CHAOS Helicopter 600 ESP

We thank you for purchasing R.C. Aerodyne products!
We incorporate the finest machining and technology available to bring you enjoyable and worry free flight. Please read this manual carefully and keep it for future reference for maintenance, adjustment and parts.
CHAOS Helicopters 600 ESP

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1. INTRODUCTION

Thank you for purchasing R.C. Aerodyne products!
The Model (Insert) is a full featured R/C Helicopter fully capable of all forms of rotary flight. Please read this manual carefully prior to assembling the unit. Be sure to pay close attention to all safety precautions, warnings and recommendations contained in this manual. Failure to follow the appropriate warnings can result in serious injury.

THE MEANING OF SYMBOLS

<table>
<thead>
<tr>
<th>WARNING</th>
<th>Failure to follow the warnings may result in damage to your unit as well as serious injury to yourself and others.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTION</td>
<td>Failure to follow the warnings may result in damage to your unit as well as serious danger to yourself and others.</td>
</tr>
<tr>
<td>FORBIDDEN</td>
<td>Never attempt this under any circumstances!</td>
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IMPORTANT NOTES

R.C. Helicopters are not to be treated as toys. Although every effort is made to provide a superior and dependable product, improper use can cause serious injury and death. Be sure to read this manual carefully, paying close attention to all warnings, precautions and recommendations. You should insure your personal safety and that of others when operating R.C. Helicopters.

R.C. Aerodyne and the manufacturer assume no liability for the assembly, maintenance and operation of this product.
This product is intended for use only by adults having extensive experience flying remote controlled helicopters. You should fly this product only at legal flying fields, away from homes, other people and traffic.

We strongly recommend that you obtain liability insurance for this product. One source for such insurance is thru (Check with Cliff. There is a flying assoc. which provides this.)

Helicopter flying requires a degree of skill. Accidents, modifications or damage during flight are not covered by any warranty and are solely the pilots responsibility. Parts and service can, of course, be obtained thru R.C. Aerodyne or our authorized service centers.

When flying for the first time or if you are an inexperienced flyer, we strongly recommend you obtain assistance from an experienced pilot. Finding an experienced person to help you in assembly, set up and flying is the best way to insure a satisfying and safe flying experience.

2. SAFETY NOTES

<table>
<thead>
<tr>
<th>CAUTION</th>
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You are responsible for your actions!
Never fly this product near populated areas, homes, schools or near crowds. This product is not a toy and can cause serious injury or death. We recommend flying only on approved, legal flying fields. It is strongly recommended that you purchase liability insurance. Such insurance is available thru (See Cliff).
LOCATE AN APPROPRIATE LOCATION

Rotating blades and high speed combine to make R.C. Helicopter flying dangerous. You must take every precaution to insure your safety and the safety of those around you.
- Fly only on legal flying fields.
- Do not fly near buildings.
- Do not fly near crowds.
- Stay away from power lines.
- Fly only in areas without obstacles.
- Never fly near, buzz or approach observers or others.

PREVENT MOISTURE

R/C Models container many electrical parts which can be affected by moisture and other contaminants. Never fly your units in rain, snow, darkness or any other type of adverse conditions. Moisture in any form can cause failures in motors, servors, transmitters, receivers and other components which can cause a loss of control, crash and damage to your helicopter as well as injury to others or even death.

PROPER OPERATION

Please use only parts supplied thru R.C. Aerodyne so insure proper operation and safety.

OBTAIN THE ASSISTANCE OF AN EXPERIENCED PILOT

If you are not an experienced pilot, find one to fly with!
Before you begin, be sure that no one else is operating in the area on the same frequency. Frequency interference can cause you or others to loose control of the aircraft resulting in crashes and damage to your craft as well as injury or death.

SAFE OPERATION

Never operate this helicopter if you are tired, taking medications which may impair your reactions or ability or under the influence of alcohol or drugs.

ALWAYS BE AWARE OF THE ROTATING BLADES

Rotating blades of the helicopter move at a high rate of speed. They are very dangerous and extreme care must be taken when operating a helicopter. Be aware of your surrounding and take care not be fly near yourself or others. Maintain a safe distance between yourself, others, building, power lines and other obstructions and your helicopter. Once you have landed, you should immediately turn off your transmitter to avoid causing the blades to rotate accidentally.

KEEP AWAY FROM HEAT

R.C. Helicopters are affected by heat and cold.
Store your Helicopter at a stable room temperature to avoid deformation. Never place your helicopter near a heat source.
SAFETY CHECK BEFORE FLYING

CAREFULLY INSPECT BEFORE REAL FLIGHT

Please perform the following preflight examination before each flight:
Insure that there is no one in the flight area using the same frequency.
Insure that batteries are fully charged and ready for flight.
Prior to powering up your transmitter, be sure that the throttle switch is in the lowest position and the "Idle" switch is off.
On/Off Procedures:
   On: Turn the transmitter on first, then turn on the receiver.
   Off: First turn off the receiver, then turn off the transmitter.
Failure to follow this procedure could be hazardous!
Prior to each flight insure that all moving parts are operating smoothly, that the servos are operating properly and that there are no damaged, chipped or broken gears.
Check for any loose connections, screws, nuts and bolts. Do not fly this helicopter if there are any compromised or damaged parts of loose connections. Secure all connections and replace any damaged parts prior to flight.
Ball links should be check for excess play and should be periodically replaced as needed. The quality and stability of your flight will be compromised if there is too much play.
Helicopters vibrate. Check all battery connections to insure they have not been loosened in previous flight.

POST FLIGHT INSPECTION

1. Inspect the model thoroughly to insure no parts have come loose or become damaged during the flight and landing. Replace damaged parts and tighten loose screws before flying again.
2. Clean the helicopter body.
3. Lubricate all moving parts to ensure smooth operation for the next flying.
4. Replace any worn ball links and damaged bearings.
5. Store the model in a cool, dry place. Avoid putting it under direct sunlight or near a source of heat.
Following these simple rules will allow you to enjoy the thrill of model helicopter flying for many years.

CAUTION

When the model has crashed, inspect the flybar, rotor shaft and the blade spindle to make sure they are not bent. If any item is damaged, it must be replaced with a new part to ensure safe operation. Do not glue any broken or damaged plastic parts. Do not repair broken rotor blades. It is very important to inspect the motor, speed control and the battery.

Always inspect the following items:
Gears, Ball links, Link rods, Bearings, Main shaft, Flybar, Spindle, Tail boom and support, Fins, Tail rotor shaft, Belt, Main blades, Tail blades, the Motor, the Speed control and the Battery.
### EQUIPMENT REQUIRED FOR ASSEMBLY

**RADIO TRANSMITTER AND ELECTRONIC EQUIPMENT REQUIRED FOR ASSEMBLY**

<table>
<thead>
<tr>
<th>Image</th>
<th>Description</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td><img src="image1" alt="Transmitter" /></td>
<td>Transmitter (6-channel or more, helicopter system)</td>
<td>1pc</td>
</tr>
<tr>
<td><img src="image2" alt="Receiver" /></td>
<td>Receiver (6-channel or more)</td>
<td>1pc</td>
</tr>
<tr>
<td><img src="image3" alt="Battery" /></td>
<td>11.1V 3S 2200-2500mAh Li-Po Battery</td>
<td>1pc</td>
</tr>
<tr>
<td><img src="image4" alt="Battery" /></td>
<td>14.8V 4S 2200-2500mAh Li-Po Battery</td>
<td>1pc</td>
</tr>
<tr>
<td><img src="image5" alt="Dial Pitch Gauge" /></td>
<td>Dial Pitch Gauge</td>
<td>1pc</td>
</tr>
</tbody>
</table>

**ADDITIONAL TOOLS REQUIRED FOR ASSEMBLY**

<table>
<thead>
<tr>
<th>Image</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image6" alt="Scissors" /></td>
<td>Scissors</td>
</tr>
<tr>
<td><img src="image7" alt="Cutter Knife" /></td>
<td>Cutter Knife</td>
</tr>
<tr>
<td><img src="image8" alt="Diagonal Cutting Pliers" /></td>
<td>Diagonal Cutting Pliers</td>
</tr>
<tr>
<td><img src="image9" alt="Needle Nose Pliers" /></td>
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<td><img src="image10" alt="Oil" /></td>
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<tr>
<td><img src="image11" alt="CA" /></td>
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</tr>
<tr>
<td><img src="image12" alt="Hexagon Screw Driver" /></td>
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</tr>
<tr>
<td><img src="image13" alt="Philips Screw Driver" /></td>
<td>Philips Screw Driver</td>
</tr>
</tbody>
</table>

*Notes: 2.5mm/2mm/1.5mm/1.3mm, PH1 (± 3.0mm)*
**ASSEMBLY SECTION**

**Attention:**
When securing metal parts, apply a small amount of thread lock.

### H-1

**CAUTION**
Apply grease on thrust bearing.

(OUT) Smaller ID

(LIN) Larger ID

Thrust bearing

Apply grease on thrust bearing.

*When tightening a linkage ball to plastic parts, apply a small amount of CA glue. Tighten firmly but carefully. Avoid overtightening as this may cause the threads to strip.*

### H-2

- **Metall main rotor housing**
- **Feathering shaft** Ø9×Ø31.5×3.2mm
- **Apply grease**
- **Damper rubber** Ø7×Ø3×6.5±mm
- **Spacer(Copper)** Ø9×Ø11.5×1.3mm
- **Pin** Ø2×5.2mm
- **Damper rubber-gray 70° is suitable to general flight for beginners. Damper rubber-black 80° is suitable to 3D flight for advanced users.**
- **Washer** Ø4×Ø12×1.1mm
- **Socket screw** M4×10mm
Attention:
When securing metal parts, apply a small amount of thread lock.

H-3

Bearing MR74ZZ
Ø4=Ø7=2.9mm

Already assembled by Factory.

Bearing MR83ZZ
Ø3xØ1=2mm

M3 collar screw
M3x=2.9mm

Metal flybar seesaw holder

H-4

Socket button head screw
M3=12mm

Collar
Ø3xØ4=6x1.5mm

For stability in 3D flight, use this mounting position in the SF mixing arm. This is the recommended position.

Washer
Ø3xØ4=6x0.3mm

Linkage ball A(M3x4)
Ø4=7.5x6.6mm

Metal SF Mixing arm

Washer
Ø3xØ4=6x0.3mm

Socket button head screw
M3=12mm

Linkage ball B(M3x3)
Ø4=7.5x0.7mm

Washer
Ø3xØ7=2mm

Bearing 683ZZ
Ø3xØ7=2mm

H-5

Metal flybar control arm

Tighter press side
Looser press side

Flybar control rod
Ø4=7.4x3.9mm

M4 set screw
M3=3mm

Flybar control rod
Ø4=7.4x2.2mm

Socket screw
M3=5mm

M3 set screw
M3=12mm

3K flybar paddle

Assemble linkage rod (B) before assembling flybar control set.

Linkage rod (B)
Approx 39.5mm×2
**Attention!**

When securing metal parts, apply a small amount of thread lock.

---

**H-6**

- Socket collar screw M3×20mm
- M3 nut

---

**Linkage ball B (M3×3)**

- Ø4.75×9.77mm

---

**CAUTION**

Although this section if preassembled at the factory, please check to insure that all fasteners are secured with glue.

- Linkage ball B (M3×3)
  - Ø4.75×9.77mm
- Bearing 683ZZ
  - Ø3×Ø7×3mm
- Washer Ø5×Ø4.8×0.3mm
- Socket button head screw M3×12mm
- Socket screw M2×5mm
- Bearing FMR52ZZ
  - Ø2×Ø5×2.3mm
- Metal washout control arm
- Collar Ø3×Ø4.8×1.5mm
- Metal washout base
- Washer Ø3×Ø4.8×0.3mm
- Socket button head screw M3×12mm
**H-7**

Attention!

When securing metal parts, apply a small amount of thread lock.

- **Linkage rod (A)**
  - Approx 31mm x 2

- **Linkage rod (B)**
  - Approx 39.5mm x 2

- **Linkage rod (C)**
  - Approx 66mm x 2

- **Socket screw**
  - M3 x 10mm

- **Metal head stopper**

- **3K Flybar paddle**

**H-8**

- **Approx 145mm**

- **Insure that both sides are of equal length.**
Attention!

When securing metal parts, apply a small amount of thread lock.

CAUTION

Although this section if preassembled at the factory, please check to insure that all fasteners are secured with glue.

H-9

- Socket collar screw M3x28mm
- Washer Φ11.5xΦ18x0.8mm
- Main drive gear 170T
- Main gear case
- One-way bearing Φ12xΦ18x19mm
- Hex socket self tapping screw T1x7mm
- One-way bearing shaft Φ3xΦ13x44.55mm
- Autorotation tail drive gear 190T
- M3 nut

H-10

- Socket button head self tapping screw T2.5x6mm
- M3 specialty washer Φ3xΦ3x<2mm
- Socket screw M3x8mm
- Frame mounting bolt
- Socket collar screw M3x20mm
- Metal main shaft clamp ring
- Bearing 6800ZZ Φ10xΦ19x5mm
- Metal bearing block
- Canopy mounting bolt
- M3 washer Φ3xΦ8x<1mm
- Socket screw M3x10mm
- Socket button head self tapping screw T3x10mm
- Bottom bracket
Proper Main Frame Assembly
Assemble the main frame but do not fully tighten the screws. Insert the three bearings and slide the main shaft in. Place the frame so that the bottom bracket rests firmly on a level table top. A glass table top works well for this purpose. Begin tightening the screws while insure that the movement of the shaft remains smooth.
Attention!
When securing metal parts, apply a small amount of thread lock.
Attention:
When securing metal parts, apply a small amount of thread lock.

H-16

- Linkage rod (E)
  Approx 49mm × 2

- Linkage rod (F)
  Approx 70mm × 2

- 3K CF serve plate
- Servo
- Servo horn
- M2 nut
- Linkage ball A (M2 × 3.5)
  Ø4.75 × 0.18mm
- Socket button head self tapping screw
  T5 × 40mm
Attention!
When securing metal parts, apply a small amount of thread lock.

CAUTION
When tightening a linkage ball to plastic parts, apply a small amount of CA glue. Tighten firmly but carefully. Avoid over tightening as this may cause the threads to strip.

After completion of the tail rotor assembly, ensure that the rotation is completely smooth. If not, make necessary adjustments to insure smooth operation.
Tips for assembling the Torque Tube

Secure the MR 148 bearing in place with a small amount of CA glue. Avoid allowing any glue to contaminate the bearing. This may cause poor results or total binding of the bearing. When inserting the Torque Tube into the tail boom, apply a film of oil and use the provided PVC passing tube to secure the bearing holder of the torque tube into the tail boom while maintaining a square position relative to the tail boom.

Tail boom
625mm

Tube front
Ø1.97x563mm

Torque tube

Tube end
Please assemble the F linkage rods inside the servo horns to avoid any interference caused by the canopy.

CAUTION
When tightening a screw to plastic parts, please tighten it firmly, but not over tightened, or they will strip.
Attention!
When securing metal parts, apply a small amount of thread lock.

CAUTION
When tightening a screw to plastic parts, please tighten it firmly, but not over tightened, or it may cause the damage of main blade holder and result in danger.

Socket collar screw
M4×27mm

Linkage rod (D)
Approx 89.5mm×2

Lock collar
⌀16×⌀15×7mm

Main drive gear set

M3 nut

Socket collar screw
Pitch And Throttle Curve Setup Continued

Below are examples of pitch curves used both for normal flight, as well as 3D flight. If this is your first helicopter we recommend starting off with the normal pitch curve setting. Learning how to fly with the 3D pitch curve is possible, but can be more difficult at first. The numbers below the graphs represent the travel of the collective stick on the transmitter. The number next to the red dots represents the pitch setting at the given stick position.

![Normal Pitch Curve](image1)
![3D Pitch Curve (Idle Up 1 And Or Idle Up 2)](image2)

Below are examples of throttle curves for both normal flight, as well as 3D flight. If this is your first helicopter we recommend you start off learning how to fly with the normal throttle curve setting. The 3D throttle curve is for more advanced aerobatic flight. The percentage values represent the percentage of throttle at the given stick position. These numbers may need to be adjusted after your first flights to get the desired head speed.

![Normal Throttle Curve](image3)
![3D Throttle Curve (Idle Up 1 And Or Idle Up 2)](image4)
Final Preflight Check List

Once all assemblies have been completed, please review the following suggestions before attempting initial flights.

1. Review the instruction manual and confirm that all assembly steps have been completed thoroughly and correctly.

2. Check to make sure all servos are operating smoothly and in the correct directions. Also verify that there is no binding in the control rods.

3. Verify that every servo horn has been properly secured with a servo horn mounting screw.

4. Check to insure all screws have been completely tightened and secured using blue threadlock where indicated.

5. Verify that the gyro is functioning properly and is compensating in the correct direction.

6. Verify that the electronic speed control has been properly setup according to the manufacturers instructions. Verify that the throttle settings are set correctly.

7. Make sure none of the servo wires can chafe on the edges of the carbon frames. Also verify that the servo wires cannot come into contact with the electric motor in flight.

8. Make sure the transmitter battery and flight pack battery have been fully charged. Refer to your radio system instructions for charging details. Also refer to the flight battery manufacturers charging instructions.

Making Blade Tracking Adjustments

Blade “tracking” is an adjustment to the main rotor blade pitch that must be accomplished during the initial flights.

Although the blade pitch angle may appear to be the same when checked with a pitch gauge, it is still possible for the blades to run “out of track” (one separate planes) during the first flight making adjustment necessary. Main rotor blades that are out of track can cause vibration, instability, and a loss of power due to additional drag.

Care needs to be taken to make sure adjustments are made safely. If at all possible have a friend view the main rotor disk (spinning rotor blades) at eye level from a safe distance (approximately 15 to 20 feet). Increase the blade speed to just before lift off. Observe which blade appears to be lower than the other. Increase the pitch of the low blade one turn of the ball link at a time until each blade runs in track with one another (on the same plane). If a friend is not available we suggest great care be taken while making adjustments.

In the diagrams on the following page we will show an illustration of what to look for. We will also cover marking one of the blades for making adjustments, as well as which push rod to use for making adjustments.
After First Flights And Regular Maintenance

After your first flights we highly recommend you look over the entire model. Below is a list of things to check after the first flights. This list should also become part of a regular pre-flight check up. All model aircraft require regular maintenance to fly safely and reliably. It is the owner's responsibility to properly check over and maintain this model helicopter.

1. Check all screws and fasteners to make sure they are still present and tight. We suggest you do this every time after the first 5 or 6 flights, and on a regular basis thereafter.

2. Check all wires and radio gear for chafing or components rubbing against one another. Wires chafing can cause a serious radio failure.

3. Check all gears to make sure they are still turning smoothly, and that the gear mesh on all gears has not changed.

4. Check all ball links for binding and or excessive play. Replace or size any links requiring attention.

5. Check all shafts for binding. Lubricate shafts with a light oil.

6. Verify every servo horn is secured with a servo horn mounting screw.

7. Verify that gyro tape is still secure and not splitting apart.

8. Periodical check rubber dampers in rotor head for excessive wear or play. Replace if needed.

9. Check servos to make sure they are still tight in frames and not moving.
Specifications & Equipment:

Length: 109mm (4.30in)
Height: 100mm (3.94in)
Main Rotor Diameter: 130mm (5.12in)
Tail Rotor Diameter: 200mm (7.87in)
Motor Pinion Gear: 14T (15T optional)
Main Drive Gear: 10T
Aurora Tail Drive Gear: 10T
Tail Drive Gear: 40T
Weight (Without Power System): 2450g (5.41lb)
Flying Weight: Approx. 340g (0.75lb)