Goblin 630 COMPETITION Manual
The Goblin Competition is the result of all the feedback and experienced gained with the original Goblin. All the changes incorporated into the Goblin Competition create a model even more reliable and efficient than ever before. New colors, new composite materials and many upgrades are included in this kit making it the best Goblin ever.

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.

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**VERY IMPORTANT**

Inside Box 5, 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](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: 1428mm (with 630mm blades)
Main blade length: 600 to 630mm
Tail rotor diameter: 285mm
Tail blade length: 105mm
Main shaft diameter: 12mm
Tail shaft diameter: 6mm
Spindle diameter: 10mm
Weight including standard electronics: 3220g (excluding batteries).
Motor size: Maximum 64mm diameter, maximum height 64mm
Battery compartment: 60x58x350mm (adaptable to 64x58x350mm)
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**
- **Use retaining compound (eg Loctite 648)**
- **Use retaining compound (eg Loctite 243)**
- **Use CA Glue**
- **Use grease (eg Vaseline Grease)**
- **Use grease (eg Tri-Flow Synthetic Grease)**
- **Indicates that for this assembly phase you need materials that are in box xx, bag xx, tray xx.**
ADDITIONAL COMPONENTS REQUIRED

*Electric Motor: 10 - 12S – 480/650Kv
  Maximum diameter 64mm,
  Maximum height 64mm,
  Pinion shaft diameter 6mm
*Speed controller: minimum 100A to be safe.

*Batteries: 10 - 12S - 3700/4500mAh
*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 21)

TOOLS, LUBRICANTS, ADHESIVES

*Generic pliers
*Hexagonal driver, size 1.5,2.5,3,4mm
*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)
*Synthetic grease (eg. Tri-Flow Synthetic Grease)
*Grease (eg. Vaseline grease)
*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.
Box 3: Boom, Blades, Tail blades, 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
Box 6: Carbon parts
Box 7: Carbon parts

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 red box in the upper right hand corner of the page at the beginning of every chapter.
The manufacturing process of the carbon parts often leaves micro-burr and sharp edges. We recommend de-burring the edges to minimize the risks of electrical wire cuts, etc. Very important in red line zone.
Box 7, Bag 1-1, Tray 2

Chapter 4, Carbon Frame

Socket Head Cap Screw M2.5x8mm
(HC020-S)  ... x2

Flat Head Cap Screw M2.5x5mm
(HC128-S)  ... x4

Stop Battery Plate
(H0150-S)

Battery Tray
(H0002-S)

Frame Spacer
(H0003-S)

Battery Tray Assembly 1

Battery Tray Assembly

Socket Head Cap Screw M2.5x8mm

Flat Head Cap Screw M2.5x5mm

Battery Tray Assembly 1

Flat Head Cap Screw M2.5x5mm

Battery Support
(H0153-S)

Flat Head Cap Screw M2.5x5mm

Flat Head Cap Screw M2.5x5mm

......x6

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Battery support position

Top holes: Standard position.

1. Socket Head Cap Screw M3x10mm (HC056-S) ..... x3
2. Finishing Washer M3 ..... x3
3. Finishing Washer M3 (H0007-S) ..... x7
4. Socket Head Cap Screw M3x8mm (HC056-S)
5. Finishing Washer M3 (H0007-S)
6. Battery Support Assembly

Canopy Positioners (H0159-S)

Socket Head Cap Screw M3x10mm (HC056-S)

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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 advisable to lubricate these two elements with a lubricant (Tri-Flow Synthetic grease).
Tail Belt Idler Assembly (H0070-S)

- Flanged Bearing Ø3xØ7x3mm (HC402-S)
- Tail Belt Idler

Belt Tensioner Arm Assembly (H0070-S)

- Belt Tensioner Arm
- Flanged Bearing Ø5xØ9x3mm (HC410-S)

Button Head Cap Screw M3x4mm 
... x1
Socket Head Cap Screw M3x12mm  
... x1
Socket Head Cap Screw M3x50mm  
... x1
Flanged Bearing Ø3xØ9x3mm  
... x2
Flanged Bearing Ø3xØ7x3mm  
... x2
Washer Ø3xØ4x0.5mm  
... x1

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

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Note for 6mm motor shaft

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.
6 - Main Rotor
Uniball Radius Arm... x2 Assembly

Flanged Bearing ø2.5xØ6x2.5mm (HC400-S)
Spacer Arm ø2.5xØ4x6.3mm H0253 (H0132-S)
Uniball Radius Arm H0205 (H0132-S)

Radius Arm ... x2 Assembly

Flanged Bearing ø3xØ7x3mm (HC402-S)
Radius Arm (H0132-S)
Spacer Arm 3x5x2.7mm H0134 (H0132-S)

Center Hub Assembly

Flanged Bearing ø3xØ7x3mm (HC402-S)
Radius Arm (H0132-S)
Center Hub (H0130-S)

Swashplate Assembly

Swashplate Assembly (H0023-S)
Uniball M3x4 Ø5H3 (H0065-S)
Uniball M3x4 Ø5H18 (H0063-S)

Main Blade Grip Assembly... x2

Bearing ø10xØ19x5mm (HC422-S)
Main Blade Grip (H0086-S)

Uniball Radius Arm... x2 Assembly

Flanged Bearing ø2.5xØ6x2.5mm (HC400-S)
Spacer Arm ø2.5xØ4x6.3mm H0253 (H0132-S)
Uniball Radius Arm H0205 (H0132-S)

Radius Arm ... x2 Assembly

Flanged Bearing ø3xØ7x3mm (HC402-S)
Radius Arm (H0132-S)
Spacer Arm 3x5x2.7mm H0134 (H0132-S)

Center Hub Assembly

Flanged Bearing ø3xØ7x3mm (HC402-S)
Radius Arm (H0132-S)
Center Hub (H0130-S)

Swashplate Assembly

Swashplate Assembly (H0023-S)
Uniball M3x4 Ø5H3 (H0065-S)
Uniball M3x4 Ø5H18 (H0063-S)

Main Blade Grip Assembly... x2

Bearing ø10xØ19x5mm (HC422-S)
Main Blade Grip (H0086-S)

Linkage Rod A Assembly ... x2

Plastic Ball Link (H0066-S)
Uniball Radius Arm H0205 (H0132-S)
Radius Arm Assembly
Socket Head Cap Screw M3x16mm (HC068-S)
Washer 3x4x0.5mm HC176-S
Uniball M3x4 Ø5H3 (H0065-S)
Linkage Rod Assembly
Socket Head Cap Screw M3x16mm (HC068-S)
Washer 3x4x0.5mm HC176-S
Uniball M3x4 Ø5H3 (H0065-S)

Note: The main rotor is assembled provisionally without loctile. Need to add Loctile 243 in the screws M4x10 and M6x10

The HPS head should be assembled with one, 1mm shim (HC230) and one, 0.2mm shim (HC232) on each side. 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.

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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.

SERVO ASSEMBLY 1, 2, 3

Uniball M2 φ5H6 (H0064-S)
Socket Head Cap Screw M3x8mm (HC044-S)
or
Socket Head Cap Screw M2x8mm (HC008-S)
without Uniball Spacer

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ASSEMBLY OF THE BALL ON THE HORN.

The linkage ball must be positioned between 17-19 mm out on the servo arm (figure 1). 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.

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 INSTALLATION OF SWASHPLATE SERVOS

The linkage ball must be positioned between **17-19 mm** out on the servo arm (figure 1). 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.
Head HPS Version Preliminary Setup

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

Linkage Rod A Assembly  ... x2

Approx 75mm
(H0346-S)

Left Thread
Plastic ball link (H0066-S)

Right Thread
Plastic ball link (H0066-S)

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

Linkage Rod B Assembly  ... x3

Approx. 49 mm

Set Screw M2.5x18mm
(HC140-S)

Plastic ball link (H0066-S)

Initial length for the rods from the servos to the swash plate.
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 Jive 120 HV ESC from Kontronik. You can also use the heat sink (H0165-S) if you wish for improved cooling.

Figure 3: Passage recommended for ESC wires. Consider the movement of the battery tray.

Figure 4: Show the installation of the ESC with heatsink. Note that carbon plate (H0088) has been removed.

Figure 5: The passage of the controller wires to the motor is highlighted.

Figure 6: Show the installation of a 2S battery for flight control system. Alternatively, a BEC could be placed in the same area.
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 shows an example of installation of the receiver and flybarless control unit.

In Figure 3 you can see the extension lead for the tail servo. It is very important to include a connector for fast disassembly of the boom module. The connector will prevent servo damage in case of boom separation during a crash.

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.

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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:

- H0015-18-S - 18T Pinion = ratio 11.9:1
- H0015-19-S - 19T Pinion = ratio 11.3:1
- H0015-20-S - 20T Pinion = ratio 10.7:1
- H0015-21-S - 21T Pinion = ratio 10.2:1
- H0015-22-S - 22T Pinion = ratio 9.7:1
- H0015-23-S - 23T Pinion = ratio 9.3:1
- H0015-24-S - 24T Pinion = ratio 8.9:1
- H0015-26-S - 26T Pinion = ratio 8.2:1

H0015-xx-S is a motor pulley for 6mm motor shaft. Available H0126-xx-S motor pulley for 8mm motor shaft.

Some example configurations:

### GOBLIN 630 COMPETITION CONFIGURATIONS

<table>
<thead>
<tr>
<th>Performance</th>
<th>Battery</th>
<th>Motor</th>
<th>ESC</th>
<th>Pinion</th>
<th>RPM Max (Gov)</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL</td>
<td>10S</td>
<td>Pyro 700-56</td>
<td>Edge 120 HV (V2)</td>
<td>24T</td>
<td>2100</td>
<td>± 12,5</td>
</tr>
<tr>
<td></td>
<td>4000/4500</td>
<td>Jive 120 HV</td>
<td>23T</td>
<td>2100</td>
<td>± 12,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scorpion 4025-730</td>
<td>Edge 120 HV (V2)</td>
<td>19T</td>
<td>2100</td>
<td>± 12,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jive 120 HV</td>
<td>YGE 120 HV</td>
<td>18T</td>
<td>2100</td>
<td>± 12,5</td>
<td></td>
</tr>
<tr>
<td>3D</td>
<td>12S</td>
<td>Quantum 4135-560</td>
<td>Edge 120 HV (V2)</td>
<td>23T</td>
<td>2300</td>
<td>± 12,5</td>
</tr>
<tr>
<td></td>
<td>3700/4000</td>
<td>Jive 120 HV</td>
<td>21T</td>
<td>2300</td>
<td>± 12,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scorpion 4035-560</td>
<td>YGE 120 HV</td>
<td>20T</td>
<td>2400</td>
<td>± 12,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pyro 700-56</td>
<td>Jive 120 HV</td>
<td>20T</td>
<td>2400</td>
<td>± 12,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scorpion 4225-610</td>
<td>YGE 160 HV</td>
<td>20T</td>
<td>2400</td>
<td>± 12,5</td>
<td></td>
</tr>
</tbody>
</table>

Note: Although the Goblin can fly at high rpm, for safety reasons we suggest to not exceed 2350 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.

**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:**

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.
7-Boom and Tail
Tail Rotor Hub Assembly

Tail Pitch Slider Assembly

Tail Pitch Slider Link Assembly

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.
Bell Crank Lever Assembly

- Bell Crank Base (H0058-S)
- Washer Ø3xØ4x0.5mm
- Spacer Ø3×Ø4×9.6mm (H0060-H0059-S)
- Socket Head Cap Screw M2x8mm (H0008-S)
- Bell Crank Lever (H0059-S)
- Uniball Spacer (H0031-H0064-S)
- Uniball M2×5H6 (H0064-S)
- Socket Head Cap Screw M3×22mm (HC086-S)

Tail System Assembly

- Socket Head Cap Screw M3×8mm (HC050-S)
- Flanged Bearing Ø6×Ø13x5mm (HC414-S)
- Yellow Vertical Fin (H0046-S)
- Washer 3×4×0.5mm
- Bell Crank Base (H0058-S)
- Belt Gates (HC324-S)
- 27T Pulley (H0102-S)
- Bell Crank Lever Assembly

Tail Side Plate Assembly

- Tail Upper Case (H0360-S)
- Tail CaseSpacer (H0061-S)
- Socket Head Cap Screw M3×8mm (HC050-S)
- Bell Crank Lever Assembly
- Flanged Bearing Ø6×Ø13x5mm (HC414-S)

- Set Screw M4×6
- Socket Head Cap Screw M3×8mm
- Motor Shaft (H0102-S)
- Tail Rotor Shaft Assembly

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

**Assemble H0040-S in the boom:**
Before assembling the two parts in the boom we suggest tightening the M2.5 screws into the two plastic parts to pre-thread them. In this way when you will assemble the tail servo it will be easier to tighten the screws into the plastic parts. Check the tail servo can fit, if necessary carefully sand the hole.

**DETAIL B**

**Assemble H0045-S in the boom:**
Before mounting H0045 on the boom we suggest to first tighten the M2.5 screws into the holes to thread them. In this way when you assemble the part it will be easier to tighten the screws.

**DETAIL C**

**Locking Element Tail Assembly .... X 2**

*Already Assembled*

Locking Element Tail (H0041-S)
**Tail Boom Assembly**

- **Plastic Ball Link** (H0066-S)
- **Threaded Rod M2.5x40mm** (HC242-S)
- **Socket Head Cap Screw M3x12mm** (HC062-S)
- **Finishing Washer M3** (H0007-S)

**Box 3, Bag 16**

- **Threaded Rod M2.5x40mm** (HC242-S)
- **Plastic Ball Link** (H0066-S)
- **Carbon Rod Ø4xØ2.5x635mm** (HC237-S)
- **CA Glue**

**Note:**

- Length: Approx 685mm
- Diameter: 12mm
- Diameter: 3mm
The tail servo wire lead must not be allowed to move above this line (figure 1). To ensure this, it is necessary to position it and then secure with hot glue in the area indicated by the arrow. Figure 2 shows the installed servo.

**Note:** Please note that the boom edges might be rough and can eventually chafe or cut your tail servo lead - we recommend protecting the leads with heat shrink or even electrical tape.
BOOM ASSEMBLY

*Insert the tail boom assembly.
*Lock the M8 nuts with the HA016 special tool supplied (Tray 2).
*Firmly lock the lateral screws M3x12. Use Loctile for this screw and make sure you remain tight.
*Assemble the H0038 carbon security plate.
*Connect the tail servo wire to the previously fitted extension lead.

Socket Head Cap Screw M3x6mm

Finishing Washer M3

...x1

Socket Head Cap Screw M3x12mm

...x2

Nylon Screws M8x20mm

...x2
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.

CANOPY

On the Goblin, the canopy touches the frame. To avoid triggering vibration, it is necessary to attach an adhesive foam tape to the canopy (figure 6). To lock the canopy saver, normal is possible to use a little bit of CA Glue.

CANOPY QUICK REALISE

Allows for quick installation and removal of the canopy. The canopy hole must be 12 to 12.5 mm in diameter. You can enlarge the hole slightly to optimize the vertical position of the canopy itself. Always ensure the proper installation and locking before each flight. The lock button must always come out to ensure locking. It is recommended to attempt removal by forcing the canopy slightly to ensure proper locking.
BATTERIES

The battery tray system in the Goblin 630 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 (Part1#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 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 2350 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°-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 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, 1800 RPM.
  After this first flight, do a general check of the helicopter. Verify that all screws are correctly tightened.

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 (<2100 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 [H0103-S]
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 silicone and Tri-Flow Synthetic grease, even though the gear is made of technopolymer, a high mineral based filler, it still requires some lubrication.

*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.
## Main Frame

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Chapter 17, Exploded view, Transmission Assembly

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# Chapter 17, Exploded view, Head System

![Swashplate Set - H0023](image)

## Head System

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### TAIL SYSTEM

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</table>
### 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.

### Landing Gear Support [H0005-S]
- 1 x Landing Gear Support.

### Finishing Washer M3 [H0007-S]
- 10 x Finishing Washers M3.

### Main Structure [H0009-S]
- 1 x Main Structure.

### Servo Support [H0010-S]
- 1 x Servo Support.

### Motor Mount [H0011-S]
- 1 x Motor Mount.
- 2 x Set Screws M5x20mm.
- 2 x Washer Ø5,3xØ15x1mm.
- 2 x Metric Hex Nylon Nut M5x4,8.
- 2 x Finishing Washer.
- 2 x Socket Head Screw M3x16mm.
- 2 x Spring de 5,8xφ0,3xLL12.
- 2 x Metric Hex Nylon Nut M3x12.

### 68T Main Gear [H0012-S]
- 1 x 68T Main Gear.
- 1 x Socket Head Cap Screw M4x25mm.
- 1 x Metric Hex Nylon Nut M4x5.

### Motor Pulley 18T [H0015-18-S]
- 1 x Motor Pulley 18T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 19T [H0015-19-S]
- 1 x Motor Pulley 19T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 20T [H0015-20-S]
- 1 x Motor Pulley 20T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 21T [H0015-21-S]
- 1 x Motor Pulley 21T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 22T [H0015-22-S]
- 1 x Motor Pulley 22T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 23T [H0015-23-S]
- 1 x Motor Pulley 23T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 24T [H0015-24-S]
- 1 x Motor Pulley 24T.
- 2 x Set Screws M4x4mm.

### Motor Pulley 26T [H0015-26-S]
- 1 x Motor Pulley 26T.
- 2 x Set Screws M4x4mm.

### Swashplate Anti-Rotation Guide [H0017-S]
- 1 x CF Swashplate Anti-Rotation Guide.
- 1 x Finishing Washer M3.
- 1 x Socket Head Cap Screw M3x8mm.

### Column [H0018-S]
- 4 x Columns.

### Swashplate [H0023-S]
- 1 x Swashplate Assembly.
- 2 x Bearings 30xØ37x4mm.
- 4 x Uniballs M3x4 Ø5 H3.
- 1 x Uniball M3x4 Ø5 H18.
- 3 x Socket Head Cap Screws M2x5mm.
- 4 x Socket Head Cap Screws M2x8mm.

### Bearing Support [H0024-S]
- 1 x Bearing Support.
- 1 x Bearing Ø12xØ24x6mm.
- 3 x Flat Head Cap Screws M2.5x5mm.
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</table>
Chapter 18, Spare Parts

**Blade Grip [H0086-S]**
- 2 x Blade Grip.  
- 2 x Thrust Bearing Ø10x Ø16x2.5mm.  
- 4 x Bearing Ø10x Ø19x6mm.  
- 2 x Washer Ø10x Ø16x1.1mm.  
- 2 x Button Head Socket Cap M6x10mm.

**ESC Support [H0088-S]**
- 1 x ESC Support.  
- 2 x Frame Spacer.  
- 4 x Flat Head Cap Screws M2.5x5mm.

**Spindle [H0097-S]**
- 1 x Spindle Shaft.  
- 2 x Button Head Cap Screw M6x10mm.  
- 2 x Washer Ø6x Ø14x1.5mm.

**Aluminum Front Tail Pulley [H0101-S]**
- 1 x Aluminum Front Tail Pulley.  
- 1 x Socket Head Cap M2.5x19mm.  
- 1 x Metric Hex Nylon Nuts M2.5xH3.5.

**27T Tail Pulley [H0102-S]**
- 1 x 27T Tail Pulley.  
- 1 x Set Screw M4x4mm.  
- 6 x Socket Head Cap Screws M2x5mm.

**60T Pulley [H0104-S]**
- 1 x Aluminum Pulley 60T.  
- 2 x Brass Bushing.  
- 2 x Radial Bearings Ø10x Ø15x4mm.  
- 1 x One Way Bearing Ø10x Ø14x12mm.

**Yellow Landing Gear [H0106-S]**
- 1 x CF Yellow Landing Gear.

**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 H5.

**Main Shaft [H0122-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 H5.

**Center Hub [H0130-S]**
- 1 x Center Hub.  
- 1 x Socket Head Cap Screw Shouldered M4x24mm.  
- 1 x Metric Hex Nylon Nut M4 H5.  
- 2 x Socket Head Cap Screws M3x12mm.

**Blade Grip Arm [H0131-S]**
- 2 x Blade Grip Arm.  
- 2 x Socket Head Cap Screw M3x10mm.  
- 2 x Uniball M3x4 Ø5 H3.5.

**Radius Arm [H0132-S]**
- 2 x Radius Arms.  
- 2 x Spacer Arm Ø3x Ø5x2.7mm.  
- 2 x Spacer Arm Ø2.5x Ø4x6.3mm.  
- 2 x Uniball Radius Arms.  
- 2 x Socket Head Cap Screws M3x16mm.  
- 2 x Socket Head Cap Screws M2.5x18mm.  
- 2 x Washers Ø3x Ø4x0.5mm.  
- 2 x Flanged Bearings Ø2.5x Ø6x2.5mm.  
- 2 x Flanged Bearings Ø3x Ø7x3mm.

**Damper [H0144-S]**
- 2 x Damper Derlin.  
- 2 x Washers Ø10x Ø16x1.1mm.  
- 4 x Washers Ø16x Ø16x0.2mm.  
- 4 x Orings 3050.

**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 Screw M2.5x6mm.

**Carbon Fiber ESC Support [H0153-S]**
- 1 x Carbon Fiber ESC Support.  
- 6 x Flat Head Socket Cap M2.5x5mm.
### Chapter 18, Spare Parts

#### 19T Drive Pinion [H0156-S]
- 1 x 19T Drive Pinion.
- 1 x Socket Head Cap Screw Shouldered M3x22mm.
- 1 x Metric Hex Nylon Nut M3x4.

#### Secondary Shaft [H0157-S]
- 1 x Secondary Shaft M3.
- 1 x Socket Head Cap Screw Shouldered M2.5x19mm.
- 1 x Metric Hex Nylon Nut M2.5H3.5.
- 1 x Socket Head Cap Shoulder M3x22mm.
- 1 x Metric Hex locknut Nuts M3H4.

#### Aluminum Blade Spacer [H0158-S]
- 4 x Aluminum Blade Spacer

#### Canopy Positioner [H0159-S]
- 2 x Canopy Positioner.
- 2 x Socket Head Cap Screws M3x10mm.

#### Plastic Tail Linkage [H0261-S]
- 1 x Plastic Tail Linkage.
- 1 x Grip Link Bushing.
- 1 x Socket Head Cap Screws M2x6mm.

#### Quick Release Canopy Mount [H0319-S]
- 2 x Quick Release Canopy Assembly.
- 2 x Socket Head Cap Screws M3x8mm.
- 2 x Canopy Grommets.

#### 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 Spindle Shaft [H0329-S]
- 1 x Tail Spindle Shaft.
- 2 x Button Head Socket Cap 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.

#### Linkage HPS V2 [H0346-S]
- 2 x Linkage HPS.
- 4 x Plastic Ball Link.
- 2 x Linkage Rod.

#### Tail Boom Support [H0358-S]
- 1 x Tail Boom Support.
- 1 x Nylon screw M8x20mm.
- 1 x Flat Head Socket Cap M3x8mm.

#### Aluminum Tail Side Plate [H0359-S]
- 1 x Aluminum Tail Side Plate.
- 1 x Flanged bearing Ø6xØ13x5mm.

#### Aluminum Tail Case Spacer [H0360-S]
- 1 x Aluminum Tail Case Spacer.
- 4 x Socket Head Cap M3x8mm.

#### Main Frame [H0362-S]
- 1 x Main Frame.

#### Yellow Tail Boom [H0355-S]
- 1 x Yellow 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 Socket Head Cap Screws M3 x 12mm.
- 2 x Nylon Screw M8x20mm.
- 1 x Flat Head Cap Screws M3x8mm.

#### Canopy Yellow/Orange. [H0364-S]
- 1 x Canopy Yellow/Orange.
- 1 x Canopy Grommet.
- 1 x Canopy mousse.
- 1 x Canopy Edge Protection.

#### Canopy Yellow/Green. [H0365-S]
- 1 x Canopy Yellow/Green.
- 1 x Canopy Grommet.
- 1 x Canopy mousse.
- 1 x Canopy Edge Protection.

#### Red Vertical Fin [H0281-S]
- 1 x Red Vertical Fin.
- 2 x Socket Head Cap Screws M3x12mm.
- 2 x Finishing Washers M3.

#### Red Landing Gear [H0285-S]
- 1 x CF Red Landing gear.

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Chapter 18, Spare Parts

[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 M2x12mm.

[HC020-S] - 5 x Socket Head Cap Screws M2x16mm.

[HC026-S] - 5 x Socket Head Cap Screw M2.5x12mm.

[HC033-S] - 5 x Socket Head Cap Shouder M2.5x19mm. - 4 x Metric Hex Nylon Nut M2.5.

[HC038-S] - 5 x Button Head Cap Screws M2.5x4mm.

[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 Shoulder M3x18mm.

[HC086-S] - 5 x Socket Head Cap Screw M3x22mm.

[HC090-S] - 2 x Socket Head Cap Shouldered M3x50mm.

[HC096-S] - 5 x Button Head Cap Screws M4x8mm.

[HC098-S] - 5 x Button Head Cap Screws M4x10mm.

[HC100-S] - 5 x Button Head Cap Screws M4x12mm.

[HC104-S] - 2 x Socket Head Cap Shoulder M5x30mm.

[HC111-S] - 2 x Metric Hex Nut M5.

[HC114-S] - 5 x Button Head Cap Screws M4x22mm.

[HC119-S] - 2 x Socket Head Cap Shoulder M5x30mm.

[HC122-S] - 2 x Metric Hex Nut M5.

[HC128-S] - 5 x Flat Head Cap Screws M2.5x3mm.

[HC134-S] - 5 x Flat Head Cap Screws M2.5x5mm.

[HC140-S] - 5 x Cup Poin Set Screws M2.5x20mm.

[HC144-S] - 5 x Cup Poin Set Screws M3x6mm.

[HC150-S] - 5 x Cup Poin Set Screws M3x8mm.

[HC155-S] - 5 x Cup Poin Set Screws M3x10mm.

[HC158-S] - 5 x Cup Poin Set Screws M3x20mm.

[HC165-S] - 4 x Nylon Hex Nut M6x20mm.

[HC170-S] - 10 x Washer Ø2.2xØ5x0.3mm.

[HC176-S] - 5 x Washer Ø3xØ4x0.5mm.

[HC180-S] - 10 x Washer Ø3.3xØ6x0.5mm.

[HC188-S] - 5 x Washer Ø5.3xØ15x1mm.
### Chapter 18, Spare Parts

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<tr>
<td>HC200-S</td>
<td>- 10 x Metric Hex Nylon Nuts M2.5xH3.5.</td>
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<td>HC230-S</td>
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<td>HC232-S</td>
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<td>HC233-S</td>
<td>- 1 x Tail Belt.</td>
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<td>HC237-S</td>
<td>- 3 x Thread Rods M2.5 x 40mm.</td>
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<td>HC242-S</td>
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<td>HC308-S</td>
<td>- 1 x Carbon Rod Ø4xØ2.5x635mm.</td>
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<tr>
<td>HC324-S</td>
<td>- 2 x Plastic Ball Linkage.</td>
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<td>HC335-S</td>
<td>- 2 x Thread Rod M2.5x40mm.</td>
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<td>HC400-S</td>
<td>- 4 x Flanged Bearings Ø2.5xØ26x2.6mm.</td>
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<tr>
<td>HC402-S</td>
<td>- 4 x Flanged Bearings Ø3xØ7x3mm.</td>
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<tr>
<td>HC410-S</td>
<td>- 4 x Flanged Bearings Ø5xØ9x3mm.</td>
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<td>HC411-S</td>
<td>- 4 x Bearings Ø5xØ10x4mm.</td>
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<tr>
<td>HC414-S</td>
<td>- 2 x Flanged Bearings Ø6xØ13x4mm.</td>
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<td>HC418-S</td>
<td>- 2 x Flanged Bearings Ø8xØ12x3.5mm.</td>
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<tr>
<td>HC420-S</td>
<td>- 2 x Bearings Ø10xØ15x4mm.</td>
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<tr>
<td>HC422-S</td>
<td>- 4 x Flanged Bearings Ø10xØ19x5mm.</td>
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<tr>
<td>HC426-S</td>
<td>- 2 x Bearings Ø12xØ24x6mm.</td>
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<tr>
<td>HC430-S</td>
<td>- 2 x Rad Bearings Ø30xØ37x4mm.</td>
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<tr>
<td>HC435-S</td>
<td>- 2 x Thrust Bearings Ø5xØ10x4mm.</td>
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<tr>
<td>HC438-S</td>
<td>- 2 x Thrust Bearings Ø10xØ18x5.5mm.</td>
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<td>HC442-S</td>
<td>- 1 x One Way Bearings Ø10xØ14x12mm.</td>
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<td>HA001-S</td>
<td>- 1 x Foam Blade Holder</td>
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<td>HA002-S</td>
<td>- 2 x Hex Wrenches 2.5.</td>
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<td>HA006-S</td>
<td>- 1 x Canopy Mousse.</td>
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<td>HA010-S</td>
<td>- 2 x Cable Pass.</td>
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</table>
**UPGRADES and ACCESSORIES**

**New Heavy-Duty Tail Pulley 26T**  
[H0103-S]  
- 1 x New Heavy-Duty Tail Pulley 26T

**19T Motor Pulley (for 8mm Motor Shaft)**  
[H0126-19/26-S]  
- 1 x Motor pulley  
- 2 x Cone Point Set Screws M4x4mm.

**Aluminum 6mm Motor Mount Third Bearing Support**  
[H0143-S]  
- 1 x Motor Mount Third Bearing Support.  
- 1 x Flanged bearing Ø6 x Ø13 x 5.  
- 2 x Socket Head Cap M3x8mm.

**Aluminum ESC Heat Sink - YGE 160A**  
[H0165-S]  
- 1 x Aluminum ESC Heat Sink.  
- 4 x Socket Head Cap M3x6mm.  
- 4 x Cup Point Set Screws M3x20mm.  
- 12 x Washer Ø3,3 x Ø6 x 0,5mm.  
- 4 x Metric hex locknut Nuts M3 H4.

**Aluminum Cooling Motor Mount**  
[H0316-S]  
- 1 x Aluminum Third Bearing Support.  
- 1 x Aluminum Cooling Motor Mount.  
- 1 x Flanged Bearing Ø6 x Ø13 x 9mm.  
- 2 x Socket Head Cap Screw M3x8mm.  
- 2 x Aluminum Finishing Washers.  
- 2 x Socket Head Cap Screw M3x10mm.  
- 2 x Spring 5.8 / 0.3 / LL 9.  
- 2 x Spring 3 / 0.5 / LL 12.

**Strong Main Gear G700**  
[H0320-S]  
- 1 x Strong Main Gear (Set).  
- 1 x Pinion (Set).

**SAB HELI DIVISION Futaba Servo Horn**  
[HA050]  
- 1 x Plastic Servo Horn.

**SAB HELI DIVISION JR Servo Horn**  
[HA051]  
- 1 x JR Servo Horn.

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

**SAB HELI DIVISION Black Polo Shirt**  
[HM027-S-M-L-XL-XXL]  
- 1 x SAB HELI DIVISION Black Polo Shirt.

**SAB HELI DIVISION Black Hoodies**  
[HM029-S-M-L-XL-XXL]  
- 1 x SAB HELI DIVISION Black Hoodies.

**SAB HELI DIVISION Neck Strap**  
[HM034]  
- 1 x Neck Strap.

**SAB HELI DIVISION Decal**  
[HM035]  
- 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).