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 website www.goblin-helicopter.com for updates and other important information.

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 website at:

http://www.goblin-helicopter.com

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

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

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

SAB Heli Division

INDEX

1 – Serial Number
2 – Important Notes
3 – Components and Box
4 – Carbon frame Assembly
5 – Transmission Assembly
6 – Main rotor
7 – Assembling The Modules
8 – Installation of Swashplate Servos
9 – Installation of The ESC
10 – Installation of Flybarless Unit and RX
11 – Installation of The Motor
12 – Tail Assembly
13 – Installation of the Boom, Canopy
14 – Battery
15 – In flight
16 – Maintenance
17 – Exploded Views
18 – Spare Parts

SPECIFICATIONS

Main rotor diameter: 1728mm (with 770mm blades)
Main blade length: 720 to 770mm
Tail rotor diameter: 295mm
Tail blade length: 110mm
Main shaft diameter: 12mm
Tail shaft diameter: 6mm
Spindle diameter: 10mm

Weight including standard electronics: 4040g (excluding batteries).
Motor size: Maximum 64mm diameter, maximum height 64mm
Battery compartment: 60x58x350mm (adaptable to 75x58x350mm)
Chapter 2, Important Notes

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)
- Box xx
- Bag xx
- Tray xx

Indicates that for this assembly phase you need materials that are in box xx, bag xx, tray xx.
**ADDITIONAL COMPONENTS REQUIRED**

*Electric Motor: 400 - 520Kv  
  Maximum diameter 64mm,  
  Maximum height 64mm,  
  Pinion shaft diameter 6/8mm

*Speed controller: minimum 120A , suggest 160A

*Batteries: 12S-5500 mAh, 14S-4500/5000 mAh  
*1 flybarless 3 axis control unit  
*Radio power system, if not integrated with the ESC  
*3 cyclic servos  
*1 tail rotor servo  
*6 channel radio control system on 2.4 GHz

(See configuration examples on page 21)

**TOOLS, LUBRICANTS, ADHESIVES**

*Generic pliers

*Hexagonal driver, size 1.5,2,2.5,3,4mm

*4mm T-Wrench

*5.5mm Socket wrench (for M3 nuts)

*8mm Hex fork wrench (for M5 nuts)

*Medium threadlocker (eg. Loctite 243)

*Strong retaining compound (eg. Loctite 648)

*Spray lubricant (eg. Try-Flow Oil)

*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: Landing gear support

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

- Flat Head Cap Screw M2.5x5mm (x4)
- Frame Spacer (H0003-S)
- Flat Head Cap Screw M2.5x5mm (HC128-S)
- Frame Spacer (H0003-S)

Note:
- Socket Head Cap Screw M3x10mm (x2)
- Finishing Washer M3 (x1)
- Main Frame 1 (H0354-S)
- ESC Support Assembly
- Canopy Positioners (H0159-S)
- Cable Pass (HA010-S)
- Finishing Washer M3 (H0007-S)
- Socket Head Cap Screw M3x10mm (HC056-S)

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Note:
Choose the position for the batteries
Normally is used the average position

Bottom holes: 75mm max height batteries.
Middle holes: 70mm max height batteries.
Top holes: 60mm max height batteries.
5 - Transmission Assembly
**Note 1:** When you tighten the collar (H0121-S) on the main shaft, ensure there is no axial play. Push down the main shaft while pulling up the locking collar. Tighten the screw M4x22 at this time.

**Note 2:**

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

It is very important to lubricate these two elements with a lubricant (Tri-Flow Synthetic grease).
Chapter 5, Transmission Assembly

**Tail Belt Idler Assembly (H0174-S)**

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

**Belt Tensioner Arm Assembly (H0174-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 M3x40mm**

- ...x1

**Flanged Bearing Ø5xØ9x3mm**

- ...x2

**Flanged Bearing Ø3xØ7x3mm**

- ...x2

**Washer Ø3xØ4x0.5mm**

- ...x1

**Main Structure Assembly 3**

- Washer Ø3.2xØ6x0.5mm (HC180-S)
- Washer Ø3xØ4x0.5mm (HC176-S)

**Tail Belt Idler Assembly (H0174-S)**

- Belt Tensioner Support (H0174-S)
- Spring de 8 / df0.5 / LL8 (HC315-S)
- Belt Tensioner Arm Assembly (H0174-S)
- Washer Ø3.2xØ6x0.5mm (HC180-S)
- Washer Ø3xØ4x0.5mm (HC176-S)
- Socket Head Cap Screw M3x40mm (HC091-S)
- Socket Head Cap Screw M3x12mm (HC062-S)

**Note:**

Position without preload. Insert the screw in the hole through the aluminum support as in the picture.
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
<table>
<thead>
<tr>
<th>Component</th>
<th>Notes</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniball Radius Arm... x2 Assembly</td>
<td>- Flanged Bearing Φ 2.5x Φ 6x 2.5mm (HC400-S)</td>
<td>x2</td>
</tr>
<tr>
<td>Radius Arm ... x2 Assembly</td>
<td>- Flanged Bearing Φ 3x Φ 7x 3mm (HC402-S)</td>
<td>x2</td>
</tr>
<tr>
<td>Center Hub Assembly</td>
<td>- Vaseline</td>
<td></td>
</tr>
<tr>
<td>Swashplate Assembly</td>
<td>- HC232-S</td>
<td></td>
</tr>
<tr>
<td>Main Blade Grip Assembly...x2</td>
<td>- Bearing Φ 10x Φ 19x 5mm (HC422-S)</td>
<td>x2</td>
</tr>
<tr>
<td>Linkage Rod Assembly</td>
<td>- Approx. 75mm</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- The main rotor is assembled provisionally without loctite. Need to add Loctite 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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Chapter 7, Assembling The Modules

Socket Head Cap Screw M3x8mm
- x6

Finishing Washer M3
- x6

Metric Hex Nylon Nut M4
- x1

Socket Head Cap Screw M3x12mm
- x2

Socket Head Cap Screw M4x24mm
- x1

Metallic Frame Assembly

Canopy Mount Base

Resin Plate Assembly

Central Group Assembly

Swashplate Assembly

Flat Head Cap Screw M3x8mm

Finishing Washer M3

Socket Head Cap Screw M3x12mm

Socket Head Cap Screw M3x8mm

Swashplate Assembly

Flat Head Cap Screw M3x8mm

Canopy Mount Base

Socket Head Cap Screw M3x8mm

Metric Hex Nylon Nut M4

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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.

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.
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 B Assembly

Approx 66 mm

Linkage Rod A Assembly

Approx 68 mm

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

Linkage Rod A Assembly

Approx 75 mm

Linkage Rod B Assembly

Approx 64 mm

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

Set Screw M2.5x40mm

Left Thread

Plastic ball link (H0066-S)

Right Thread

Plastic ball link (H0066-S)

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Fig. 5
DE-BURR THE SIDE FRAMES

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

ESC INSTALLATION

The speed controller (ESC) is installed in the front of the helicopter. Figure 1 shows the mounting area. Figure 2 shows the installation of the Kosmik ESC from Kontronik. You can also use the heat sink (H0165-S) if you wish for improved cooling (Figure 3,4,5)

Figure 6: Shows the wiring which connects the receiver and ESC (in this picture one frame has been removed). If the BEC used is combined with the ESC, it is recommended to use a dual wire connection.

Figure 7: The passage of the controller wires to the motor is highlighted.

Figure 8: Shows the installation of a 2S battery for the flight control system. Alternatively, a BEC could be placed in the same area.
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.
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:

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Pinion</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>H0175-18-S - 18T</td>
<td>Pinion = ratio 11.9:1</td>
<td></td>
</tr>
<tr>
<td>H0175-19-S - 19T</td>
<td>Pinion = ratio 11.3:1</td>
<td></td>
</tr>
<tr>
<td>H0175-20-S - 20T</td>
<td>Pinion = ratio 10.7:1</td>
<td></td>
</tr>
<tr>
<td>H0175-21-S - 21T</td>
<td>Pinion = ratio 10.2:1</td>
<td></td>
</tr>
<tr>
<td>H0175-22-S - 22T</td>
<td>Pinion = ratio 9.8:1</td>
<td></td>
</tr>
<tr>
<td>H0175-23-S - 23T</td>
<td>Pinion = ratio 9.3:1</td>
<td></td>
</tr>
<tr>
<td>H0175-24-S - 24T</td>
<td>Pinion = ratio 8.9:1</td>
<td></td>
</tr>
<tr>
<td>H0175-25-S - 25T</td>
<td>Pinion = ratio 8.6:1</td>
<td></td>
</tr>
</tbody>
</table>

Some example configurations:

**GOBLIN 770 COMPETITION CONFIGURATION**

<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>12S</td>
<td>Kontrionik Pyro 800-480</td>
<td>Edge 160 HV</td>
<td>22T</td>
<td>1950</td>
<td>± 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jive 120 HV</td>
<td>YGE 160 HV KOSMIK 160/200</td>
<td>21T</td>
<td>1950</td>
<td>± 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Edge 160 HV</td>
<td>21T</td>
<td>1950</td>
<td>± 12.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jive 120 HV</td>
<td>YGE 160 HV KOSMIK 160/200</td>
<td>20T</td>
<td>1950</td>
<td>± 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Edge 160 HV</td>
<td>20T</td>
<td>1950</td>
<td>± 12.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jive 120 HV</td>
<td>YGE 160 HV KOSMIK 160/200</td>
<td>19T</td>
<td>1950</td>
<td>± 12.5</td>
</tr>
</tbody>
</table>

**GENERAL and 3D**

<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>14S 5000 mAh</td>
<td>Kontrionik Pyro 850-40L</td>
<td>YGE 160 HV KOSMIK 160/200</td>
<td>22T/23T</td>
<td>2000/2100</td>
<td>± 12.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantum 4530-450</td>
<td>Scorpion HK 4530-450</td>
<td>YGE 160 HV KOSMIK 160/200</td>
<td>20T/21T</td>
<td>2000/2100</td>
<td>± 12.5</td>
</tr>
<tr>
<td></td>
<td>Kontrionik Pyro 800-48</td>
<td>YGE 160 HV KOSMIK 160/200</td>
<td>19T/20T</td>
<td>2000/2100</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 2000 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 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.
Tail Rotor Hub Assembly

- Thrust Bearing Ø 5x Ø 10x4mm (HC435-S)
- Oring (HC335-S)
- Tail Shaft (H0325-S)
- Vaseline

Tail Pitch Slider Assembly

- Flanged Bearing Ø 8x Ø 12x3.5mm (HC418-S)
- Spacer Ø 8.1x Ø 9.2x3.2mm
- Uniball M3x3.5 Ø 5H3 (H0065-S)
- Tail Pitch Slider 01 (H0053-S)
- Tail Pitch Slider 02 (H0053-S)
- Tail Pitch Slider 03 (H0053-S)
- Vaseline

Note: It is 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.

Tail Pitch Slider Link Assembly

- Tail Pitch Slider Link (H0261-S)
- Thrust Bearing Ø 5x Ø 10x4mm (HC411-S)
- Spacer Ø 5x Ø 9x0.75mm (H0330-S)
- Bearing Ø 5x Ø 10x4mm (HC411-S)
- Vaseline
- Tail Rotor Hub Assembly
- Tail Blade Grip Assembly

Note: S >> Left Side
Note: S >> Right Side

Bottom Head Cap Screw M4x6mm (HC096-S)

Socket Head Cap Screw M2x6mm (HC004-S)

Note: Smaller ID
Note: Larger ID

Spacer Ø 7.5x Ø 10x0.5mm (H0349-S)

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Bell Crank Lever Assembly

Bag 11, Tray 2

- Bell Crank Base (H0058-S)
- Washer Ø3xØ4x0.5mm
- Spacer Ø3 x Ø4 x 9.6mm (H0060 (H0059-S))
- Socket Head Cap Screw M2x8mm (H0008-S)
- Bell Crank Lever (H0059-S)
- Uniball Spacer H0031 (H0064-S)
- Uniball M2 x 5H6 (H0064-S)
- Socket Head Cap Screw M3x22mm (H0056-S)

Tail Side Plate Assembly

Bag 12, Tray 2

- Tail Upper Case (H0360-S)
- Tail Case Spacer (H0061-S)
- Tail Side Plate (H0359-S)
- Socket Head Cap Screw M3x8mm (H0050-S)
- Flanged Bearing Ø6xØ13x5mm (HC414-S)
- Socket Head Cap Screw M2.5x8mm (HC020-S)
- Bell Crank Lever Assembly
- Flanged Bearing Ø6xØ13x5mm (HC414-S)
- Socket Head Cap Screw M2.5x8mm (HC050-S)

Tail System Assembly

Box 6, Bag 12, Tray 3

- Socket Head Cap Screw M3x8mm (H0050-S)
- Flanged Bearing Ø6xØ13x5mm (HC414-S)
- Yellow Vertical Fin (H0046-S)
- Belt Gates 2160-3GT-06 (HC325-S)
- Set Screw M4x6mm (HC153-S)
- 25T Pulley (H0155-S)
- Bell Crank Lever Assembly

Set Screw M4x6
- ... x1
- Socket Head Cap Screw M3x8mm
- ... x4

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

Attaching H0041 to the boom:
Locking Element Tail Assembly .... X 2
Already Assembled

Locking Element Tail (H0041-S)

Metric Hex Nylon Nut M3
(HC206-S)

Metric Hex Nylon Nut M3
...x4

Double Sided Tape
Finishing Washer M3

Socket Head Cap Screw M3x12mm

Socket Head Cap Screw M3x12mm

Socket Head Cap Screw M3x12mm

Finishing Washer M3

Finishing Washer M3

Finishing Washer M3

Threaded Rod M2.5x40mm (HC242-S)

Threaded Rod M2.5x40mm (HC242-S)

Plastic Ball Link (H0066-S)

Plastic Ball Link (H0066-S)

Carbon Rod Ø4xØ2.5x752mm (HC238-S)

CA Glue

CA Glue

Note:

12mm

3mm

Approx 803mm

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 Loctite 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**
- ...x1

**Finishing Washer M3**
- ...x1

**Socket Head Cap Screw M3x12mm**
- ...x2

**Nylon Screws M8x20mm**
- ...x2

Note: Between the boom and the aluminum plate, there is a space of around 0.75mm. Look the picture.
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 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.

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.
BATTERIES

The battery tray system in the Goblin 700 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.

---

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7
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 2000 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, 1500/1600 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 (< 1900 rpm), for best results we recommend changing the tail pulley for a smaller one to increase tail rotor rpm. In this way, you will have extremely precise tail control even at low RPM. This pulley is available in the upgrade list [H0154-S]
HPS HEAD

- The dampening system of this head allows for a wide range of head speeds to be used without sacrificing safety.

- The dampers are composed of an o-ring and a technopolymer damper that defines the maximum possible movement of the spindle.

- The model response with change based on the preload, less preload (less shims) will allow for a softer feel and lower head speed, a high preload is used for hard 3D flight.

- To increase the preload, you can add an additional 0.2mm shim on each side, to decrease the preload, you can remove a 0.2mm shim on each side. It is important that the blade grips do not have the axial play so you must always keep the 1mm shim on each side regardless.

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 Tri-Flow Synthetic grease every 20 flights.

*Check the screws that are highlighted in the following images frequently, make sure you remain tight (fig.2 and fig.3).

*To ensure safety you should do a general inspection of the helicopter after each flight. You should check:

* The maintenance of proper belt tension.
* The proper isolation of wires from the carbon and aluminum parts.
* That all screws remain tight.
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Chapter 17, Exploded view, Carbon Frame
### Head System

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Chapter 17, Exploded view, Head System

Swashplate Set - H0023

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<td>Nylon Screw M5x20mm</td>
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<td>H0002-S</td>
<td>- 1 x CF Battery Tray. - 6 x Flat Head Cap Screws M2.5x5mm.</td>
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<tr>
<td>Frame Spacer</td>
<td>H0003-S</td>
<td>- 3 x Frame Spacers.</td>
</tr>
<tr>
<td>Swashplate</td>
<td>H0023-S</td>
<td>- 1 x Swashplate Assembly. - 2 x Bearings 30xØ37x4mm. - 4 x Uniballs M3x4 Ø5 H3. - 3 x Socket Head Cap Screws M2x5mm. - 4 x Socket Head Cap Screws M2x8mm. - 2 x Finishing Washers M3. - 10 x Finishing Washers M3.</td>
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<tr>
<td>Servo Support</td>
<td>H0010-S</td>
<td>- 1 x Servo Support.</td>
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<tr>
<td>Column</td>
<td>H0018-S</td>
<td>- 4 x Columns.</td>
</tr>
<tr>
<td>Locking Element Tail</td>
<td>H0041-S</td>
<td>- 2 x Locking Element Tails. - 4 x Metric Hex Nylon Nuts M3. - 2 x Double Sided Tapes.</td>
</tr>
<tr>
<td>Bearing Support</td>
<td>H0024-S</td>
<td>- 1 x Bearing Support. - 1 x Bearing Ø12xØ24x6mm. - 3 x Flat Head Cap Screws M2.5x5mm.</td>
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<tr>
<td>Safety Lock Tail Boom</td>
<td>H0038-S</td>
<td>- 1 x Safety Lock Tail Boom. - 1 x Finishing Washer M3. - 1 x Socket Head Cap Screw M3x8mm.</td>
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<tr>
<td>Tail Servo Lock</td>
<td>H0040-S</td>
<td>- 2 x Tail Servo Locks. - 2 x Servo Spacers. - 4 x Socket Head Cap Screws M2.5x12mm. - 2 x Finishing Washers M3.</td>
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<tr>
<td>Spacer Flybarless</td>
<td>H0043-S</td>
<td>- 1 x Spacer Flybarless. - 1 x Servo Cap Screws M3x8mm. - 5 x Socket Head Cap Screws M3x6mm.</td>
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<tr>
<td>Linkage Tail Support</td>
<td>H0045-S</td>
<td>- 1 x Linkage Tail Support. - 2 x Socket Head Cap Screws M2.5x8mm.</td>
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<tr>
<td>Yellow Vertical Fin</td>
<td>H0046-S</td>
<td>- 1 x Yellow Vertical Fin. - 2 x Socket Head Cap Screws M3x12mm. - 2 x Finishing Washers M3.</td>
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<tr>
<td>Antenna Guide</td>
<td>H0050-S</td>
<td>- 2 x Antenna Guide. - 2 x Button Head Cap Screws M3x4mm.</td>
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<tr>
<td>Tail Pitch Slider</td>
<td>H0053-S</td>
<td>- 1 x Tail Pitch Slider 01. - 1 x Tail Pitch Slider 02. - 1 x Tail Pitch Slider 03. - 1 x Spacer Ø8xØ9x3.2mm. - 1 x Uniball M3x4 Ø5 H18. - 2 x Flanged Bearings Ø8xØ12x3.5mm</td>
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<tr>
<td>Bell Crank Base</td>
<td>H0058-S</td>
<td>- 1 x Bell Crank Base.</td>
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<tr>
<td>Bell Crank Lever</td>
<td>H0059-S</td>
<td>- 1 x Bell Crank Lever. - 1 x Bush Bell Crank. - 1 x Washer Ø3xØ4x0.5mm. - 1 x Spacer Ø3xØ4x9.6mm. - 1 x Socket Head Cap Screw M3x22mm. - 2 x Flanged Bearings Ø3xØ7x3mm.</td>
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<tr>
<td>Tail Case Spacer</td>
<td>H0061-S</td>
<td>- 2 x Tail Case Spacers. - 4 x Socket Head Cap Screws M3x8mm.</td>
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<tr>
<td>Uniball M3x4 Ø5 H18</td>
<td>H0063-S</td>
<td>- 1 x Uniball M3x4 Ø5 H18.</td>
</tr>
</tbody>
</table>
Chapter 18, Spare Parts

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

**Quick Release Canopy Mount**
- 2 x Quick Release Canopy Assembly.
- 2 x Flat Head Socket Cap M3x8mm.
- 2 x Canopy Grommets.

**68T Main Gear**
- 1 x 68T Main Gear.
- 1 x Socket Head Cap Screw M4x25mm.
- 1 x Metric Hex Nylon Nut M4 H5.
- 1 x 19T Drive Pinion.
- 1 x Socket Head Cap Screw Shouldered M3x22mm.
- 1 x Metric Hex Nylon Nut M3 H4.

**Steel Tail Shaft**
- 1 x Steel Tail Shaft Assembly.
- 1 x Tail O ring Damper.

**Aluminum Tail Blade Grip**
- 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 M2x5mm.
- 2 x Washer Ø5xØ8.9x0,75mm.
- 2 x Washer Ø7.5xØ10x0,5mm.

**Tail Spide Shaft**
- 1 x Tail Spide Shaft.
- 2 x Button Head Socket Cap M4x6mm.

**Spacer Set For Tail Rotor**
- 2 x Washer Ø5xØ8.9x0,75mm.
- 2 x Washer Ø7.5xØ10x0,5mm.
- 2 x Tail O ring Damper.

**Landing Gear Plastic Support G700**
- 2 x Landing Gear Plastic Support.
- 2 x Yellow Landing Gear.
- 4 x Finishing Washer.
- 4 x Socket Head Cap Screw M3x10.
- 4 x Metric Head Nylon Nut M3.

**Linkage HPS V2**
- 2 x Linkage HPS.
- 4 x Plastic Ball Link.
- 2 x Linkage Rod.

**Main Frame**
- 1 x Main Frame.

**Tail Boom Support**
- 1 x Tail Boom Support.
- 1 x Nylon screw M8x20mm.
- 1 x Flat Head Socket Cap M3x8mm.

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

**Tail Upper Case**
- 1 x Tail Upper Case.
- 4 x Socket Head Cap Screws M3x8mm.

**Yellow Tail Boom**
- 1 x Yellow Tail Boom.
- 2 x Locking Element Tails.
- 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/Green**
- 1 x Canopy Yellow/Green.
- 2 x Canopy Grommet.
- 1 x Canopy mousse.
- 1 x Canopy Edge Protection.

**Canopy Yellow/Orange**
- 1 x Canopy Yellow/Orange.
- 2 x Canopy Grommet.
- 1 x Canopy mousse.
- 1 x Canopy Edge Protection.

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

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Chapter 18, Spare Parts

- 10 x Metric Hex Nylon Nuts M2.5H3.5.
- 10 x Metric Hex Nylon Nuts M3H4.
- 10 x Metric Hex Nylon Nuts M4H5.
- 5 x Metric Hex Nylon Nuts M5H6.5.

- 5 x Shims Ø10xØ16x1mm.
- 5 x Shims Ø10xØ16x0.2mm.

- 1 x Motor Belt 240-3MGT 19mm.
- 2 x Spring 6x Ø/df 0.5 / LL 8.
- 2 x Spring 5x Ø/df 0.3 / LL 9.
- 2 x Spring 3x Ø/df 0.5 / LL 12.

- 4 x Flanged Bearings Ø5x Ø/2x 3mm.
- 4 x Flanged Bearings Ø5x Ø/10x4mm.

- 2 x Rad Bearings Ø6x Ø/37x4mm.
- 2 x Thrust Bearings Ø5x Ø/10x4mm.
- 2 x Thrust Bearings Ø10x Ø/18x5.5mm.

- 4 x One Way Bearings Ø10x Ø/14x12mm.
- 1 x Foam Blade Holder

- 2 x Hex Wrenches 2.5.
- 1 x Canopy Mousse.
- 2 x Cable Pass.
UPGRADES and ACCESSORIES

New Heavy-Duty Tail Pulley 24T
[H0154-S]  
1 x New Heavy-Duty Tail Pulley 24T

Aluminum ESC Heat Sink
[H0165-S]  
- 1 x Aluminum ESC Heat Sink.
- 4 x Socket Head Cap M3x6mm.
- 4 x Cup Point Set Screws M3x20mm.
- 12 x Washer Ø3.3xØ6x0.5mm.
- 4 x Metric hex locknut Nuts M3H4.

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 5mm.
- 2 x Socket Head Cap Screw M3x8mm.
- 2 x Aluminum Finishing Washers.
- 2 x Socket Head Cap Screw M3x10mm.
- 2 x Spring 3 / 0.5 / LL 12.

SAB HELIDIVISION Futaba Servo Horn
[HA050]  
- 1 x Plastic Servo Horn.
- 4 x JR Servo Horn.

SAB HELIDIVISION JR Servo Horn
[HA059]  

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

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

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

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

SAB HELI DIVISION Decal
[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 ).