

V120002 HELICOPTER 2.4GHz



User Handbook

Specifications:

Main Rotor Dia. : 305mm

Tail Rotor Dia. : 85mm

Overall Length: 290mm

Gyro: Built-in

All-up Weight: 92g (Battery included)

Transmitter: WK-2603

Receiver: RX-2610V

Battery: 3.7V 600mAh Li-Po

Brushless Motor: WK-WS-12-005

Brushless Speed Controller: WK-WST-10A-L3

Servo: wk-02-1

weight 3.18g

speed 0.12sec/60° (3.0~4.5V)

orque 0.12kg/cm (3.0~4.5V)

dimension 19.2×8.3×19.7mm

Tail Servo: wk-03-4

weight 3.5g

speed 0.12sec/60° (3.0~4.5V)

orque 0.2kg/cm (3.0~4.5V)

dimension 17.5×6.4×21.7mm

Features:

1. The design of flybarless balance characterizes low power loss and great efficiency improvement.
2. 3-axle gyro, Aileronless balance control system and amend the stable flight gesture automatically.
3. Adopting high efficient shaft driven system infinitely reduces the extra waste of the power system.
4. Mature low voltage driven system presents green, environmental friendly and safety concept.
5. Low voltage and high torque brushless motor can provides strong and durable power.
6. Mini size helicopters for indoor. It offers 8-9 minutes flight time after full charged.

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01

Forewords



02

Matters needing attention

Dear customer:

Thank you for your purchase of Walkera radio control aircraft model products. In order to promptly and safely master the operations of V120D02 RC helicopter, please carefully read the user handbook, and then save it in a safe place for future consultation and reference.

V120D02 spread spectrum technology, it features vigorous power, stable flight, prompt response, and strong anti-jamming capacity.

2.1 Statement

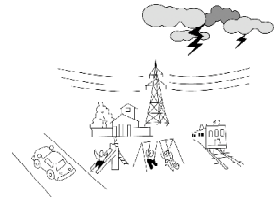
- (1) This product is not a toy. It is a piece of complicated equipment which harmoniously integrates together engineering materials, mechanics, electronics, aerodynamic and high frequency radio. Correct installation and adjustment are a must in order to avoid accidents taking place. The owner should operate in a safe manner. Improper operation may result in serious property damage or bodily injury, even death.
- (2) We accept no liability for damage and consequent damage arising from the use of products, as we have no control over the way they are installed, used and operated.
- (3) This product is suitable for RC-helicopter-experienced people aged not less than 14 years old.
- (4) The flight field should be legally approved by the local government. We accept no liability for any safety duties arising from operations, uses, or controls as soon as the products are sold.
- (5) We consign our distributors to offer technical support and service after sale. Please contact the local distributors for problem solutions caused by usage, operation, maintenance, etc.

2.2 Safety needing attention

RC helicopter is a high risk hobby, whose flight should be kept far away from other people. Misassembled or broken main frame, defective electronic equipment, and/ or strangeness to radio system will lead to unforeseen accidents such as bodily injury or property damage. The pilot **MUST** pay attention to the flight safety and UNDERSTAND his responsibility for accidents caused by his carelessness.

(1) Far away from obstacle and people

RC helicopter in flight is uncertain of flight speed and status, which potential risk exists in, when flying, please keep your RC helicopter far away from people, high buildings, high-tension line, etc, and avoid operating in rain, storms, thunder and lightening.



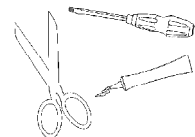
(2) Away from humidity environment

RC helicopter should be kept away from humidity and vapor because it is composed of complicated precise electronic elements and mechanic parts.



(3) Proper operation

Please use Walkera original spare parts to upgrade, modify or maintain your helicopter in order to assure its safety. Please operate your helicopter within the range of functions permitted. It is forbidden to use out of the safety laws or regulations.



(4) Avoid flying alone

At the beginning of studying radio-control flight skills, there exist some difficulties. Please avoid your flying alone, and should invite experienced pilots to guide you (it is one of the effective manners to practice via PC simulator and/ or skilled pilots' guidance).



(5) Safety operation

Please fly your helicopter according to your body status and flight skills. Fatigue, listlessness and miss-operation will increase the possibilities of accidental hazard.



(6) Away from highly spinning parts

Please keep pilot, people and object away from the spinning blades of both main rotor and tail rotor.



(7) Away from heat source

RC helicopter is made from metal, fiber, plastic and electronic elements, etc. Please keep away from heat, sunshine in order to avoid distortion, even damage, caused by high temperature.



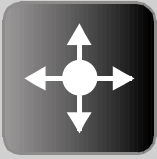
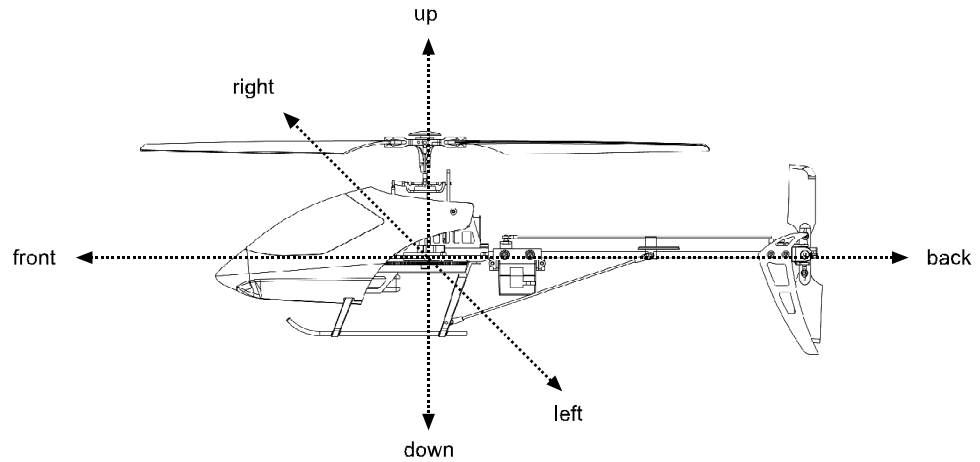
2.3 Attention before flight

- (1) Ensure the battery packs of both transmitter and receiver are fully charged (saturated).
- (2) Ensure both the throttle stick and the throttle trim of your transmitter stay at the lowest positions before operation.
- (3) Please strictly obey the order of turn-on and turn-off before operation. When starting your flight, please turn on your transmitter first, and connect the power cable of your helicopter last.
When finishing your flight, please disconnect the power cable of your helicopter first, and turn off your transmitter last.
- (4) An upset in the order of connection may cause your helicopter to loose control. Please cultivate a correct habit of turn-on and turn-off.
- (5) Ensure the directions and actions which servos execute transmitter commands are correct and smooth, respectively. Using a broken servo will result in unforeseen dangers.
- (6) Check there are no missing or loose screws and nuts, no unassembled or damaged parts. Carefully check the main blades have no defects, especially the position close to the main blade connector. Broken or unassembled parts will have an effect on the flight performance, and will cause unforeseen potential dangers.
- (7) Check all the connections between ball linkage and ball. Loose linkages and balls should be changed. Loose connection between linkage and ball will have an effect on the flight performance, even lose control.
- (8) Assure there are solid connections between the power cables of battery pack and motors. Continuous vibrations and drastic 3D actions in flight may loosen the battery tie-ins.



02
Matters
needing
attention

We define the orientation of helicopter in order not to cause confusion in the following descriptions. That is to say, the tail boom of helicopter is facing the pilot (tail in), and its head facing forward (front of pilot). The left hand of pilot is the left side of helicopter, the right hand of pilot is the right side of helicopter. Its head is to the front and its tail boom is to the back. The direction in which main body of helicopter is facing is up, and its skids are facing down.



03

Definition of Helicopter Orientation



04

Standard equipments



▲ V120D02 helicopter



▲ WK-2603 transmitter



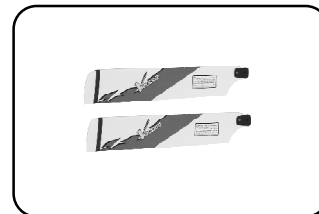
▲ Li-polymer battery pack



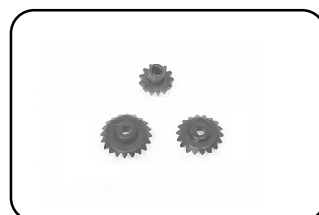
▲ Tool kit



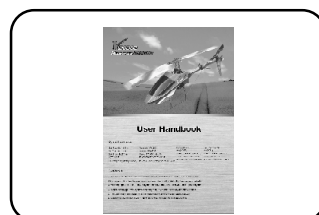
▲ Wall adapter /Power supply



▲ Main rotor blades

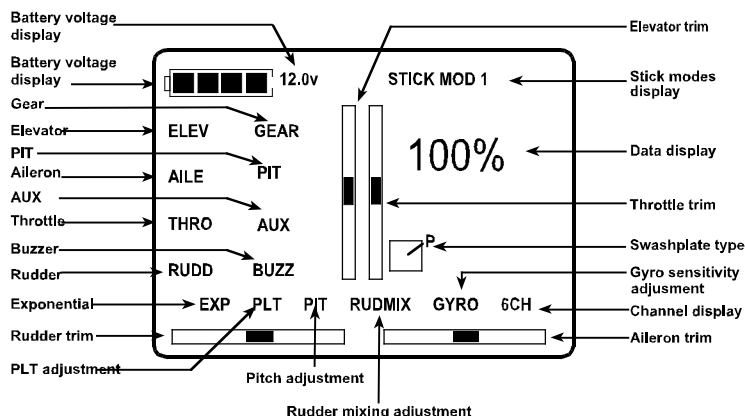


▲ Tail gear



▲ User Handbook

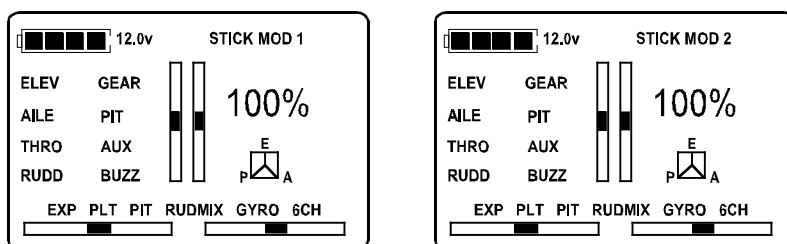
5.1 Main Menu



When turning on the transmitter power, the buzzer rings, and 4 trims bars begin to make stream-like movements. After the ID binding is finished, both buzzing and trim bars stream-like movements stop, instead of opening screen appears.

5.2 Swashplate setup

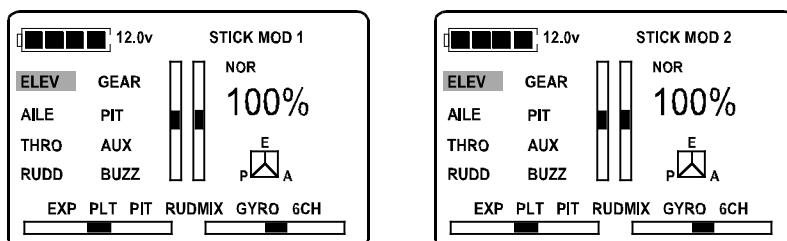
Press ENT to flash both the SICK MOD and its current status of stick (any one number from 1 through 4). That means the setting status is entered. Press UP or DN to flash the swashplate type, and then press R or L to choose the desired swashplate type. Press ENT to confirm and then press EXT to exit. The swashplate type graphics respectively shows: 3 servos (120° E-P-A).



5.3 Channel reverse setup

ELEV reverse setup

Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to ELEV, and both the ELEV and the current status NOR or REV flashing. If want to make reverse, press R or L to let NOR flashing, and then press ENT to confirm. Press EXT to exit and save.



AILE reverse setup

Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to AILE, and both the AILE and the current status NOR or REV flashing. If want to make reverse, press R or L to let NOR flashing, and then press ENT to confirm. Press EXT to exit and save.



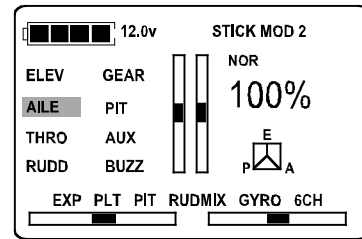
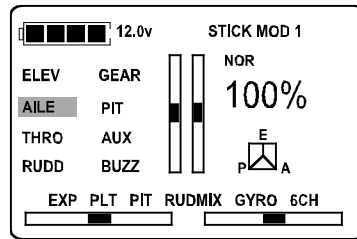
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Setting of WK-2603



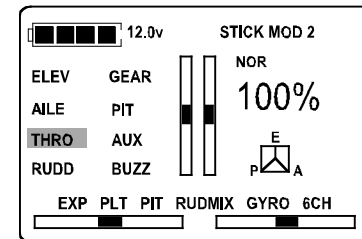
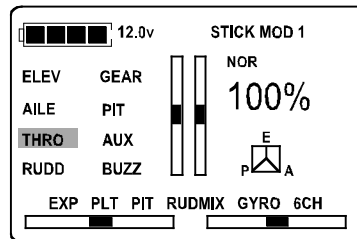
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Setting of WK-2603



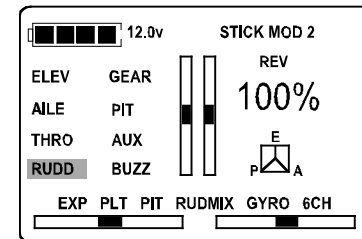
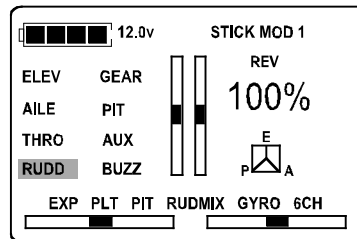
THRO reverse setup

Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to THRO, and both the THRO and the current status NOR or REV flashing. If want to make reverse, press R or L to let NOR flashing, and then press ENT to confirm. Press EXT to exit and save.



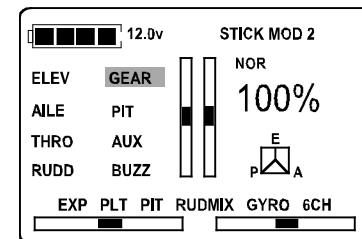
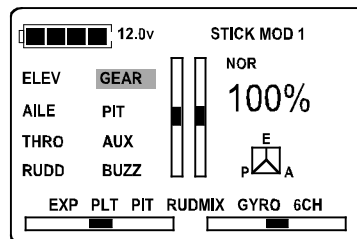
RUDD reverse setup

Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to RUDD, and both the RUDD and the current status NOR or REV flashing. If want to make reverse, press R or L to let REV flashing, and then press ENT to confirm. Press EXT to exit and save.



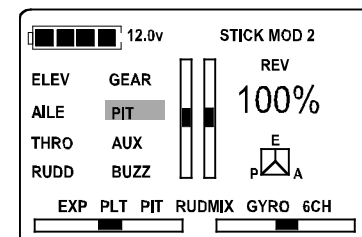
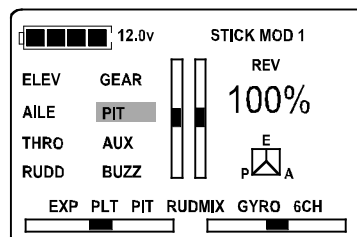
GEAR reverse setup

Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to GEAR, and both the GEAR and the current status NOR or REV flashing. If want to make reverse, press R or L to let NOR flashing, and then press ENT to confirm. Press EXT to exit and save.



PIT reverse setup

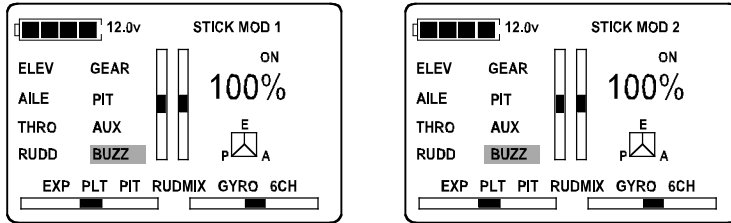
Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to PIT, and both the PIT and the current status NOR or REV flashing. If want to make reverse, press R or L to let REV flashing, and then press ENT to confirm. Press EXT to exit and save.



5.4 Buzzer setup

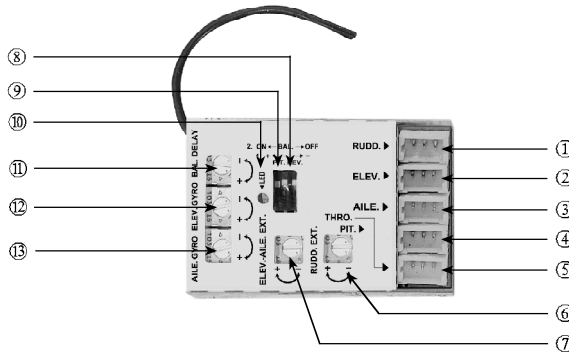
The buzzer setup includes two status: ON or OFF. Below is the setting method:

Press ENT to flash both STICK MOD and its current status of stick (any one number of 1 through 4). That means the setting status is entered. Press UP or DN to BUZZ, and both the BUZZ and the current status ON or OFF flashing. If want to make reverse, press R or L to let ON flashing, and then press ENT to confirm. Press EXT to exit and save.



6.1 Features of receiver RX 2610V

- (1) Receiver RX2610V adopts 2.4G spread spectrum technology with the functions of automatic scanning, code pairing and LED receiving indication.
- (2) The usage of high performance receiver dramatically reduces the possibility of missing signal and ensures the accuracy and reliability of signal receiving.
- (3) 6-channel signal output makes fine actions and powerful functions available.
- (4) Gyro sensitivity and servo extent offer fine and customized adjustments to relevantly meet the habits of your operation.



6.2 Function of receiver

S/N	Name for short	Full name	Function
1	RUDD	Rudder servo	Connects to the rudder servo and receives the control signal of rudder servo.
2	ELEV	Elevator servo	Connects to the elevator servo and receives the control signal of elevator servo.
3	AILE	Aileron servo	Connects to the aileron servo and receives the control signal of aileron servo.
4	PIT	Pitch servo	Connects to the PIT servo and receives the control signal of PIT servo
5	THRO	Throttle	Connects to the brushless ESC and receives the signal of brushless ESC (Electronic Speed Controller).
6	RUDD. EXT.	Rudder servo extent knob	Rudder servo extent knob is used to set up the servo travel.
7	ELEV/AILE EXT.	Elevator/Aileron servo extent knob	Elevator/Aileron servo extent knob is used to set up the servo travel.
8	PIT.REV	Pitch Reverse switch	Reverse the rotation direction of the pitch servo.





06

Instruction and attention of RX2610V

9	ON - OFF	Flight mode switch	Set/choose helicopter flight mode.
10	LED	LED	Displays the status of receiving signal.
11	BAL DELAY	Balance control delay	Adjusts the signal control speed from the ELEV/AILE servo, changes the flight effect.
12	ELEV.	Elevator gyro sensitivity adjust knob	Adjusts the elevator gyro sensitivity, changes the flight effect.
13	AILE.	Ailer gyro sensitivity adjust knob	Adjusts the ailer gyro sensitivity, changes the flight effect.

6.3 Flight mode setting

Note: When mounting the receiver, please make sure the receiver is placed flat and be vertical to the main axis of the helicopter.

1. ADJUST MODE: press the ENT button on the transmitter after successful pairing, the STICK MOD and the present stick(MODE1-MODEL4) will flash together, then it is in the setting status. Press the UP or DN button to RUDMIX GYRO and the OFF is flashing. Press R or L to change OFF to flashing ON. Rotate the V1 and V2 knobs on the transmitter to the middle position, the red light on receiver keeps on. Rotate the V1 knob towards "-" direction till the red light off, then it is in adjusting mode, You can adjust the swashplate in a flat status by adjusting the servo and the mechanical structure. This mode is not suitable for flight.
2. NORMAL FLIGHT MODE: switch the flight mode switch 2 to the "OFF" position. The rudder servo has the rudder-lock function, while the elev/aile don't have the balance function. adjust the elev/aile extent adjust knob to 50% position, then make suitable adjustment accordding to the helicopter fight status and your comfort: the bigger percentage you increase the elev/aile extent adjust knob, the more flexiable of the elev/aile servo moves; and vice versa. You don't need to adjust the elev/aile gyro sensitivity adjust knob. This mode is recommended for 3D flight.
3. Balance flight mode: switch the flight mode switch 2 to "ON" position. Not only the rudder servo has the AVCS rudder-lock function, but also the elev/aile have the balance function. First turn the elev/aile extent adjust knob and elev/aile/gyro sensitivity adjust knob/balance control delay adjust knob to the 50% position, and then make suitable adjustment according to the flight status and your comfort: the bigger percentage you increase the elev/aile extent adjust knob, the more flexiable of the elev/aile servo moves; and vice versa. If you increase the sensitivity of the elev/aile gyro, it will increase the balance of the helicopter(it will be the best if the helicopter does not shake); and vice versa.

6.4 Adjustment of receiver

- (1) Status of LED indicator of receiver: quick flash means the signal is being received; solid lighting means the signal has been received; slow flash means no signal has been received.
- (2) Servo extent knob : CW rotating toward (+) increases the servo travel and CCW rotating toward (-) decreases the travel.
- (3) Gyro turning knob: CW rotating toward (+) increases the gyro sensitive and CCW rotating toward (-) decreases the travel.
- (4) Balance delay adjust knob: CW rotating toward (+) decrease the elev/aile servo rotation speed and CCW rotating toward (-) increase the elev/aile servo rotation speed.

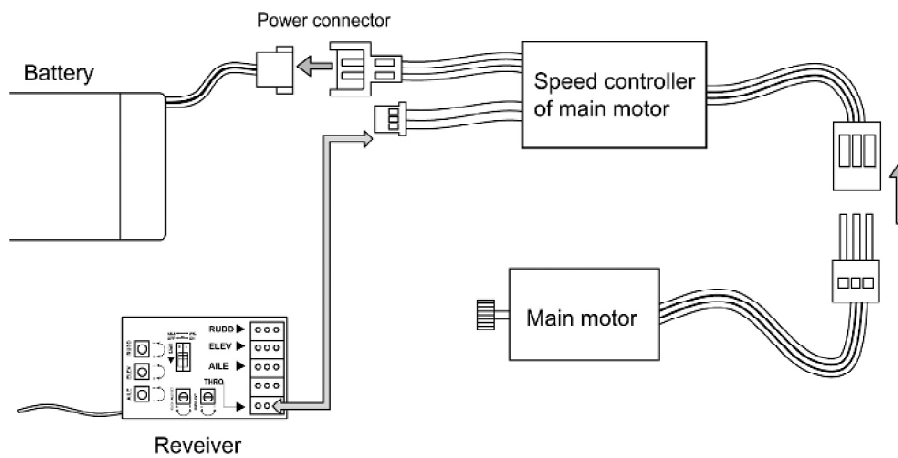
6.5 Channel connection of receiver

S/N	Receiver terminal	Connection method	Wire direction
1	RUDD	Connects to the plug of rudder servo signal wire	The white wire is facing front
2	ELEV	Connects to the plug of elevator servo signal wire	The white wire is facing front
3	AILE	Connects to the plug of aileron servo signal wire	The white wire is facing front
4	PIT	Connects to the plug of pitch servo signal wire	The white wire is facing front
5	THRO	Connects to the plug of brushless ESC throttle signal wire	The white wire is facing front

6.6 Matters needing attention

- (1) All the signal wires should be connected in a correct way. Misconnection will result in failure to receive signal, even damage to receiver.
- (2) Use special adjustment pen to rotate the servo extent knob and gyro sensitive in order to avoid damaging knobs.
- (3) Please strictly follow the sequence of "power on the transmitter first, then connect the battery". Turn on the transmitter, then connect the battery with receiver within 10 seconds, the red light on receiver begins flash. The red light will get a solid light 1-3 seconds, after the transmitter finishes pairing with receiver, the red light will flash again. If the red light get a solid light and a mechanical BEEP sound can be heard from the servo, it means the receiver have received the signal from the transmitter and their codes match successfully.

6.7 Brushless connection sketch map



7.1 Specification and function of servo

7.1.1 Specification of servo

	Weight	Voltage	Torque	Speed	Dimension
WK-02-1	3.18g	3.0~4.5V	0.12kgf.cm	0.12sec/60°	19.2×8.3×19.7mm
WK-03-4	3.5g	3.0~4.5V	0.2kgf.cm	0.12sec/60°	17.5×6.4×21.7mm

7.1.2 Basic function of servo

Servo is a kind of electromechanical device that converts the signal from the receiver into mechanical movement, the function of which mainly aims at transforming the electronic signal into relevant mechanical movement, by means of which the control for its direction and speed can be achieved.

7.2 Connection and adjustment of servo

7.2.1 Connection of servo

S/N	Receiver terminal	Connection method	Wire direction
1	RUDD	Connects to the plug of tail servo signal wire	The white wire is facing front
2	ELEV	Connects to the plug of elevator servo signal wire	The white wire is facing front
3	AILE	Connects to the plug of aileron servo signal wire	The white wire is facing front
4	PIT	Connects to the plug of pitch servo signal wire	The white wire is facing front



07

**Instruction
and
attention of
servo**

7.2.2 Adjustment of servo

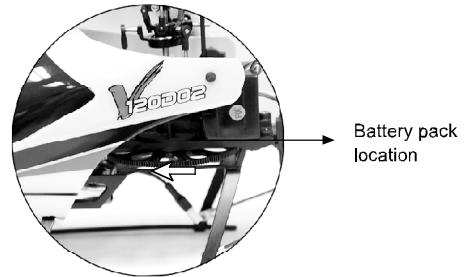
Before departure from Factory, all the servos have been given correct adjustment and are locked at the initiation status. In general, we don't need make any adjustment.

7.2.3 Matters needing attention

- (1) All the plugs should be correctly connected. Otherwise wrong connection will make servos not function or lead to the direction which is different from the pre-set.
- (2) Before departure from Factory, all the servos have been given correct adjustment and are locked at the initiation status. Please ensure that the travels of servo bell cranks should be within the range of its fixed extent during replacement, installation, and adjustment of servo linkages.

8.1 Installation of battery pack

Install the battery pack into the battery compartment along the arrow direction.



Sketch map of battery installation

8.2 Turn on the power

8.2.1 Turn on the power



1. Take off the canopy, and install the battery pack in the battery compartment.



2. Turn on the power of transmitter.



3. Pull down the throttle stick and throttle trim of transmitter to the lowest position, and then move the elevator trim, aileron trim, and rudder trim at the neutral positions, respectively.



4. Connect the power cable of helicopter to receive signal from transmitter.



08

Steps of
flight

8.2.2 Matters needing attention

- (1) Please strictly follow the sequence of "power on the transmitter first, then connect the battery". Turn on the transmitter, then connect the battery with receiver within 10 seconds, the red light on receiver begins flash. The red light will get a solid light 1-3 seconds, after the transmitter finishes pairing with receiver, the red light will flash again. If the red light get a solid light and a mechanical BEEP sound can be heard from the servo, it means the receiver have received the signal from the transmitter and their codes match successfully.
- (2) If failed to connect the power cable of helicopter in 10 seconds after transmitter is turned on, please turn off the transmitter and repeat the step (1).

8.2.3 Troubleshoot of receiver LED keeping on flashing after power cable connected

Possible causes	Solutions
Failure to code pairing.	Re-turn on transmitter and re-connect the power cable of helicopter.
The throttle trim and throttle stick of transmitter are not at the lowest position.	Pull down the throttle trim and throttle stick to the lowest position and re-pair code.
The electricity of transmitter is short or used up.	Change new battery of transmitter, and pair code again.
The electricity of helicopter is short or used up.	Change new battery pack of helicopter, and pair code again.
No function in receiver or transmitter.	Change receiver or transmitter, and pair code again.

8.3 Adjustment before flight

Warning: Disconnect the power cable of main motor before adjustment for the sake of pilot's safety.

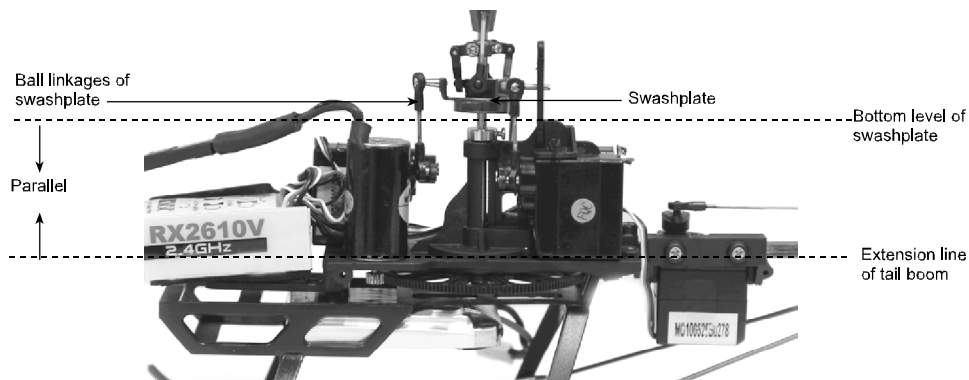
Matters needing attention: all the original equipments have been adjusted well before departure from factory. In general, it is unnecessary to make adjustment. Due to bump caused in long-distance transportation, some joint parts may be loose, even broken off. For the sake of safety, please strictly refer to the section 2.3 – "attention before flight" and check throughout your helicopter.

8.3.1 Adjustment of swashplate

Inspection of swashplate

Warning: Disconnect the power cable of main motor before adjustment for the sake of pilot's safety.

Put your helicopter in a spacious horizontal ground. Move the throttle stick and throttle trim of transmitter to the lowest position, and move the elevator trim, aileron trim and rudder trim at the neutral position, respectively. Turn on the transmitter first and then connect the power cable of helicopter. After the LED in the receiver stops flashing while mechanic beeps of servos initiation heard, the signal has been received. Then check whether the bottom level of swashplate is parallel to the longitudinal axis of the helicopter – the extension line of tail boom. Check also that the bottom level of swashplate is parallel to the lateral axis of the helicopter.



08

Steps of flight



08

Steps of flight

Adjustment of swashplate

Warning: Disconnect the power cable of main motor before adjustment for the sake of pilot's safety.

Servo bellcranks must be horizontal at mid throttle. Swashplate must be at center of travel at mid throttle.

If the bottom of swashplate is not in horizontal level, it can be adjusted via the following three steps:

- (1) Adjust the bellcrank of servo. Disconnect the power cable of helicopter first and then turn off transmitter. Unscrew the screw in the bellcrank of servo and take off the bellcrank. Re-turn on transmitter and re-connect the power cable of helicopter in sequence. After servos' initialization, re-mount the bellcrank of servo and check that the swashplate is at center of travel, and then tighten the screw of bellcrank.
- (2) Adjust the ball linkage of servo. Make the swashplate parallel to the horizontal level via adjusting the length of servo ball linkage.

8.4 Adjustment of main rotor blades

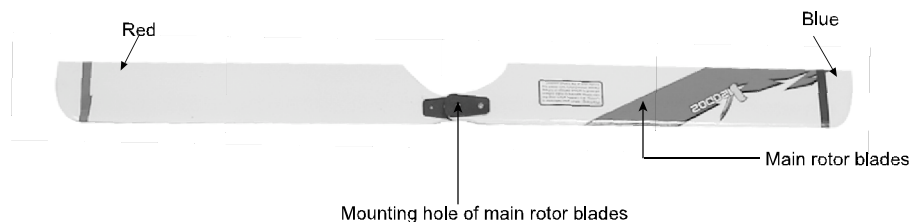
The purpose of adjustment is to make the weight and gravity center of main rotor blades equally distributing and ensure the main rotor blades are in same level during high speed spinning.

8.4.1 Color decal (tracking tape)

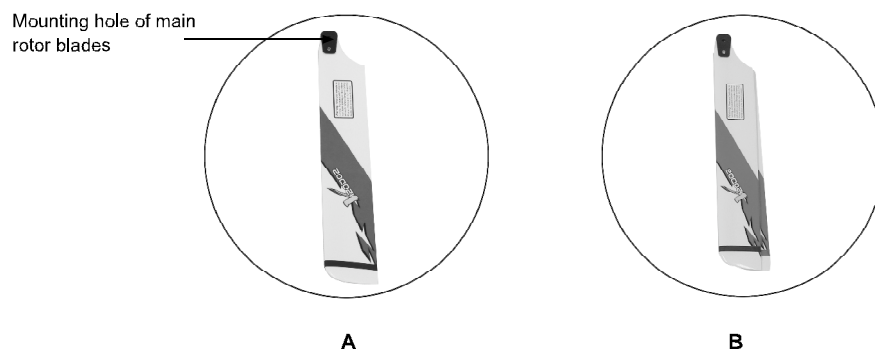
Two different colored blade tracking decals (red and blue) should be placed 6 mm away from each end of blade tip, whose purpose is to identify the position of each spinning blade in the following inspection of blade tracking.

8.4.2 Inspection and gravity center adjustment of main rotor blades

- (1) Transverse inspection and adjustment of gravity center. Use a bolt to insert the mounting hole of main rotor blades and screw the bolt cap, and then stretch the main rotor blades in line. Hang the couple of main rotor blades in the air using the bolt as a fulcrum. If the main rotor blades keep in a horizontal line, it means ok; if one end of the main rotor blades is higher than the other one, please move the high end stick to the high direction, and/ or move the low end stick to the high end until balanced.



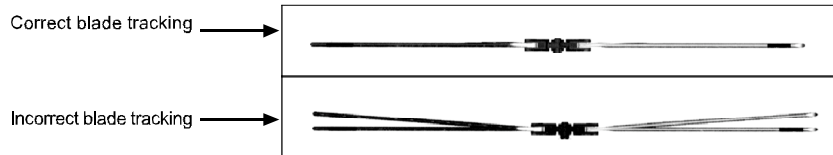
- (2) Longitudinal inspection of gravity center. Shown as below, take the mounting hole of main rotor blades as the fulcrum to vertically hang in the air. If the two main rotor blades are almost superposed, it means normal (shown as Fig. A); otherwise abnormal.



8.4.3 Tracking inspection

Note: for the sake of safety, please keep the main rotor blades of helicopter at least 3 meters away from the pilot when his inspecting the tracking problem.

Slowly push up the throttle stick of transmitter and ensure both the line of sight of pilot and the main rotor blades are in the same horizontal level. When the main rotor blades are spinning, please observe whether or not the two levels, respectively caused by the red and blue decals, are superposed in the same level. Superposition is correct; otherwise there exists tracking problem and adjustment is required.



8.4.4 Adjustment of blade tracking

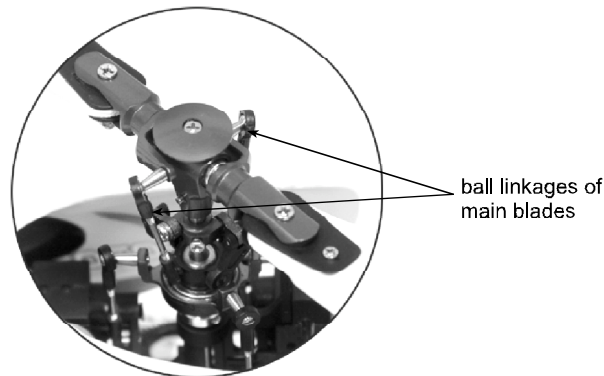
Below are the main causes for incorrect blade tracking:

- (1) The weights of two blades are unequal.
- (2) The gravity center distribution of two blades is unequal.
- (3) The lengths of ball linkages of two blades are set improperly.
- (4) When blades are too loose, blades shake due to gap, or main blade connectors distort.

When the main rotor blades appear to be unbalanced, you should adjust the ball linkage on the right side of the higher to be length or the ball linkage on the right side of the lower to be shorter.

If the main rotor blades happen to be normal at low speed; abnormal at high speed, or abnormal at low speed, normal at high speed, please check whether it is loose or distortion. If it is loose, please re-lock tightly. If it is distortion, please replace it immediately. You only by repeating precise adjustment to avoid of this appearance.

The lengths of ball linkages of main blades are required to adjust when there exist tracking blades. If the decal color of the high blade is red, please shorten the length of the ball linkage of red blade and/ or prolong the length of the ball linkage of blue blade. If the decal color of the high blade is blue, please shorten the length of ball linkage of blue blade and/ or prolong the length of ball linkage of red blade.



8.5 PIT Adjustment

After successfully code paired, Press ENT key, STICK MOD and current stick state (any number among 1-4) are blinking together and then enter the setting state, press UP or DN to PLG. PIT and current switch OFF blink together. Press R or L, then OFF is changed to blinking ON, Transmitter faceplate Knob V1, V2 are in the middle position, adjust PIT: Adjust the knob V1 from “—” terminal to “25%” position (LCD display), Adjust the knob V2 from “—” terminal to “30%” position (LCD display). The PIT parameter is set as:

- (1) when throttle stick is in the middle position, PIT setting value is “5°” and adjust servo connect rod to the same level of swashplate.
- (2) when throttle stick is on the top position, PIT setting value is “8° ~+9°”, and adjust servo connect rod to the same level of swashplate.
- (3) when throttle stick is on the bottom position, PIT setting value is “3° ~-4°”, and adjust servo connect rod to the same level of swashplate.



Appendix 1- flight control



Appendix 2 – trimming the flight actions

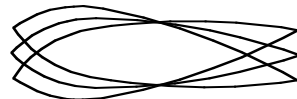
POSITIVE PIT

+8°--9°

+5°

-3°--4°

NEGATIVE PIT

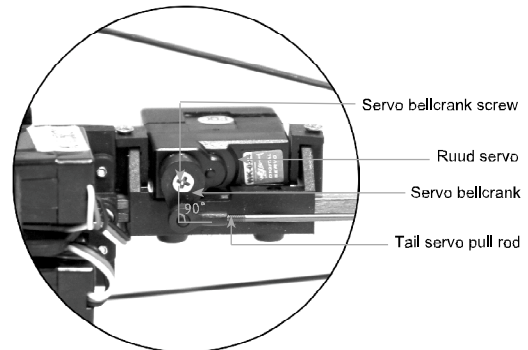
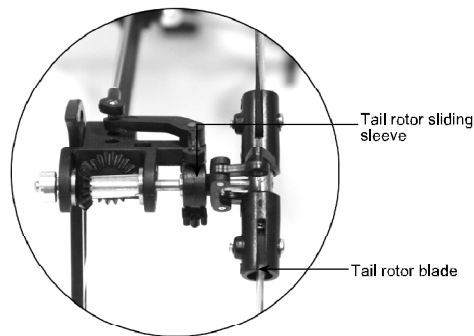


← of main rotor blades

8.6 Rudder Servo Adjustment

Slide the throttle stick and throttle trim to the lowest position and the rudder trim of the transmitter to the neutral position; reconnect to the battery pack and move the rudder stick leftward and rightward after the reposition of tail servo. Check the movement range of the tail rotor sliding sleeve and the angle between the tail servo arm and the tail servo pull rod. If the tail rotor sliding sleeve moves symmetrically left and right and the angle between the tail servo arm and the tail servo pull rod is 90 degrees, the tail servo is in the proper arrangement.

Otherwise, the tail servo and the tail servo pull rod should be re-adjusted. First, disconnect the battery from the motor and loosen the screw on the servo arm, then plug in the battery connection. The tail servo will reposition. Adjust the angle between the tail servo bellcrank and servo linkage rod at 90 degrees and then tighten servo bellcrank screw.

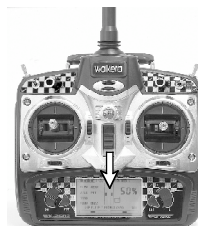


8.7 Adjustment of rudder gyro sensitivity

Press the ENT button on the transmitter after successful pairing, the STICK MOD and the present stick(MODE1-MODEL4) will flash together, then it is in the setting status. Press the UP or DN button to RUDMIX GYRO and the OFF is flashing. Press R or L to change OFF to flashing ON. Rotate the V1 and V2 knobs on the transmitter to the middle position, the red light on receiver keeps on. Rotate the V1 knob towards "+" direction, then enter the gyro locking mode. Set the gyro sensitivity to about 70%(can be seen on LCD display of transmitter).



Step 1: disconnect the power cable of helicopter.



Step 2: turn off the transmitter.



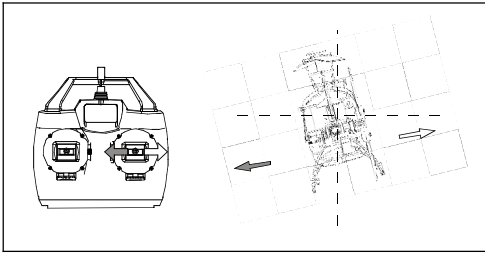
Step 3: take off the canopy and remove the battery pack.



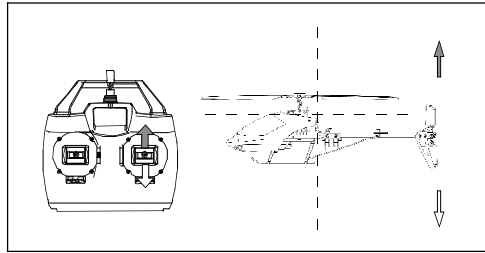
09

Flight over

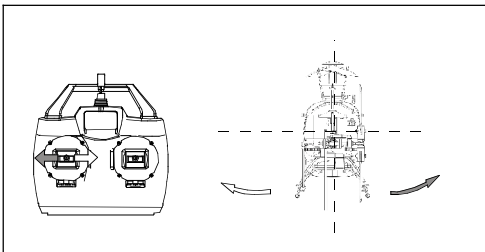
Mode 1 (throttle stick at right hand)



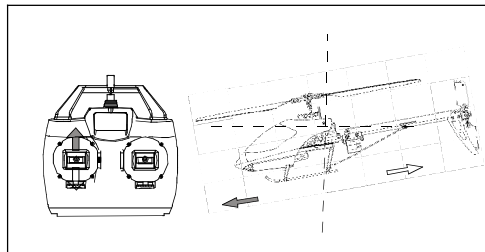
1. When moving the aileron stick left or right, the helicopter accordingly flies left or right.



2. When moving the throttle stick up or down, the helicopter accordingly flies up or down.

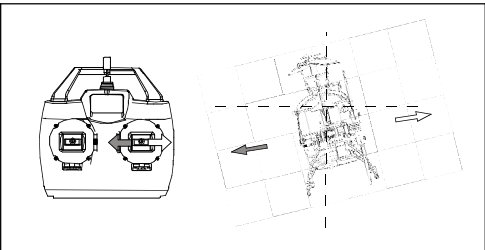


3. When moving the rudder stick left or right, the head of helicopter accordingly flies left or right.

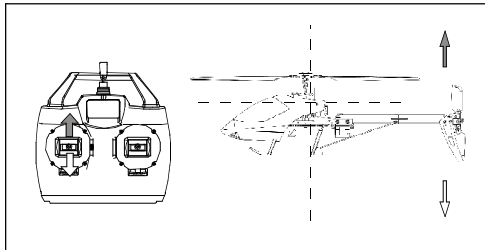


4. When moving the elevator stick up or down, the helicopter accordingly flies forward or backward.

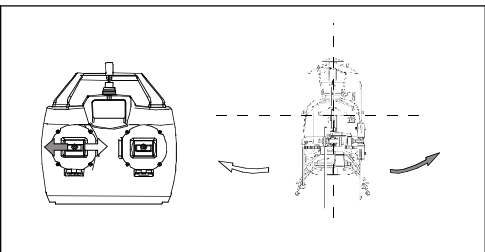
Mode 2 (throttle stick at left hand)



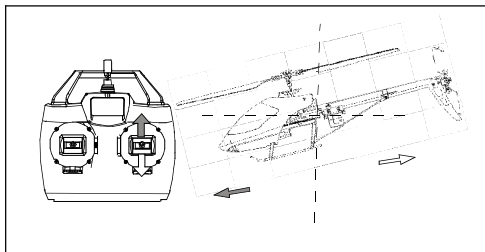
1. When moving the aileron stick left or right, the helicopter accordingly flies left or right.



2. When moving the throttle stick up or down, the helicopter accordingly flies up or down.



3. When moving the rudder stick left or right, the head of helicopter accordingly flies left or right.



4. When moving elevator stick up or down, the helicopter according flies forward or backward.

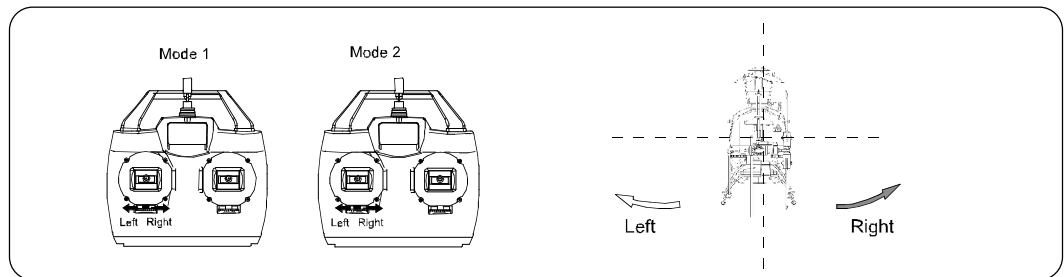


**Appendix 1-
flight control**



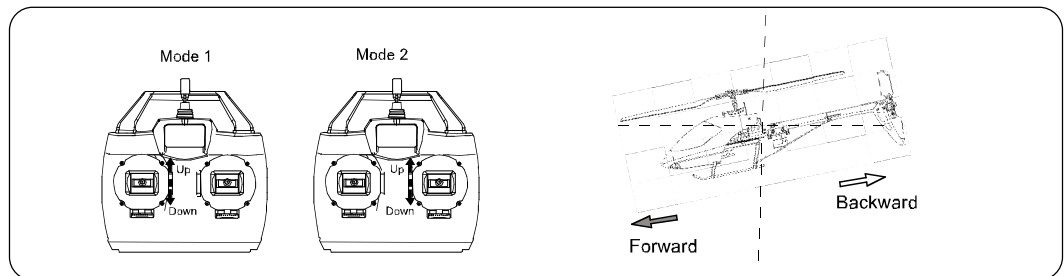
Appendix 2 – trimming the flight actions

1. Adjust the rudder trim



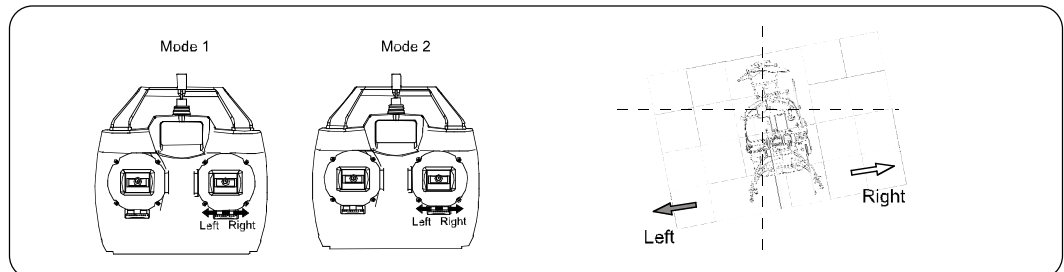
Move the rudder trim left if the head of helicopter flies right during take off; otherwise move the rudder trim left .

2. Adjust the elevator trim



Move the elevator trim down if the helicopter flies down during takeoff; otherwise move it up.

3. Adjust the aileron trim



Move the aileron trim right if the helicopter flies left during takeoff; otherwise move it left.



Appendix 3 – flight practice

1 flight practice for the beginner

1.1 Matters needing attention

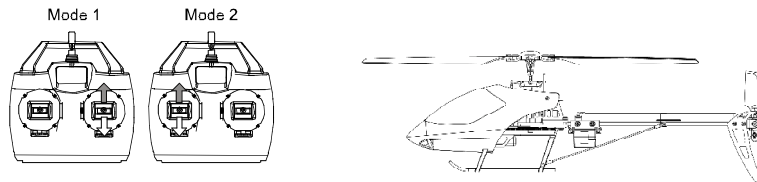
- (1) The beginners should be supervised and guided by skilled pilots when practicing.
- (2) For the sake of safety, people should keep at least 5 meters away from the helicopter during practicing.
- (3) Choose a spacious ground without people and obstacles as the flight practice field.
- (4) This is a 3D helicopter. We kindly suggest that the knowledge of flying 2D/ coaxial helicopter is preliminary before flight.

1.2 Steps

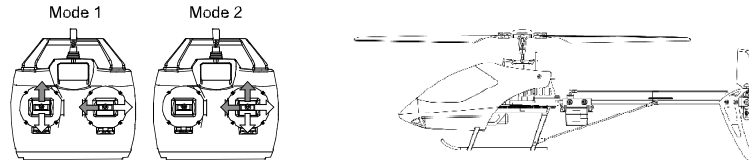
(1) Practice of throttle control - stationary flight

When helicopter taking off from the ground, slowly pull down the throttle stick and land it on gradually and stably. Repeatedly practice this step until controlling over the throttle stick with facility.

When hovering, tail rotor counteracts torque but also pushes helicopter to the left. Don't forget to counteract this effect using cyclic stick to the right and take off slightly inclined. It is important to hover vertically, stabilize helicopter at 1.5m height and then land it.

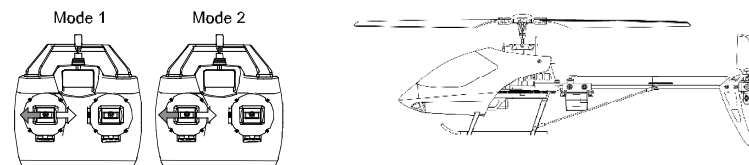


(2) Practice of aileron and elevator control



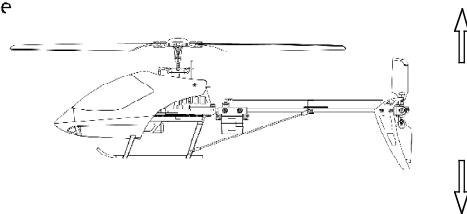
Slowly push up the throttle stick to purposely fly your helicopter forward, backward, left and right; then reversely control over the aileron stick and elevator stick to fly your helicopter back to the takeoff point. Repeatedly practice this step until controlling with facility.

(3) Practice of rudder control



Slowly move the throttle stick to change the head of your helicopter left and right, respectively; reversely control over the relative sticks to restore your helicopter. Repeatedly practice this step until controlling with facility.

(4) Frog-hopping practice



Repeatedly push up and pull down the throttle stick of transmitter to vertically take off and land your helicopter. It is called "frog-hopping practice" because the whole practice process is like a frog jumping

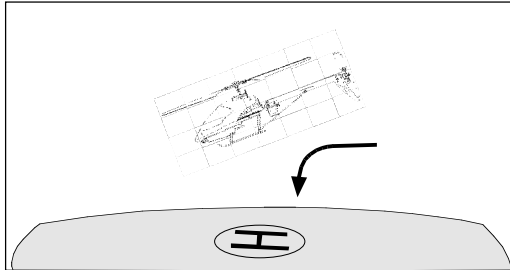


Appendix 3 – flight practice

2 Advanced practice

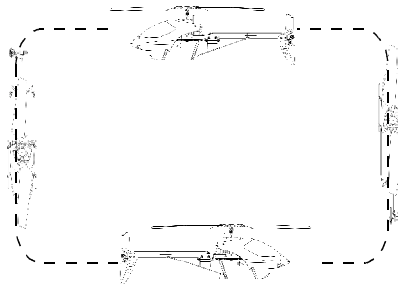
2.1 practice of takeoff and landing

Select a patch of fixing ground as the flight platform to purposely take off and land your helicopter in a set range. The process of takeoff and landing should be kept stable and vertical as best as possible.



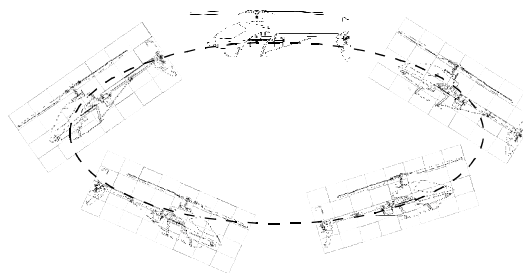
2.2 practice of square flight

Take the takeoff point as the center to draw a square whose side length is about 2 meters. Fly your helicopter along the 4 sides and keep the flight height parallel to the line of sight. Make 90° rotate at each corner of the quadrangle to adjust the flight direction. Train you the skill of straight flight and the adjustment of flight courses at right angle in flight.



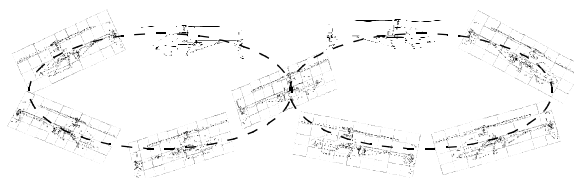
2.3 Practice of circular flight

After you master the operations with facility from step 2.1 to 2.2, please draw a proper size of circle in the ground. Then fly your helicopter along the circle track until you are skillful. This maneuver is more complex than first impressions may suggest because you have to use all orientations.



2.4 Figure eight practice

If you are skillful in the previous practices, you can try the figure eight flights shown as below.





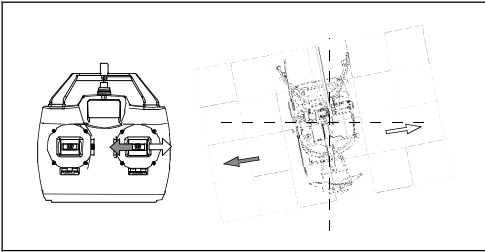
**Appendix 3 –
flight practice**

2.5 Aerobatic flight

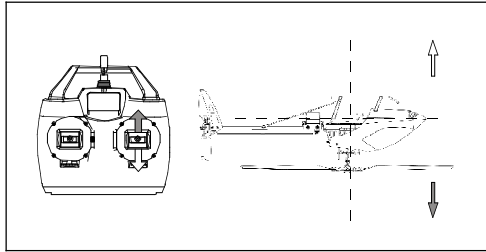
Your V120D02 can perform such breathtaking and exciting aerobatic flight as dive's and 3D inverted.

Inverted flight

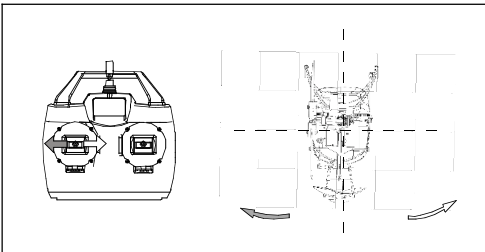
Mode 1 (throttle stick at right hand)



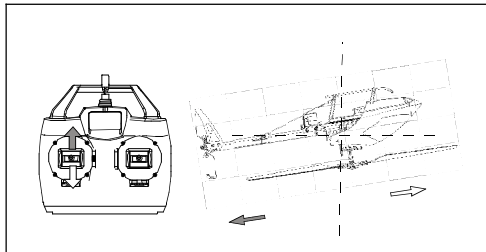
1. When moving the aileron stick left or right, simultaneously your helicopter flies left or right, respectively.



2. When moving the throttle stick up or down, simultaneously your helicopter flies up or down, respectively.

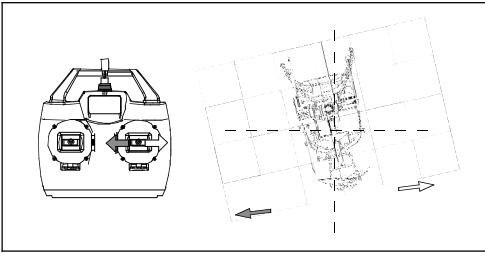


3. When moving the rudder stick left or right, your helicopter simultaneously flies right or left, respectively.

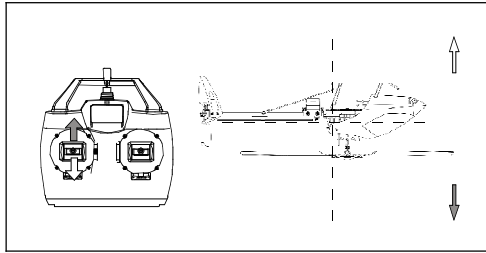


4. When moving the rudder stick up or down, your helicopter simultaneously flies backward or forward, respectively.

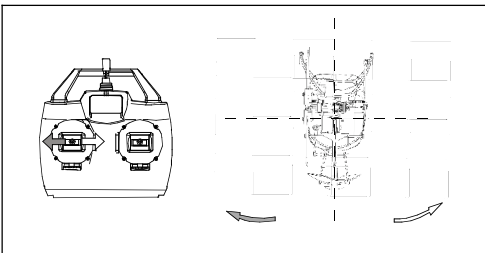
Mode 2 (throttle stick at left hand)



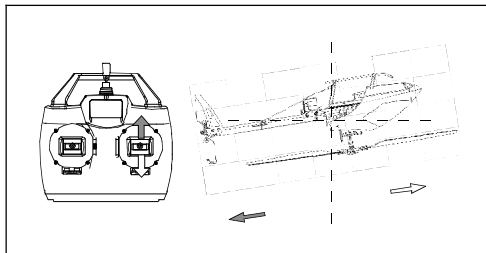
1. When moving the aileron stick left or right, your helicopter simultaneously flies left or right, respectively.



2. When moving the throttle stick up or down, your helicopter simultaneously flies down or up, respectively.



3. When moving the rudder stick left or right, the head of your helicopter simultaneously flies right or left, respectively.



4. When moving elevator stick up or down, your helicopter simultaneously flies backward or forward, respectively.