KNIGHT 3D
Top 3D Equipment
Instruction Manual

* Hardened hollow main shaft.
* Dual pin tail rotor pitch system
* Thrust bearings built in tail grips.
* CCPM swash controls
* Quick to build
* Hardcore 3D out of box
* Fully Ball-Raced.
* +/-12.5° collective pitch range for extreme 3D
* Extra tough frame design.
* Vibration isolation engine mount.
* High efficiency direct belt drive system.
* High CG design.
* Push-pull control.

Gear Ratio: 1:8.7:4.8
Blade Length: 600–620mm
Engine: 50 size
Take-off Weight (no fuel): 3.3kg
Fuel Tank Capacity: 400cc

* 加硬空心主轴
* 两点支撑尾螺距机构
* 尾桨夹合压力轴承
* CCPM 控制系统，反应更快
* 拆装维修容易
* 无需升级即具备全面3D飞行能力
* 全方位轴承润滑
* +/-12.5°大桨螺距范围
* 超强主架结构
* 独创避震引擎架
* 高效传动系统
* 高重心设计
* 双推拉控制系统

As we continue to improve our products. This manual may not reflect all recent product amendments. Please refer to the received product and check our website: www.compassmodel.com

由于产品不断更新,此说明书或有错漏,请参照实物及我公司网页: www.compassmodel.com
不便之处,敬请原谅.
Thank you for choosing the Knight 3D and welcome to Compass Model. The Knight 3D has been carefully designed to offer outstanding flight performance and includes many innovative features along with proven components to provide you with a model which is accurate, durable and agile. The 3D was developed with input from leading pilots to meet the requirements of the most demanding aerobatic flight styles, both now and in the future. The control system incorporates a closed loop push-pull system for all swash plate linkages and optimum CCPM geometry to ensure unrivalled control accuracy and rapid head response. Similarly, the frame lay out has been designed to create an extraordinarily rigid platform which is both durable and further improves control accuracy. This compact layout features light weight, raised centre of gravity and unique engine isolation mounting.

Please read the complete manual before assembly, which has been designed to enable you to get the best from your model - please take careful note of all precautions and assembly tips. Please also keep the manual as a reference for part numbers and reassembly following maintenance.

The Meaning of Symbols 标志含义

- **Caution**
  - Mishandling due to failure to follow these instructions may result in damage, personal injury or danger.

- **Warning**
  - Blue Thread lock should be applied.

Warning 重要声明

**This radio controlled helicopter model is not a toy.** It is a sophisticated piece of equipment for hobby use only. Improper operation or assembly of this product can cause serious injury or death for both operator and spectators. This product is not recommended for use by children.

Manufacturer and Sellers assume no responsibility for using and operating this product. The customer must take full responsibility for the safe operation of this product.

- Mishandling due to failure to follow these instructions may result in damage, personal injury or danger.
- Blue Thread lock should be applied.

AMA INFORMATION

We strongly encourage all prospective and current R/C aircraft pilots to join the Academy of Model Aeronautics. The AMA is a non-profit organization that provides services to model aircraft pilots. As an AMA member, you will receive a monthly magazine entitled Model Aviation, as well as a liability insurance plan to cover against possible accident or injury. All AMA charter aircraft clubs require individuals to hold a current AMA sporting license prior to operation of their models. For further information, you can contact the AMA at:

**Academy of Model Aeronautics**
5151 East Memorial Drive
Muncie, IN 47302

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Safety Notes 安全注意事项

- **Caution**
  - Operate in safe areas.

Operate in safe areas.

Do not fly r/c helicopter model near buildings, high voltage cables, trees or other obstacles. Do not fly r/c helicopters in poor weather such as rain, snow or fog. Do not fly r/c helicopters over crowds of people, cars or other property. Flying field should be a smooth, clean and flat field.

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Obtain assistance from experienced pilots

Certain level of skill is required to operate R/C helicopter. The Guidance provided by experienced pilots is valuable and sometimes necessary for assembly, tuning, and flights. It is also recommended that you practice with a computer based flight simulator.

Keep a safe distance when operating

During operation, the main blades and tail blades on a r/c helicopter spin at a very high rate of speed. The blades are capable of inflicting serious bodily damage or injury to yourself or others. Keep the model at a safe distance away from yourself and other people. Never take your eyes off the model whenever the blades are spinning.

Do not expose to rain or moisture

R/c helicopter models are comprised of many electrical components. Water, moisture or other contaminants can cause failure or malfunction of those components, and result in crashes or accidents.

Keep Away From Heat

R/c Helicopters are made up various forms of plastic. Extreme heat can introduce damage or deformation of those plastic parts. Do not store the model near any source of heat such as an oven or heater. Do not store in a car under severe insolation.

Frequency Check

Make sure there is no same frequency been used in the operation area. Frequency interference can cause crash and even serious personal injury.

Proper Maintenance

Only use genuine parts to replace or repair this model. Always check if there is any damage or looseness of parts on the model before and after any flights. Replace worn or damaged parts before the flight.

Operation under good condition

Flying a r/c helicopter requires good mental attention. Do not fly when you are tired, sick or under the influence of alcohol. Operation under bad mental or physical condition may cause danger to you or others.

Keep this product away from children

R/C helicopters are not toys. It must not be used without adult supervision.
Necessary Items Not Included In this Package

In order to operate this model, you need to purchase the following items which are not included in the package.

1. Use only GLOW fuel for model engines.
   *Do not use gasoline or kerosene.
   *GLOW fuel is highly flammable and explosive, always use with care!
2. Always keep the fuel and empty fuel cans away from children.
3. Never refuel before the engine has cooled down.
4. Be careful not to drink or allow the fuel in contact with eyes.

Main Rotor Blades
主旋翼大桨

Fuel Pump
油泵

Starte Shaft
启动头

Fuel Filter
滤油器

Plug Heater
加热器

Loctite
胶水

Grease
润滑脂

Engine Starter
起动电机

Battery for Engine Starter
蓄电池

Instant Glue
快干胶水

六角扳手（1.5mm，2mm，2.5mm，3mm）
Hexagon wrench（1.5mm，2mm，2.5mm，3mm）

Cutter Knife
裁纸刀

Needle Nose Pliers
尖嘴钳

Screw Driver
螺丝刀

50级发动机
Class 50 engine

50级排气管
Muffler for 50 class

长轴Length 600mm
孔径Diameter 4mm
厚度Thickness 12mm
**Standard Equipment 标准装备**

This model is packed according to assembling steps. Do not open all the bags at one time. Open only one bag for each step of assembly when building. 本产品是按照装配步骤依次包装。不要一次打开所有包装袋。每一步骤请只打开相关的包装袋。

<table>
<thead>
<tr>
<th>Canopy</th>
<th>Frame Set</th>
<th>Rotor Head</th>
<th>Long items</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Canopy" /></td>
<td><img src="image2" alt="Frame Set" /></td>
<td><img src="image3" alt="Rotor Head" /></td>
<td><img src="image4" alt="Long items" /></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
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<td><img src="image7" alt="Step 3" /></td>
<td><img src="image8" alt="Step 4" /></td>
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<table>
<thead>
<tr>
<th>Step 5</th>
<th>Step 6</th>
<th>Step 9</th>
<th>Decal</th>
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<tbody>
<tr>
<td><img src="image9" alt="Step 5" /></td>
<td><img src="image10" alt="Step 6" /></td>
<td><img src="image11" alt="Step 9" /></td>
<td><img src="image12" alt="Decal" /></td>
</tr>
</tbody>
</table>

**ORDER OF SWITCH ON/OFF 启动/关闭顺序**

When switching the R/C system ON or OFF, always proceed in the following order:

When switching ON:
Place the throttle control stick into motor stop position.
Turn on the transmitter.
Turn on the receiver.
Start the engine.
Operate your model.

When switching OFF:
Turn off the motor (place the throttle control stick into motor stop position).
Shut down the engine
Wait until the rotor head has stopped spinning.
Turn off receiver.
Turn off transmitter.

在启动或关闭遥控系统时务必按照以下顺序进行:

当启动遥控系统时:
油门控制杆在最低位置.
打开遥控器.
打开接收机.
启动引擎.
开始飞行.

关闭遥控系统时:
油门控制杆在最低位置.
关闭引擎.
等到螺旋桨停止转动.
关闭接收机.
关闭发射机.
Assembling 组装

* Always apply blue Loctite when fixing Bolts on Metal parts. 所有金属元件上的螺丝需用蓝色厌氧胶加固。
* Always apply green Loctite where Bearings fit in Metal parts. 所有轴承位需用绿色厌氧胶加固。
* Do not over tighten Self-Tapping Bolts into plastic, otherwise plastic part could be damaged. 切勿过分收紧塑料元件上的自攻螺丝以免破坏塑料元件。

Step 1 Landing Gear Installation 脚架的装配

Step 2 Engine & Pinion Installation 引擎的装配
Step 3 Tail Boom, Tail Boom Brace & Tail Rotor Installation

Note: Apply special engine tool when fixing Fan Hub on the engine. And make sure Fan Hub Set is firmly tightened on the Engine.

Caution: Leave 0.2~0.5mm room between the top of the clutch & the clutch bell. Fail to do that could cause engine damage.

05-9001 Engine Tool 专用引擎工具

Hex Wrench 六角扳手
Crimping damages the tensile cords and will result in premature failure.

Note: The shallow gap faces forward.

To avoid any tail gear case rotation drill a hole in the boom through the guide hole on the tail gear case and fix it using a bolt.

During re-assembly check for correct orientation of the bearing block.

Apply Grease Here

Shim Here

Deep Gap

Shallow Gap

During re-assembly of the tail blade holders check that the thrust bearing is correctly installed and that the shim is installed in the correct position.
Step 4 Main Gear Installation 齿轮的装配

Check tail drive belt direction.

If the tail rotor rotates incorrectly, simply pull out the main shaft and twist the belt in the other direction. 拉出主轴，翻转皮带从新装配。
Step 5 Rotor Head, Washout & Swashplate Installation 旋翼头的装配

- M3 Nylon Nut x1
- M3x22 Socket Head Bolt x1
- M3x3 Set Screw x2
- M3x3 Set Screw
- Paddle
- M3x22 Socket Head Bolt
- Washout Set
- Swash Plate
- Main Shaft
- 8x16x5 Bearing
- 8x16x5 Thrust Bearing

Thrust Bearing Direction 压力轴承的安装

Main grips are factory preassembled, in case of reassembling; be sure to note correct placement of large/small I.D. washers during assembly.

大桨夹已经事先组装好了, 如果想自己重新检查, 在重新组装时请注意压力轴承的安装方向.

Adjust so that each side has exactly the same length 两边距离要一致
Step 6 Servo & ESC Installation

All control balls should be set to 11mm from the center.

Rudder Servo Installation

11mm
Please check first your radio manuals before connecting these electronic devices as shown below.

以下电子设备连线前请详细参阅遥控器的说明书.

<table>
<thead>
<tr>
<th>Device</th>
<th>Hitec</th>
<th>Futaba</th>
<th>JR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aileron</td>
<td>Ch1</td>
<td></td>
<td>Ch2</td>
</tr>
<tr>
<td>Elevator</td>
<td>Ch2</td>
<td>Ch3</td>
<td>Ch3</td>
</tr>
<tr>
<td>Throttle</td>
<td>Ch3</td>
<td>Ch1</td>
<td></td>
</tr>
<tr>
<td>Gyro Gain</td>
<td>Ch5</td>
<td></td>
<td>Aux2</td>
</tr>
<tr>
<td>Rudder</td>
<td>Ch4</td>
<td>Ch4</td>
<td></td>
</tr>
<tr>
<td>Pitch</td>
<td>Ch5</td>
<td></td>
<td>Aux1</td>
</tr>
</tbody>
</table>
**Step 8 Phasing Control Ring Adjustments**

Gets the right phasing adjustment by turning the phasing control ring until the washout arms and main grips would be parallel to the tail boom.

**Step 9 Linkage Length Adjustments**

All linkage length are measured in this way. The following linkage lengths indications are basic values which could vary depend on used servos. Some fine adjustments are still needed in following setup steps.

---

**Main Grip**

**Washout Arm**

**Parallel to the Boom**

**Boom**

**Phasing Control Ring**

**Main Grips**

**Washout Arm**

**Phasing Block**

**Washout Arm**

**Boom**

---

**41mm x2**

**26.5mm x2**

**59mm x2**

**41mm x2**

**168mm x2**

**85.5mm x2**

**85mm x2**
If Ball Links are too tight, to resize tight ball links only use the Compass Model ball link sizing tool (E-XQT-01). The Ball Link Sizing Tool is very sharp, use it with caution. Do not over size Ball Links and do not adjust with pliers.

Do not apply plier to resize Ball links. Pliers could cause hidden damage to ball links and hence result in failure when operation.

切勿用钳子挤捏球头接头，钳子会造成球头接头的潜在伤害从而导致飞行事故。

Step 10 Radio Setting 遥控器的设定

Pitch Curve 螺距曲

<table>
<thead>
<tr>
<th>Normal</th>
<th>ID 1</th>
<th>ID 2</th>
<th>Auto Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
</tr>
</tbody>
</table>

Throttle Curve 油门曲线

<table>
<thead>
<tr>
<th>Normal</th>
<th>ID 1</th>
<th>ID 2</th>
<th>Auto Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
</tr>
</tbody>
</table>

Pitch Setting 螺距范围

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>ID 1</th>
<th>ID 2</th>
<th>Autorotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pitch</td>
<td>9–10</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Hovering</td>
<td>5–5.5</td>
<td>4–5</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Low Pitch</td>
<td>-4</td>
<td>-6</td>
<td>-12</td>
<td>-7</td>
</tr>
</tbody>
</table>

Swash Type Setting 水平盘混合比设定

<table>
<thead>
<tr>
<th></th>
<th>JR</th>
<th>Futaba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swash Type</td>
<td>S3 120</td>
<td>SR3</td>
</tr>
<tr>
<td>Aile</td>
<td>Elev</td>
<td>Pitch</td>
</tr>
<tr>
<td>65%</td>
<td>65%</td>
<td>65%</td>
</tr>
</tbody>
</table>

For any radio setup please refer to your radio instructions first. The data's shown above provide some general suggestions for radio setting. This information varies according to types of main blades, motor, pinion gear and engine. Adjustment has to be made during the actual flight. 以上设定仅为参考，请根据实际情况及要求自行调节.
Step 11 Servo Direction Check

Turn on the radio, position the heli tail point to yourself. Make sure radio is set to 120 degree CCPM mode. Move the stick and check the reaction of the Swash Plate, Throttle and Tail Pitch Plate. Adjust radio settings accordingly.

打开遥控器，将直升机尾部指向自己。注意将遥控器设为120度ccpm模式。如下图摇动控制杆检查各个舵机运动是否正常。

<table>
<thead>
<tr>
<th>Mod 1</th>
<th>Mod 2</th>
<th>Swash Plate Reaction 水平盘反应</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Aileron Check 副翼检查" /></td>
<td><img src="image2.png" alt="Aileron Check 副翼检查" /></td>
<td><img src="image3.png" alt="Swash Plate Reaction 水平盘反应" /></td>
</tr>
<tr>
<td><img src="image4.png" alt="Elevator Check 升降检查" /></td>
<td><img src="image5.png" alt="Elevator Check 升降检查" /></td>
<td></td>
</tr>
<tr>
<td><img src="image6.png" alt="Pitch Check 螺距检查" /></td>
<td><img src="image7.png" alt="Pitch Check 螺距检查" /></td>
<td></td>
</tr>
<tr>
<td><img src="image8.png" alt="Rudder Check 尾舵检查" /></td>
<td><img src="image9.png" alt="Rudder Check 尾舵检查" /></td>
<td></td>
</tr>
</tbody>
</table>
Step 12 Setup 设定

Make sure the Flybar Control Arm and Paddle are in line as in the diagram. Then start to setup.

A) Turn on the radio, set throttle to middle position for 0 degree. Use the subtrim in radio program to adjust all the servo to get control horn to the right angle.

B) Next is to adjust the link from servo to the T Arm and I Arm so that the T Arm is Horizontal and the Inner Arm is Horizontal. Use the 2 Guide Holes on the frame to make sure the 2 Arms being horizontal.

Note: The 2 Push-pull link rods are not necessarily parallel, but must be the same length.

Note: 双推拉两个连杆不一定平行,但长度一定要一致.
C) Next adjust the links from T Arms to Swash Plate to level Swash Plate. A compass Swash Plate Tool can be applied here as a guide.

D) Set the Washout Arms horizontal.

E) Set Mix Arm 2° downwards to Flybar

F) Install the main blade and set the Main Blade to 0° pitch. 2 Ball Links might need to be cut shorter to get the right pitch.

G) At the low throttle stick and throttle trim, the carburetor hole should be completely close. At full throttle stick, carburetor hole should be completely open. Adjust the ATV in radio, or/and the control horn position on the engine to achieve above requirement. Make sure the servo does not bind at any traveling point.

H) At Rudder middle stick, set Rudder Servo 90 degree to the tail link. And set Tail Blade to 7° pitch.
Drill holes after checking correct position

Cut along this line

Install Canopy Window and Canopy Damper

Drill a hole on this mark.

Step 13 Canopy Installation 头罩的装配

This Mark is only a guide, please put the canopy on the heli frame to obtain the exact position before drilling the hole here.

头罩所示孔位仅作为参考。务必将头罩装上机身以精确定位孔位。

Canopy window

Canopy Dampner

Canopy Damper

Install the Canopy onto the helicopter.

将头罩装上机身

Install the Canopy onto the helicopter.

M3 Washer

M3x12 Socket Head Bolt  木纹螺栓

M2.5x6 Selftapping Screw  self-tapping screw
When Main Blades turn clockwise, tail blades should turn clockwise when view from the Tail Fin side. If not the belt is installed incorrectly.

当大桨顺时针旋转时，从垂直尾鳍方向看去，尾桨应顺时针旋转。如果不是，皮带的安装方向不对。
1. Ensure that receiver & transmitter battery are fully charged.
2. Check all bolts and screws are tight.
3. Repeat step 11 to check all Servo functions are correct.
4. Ensure Tail + Gyro direction are correctly set.
5. Check that the Main Blades, Paddles and Tail Blades are installed in the right direction.
6. Always hold the Rotor Head when starting the engine.
7. Check that there are no missing or damaged parts, never fly with any damaged parts.
8. Make sure all electronic devices are firmly fastened and connected.
9. Before starting the motor make sure the IDLE switch is OFF and Throttle stick is in the low position.
10. Only turn off the transmitter after turning off the receiver.

Compass Model (HK) Limited
www.compassmodel.com