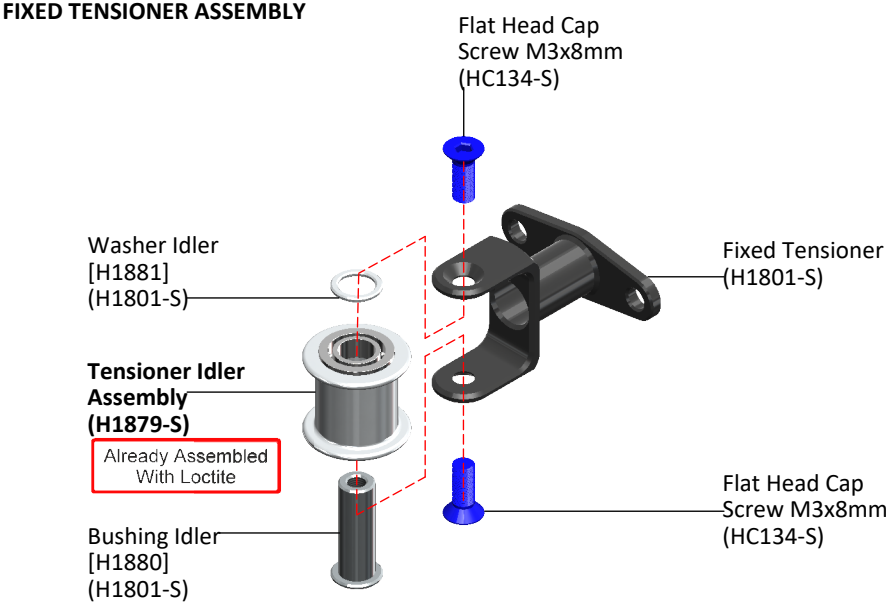
BOX 1, BAG FOR PAGE 28

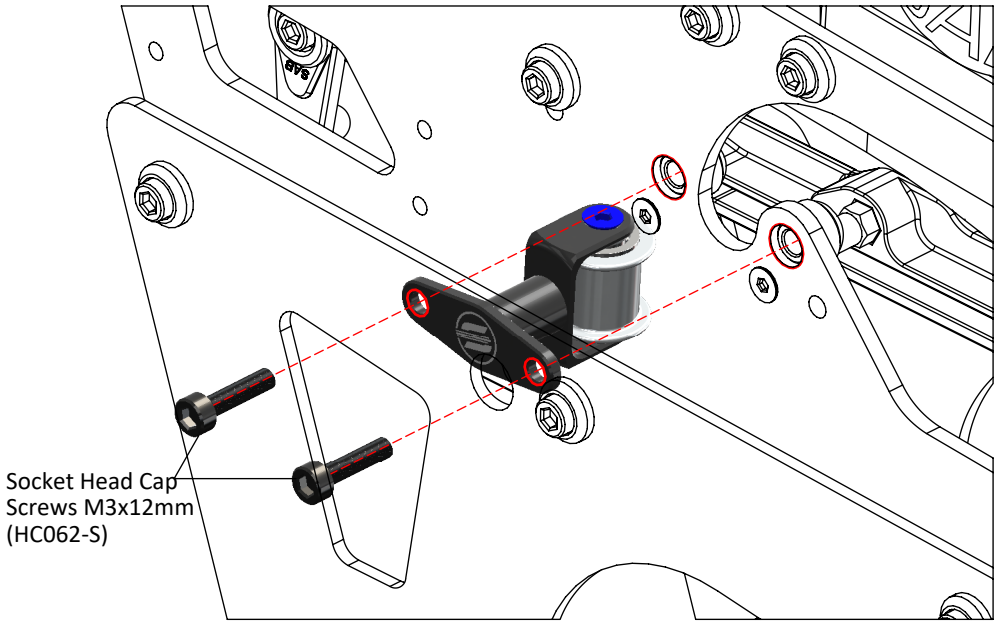
PUSH TENSIONER ASSEMBLY





FIXED TENSIONER ASSEMBLY





TAIL BELT TENSION

To provide the correct tail belt tension, you can use the **"zig-zag"** method.

Figure 1, Loosen the 2 **RED** screws and the **BLUE** screw, then push the tail side in the direction indicated by the red arrow. While pushing, tighten the **BLUE** screw.

Figure 2, Loosen the 2 **RED** screws and the **YELLOW** screw, then push the tail side as indicated by the red arrow. While pushing, tighten the **YELLOW** screw. Continue adjusting step by step until the tail belt is sufficiently tight. Note that a Hard 3D flying style will require more tension; once you achieve the desired tension, ensure all screws are tight and the tail shaft is perfectly aligned and straight.

Figure 3, The tail output shaft must be perpendicular to the boom mid-line.

Figure 4, The indicator on the tensioner needs to reach **"Zero"**.

Fig. 4

Fig. 1

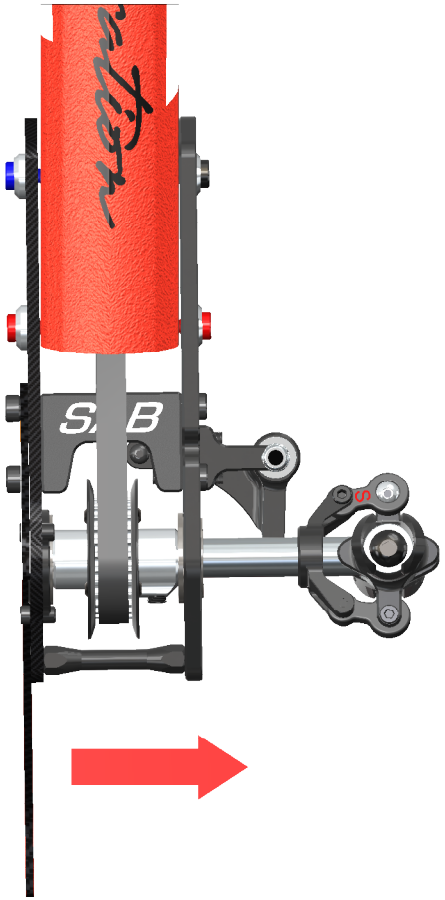


Fig. 2

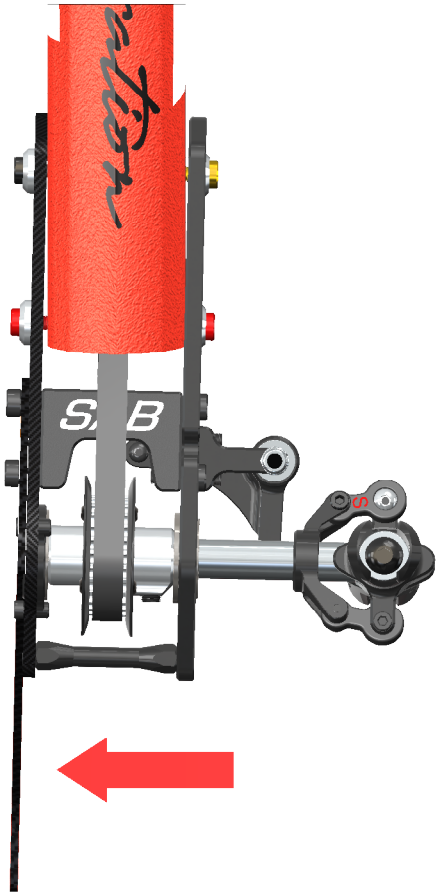
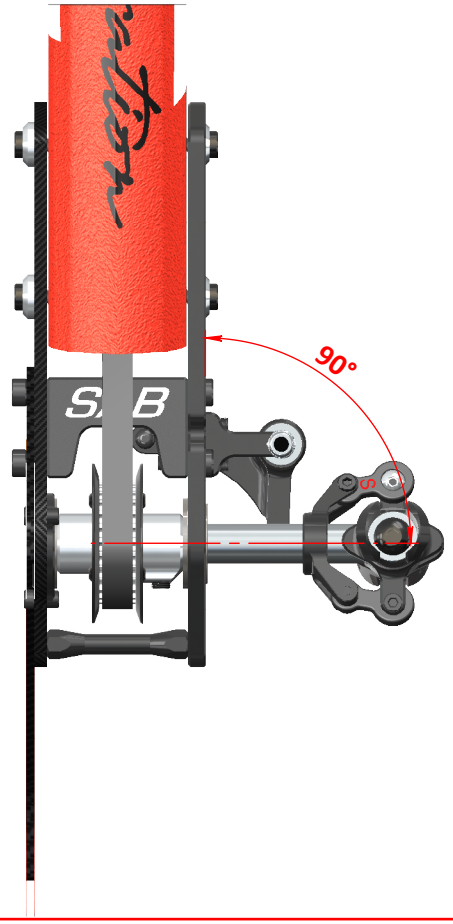
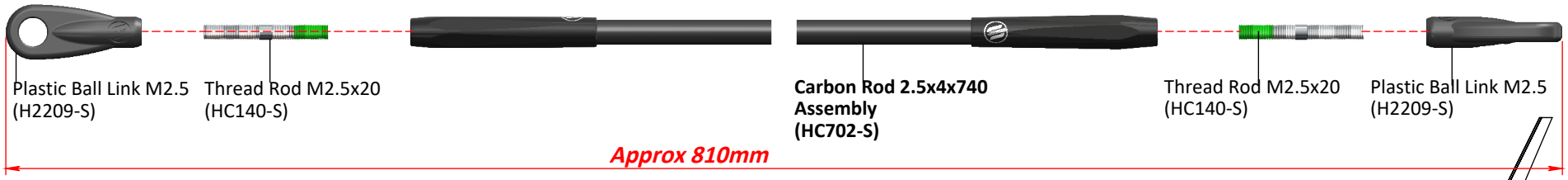


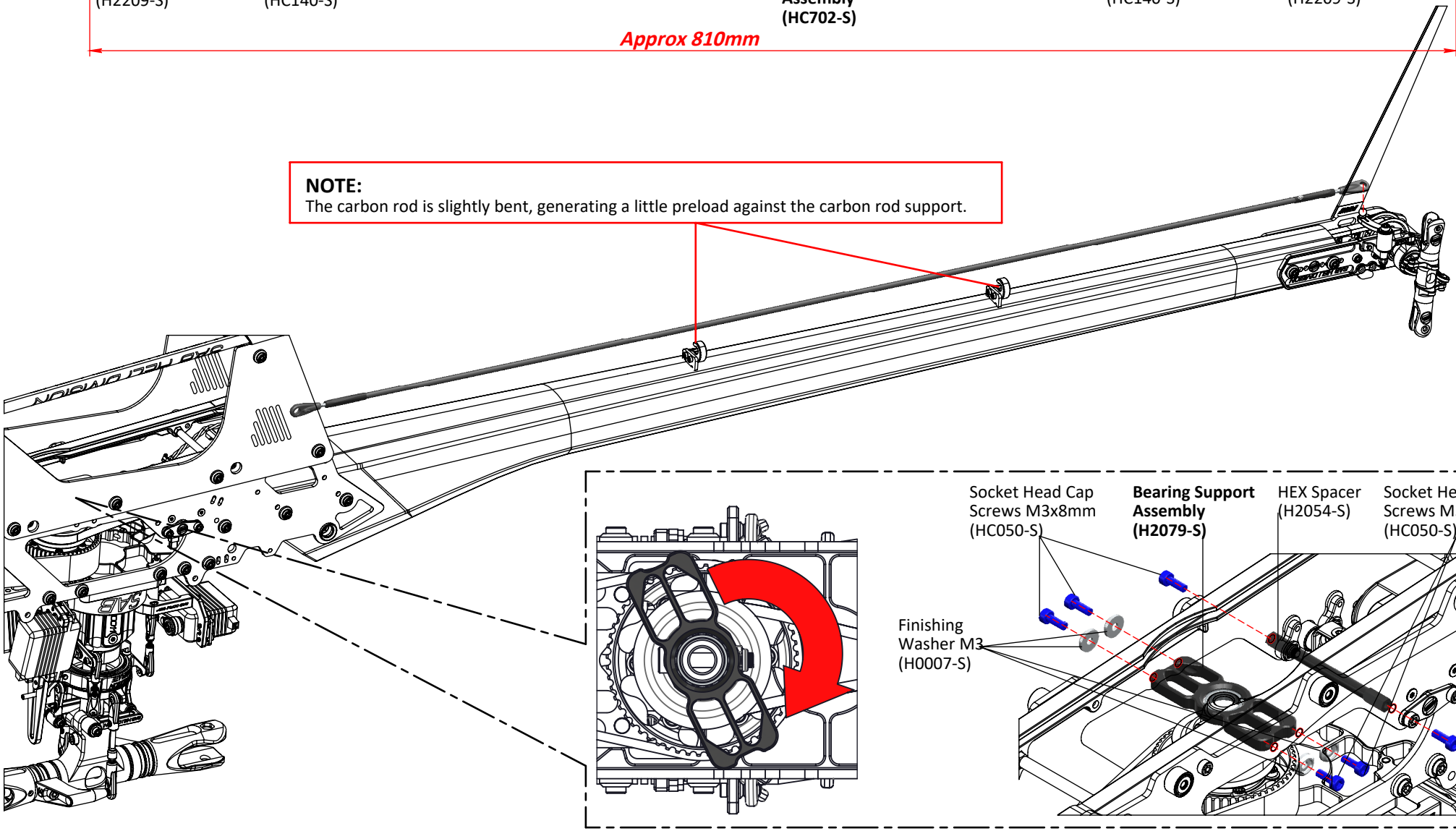
Fig. 3



BOX 3, BAG FOR PAGE 30



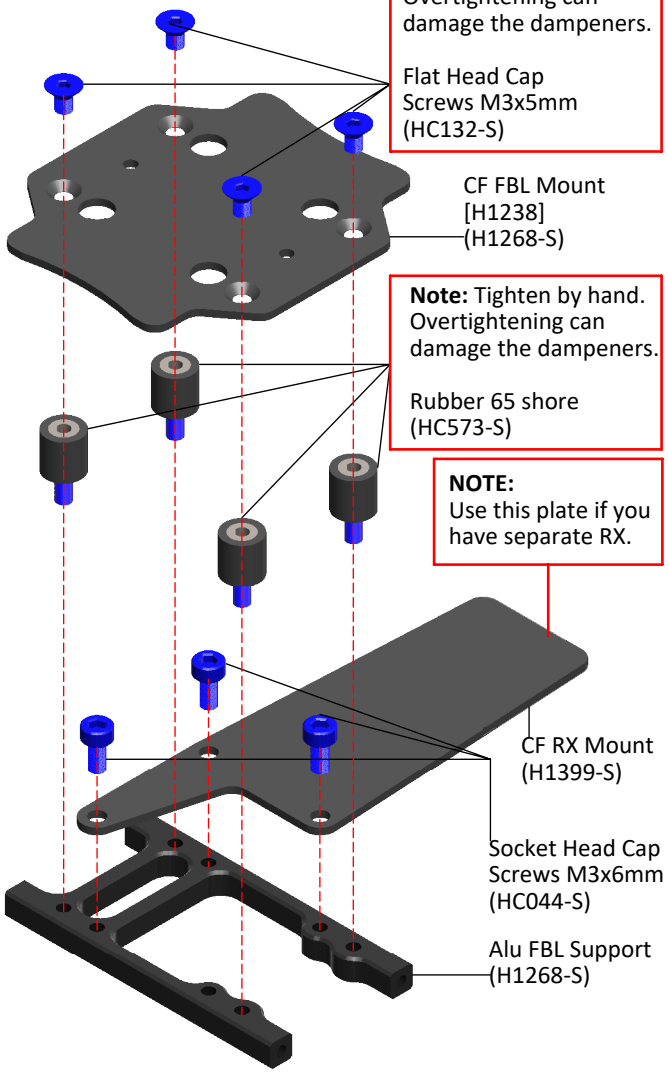
NOTE:
The carbon rod is slightly bent, generating a little preload against the carbon rod support.

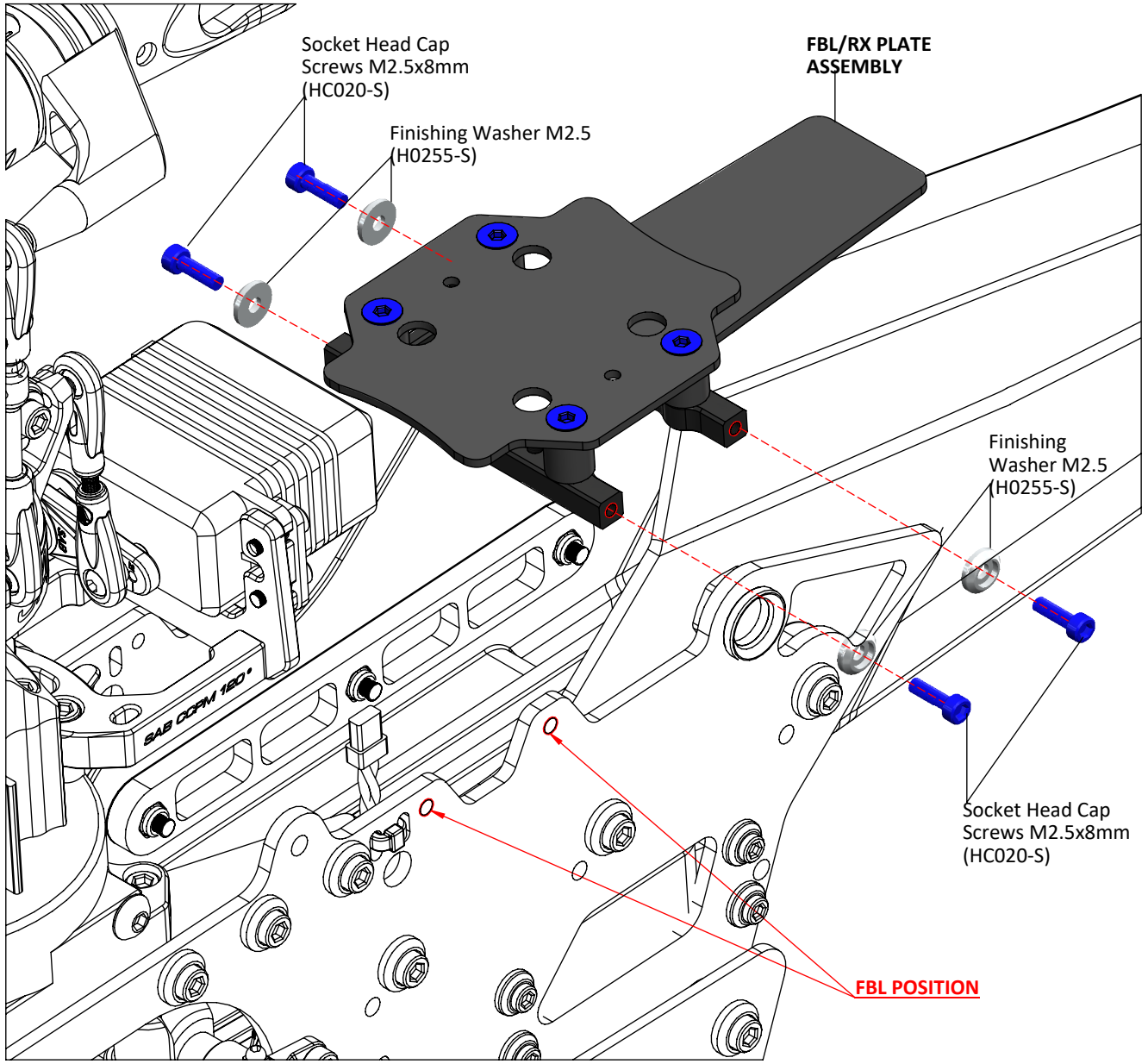


BOX 1, BAG FOR PAGE 31

FBL/RX PLATE ASSEMBLY

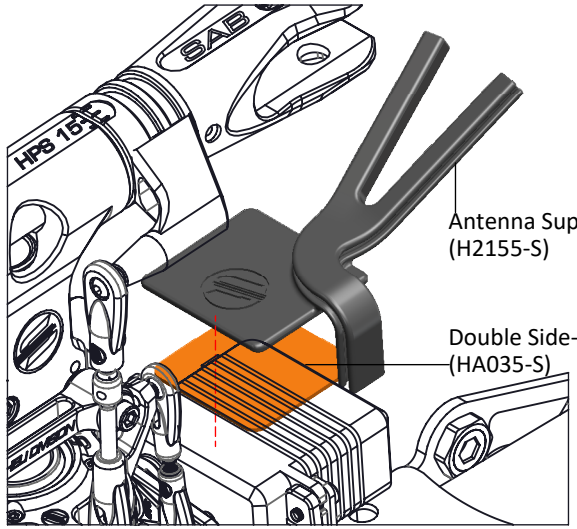
NOTE: 2mm thick tape for the gyro is recommended.





BOX 1, BAG FOR PAGE 32

In bag 32-2, you can find a “3D Printed” antenna support.
Use it as desired with your RX system.



Socket Head Cap
Screw M3x8mm
(HC050-S)

Note:
You can use a small piece of heat shrink tube to secure the antenna wires in place.

Socket Head Cap
Screw M3x8mm
(HC050-S)

Wire Support
(H1798-S)

Zip-Tie

BOX 1, BAG FOR PAGE 33

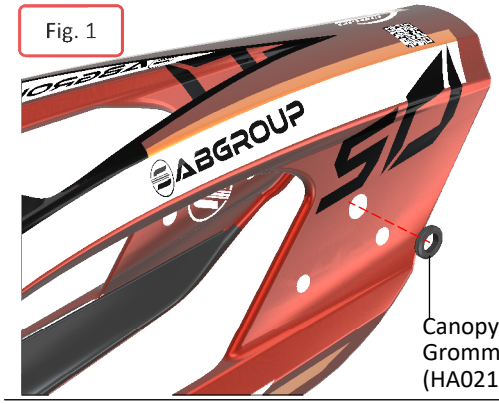
CANOPY

*Install Canopy grommets **(Figure.1)** and the two quick knobs **(Figure.2).**

*Fit the canopy in the red arrow zone, and insert the knobs.

⚠ ***Confirm the canopy is secure prior to each flight.**

Fig. 1

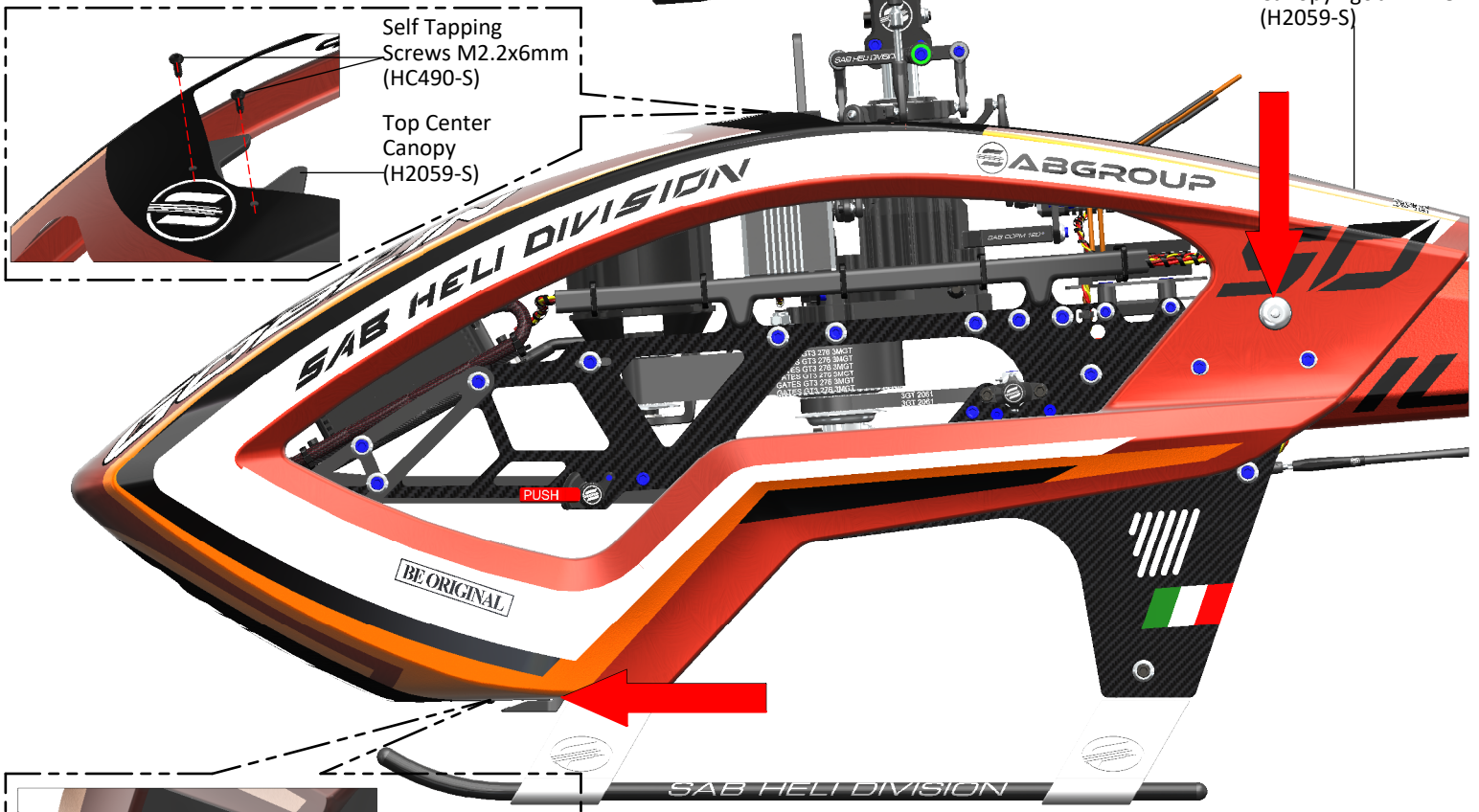


Canopy Grommet (HA021-S)

Fig. 2

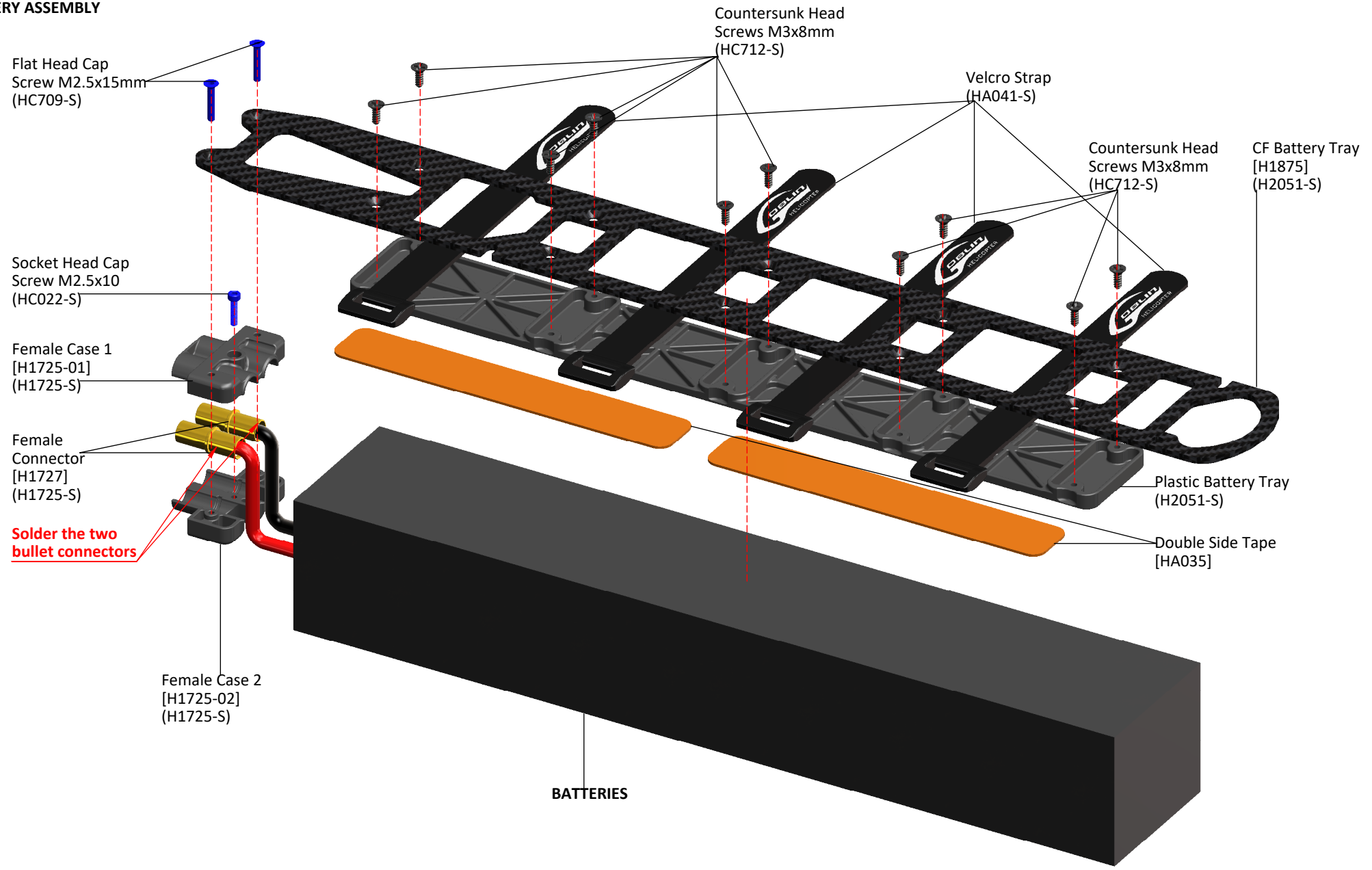
Canopy knobs Assembly (H2106-S)

NOTE:
Put a very small drop of CA glue on the grommet and then insert the quick release canopy mount. This way when you remove the canopy, the mounts can not come off. Be careful not to block the quick release mechanism with glue.

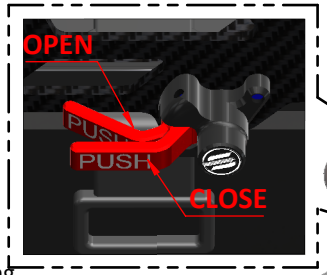


BOX 1, BAG FOR PAGE 34

BATTERY ASSEMBLY



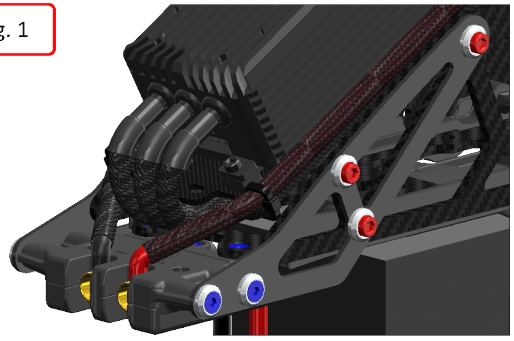
Before permanently mounting the batteries onto the battery tray, check the ideal position for the best center of gravity.



Ensure Correct Connector Alignment

* Ensure the connector is correctly aligned before proceeding.
* Place the battery tray with the connector into its designated position.
* Unscrew the 3+3 M3 screws of the carbon support **Fig.1**.
* Slightly move the components as needed to ensure proper alignment.
* Tighten the screws securely.

Fig. 1



BOX 1, BAG FOR PAGE 36

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 or 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 2200rpm.

*Fit the main blades and tail blades. (**Figure.1** and **Figure.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 +/-13°.

*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. 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.
*Confirm the canopy is secure prior to each flight.
* Make sure that the battery locking pin is back in its resting position, blocking in correct way the battery tray.

*Perform the first flight at a low headspeed, 1800 RPM.

After this first flight, do a general check of the helicopter. Verify that all screws are correctly tightened.

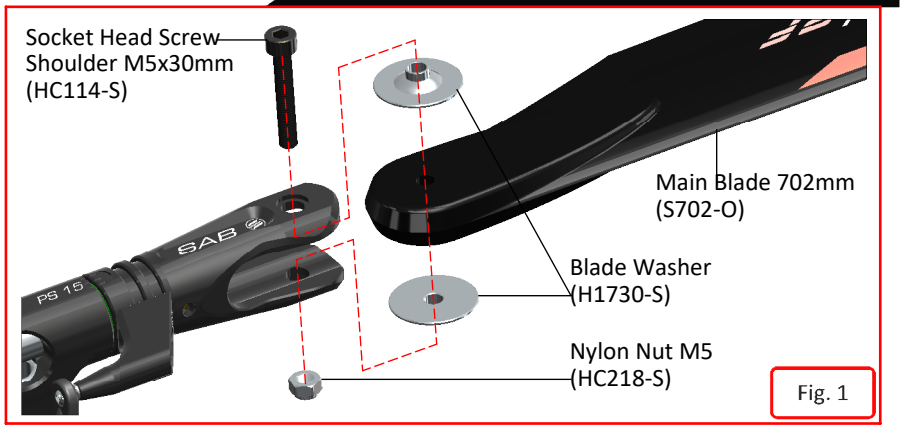


Fig. 1

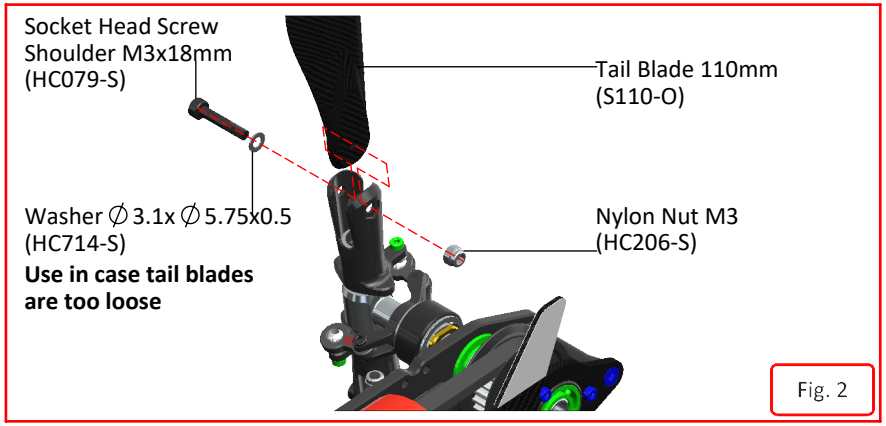


Fig. 2

IN FLIGHT

ABOUT HEAD

The HPS head allows for a very broad range of dampening setups.
The dampers are composed of 3 O-ring (that defines the rigidity) and a technopolymer damper (that defines the maximum possible movement of the spindle).
Using different O-ring and dampers you can get different responses of the model.

O-ring
80 Shore: Soft for smooth response
90 Shore: Firm for direct and precise response
Damper
A = Max movement of the spindle, feeling more elastic.
B = Medium.
C = Min movement of the spindle, feeling more direct.

The kit includes B damper H1046-B with 90 Shore O-ring
[other Setting >>p/n H1135-S, HC530-S].

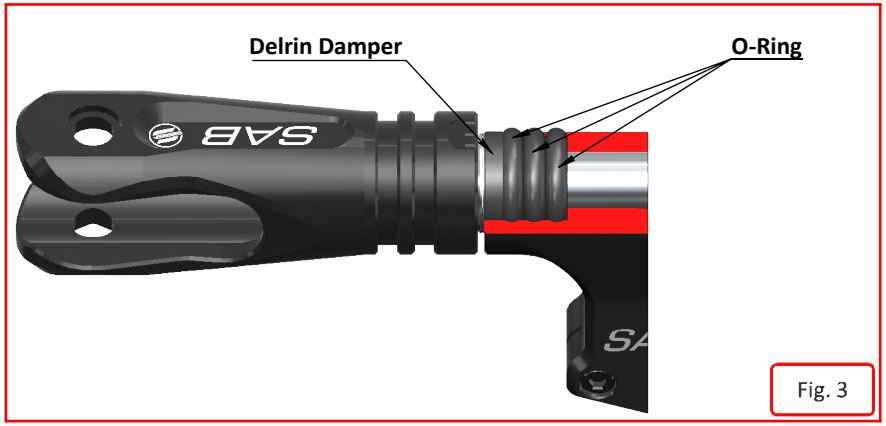
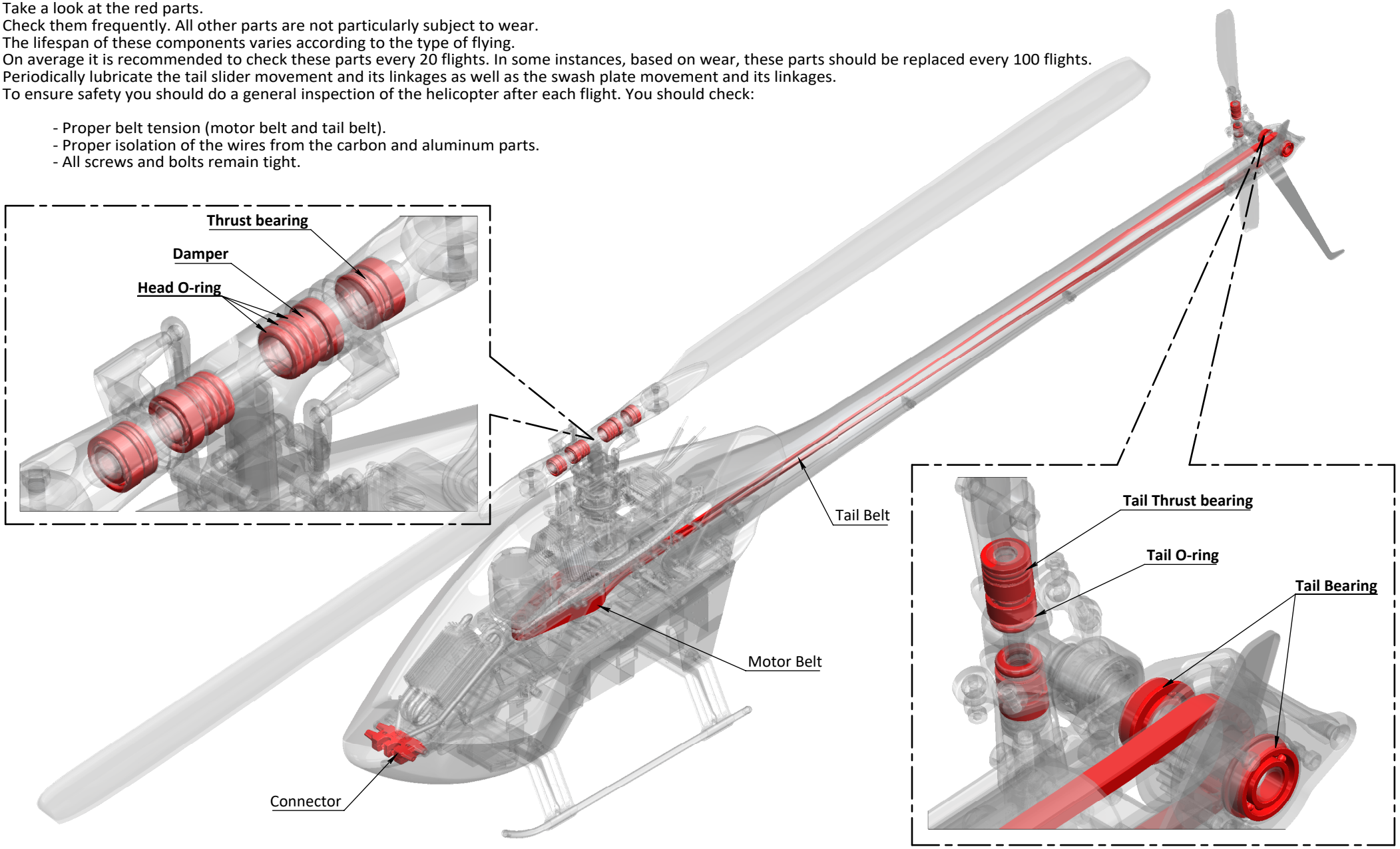


Fig. 3

MAINTENANCE

Take a look at the red parts.
Check them frequently. All other parts are not particularly subject to wear.
The lifespan of these components varies according to the type of flying.
On average it is recommended to check these parts every 20 flights. In some instances, based on wear, these parts should be replaced every 100 flights.
Periodically lubricate the tail slider movement and its linkages as well as the swash plate movement and its linkages.
To ensure safety you should do a general inspection of the helicopter after each flight. You should check:

- Proper belt tension (motor belt and tail belt).
- Proper isolation of the wires from the carbon and aluminum parts.
- All screws and bolts remain tight.



TRANMISSION MODULE

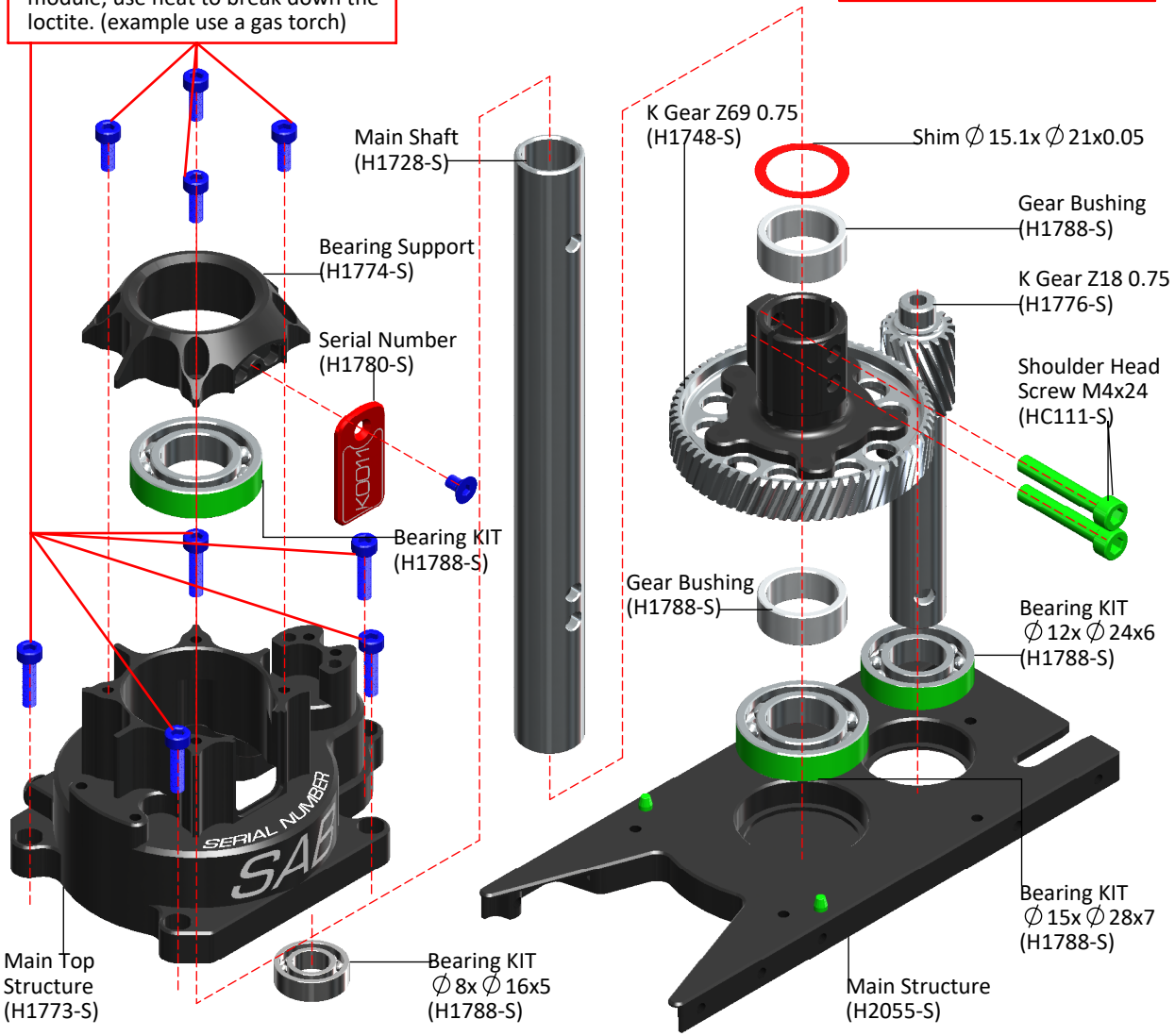
The transmission module is supplied assembled and verified, ready to be used.

Explode and Spare Parts

NOTE:

Before opening the transmission module, use heat to break down the loctite. (example use a gas torch)

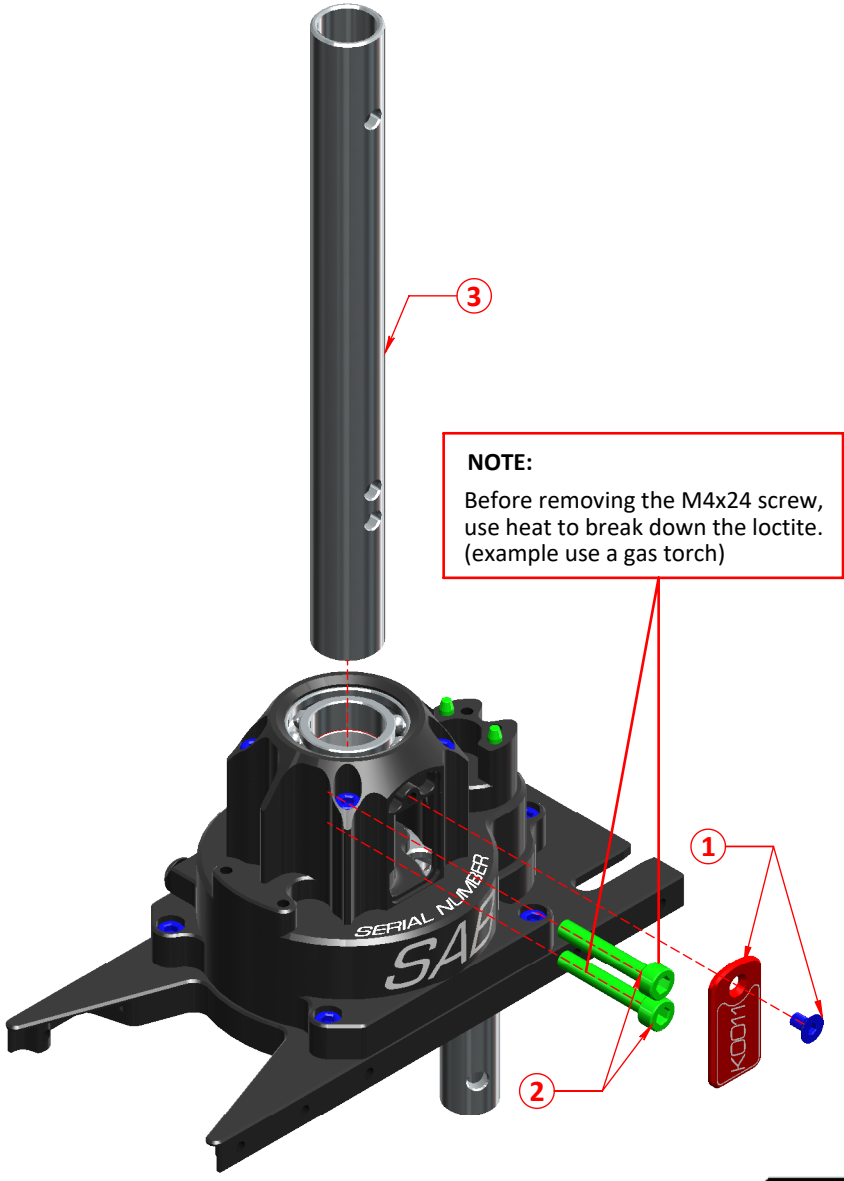
Use SAB HA076 Grease inside the module.



MAIN SHAFT REPLACEMENT

For replacing the main shaft:

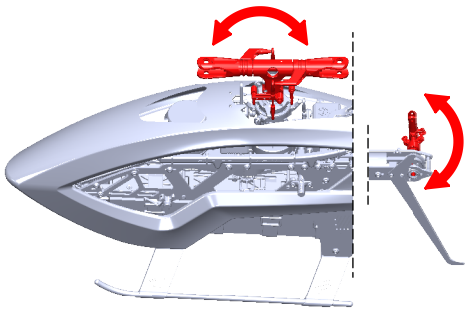
*Remove the serial number plate.
*Remove the two M4x24 screw.
*Remove and replace the main shaft.
*Screw in the two M4x24 screw, with high force and using green loctite.



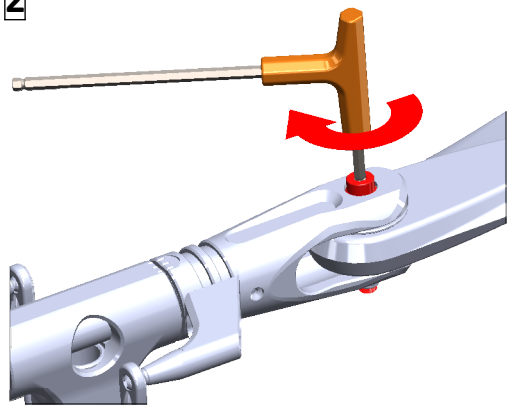
NOTE:

Before removing the M4x24 screw, use heat to break down the loctite. (example use a gas torch)

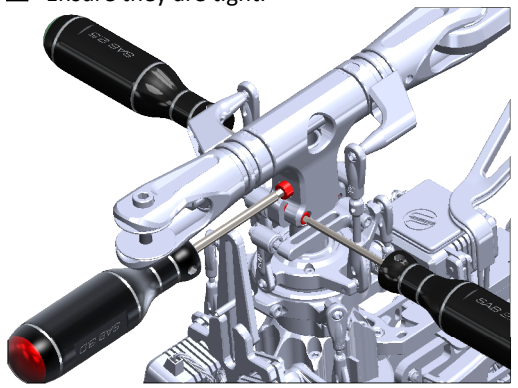
1 **Check the dampening on the main and tail rotor to be the same as always.**



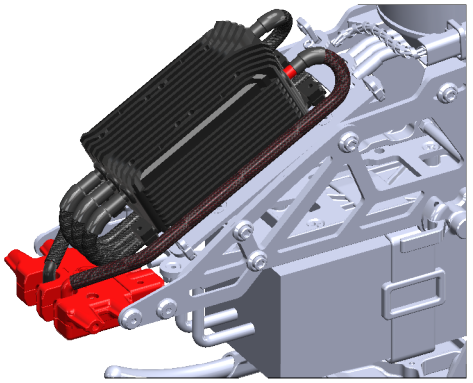
2 **Tighten the main blades before flight.**



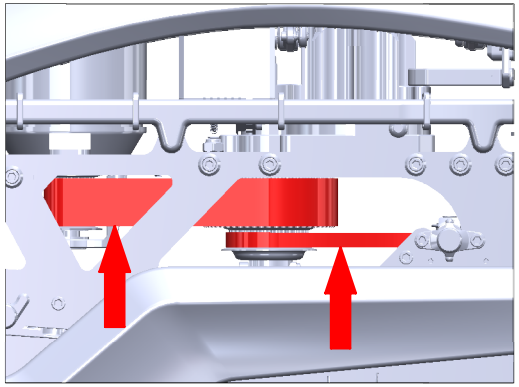
3 **Check main hub screws(M4 and 2 M3)**
Ensure they are tight.



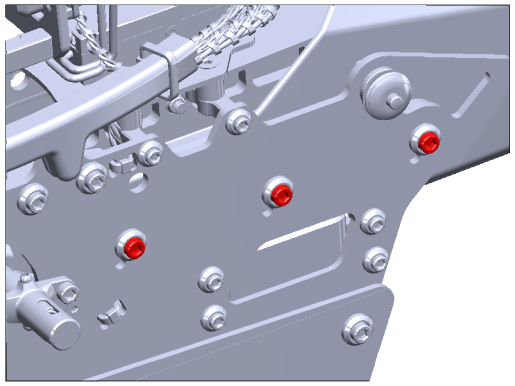
4 **Check all power connectors (Good mechanical connection).**



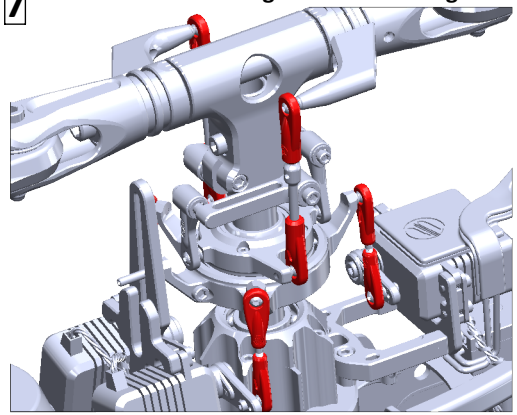
5 **Check Tail & Motor belt tension.**
The tension has to be tight.



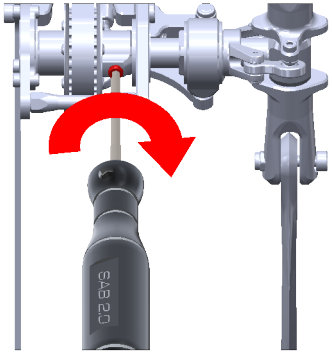
6 **Check the 6 M3 screws.**
Ensure they are tight.



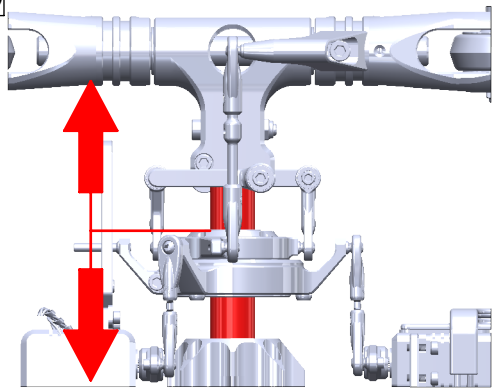
7 **Check the Main Linkages & Servo Linkages**



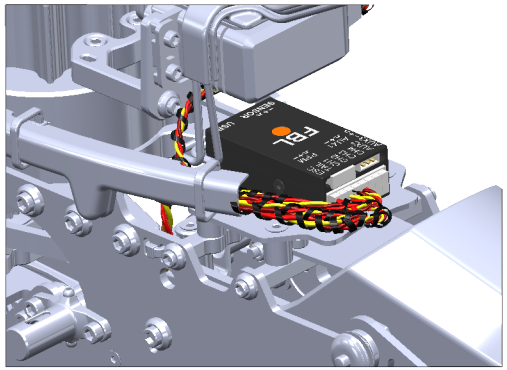
8 **Check tail pulley set screws:**
Ensure they are tight.
(It is suggested use a bit of Green Loctite.)



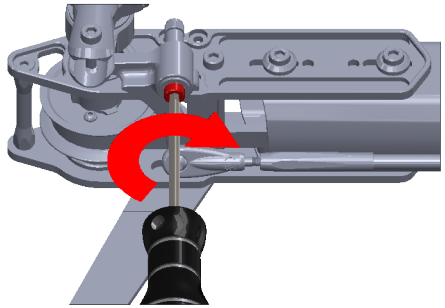
9 **Check for vertical play of the main shaft.**



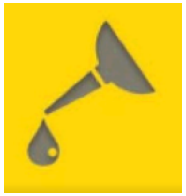
10 **Check if the FBL-RX connectors are OK (hot glue is recommended).**



11 **Check the M3 bell crank:**
Belt crank movement must be smooth and the screw locked.
(It is suggested use a bit of Green Loctite.)



12 **Be sure the follow parts are properly lubricated**
*Main shaft/swashplate
*Tail slider/tail shaft
*Carbon rod/carbon rod support
*All thrust bearings
*All plastic balls connections



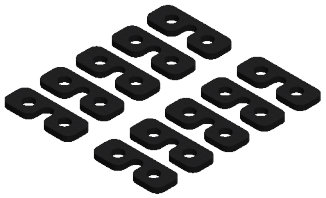
Finishing Washer M3
[H0007-S]

- 10 x Finishing Washer M3.

Unibal M2
[H0064-S]

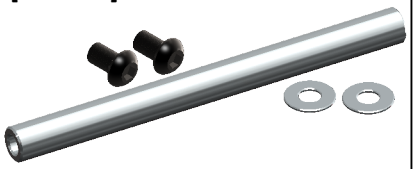
- 5 x Unibal M2.
- 5 x Unibal Spacer.
- 5 x Head Cap Screws M2x6mm.
- 5 x Head Cap Screws M2x8mm.

Servo Spacer
[H0075-S]



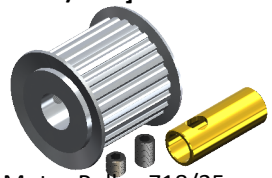
- 10 x Servo Spacer.

Main Spindle
[H0079-S]



- 1 x Main Spindle.
- 2 x Washer ∅ 6.1x ∅ 14x1.8mm .
- 2 x Button Head Cap Screws M6x10.

Motor Pulley
[H0175-18/25-S]



- 1 x Motor Pulley Z18/25.
- 1 x Motor Bushing.
- 1 x Set Screw M4x4.
- 1 x Set Screw M4x6.

Plastic Radius Arm
[H0205-S]

- 2 x Plastic Radius Arm.

Finishing Washer M2,5
[H0255-S]

- 10 x Finishing Washer M2,5.

Tail Pitch Slider Link
[H0261-S]

- 2 x Tail Pitch Slider Link.
- 2 x Bushing ∅ 2x ∅ 3x3.
- 2 x Head Cap Screws M2x6mm.

Tail Spindle
[H0329-S]

- 1 x Tail Spindle.
- 2 x Button Head Cap Screws M4x6.

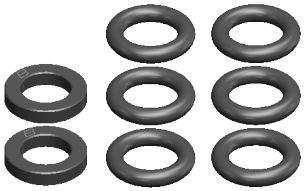
Spacer Set For Tail Rotor
[H0330-S]

- 2 x Tail Oring Damper.
- 2 x Washer ∅ 5x ∅ 8.9x0,75mm.
- 2 x Washer ∅ 7.5x ∅ 10x0,5mm.

Linkage Rod M3x50
[H0417-S]

- 2 x Linkage Rod M3x50.
- 4 x Plastic Ball Linkage.

Damper Derlin
[H1046-S]

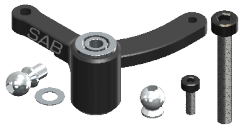


- 2 x Damper B.
- 6 x O-ring 95 Shore.

Reference Pin
[H1048-S]

- 1 x Reference Pin.

Bell Crank Clever
[H1090-S]



- 1 x Bell Crank Lever Assembled.
- 1 x Head Cap Screw M3x22mm.
- 1 x Head Cap Screw M2x6mm.
- 2 x Washer ∅ 3.2x ∅ 6x0.1mm.

Tail Case Spacer
[H1093-S]

- 1 x Tail Case Spacer.
- 4 x Head Cap Screws M3x8mm.

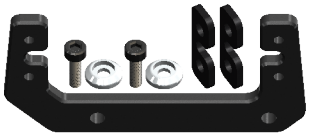
Bell Crank Support
[H1095-S]

- 1 x Bell Crank Support.
- 2 x Head Cap Screws M2.5x8mm.

Back Servo Mount Support
[H1206-S]

- 1 x Back Servo Mount Support.
- 2 x Head Cap Screws M3x8mm.

Back Servo Mount
[H1207-S]

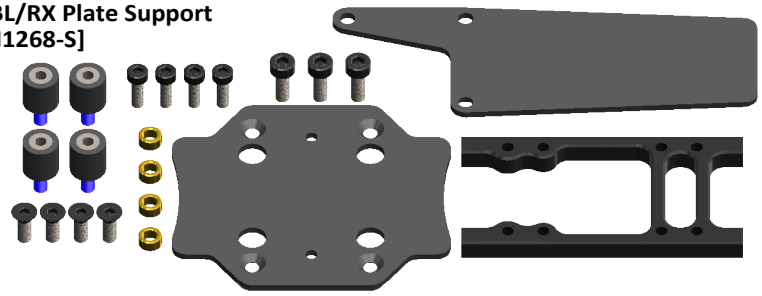


- 1 x Back Servo Mount.
- 2 x Finishing Washer M2.5.
- 2 x Servo Spacer.
- 2 x Head Cap Screws M2.5x8mm.

Landing Gear Rod D8x335
[H1242-S]

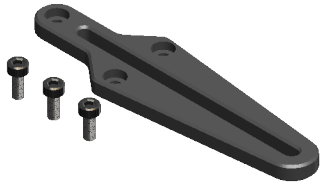
- 2 x Landing Gear Rod D8x335.
- 4 x Plastic Plug.

FBL/RX Plate Support
[H1268-S]



- 1 x FBL/RX Plate Support SET.

Anti-rotate Swashplate
[H1378-S]



- 1 x Anti-rotate Swashplate.
- 2 x Head Cap Screws M2.5x6.

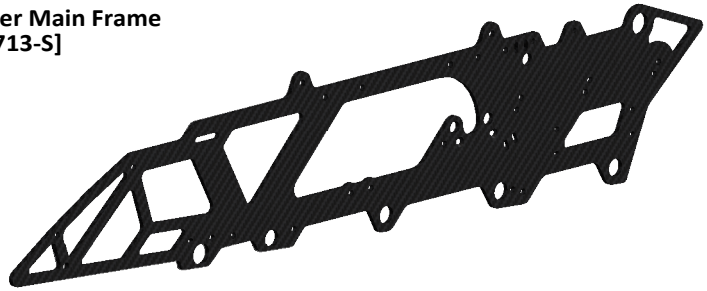
Lock Nut M3
[H1386-S]

- 5 x Lock Nut M3.
- 5 x Nylon Nut M3.

Canopy Front Lock
[H1439-S]

- 1 x Canopy Front Lock.
- 4 x Self Tapping Screws M3x10.

Upper Main Frame
[H1713-S]

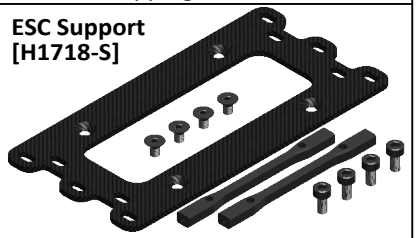


- 1 x Upper Main Frame.

Lower Main Frame
[H1714-S]

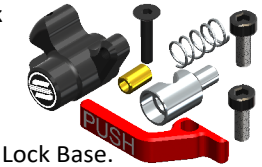
- 1 x Downer Main Frame.

ESC Support
[H1718-S]



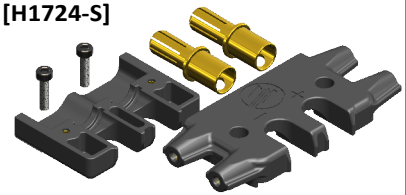
- 1 x ESC Plate.
- 2 x ESC Frame Spacer.
- 4 x Head Cap Screws M3x6.
- 4 x Flat Cap Screws M3x5.

Battery Lock
[H1721-S]



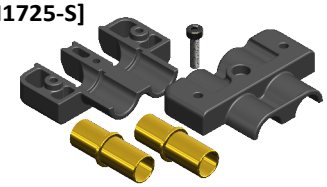
- 1 x Battery Lock Base.
- 1 x Battery Lock Level.
- 1 x Battery Lock Pin.
- 1 x Battery Lock Spring.
- 1 x Bushing ∅2,5x ∅4x6,3.
- 1 x Flat Cap Screw M2.5x12.
- 2 x Head Cap Screws M3x6.

Male Connector
[H1724-S]



- 1 x Male Connector Case 01.
- 1 x Male Connector Case 02.
- 2 x Male Connector.
- 2 x Head Cap Screws M2.5x10.

Female Connector
[H1725-S]

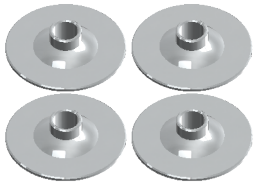


- 1 x Male Connector Case 01.
- 1 x Male Connector Case 02.
- 2 x Male Connector.
- 1 x Head Cap Screws M2.5x10.

Main Shaft D15
[H1728-S]

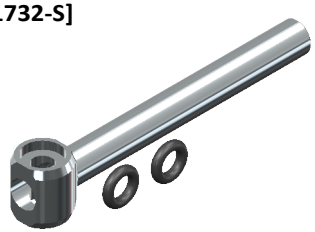
- 1 x Main Shaft D15.
- 2 x Head Cap Screws M4x24.
- 2 x Shim ∅15.1x ∅18x0.1.

Main Blade Washer
[H1730-S]



- 4 x Main Blade Washer.

Tail Shaft D8
[H1732-S]



- 1 x Tail Shaft D8.
- 2 x O-ring CS2.62xID4.42,Shore 70.

Main Gear Z68
[H1748-S]

- 1 x Main Gear Z68.
- 1 x Main Gear Mount.
- 5 x Head Cap Screws M3x6mm.
- 2 x Shoulder Cap Screw M4x24mm.

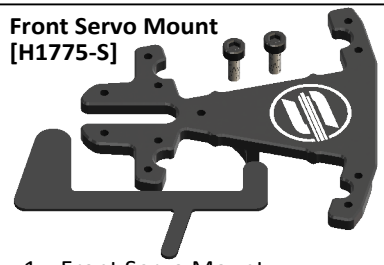
Bottom Gear Box Case
[H1773-S]

- 2 x Pin D3x6.
- 1 x Bottom Gear Box Case.
- 1 x Button Cap Screws M4x6.
- 1 x Ball Bearing ∅8x ∅16x5.

Top Gear Box Case
[H1774-S]

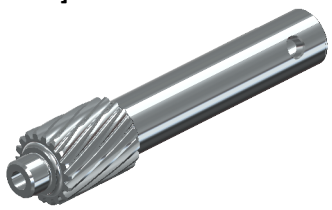
- 1 x Top Gear Box Case.
- 4 x Head Cap Screws M3x8.
- 1 x Ball Bearing ∅15x ∅28x7.

Front Servo Mount
[H1775-S]



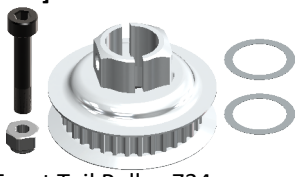
- 1 x Front Servo Mount.
- 1 x Servo Align Tool.
- 2 x Head Cap Screws M3x8.

Pinion Z18xD12
[H2229-S]



- 1 x Pinion Z18xD12.

Front Tail Pulley Z34
[H1778-S]

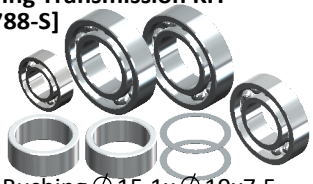


- 1 x Front Tail Pulley Z34.
- 1 x Nylon Nut M4.
- 2 x Shim ∅ 12.1x ∅ 16x0.1.
- 1 x Shouldered Cap Screw M4x21.5.

Serial Number
[H1780-S]

- 1 x Serial Number.
- 1 x Flat Cap Screw M3x5.

Bearing Transmission KIT
[H1788-S]



- 2 x Bushing ∅ 15.1x ∅ 19x7.5.
- 1 x Ball Bearing ∅ 8x ∅ 16x5.
- 1 x Ball Bearing ∅ 12x ∅ 24x6.
- 2 x Ball Bearing ∅ 15x ∅ 28x7.
- 2 x Shim ∅ 15.1x ∅ 18x0.1.

Blade Grip Arm 30
[H1789-S]

- 2 x Blade Grip Arm 30.
- 2 x Uniball M3.
- 2 x Head Cap Screws M4x10mm.

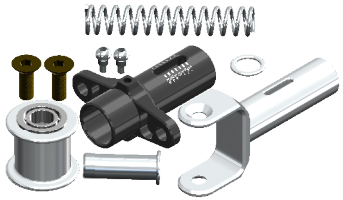
Main Blade Grip
[H1790-S]

- 1 x Main Blade Grip.
- 1 x Washer ∅ 10x ∅ 16x1.
- 1 x Washer ∅ 6,1x ∅ 14x1,8.
- 1 x Head Cap Screw M6x10mm.
- 1 x Thrust Bearing ∅ 10x ∅ 18x5,5.
- 2 x Ball Bearing ∅ 10x ∅ 19x5.

Plastic Wire Cover
[H1798-S]

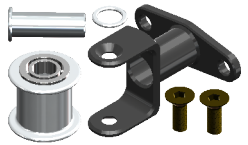
- 1 x Plastic Wire Cover.
- 2 x Head Cap Screws M3x8mm.

Push Tensioner
[H1799-S]



- 1 x Push Tensioner SET.

Fixed Tensioner
[H1801-S]



- 1 x Fixed Tensioner SET.

Tail Locking Element 30
[H1862-S]

- 2 x Tail Locking Element 30.
- 2 x Tail Locking Element 30 Tape.
- 4 x Nylon Nut M3.

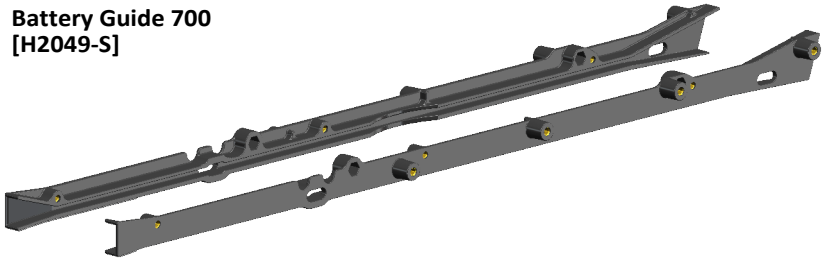
Tail Belt Idler D9x12.5
[H1879-S]

- 2 x Tail Belt Idler D9x12.5.
- 4 x Flanged Bearing ∅ 5x ∅ 9x3.

Tail Blade Grip
[H1893-S]

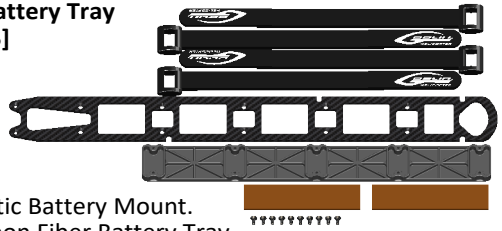
- 2 x Tail Blade Grip.
- 2 x Washer ∅ 7,5x ∅ 10x0,5.
- 2 x Button Cap Screws M4x6mm.
- 4 x Ball Bearing ∅ 5x ∅ 10x4.
- 2 x Thrust Bearing ∅ 5x ∅ 10x4.

Battery Guide 700
[H2049-S]



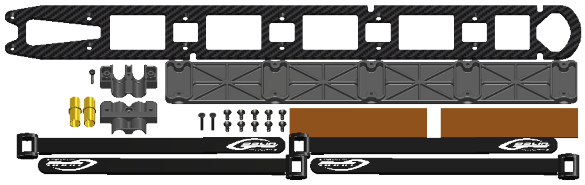
- 1 x Battery Guide SX 700.
- 1 x Battery Guide DX 700.

Plastic Battery Tray
[H2051-S]



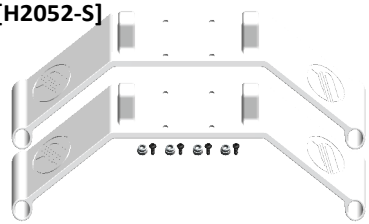
- 1 x Plastic Battery Mount.
- 1 x Carbon Fiber Battery Tray.
- 10 x Countersunk Head Screws M3x8mm.
- 2 x Double-sided Tape 1mm.
- 4 x Strap 20x250.

Plastic Battery Tray with Connector
[H2053-S]



- 1 x Plastic Battery Tray with Connector SET.

Plastic Landing Gear
[H2052-S]

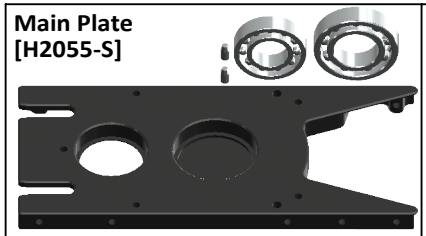


- 2 x Plastic Landing Gear.
- 4 x Nylon Nut M3.
- 4 x Tapping Head Screws M2.2x6.

HEX 5 Spacer M3x60
[H2054-S]

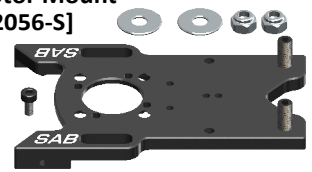
- 2 x HEX 5 Spacer M3x60.

Main Plate
[H2055-S]



- 1 x Main Plate.
- 2 x Pin 3x6.
- 1 x Ball Bearing ∅ 12x ∅ 24x6.
- 1 x Ball Bearing ∅ 15x ∅ 28x7.

Motor Mount
[H2056-S]

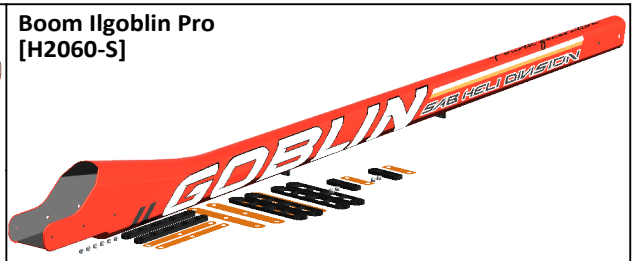


- 1 x Motor Mount 700.
- 1 x Head Cap Screw M3x6mm.
- 2 x Washer ∅ 5,3x ∅ 15x1.
- 2 x Nylon Nut M5.
- 2 x Set Screw M5x16mm.

Canopy Ilgoblin Pro
[H2059-S]

- 1 x Canopy Ilgoblin Pro.
- 2 x Canopy Grommet.
- 1 x SLS Bottom Center Canopy.
- 1 x SLS Top Center Canopy.
- 4 x Self Tapping Screws M2.2x6.

Boom Ilgoblin Pro
[H2060-S]



- 1 x Boom Ilgoblin Pro.
- 1 x Hardware SET.

Cabon Rod Support
[H2063-S]

- 2 x Carbon Rod Support.
- 4 x Head Cap Screws M2x8.

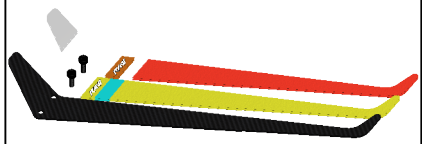
Alu Tail Side Plate
[H2064-S]

- 1 x Alu Tail Side Plate.
- 1 x Flanged Bearing ∅ 8x ∅ 16x5.

Carbon Fiber Tail Side Plate
[H2065-S]

- 1 x Carbon Fiber Tail Side Plate.

Carbon Fiber Tail Fin
[H2066-S]



- 1 x Carbon Fiber Tail Fin.
- 2 x Head Cap Screws M3x8.
- 1 x Orange Sticker.
- 1 x Yellow Sticker.

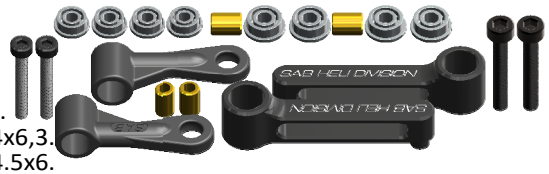
Tail Column Spacer
[H2067-S]

- 1 x Tail Column Spacer.
- 2 x Flat Head Cap Screws M3x8.

Main Hub D15
[H2074-S]

- 1 x Main Hub D15.
- 1 x Head Cap Screw M3x12mm.
- 1 x Nylon Nut M4.
- 1 x Shoulder Cap Screw M4x24.

Radius Arm 34,25
[H2075-S]



- 2 x Plastic Radius Arm.
- 2 x Bushing ∅ 2,5x ∅ 4x6,3.
- 2 x Bushing ∅ 3.2x ∅ 4.5x6.
- 2 x Radius Arm 34.25.
- 2 x Head Cap Screws M2,5x18.
- 2 x Head Cap Screws M3x20.
- 2 x Flanged Bearing ∅ 2,5x ∅ 6x2,6.
- 2 x Flanged Bearing ∅ 3x7x3.

Swashplate D15
[H2076-S]

- 1 x Swashplate SET Assembly.
- 7 x Uniball M3.
- 1 x Reference Pin.

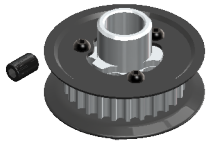
3rd Bearing Support
[H2079-S]

- 1 x 3rd Bearing Support.
- 4 x Finishing Washer M3.
- 4 x Head Cap Screws M3x8mm.
- 1 x Ball Bearing ∅ 12x ∅ 21x5.

D8 Tail Pitch Slider
[H2081-S]

- 1 x D8 Tail Pitch Slider 01.
- 1 x D8 Tail Pitch Slider 02.
- 1 x D8 Tail Pitch Slider 03.
- 2 x Ball Bearing 10x15x4.

Tail Pulley Z26
[H2083-26-S]

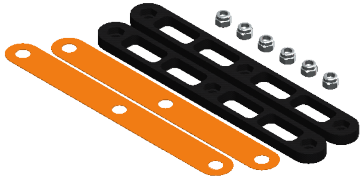


- 1 x Tail Pulley Z26.
- 2 x Tail Pulley Z26 WS.
- 6 x Button Cap Screws M2x4mm.
- 1 x Set Screw M4x6mm.

Canopy Quick Release
[H2106-S]

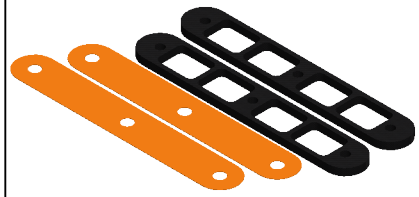
- 2 x Canopy Quick Release.

Carbon Fiber Lock Nut M3 Boom
[H2126-S]



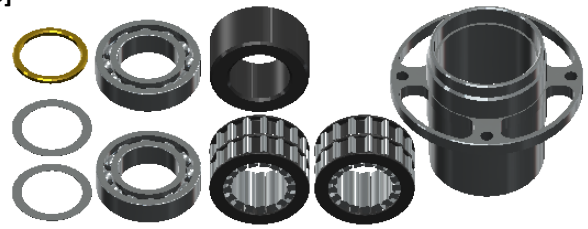
- 2 x CF Lock Nut M3 Boom.
- 2 x CF Lock Nut M3 Boom Tape.
- 6 x Nylon Nut M3.

Carbon Fiber Spacer Boom
[H2127-S]



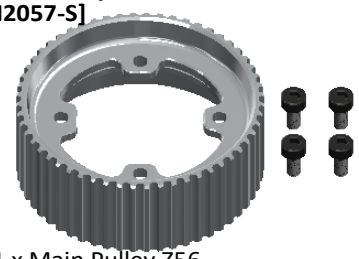
- 2 x CF Spacer Boom.
- 2 x CF Spacer Boom Tape.

Double Clutch System
[H1777-S]



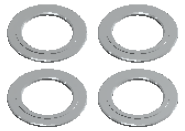
- 1 x Double Clutch System SET.

Main Pulley
[H2057-S]



- 1 x Main Pulley Z56.
- 4 x Head Cap Screws M3x4.

Washer ∅ 10.1x ∅ 16x1 with LIP
[H2146-S]



- 4 x Washer ∅ 10.1x ∅ 16x1.

SLS Antenna 700
[H2155-S]

- 1 x SLS Antena 700.
- 1 x Double-sided Tape.

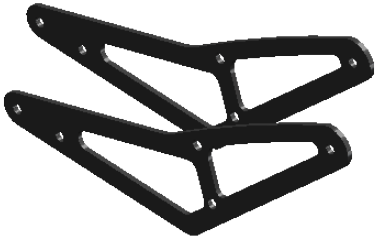
Frame Bushing
[H2156-S]

- 8 x Frame Bushing.

Tail Bearing Mount
[H2159-S]

- 1 x Tail Bearing Mount.
- 3 x Head Cap Screws M2x5.
- 1 x Flanged Bearing 8x16x5.

700 Connector Plate
[H2162-S]



- 2 x 700 Connector Plate.

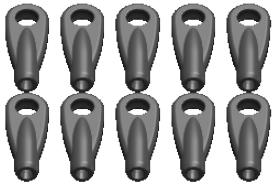
Tail Servo Mount
[H2203-S]

- 2 x Tail Servo Mount 29mm.
- 2 x Tail Servo Mount 26mm.
- 4 x Head Cap Screws M2.5x8.

Uniball Special D5
[H2204-S]

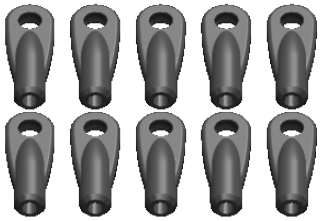
- 5 x Uniball Special D5.
- 5 x Head Cap Screws M2x6.

Plastic Ball Linkage M2.5
[H2209-S]



- 10 x Plastic Ball Linkage M2.5.

Plastic Ball Linkage M3
[H2210-S]



- 10 x Plastic Ball Linkage M3.

Wrench Nuts M8
[HA016-S]

- 1 x Wrench Nuts M8.

Canopy Grommet
[HA021-S]

- 5 x Canopy Grommet.

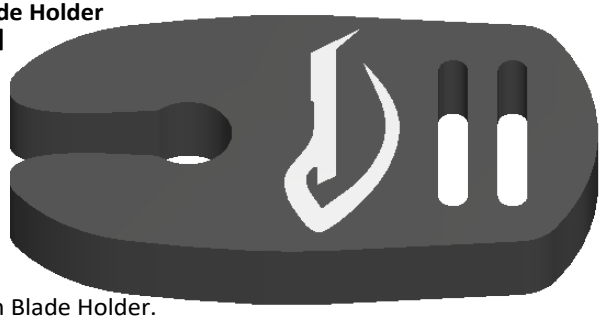
Double-sided Tape Battery
[HA035-S]

- 2 x Double-sided Tape Battery.

Straps 20x250mm
[HA041-S]

- 2 x Straps 20x250mm.

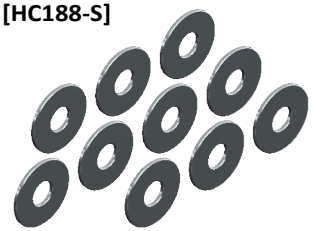
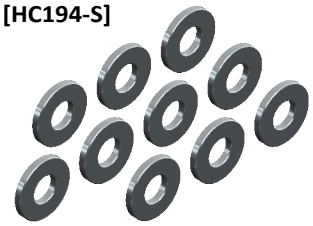
Foam Blade Holder
[HA043-S]



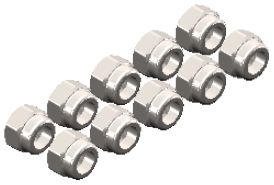
- 1 x Foam Blade Holder.

Zip Tie 2.5x200mm
[HA058-S]

- 50 x Zip Tie 2.5x200mm.

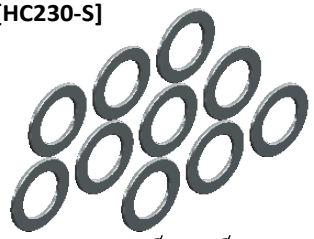
[HC002-S]  - 10 x Socket Head Cap Screws M2x5mm.	**[HC004-S]**  - 10 x Socket Head Cap Screws M2x6mm.	**[HC018-S]**  - 10 x Socket Head Cap Screws M2.5x6mm.	**[HC020-S]**  - 10 x Socket Head Cap Screws M2.5x8mm.	**[HC022-S]**  - 10 x Socket Head Cap Screws M2.5x10mm.	**[HC032-S]**  - 10 x Socket Head Cap Screws M2.5x18mm.
[HC044-S]  - 10 x Socket Head Cap Screws M3x6mm.	**[HC050-S]**  - 10 x Socket Head Cap Screws M3x8mm.	**[HC056-S]**  - 10 x Socket Head Cap Screws M3x10mm.	**[HC062-S]**  - 10 x Socket Head Cap Screws M3x12mm.	**[HC068-S]**  - 10 x Socket Head Cap Screws M3x16mm.	**[HC079-S]**  - 2 x Socket Head Cap Shoulder Screws M3x18mm. - 2 x Nylon Nut M3.
[HC096-S]  - 10 x Button Head Cap Screws M4x6mm.	**[HC102-S]**  - 10 x Socket Head Cap Screws M4x10mm.	**[HC111-S]**  - 10 x Head Cap Shoulder Screws M4x24.	**[HC114-S]**  - 2 x Head Cap Shoulder Screws M5x30. - 2 x Nylon Nut M5.	**[HC124-S]**  - 10 x Socket Head Cap Screws M6x10mm.	**[HC128-S]**  - 10 x Flat Head Cap Screws M2.5x5mm.
[HC132-S]  - 10 x Flat Head Cap Screws M3x5mm.	**[HC134-S]**  - 10 x Flat Head Cap Screws M3x8mm.	**[HC135-S]**  - 10 x Flat Head Cap Screws M3x10mm.	**[HC136-S]**  - 10 x Self Tapping Head Cap Screws M3x10mm.	**[HC140-S]**  - 10 x Thread Rod M2.5x20.	**[HC153-S]**  - 10 x Set Screw M4x6.
[HC181-S]  - 10 x Washer ∅3x∅7x1.	**[HC188-S]**  - 10 x Washer ∅5.3x∅15x1.	**[HC194-S]**  - 10 x Washer ∅6.1x∅14x1.8.	**[HC200-S]**  - 10 x Nylon Nut M2.5.	**[HC206-S]**  - 10 x Nylon Nut M3.	**[HC212-S]**  - 10 x Nylon Nut M4.

[HC218-S]



- 10 x Nylon Nut M5.

[HC230-S]



- 10 x Washer ∅10x∅16x1.

[HC304-S]

- 1 x Belt HTD 3M 2061-6mm.

[HC335-S]

- 4 x O-ring 2.62x4.42, Shore 70.

[HC351-S]

- 10 x Flat Head Cap Screws M4x6mm.

[HC400-S]

- 4 x Flanged Bearing ∅2,5x∅6x2,6mm.

[HC402-S]

- 4 x Flanged Bearing ∅3x∅7x3mm.

[HC406-S]

- 4 x Ball Bearing ∅5x∅9x3mm.

[HC411-S]

- 4 x Ball Bearing ∅5x∅10x4mm.

[HC422-S]

- 2 x Ball Bearing ∅10x∅19x5mm.

[HC435-S]

- 2 x Thrust Bearing ∅5x∅10x4mm.

[HC438-S]

- 2 x Thrust Bearing ∅10x∅18x5.5mm.

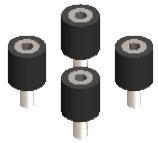
[HC529-S]

- 4 x O-ring 95 Shore.

[HC545-S]

- 10 x Head Cap Shoulder Screws M4x21.5mm.

[HC573-S]

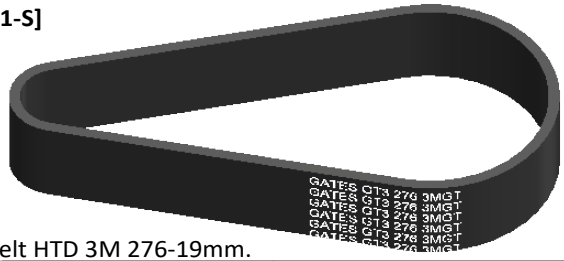


- 4 x Rubber Pin M3 65 Shore.

[HC576-S]

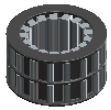
- 10 x Flat Head Cap Screws M2.5x12mm.

[HC601-S]



- 1 x Belt HTD 3M 276-19mm.

[HC602-S]



- 1 x Clutch OWB ∅12x∅20x11mm.

[HC608-S]

- 10 x Socket Head Cap Screws M3x25mm.

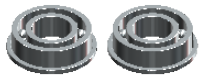
[HC609-S]

- 10 x Button Head Cap Screws M2x6mm.

[HC688-S]

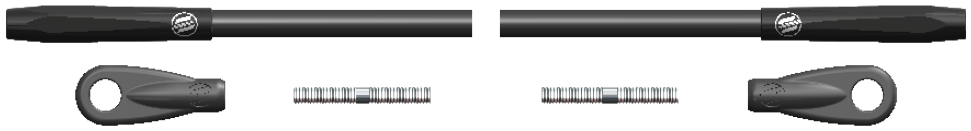
- 5 x Shims ∅10x∅16x0.2.
- 5 x Shims ∅2.1x∅16x0.1.
- 5 x Shims ∅8.1x∅10x0.1.
- 5 x Shims ∅15.1x∅21x0.05.
- 5 x Shims ∅23x∅25.9x0.05.

[HC701-S]



- 2 x Flanged Bearing ∅8x∅16x5mm.

[HC702-S]



- 1 x Carbon Rod KIT.

[HC709-S]

- 10 x Flat Head Cap Screws M2.5x15mm.

[HC712-S]

- 10 x Countersunk Head Screws M3x8mm.

The manual can be downloaded here

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Release 1.0 - October 2024

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