

CO-COMANCHE

Electric Helicopter



ESKY HOBBY MAKES YOU FUN!

敬告：遥控模型不是玩具，请详细阅读说明书以后飞行。

Warning: R/C model is not a toy, please fly it after reading the instruction detailedly.

CO-COMANCHE INSTRUCTION

EK1H-E035

Specification

- (1) Main rotor diameter: $\phi 340\text{mm}$
- (2) Weight: about 242g
- (3) Length: 435mm, width: 95mm, height: 185mm
- (4) Power system: 180 motor*2pcs
- (5) KIT/ARF/RTF: RTF;
- (6) Transmitter: Standard 4 CH(including training switch and simulator port)
- (7) Mix controller: 4 in 1 mix controller (Including gyro, mixer, ESC, receiver)
- (8) Servo: (8g, 1.3kg/cm, 0.12s/60°)
- (9) Battery: 7.4V 800mAh Li-polymer battery set

产品参数

- (1) 主旋翼直径: $\phi 340\text{mm}$
- (2) 总重量: 约242g
- (3) 机身长: 435mm, 宽: 95mm, 高: 185mm
- (4) 电机型号: 180马达*2pcs
- (5) 装配: RTF
- (6) 发射机: 标准四通道(含教练开关, 模拟端口)
- (7) 混控系统: 4合1控制器
(包含: 陀螺仪、电子变速器、接收机、混控)
- (8) 伺服器: (重量: 8g, 扭力: 1.3kg·cm, 速度: 0.12s/60°)
- (9) 电池: 7.4V 800mAh 锂聚合物电池组

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★说明书内容如有需要任何改动，不需另行通知，TWF留有最终修改权。

★Other notice is not required if any changes on the manual, TWF owns the final right of modification.

● 关于CO-COMANCHE About CO-COMANCHE

RAH-66 "COMANCHE" 直升机是陆军的新一代直升机，用于执行武装和轻型攻击侦察任务。

TWF将"CO-COMANCHE"设计成为一款采用共轴双桨系统的四通道遥控直升机，它操作简单、容易飞行，飞行动作具有真机的灵敏度高、转向灵活等特点。机头舱与机身采用分体连接式设计，采用一根碳纤维棒连接，实用而且美观，起落架采用3个滑轮组，在直升机起飞和降落时可以机动的进行滑行，装饰性的尾旋翼采用涵道尾桨，在直升机飞行时可以自动的旋转，带你进入真实的飞行境界，为飞行直升机添加了更多的乐趣。整机内配有ESKY原装加密狗，连接发射机上的模拟端口和电脑的USB接口，安装光盘内的FMS软件后，即可在电脑上进行更多有趣的飞行练习。

RAH-66 "COMANCHE" is a new helicopter being used for reconnaissance mission of arming and light assault for the land forces.

"CO-COMANCHE" was designed by TWF as a 4CH helicopter with co-axial, double rotor blades system, it is easy to fly with simple operation, which possesses the characteristics of high sensitivity and flexible turning of the real helicopter. It was designed with divided canopy and fuselage connecting by a carbon fibre rod, which is practical and beautiful. There are three sliding wheels in the landing strut, which can slide automatically while taking off and landing. The ornamental tail rotor adopts duct rotor blade that can rotate automatically while flying the helicopter, which brings you into a real flight state and brings more fun for your flight. ESKY original softdog is included in the packing, installing the FMS software of the disc, and connecting the simulator port in the transmitter to the computer with it, you can enjoy your flight in the computer then.

● 整机图 The whole parts of CO-COMANCHE



工厂100%组装完成的CO-COMANCHE，只需充电即可飞行，电子系统出厂时已经过专业人士调试，无需再做调整。标准配备包含整机一台、发射机一个、充电器一组、螺旋桨一套、充电电池一颗、发射机5号电池一组（8个）、ESKY加密狗一个、光盘一张，让你随时想飞就飞。

CO-COMANCHE, has been completely assembled in the factory, it can fly after finishing charging the battery. Electronic system has been completely adjusted by our engineer before packing, no adjustment is needed. Standard outfit include: a kit, a transmitter, a set of charger, main blade, a chargeable battery, transmitter battery unit (8pcs), a ESKY softdog and a Instructional Video CD for computer, which are ready to fly out of box.

● 电池的充电 Charging the battery pack

锂聚合物电池的充电方式如图所示：

Li-po battery charging is as the picture shows:



警告：充电时间最长不得超过120分钟。

WARNING: The time for battery charging can not exceed 120 minutes.

- 1.将充电器与电源连接,此时充电器电源指示灯显示红灯,电源连接正常。
- 2.将需要充电的2节或3节锂离子电池分别(可以同时)插入充电器电池接口,绿色指示灯闪烁,表示正在充电。
- 3.待绿色指示灯停止闪烁时表示电池已经充满。
- 1.Connect the charger with power,then the red power indicator lights up,which indicates that the power connection is normal.
- 2.Connect the 2 cells or 3cells Li-polymer battery with charging ports of charger respectively or simultaneously,then the green charging indicator flashes and it indicates the battery is on charge.
- 3.Green indicator stops flashing shows that the battery is full.

● 充电注意事项 Charging precautions

- 1.接通电源后,电源指示灯红灯会亮,红灯未亮表示电源没有连接好(图1)。
- 2.当电池连接好后,绿色指示灯会闪烁,表示正在充电;如果指示灯红灯和绿灯同时闪烁表示电池有误,请检查电池是否损坏。如果绿灯不亮,红灯闪烁时表示充电器进入保护状态,请断开充电器电源3秒以后重新接通电源(图2)。
- 3.充电完成后绿色指示灯恒亮,如果电池长时间不断开时,自放电使单节电池电压低于4.15V时充电器会重新给电池充电,直至再次充满,而且此过程会反复进行,确保电池为饱和状态。(图3)
- 4.充电时电池必须从模型上取下来进行充电。
- 5.锂聚合物电池在充电时必须有人看护。
- 6.充电器充电时应放在干燥通风处,远离热源,远离易燃易爆物品。
- 7.为了您更安全快捷的充电,请使用ESKY原厂出品的充电器。
- 1.After connecting the power,the red indicator would get light,otherwise,it indicates that power connection goes wrong(fig 1).
- 2.Green indicator would flash after connecting the battery with charger,which indicates that battey is on charge. If green and red indicators flash simultaneously,it indicates the error with battery,please check whether the battery has been damaged.If green indicator goes out and red indicator flashes,it shows that the charger is under protection mode,please disconnect the power for 3 seconds and switch the power on again (fig 2) .
- 3.Green indicator gets constant light after the charge finished.If the battery has not been unplugged for a long time after charge finished,the battery would be recharged when single battery voltage is lower than 4.15V after self discharge.Also,this procedure will circulate,so make sure the battery is in saturated state.(fig 3)
- 4.Take the battery out from the helicopter while charging.
- 5.Fire or serious injury would be resulted in under certain conditions,so please follow the instructions and never leave equipment unattended while charging.
- 6.Keep the battery charged in cool and ventilating place and be away from heat source,flammable and explosible materials.
- 7.To ensure secure and quick charging,please use ESKY original chargers.



电源指示灯
POWER
充电指示灯
CHARGER



STEP 1



STEP 2



STEP 3

绿色指示灯闪烁
Green indicator flashes

绿色指示灯恒亮
Green indicator stops twinkling



Step 1

1. Charging battery
给电池充电



Step 2

2. Loading battery
安装电池



Step 3

3. Drawing out the antenna of transmitter completely
完全抽出发射机天线



Step 4

4. Pushing the throttle stick and trimmer to the lowest then powering on transmitter.
将油门拉杆和微调调至最低。
打开发射机。



Step 5

5. Connecting battery
接通直升机电源



Step 6

6. After the red light stops flashing, the green light is kept on constantly, which indicates ready to fly.
红灯闪烁后，绿灯恒亮即显示待飞

⚠ 注意:

直升机接通电源后，四合一控制器红灯和绿灯交替闪亮，有以下主要几种情况：（如图仅供参考）

- 1: 首先检查接收机和四合一控制器的晶体是否脱落或松弛。
- 2: 打开发射机后，油门的微调 and 摇杆没有拉至最低（四合一控制器会一直亮红灯）。
- 3: 发射机内的电池电量用尽。（发射机没电时，LED指示灯会显示红灯）
- 4: 晶体与四合一控制器上的频率不相同（一般情况下不会出现）。
- 5: 开始亮绿灯，加油门后红绿光闪烁，可能是直升机电池电量不足需要充电。
- 6: 还有可能是四合一控制器坏了。

Attention:

If after connecting power, the green light and the red light in the 4 IN 1 mix controller shine alternately, the main problems are as follows: (just for reference)

1. The crystals in the receiver and 4 IN 1 mix controller have loosened or disappeared.
2. After turn on the transmitter, throttling or rocking lever hasn't been pulled to the lowest. (the light in 4 IN 1 mix controller is red all the time)
3. The battery in the transmitter has been used up. (When the transmitter is out of power, the light in it will be red).
4. The frequency of Crystal and 4 in 1 mix controller are different (usually won't occur)
5. The green light shines first, and red light shines after power, which indicates that the battery volume of helicopter is not enough, charging is needed.
6. The 4 in 1 mix controller has broken.



微调
Trimmer lever
拉杆
Stick



LED电压指示
LED Voltage indicator



晶体
Crystal
四合一控制器
4 IN 1 mix controller

模拟器接口 (背面)
Simulator port (Back)

升降微调 (制式1)
Elevator trimmer(mode 1)
油门微调 (制式2)
Throttle trimmer(mode 2)

升降及副翼操作杆 (制式1)
Elevator(mode 1)/Aileron stick
油门及副翼操作杆 (制式2)
Throttle(mode 2)/Aileron stick

方向舵微调
Rudder trimmer

晶体
Crystal



天线
Antenna

LED电压显示
LED Voltage indicator

教练开关
Trainer switch

油门微调 (制式1)
Throttle trimmer(mode 1)
升降微调 (制式2)
Elevator trimmer(mode 2)

油门及副翼操作杆 (制式1)
Throttle(mode 1)/Aileron stick
升降及副翼操作杆 (制式2)
Elevator(mode 2)/Aileron stick

副翼微调
Aileron trimmer

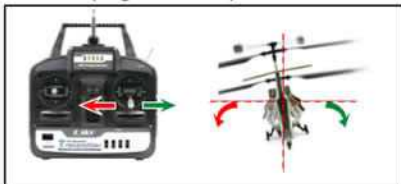
电源开关向上打开电源
Push the power switch to the upper position to turn on the power.

整机内配有ESKY原装加密狗, 连接模拟器接口接入电脑, 使用发射机可以在电脑上进行模拟器飞行(软件安装步骤请参考光盘内容)。

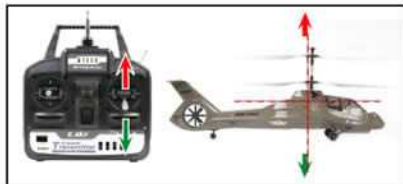
Original softdog is included in the packing. Connecting the transmitter to computer with softdog, then you can fly in the computer. (please refer to the CD for the assembly step of software)

制式1 (右手油门)

Mode 1(Right throttle)



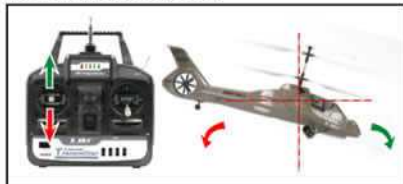
当副翼操作杆向左移动时, 直升机飞向左边。
当副翼操作杆向右移动时, 直升机飞向右边。
When the aileron stick is moved to the left, the helicopter moves to the left.
When the aileron stick is moved to the right, the helicopter moves to the right.



当油门操作杆向上推动时, 直升机上升,
当油门操作杆向下推动时, 直升机下降。
When the throttle stick is pushed up, the helicopter lifts up.
When the throttle stick is pushed downward, the helicopter descends.



当方向操作杆向左推动时, 直升机机头向左转,
当方向操作杆向右推动时, 直升机机头向右转。
When the rudder stick is moved to the left, the head of helicopter moves to the left.
When the rudder stick is moved to the right, the head of helicopter moves to the right.



当升降操作杆向上推动时, 直升机向前飞,
当升降操作杆向下推动时, 直升机向后飞。
When the elevator stick is pushed up, the helicopter flies forward.
When the elevator stick is pushed downward, the helicopter flies backward.

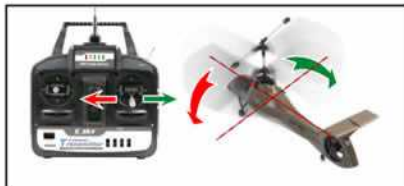
制式2 (左手油门) Mode 2(left throttle)



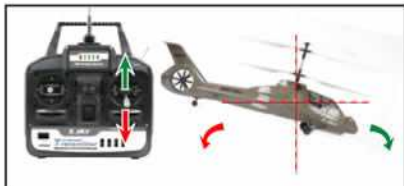
当副翼操作杆向左移动时，直升机飞向左边。
当副翼操作杆向右移动时，直升机飞向右边。
When the aileron stick is moved to the left,
the helicopter moves to the left.
When the aileron stick is moved to the right,
the helicopter moves to the right.



当油门操作杆向上推动时，直升机上升，
当油门操作杆向下推动时，直升机下降。
When the throttle stick is pushed up, the
helicopter lifts up.
When the throttle stick is pushed downward,
the helicopter descends.



当方向操作杆向左推动时，直升机机头左转，
当方向操作杆向右推动时，直升机机头右转，
When the rudder stick is moved to the left,
the head of helicopter moves to the left.
When the rudder stick is moved to the right,
the head of helicopter moves to the right.



当升降操作杆向上推动时，直升机向前飞，
当升降操作杆向下推动时，直升机向后飞。
When the elevator stick is pushed up, the
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When the elevator stick is pushed downward,
the helicopter flies backward.

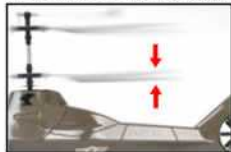
⚠ 注意：新手飞行时要保持机头方向和自己站立方向一致。

Attention: It is suggested that the novice flies with the tail of helicopter toward himself.

● 直升机双桨的调整 Blade tracking adjustment

主旋翼出现复影表示需要对它进行调整

Blades out of normal tracking Adjustment needed



Main blades don't on one plane
飞行时，主旋翼旋转不在同一平面



Adjusting method of main
blades attack-angle
主旋翼攻角的调整方法



Main blades rotate in one plane
主旋翼旋转在同一平面上

⚠ 注意：

如果主旋翼出现破裂或大量的划痕，会影响直升机的飞行，请及时更换。
更换时请注意主翼A和主翼B，不能错换。

Attention:

If there is a breakage or lot scratch on main rotor, which may impact the flying of the helicopter, please change in time. Please pay attention to main rotor A and main rotor B while replacing them, they shouldn't be confounded.

● 拆卸步骤 Disassembling instruction



拔出后纽扣
Pull out the fastener



取下脚架
Remove the landing skid.



取下前机头罩
Take the front canopy.



取下后机罩
Remove the rear hood.

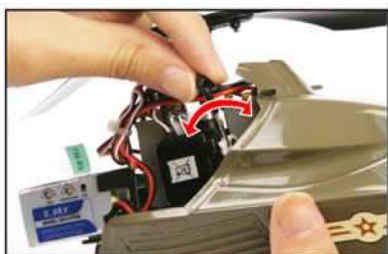
● 伺服器拉杆的调节 Adjustment of Servo pull-rod.



飞行时，确保发射机上油门微调调至最低，其他微调已经居中。如果直升机依然一直朝左或右边倾斜，请取下机壳，待飞状态下，检查十字倾斜盘是否水平。如果不是水平位置，可以取下两边

伺服器拉杆调整至适当长度(如右图)，直至两边配合把倾斜盘保持在水平位置，再试飞。

When flying, ensure throttle trimmer of the transmitter has been regulated to the lowest position, other throttling are in position of centre. If the helicopter still lean to left or right, please remove the canopy, and examine the balance of the cross swashplate under state of ready to fly, if not horizontal, you can regulate the servo pull-rod, tighten or loosen correspondingly (as the picture above). Adjust both sides to keep the swashplate in horizontal and then test flight.



● “四合一”控制器的调节 Adjustment of “4 in 1” mix ncontroller

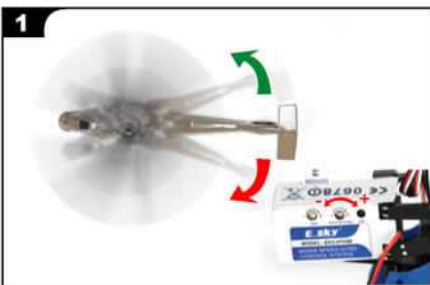
敬告：

“四合一”控制器出厂之前都经过专业人士的检测，一般无须再次调试，经过说明书所述的所有调试后，直升机依然出现以下几种情况，请按照说明谨慎调试四合一控制器。

1. 飞行时，机尾总是往左或往右旋转不受控制，先试试发射机上的微调能否调节好，依然不受控制时，可以适当调节四合一上的前后马达比例调节孔，(Proportional)调小或调大一点(“-”小；“+”大)。
2. 飞行时，机尾总是左右小幅度摆动不受控制，是因为尾部被锁的太紧，须调小陀螺仪的感度孔(GAIN)；如果是左右大幅度摆动，则调大感度。(“-”小；“+”大)。

“4 in 1” mix controller are tested by engineer before entering the market, which don't need adjustment. If the helicopter still occurs below situations after all adjustments, please readjust the “4 in 1” mix controller according to the instruction.

1. The tail of helicopter spins to left or right and uncontrollable when flying, first try the adjustment on the transmitter, if it's still out of control, please adjust the motor ratio regulating port on the controller, turn small or large.
2. The tail of helicopter spins to left or right lightly and uncontrollable when flying, maybe the tail is locked too tight, you can adjust the gyro GAIN, if swing seriously, please enlarge sensitivity.



如果您想晋升为CO-COMANCHE室内飞行的高手，以下飞行图片可以告诉您一些简单的航线。(建议，一定要了解直升机飞行的操作，飞行自如以后，再试着飞航线，一定要谨慎，不要勉强，避免不必要的失误和损失。)

If you want to become a CO-COMANCHE indoor flying superior, the pictures listed below will tell you some simple flight line. (Advice: Mastering the basic operation, try the flight line after you can flight freely. Please be cautious, don't concede to avoid damage.

1. 寻一个固定的地点做为起降平台，在规定的范围内进行起飞和降落训练，起飞和降落要尽量保持平稳和垂直，动作不要过于猛烈，训练您定点起降技术。

Look for a fixed location as the flying flat, practice taking off and landing flying in regulated area, try to keep stable and vertical while taking off and landing. Try to practice take off and fall in a fixed decimal avoid violent actions.

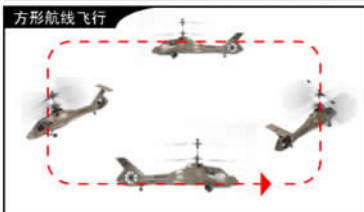
定点起飞降落



2. 以起降点为中心，划一个边长为约2M的正方形，让直升机绕正方形四边进行飞行，飞行高度大约为目测平视高度，在正方形的角点让直升机做90度的旋转，调整飞行的方向，训练您的直线飞行与飞行中进行直角调整航线。

Take the landing point as a centre, draw a square with 2M length of side, try to fly along the square, the flight height is about eye survey height, made the helicopter spin with 90 angle, adjust flying direction, practice straight flight and adjust rectangle flight line.

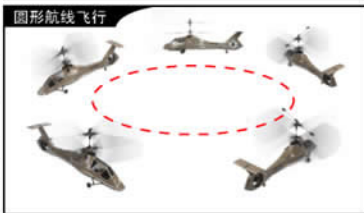
方形航线飞行



3. 以起降点作为中心，划一个直径约为2M的圆，让直升机围绕圆圈进行飞行，在飞行中高度大约为目测平视高度，飞行速度要尽量保持均匀。训练您的曲线飞行的方向控制能力。

Take the landing point as a center, draw a circle with 2M diameter, try to fly along the circle, the flight height is about eye survey height, and keep a even flight speed. To train the directional control ability for curve flight.

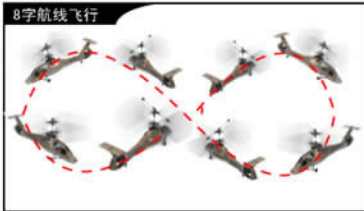
圆形航线飞行



4. 如果您对前面的动作掌握熟练了，那么您就可以进行漂亮“8”字飞行，飞行要点如图所示。

If you had command the above flight actions, then you can fly a nice "8", please find the tips in right picture.

8字航线飞行



4. 飞行后进行定点降落，如果这些动作都已经掌握的很好了，那你

就是一名优秀的CO-COMANCHE飞行高手了。

Make a fixed-point landing after flying, if you had mastered all the skills, you would become an excellent CO-COMANCHE flying superior.

定点降落



● 结束飞行步骤 Steps of finishing the flight



Step 1

1 Disconnect battery
拔掉直升机电源



Step 2

2 Turn off the transmitter
关闭发射机



Step 3

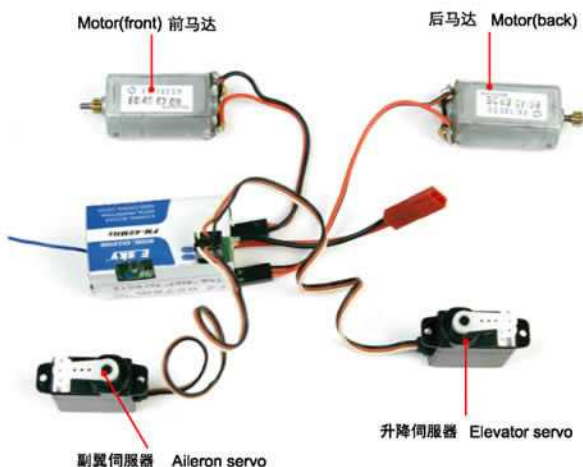
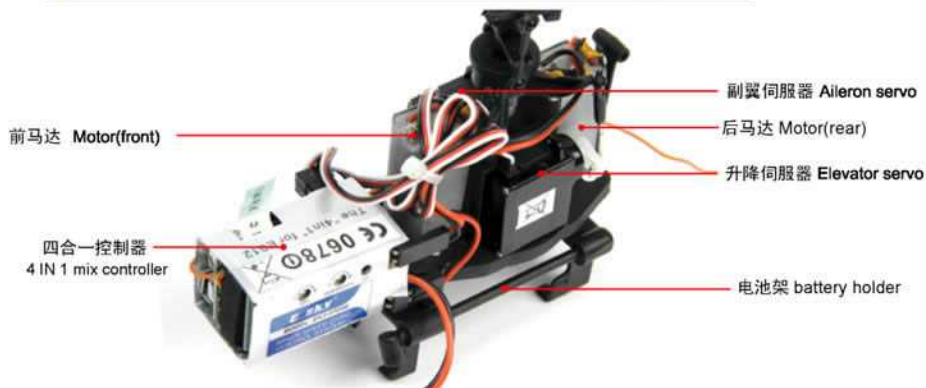
3 Retract the antenna of
transmitter completely
完全收回发射机天线



Step 4

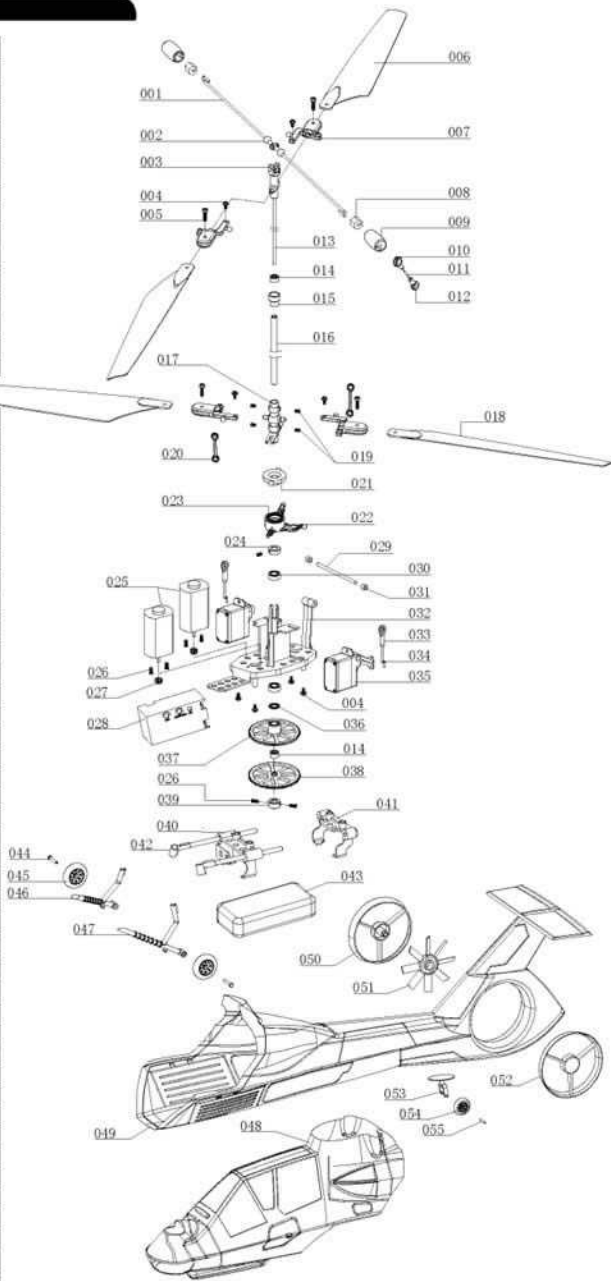
4 Take out the battery, pay attention
to the storage and maintaining.
取出电池，注意存放和保养。

● 机体局部设备示意图 Construction schematic diagram to inner equipments.



序号 NO	名称 Description	用量 Dosage	规格 Specification
001	平衡杆Flybar	1	1.5*207
002	平衡翼杆Flybar	1	
003	主旋转头A Center hub set A	1	
004	伞头十字螺丝Umbrella-head screw	8	1.7*4
005	内六角螺丝Inner hexagonal screw	4	M2*8
006	主旋翼A Main blade A	2	
007	主翼夹头Main blade grip set	4	
008	配重块Balance weight	2	
009	稳定锤Stabilizing weight	2	
010	单孔拉杆A Control link A	1	
011	无头螺杆Threaded bar	1	M1.4*7
012	单孔拉杆B Control link B	1	
013	主轴B Main shaft B	1	2*130.5
014	滚珠轴承Ball bearing	2	φ2*φ6*L3

序号 NO	名称 Description	用量 Dosage	规格 Specification
015	轴承架Bearing bracket	1	
016	主轴A Main shaft A	1	4*101
017	主旋转头B Center hub set B	1	
018	主旋翼B Main blade B	2	
019	圆头十字螺丝Round screw	5	ISO2*2.5
020	双孔连杆Ring-like push-rod	2	
021	倾斜内盘Inner swashplate	1	
022	倾斜外盘Outer swashplate	1	
023	滚珠轴承Ball bearing	1	φ7*φ3*L4
024	定位环Collar set	1	8*4
025	主马达Main motor	2	180
026	圆头十字螺丝Round screw	6	M2*4
027	主马达齿Main motor gear	2	M=0.5 T=8
028	四合一控制器4 IN 1 controller	1	
029	机身支杆A Airframe bearing rod A	1	42mm
030	滚珠轴承Ball bearing	2	φ4*φ8*L3
031	胶套Plastic cannula	2	φ1.5*φ3*4
032	机架Main frame	1	
033	拉杆头Push-rod head	2	
034	拉杆A Push-rod A	2	M1.4*22
035	伺服器Servo	2	
036	垫片washer	1	φ4*φ7.5*L0.5
037	齿轮B Main gear B	1	
038	齿轮A Main gear A	1	
039	齿轮固定环Fix collar for gear	1	8*4
040	前电池架Front battery holder	1	
041	后电池架Rear battery holder	1	
042	左右电池架固定杆Fixed link for battery holder	2	
043	电池Battery	1	7.4V, 800mAh
044	轮销Wheel pin	2	φ1.6*10.5
045	前轮Front wheel	2	
046	右前轮定位杆Locating rod for the right front gliderwheel	1	
047	左前轮定位杆Locating rod for the left front gliderwheel	1	
048	机头罩Canopy	1	
049	尾机身Tail airframe	1	
050	右尾旋翼架Right tail rotor blade mount	1	
051	尾旋翼Tail rotor blade	1	
052	左尾旋翼架Left tail rotor blade mount	1	
053	后轮支架Rear wheel bracket	1	
054	后轮Rear wheel	1	
055	销子Pin	1	φ1*7



180马达 Main motor set(8T)	180马达 Main motor set(8T)	2*6*3轴承 Bearing 2*6*3	轴承座/固定环 Bearing set collar	主旋翼A Plastic blade A
主旋翼B Plastic blade B	稳定锤 Stabilizer set	主旋转头A和主轴B Center hub set A&Main shaft B	主动齿轮B和主轴A Main gear B&Main shaft A	旋转夹头 Main blade grip set
主旋转头B Center hub set B	主齿轮A和固定环 Main gear A&retainer ring	轴承4*8*3 Bearing 4*8*3	锂聚合物电池 7.4V Li-Polymer battery 7.4v	适配器 switching adapter
伺服器 Servo 8g	四合一控制器 "4 IN 1" Controller	锂电 Charger	4通道发射机 4CH Transmitter	工具包 Allen Key
机架 frame kit	单孔拉杆 Control link	倾斜盘 swashplate	机壳支杆 canopy shoring	螺丝组 screw sets
滑撬 landing skit	电池架 battery holder	尾旋翼组 Tail rotor blade	黄色机头罩 Canopy(Yellow)	黄色机身 After fuselage(Yellow)
黄色机壳组 Housing case(Yellow)	迷彩机头罩 Canopy(Military color)	迷彩机身 After fuselage(Military color)	墨绿色机头罩 Canopy(Dark green)	加密狗 Softdog
迷彩机壳组 Housing case(Military color)	墨绿色机身 After fuselage(Dark green)	墨绿色机壳组 Housing case(Dark green)		



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