



User Handbook

Specifications:

Main Rotor Diameter : 308mm	Standard transmitter: DEVO-10	Servo: WK-02-1	Tail Servo: WK-03-4
Tail Rotor Diameter : 85mm	Optional transmitter: DEVO-6/7/8S/12S	weight 3.18g	weight 3.5g
Overall Length: 290mm	Receiver: RX2636H-D	speed 0.12sec/60° (3.0~4.5V)	speed 0.12sec/60° (3.0~4.5V)
Gyro: Six-Axis	Battery: 3.7V 600mAh Li-Po	torque 0.12kg/cm (3.0~4.5V)	torque 0.2kg/cm (3.0~4.5V)
All-up Weight: 100g (Battery included)	Brushless Motor: WK-WS-15-001	dimension 19.2×8.3×19.7mm	dimension 17.5×6.4×21.7mm
	Brushless Speed Controller: WK-WST-20A-L		

Features:

- 1) The flybarless design characterizes low power loss and great improvements in efficiency.
- 2) Adopting 6-Axis gyro and flybarless control system, amending flight status automatically, and suitable for beginner to get used to practice F3D.
- 3) Adoption of a highly efficient shaft drive tail system significantly reduces waste in the power-train.
- 4) Highly developed low voltage drive system provides a green, environmentally friendly and safe power solution.
- 5) Low voltage and high torque brushless motor provides strong and durable power.
- 6) Mini size helicopter for indoors, providing 8-9 minutes of flight time after a full charge.
- 7) The receiver can upgrade by Walkera hompage.

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01

Foreword



02

Safety matters needing attention

Dear customer:

Thank you for purchasing a Walkera radio control aircraft product. In order to quickly and safely master the operation of the NEW V120D02S RC helicopter, please read the user handbook carefully and then keep it in a safe place for future consultation and reference.

NEW V120D02S with spread spectrum technology features impressive power, stable flight, immediate response and strong anti-jamming characteristics.

2.1 Important Statement

- (1) This product is not a toy. It is a piece of complicated equipment which harmoniously integrates engineering materials, mechanics, electronics, aerodynamic and high frequency radio. Correct installation and adjustment are necessary to avoid accidents taking place. The owner must always operate in a safe manner. Improper operation may result in serious property damage, bodily injury or even death.
- (2) We accept no liability for damage and consequent damage arising from the use of these products, as we have no control over the way they are maintained, used and operated.
- (3) This product is suitable for experienced RC Helicopter pilots aged 14 years or more. All minors must be accompanied by a responsible adult when flying.
- (4) The flight field should be legally approved by the local government. We accept no liability for any safety duties or fines arising from operation, usage or mis-control after the sale of the products.
- (5) We consign our distributors to offer technical support and service after sale. Please contact the local distributors for problem resolution caused by usage, operation, maintenance, etc.

2.2 Safety matters needing attention

RC helicopter flight is a high risk hobby, whose flight should be kept far away from other people. Mis-assembled or broken main frame, defective electronic equipment, and/or problematic 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 obstacles and people

An RC helicopter in flight has risk of uncertain flight speed and direction which is potentially dangerous. When flying, please keep your RC helicopter far away from people, high buildings, high-tension lines, etc, and avoid operating in rain, storms, thunder and lightening.



- (2) Keep away from humidity

RC helicopter should be kept away from humidity and vapor because its complex, precise electronic components and mechanical parts may be damaged.



- (3) Proper operation and maintenance

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



- (4) Avoid flying alone

At the beginning of learning about radio-controlled flight there are some difficulties to overcome. Please avoid flying alone. Invite experienced pilots to guide you (two of the most effective methods to practice are via a PC flight simulator and/or under the supervision of a skilled pilot).



(5) Safe operation

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



(6) Keep away from high-speed rotating parts

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



(7) Protect from heat

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



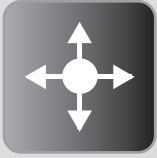
2.3 Attention before flight

- (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 incorrect order of connection may cause your helicopter to loose control. Please cultivate the correct habit of turn-on and turn-off.
- (5) Ensure the directions and actions in which servos execute transmitter commands are correct and smooth with respect to inputs. Never operate the helicopter with a broken servo as it will result in further damage to the product or people.
- (6) Check there are no missing or loose screws and nuts, no incorrectly assembled or damaged parts. Carefully check the main blades have no defects, especially the position close to the main blade connector. Broken or mis-assembled parts will have a negative effect on the flight performance, and will cause unforeseen potential dangers.
- (7) Check all the connections between ball linkages and balls. Loose linkages and balls should be replaced. Loose connections between linkages and balls will have a negative effect on the flight performance possibly resulting in a loss of control .
- (8) Make sure the connections between the power cables of the battery pack and motors are solid. Continuous vibration and drastic 3D actions may loosen the batteries or cables in flight, possibly resulting in a loss of control.



02

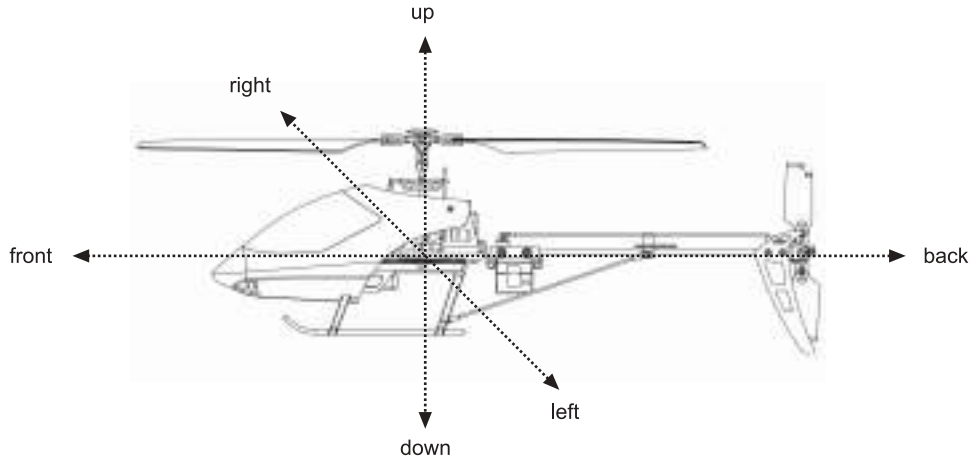
**Safety matters
needing
attention**



03

Definition of Helicopter Orientation

In order to avoid confusion, the following sections will use the directions and orientations defined as follows. The helicopter is in front of the pilot with the tail boom and rotor closest to the pilot (tail in), the head or nose is facing forward (pointing away from the pilot). The left hand of the pilot is to the left side of the helicopter, the right hand of the pilot is to the right side of the helicopter. Its head/nose is to the front and its tail boom is to the back. The direction in which the main body is facing is defined as up and its skids are in the down direction, as shown in the diagram below.



04

Standard equipment



▲ NEW V120D02S helicopter



▲ Transmitter



▲ Li-polymer battery pack



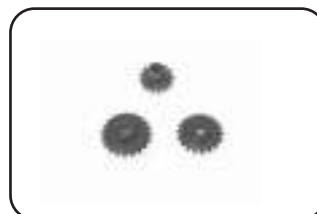
▲ Tool kit



▲ Wall adapter /Power supply



▲ Main rotor blades



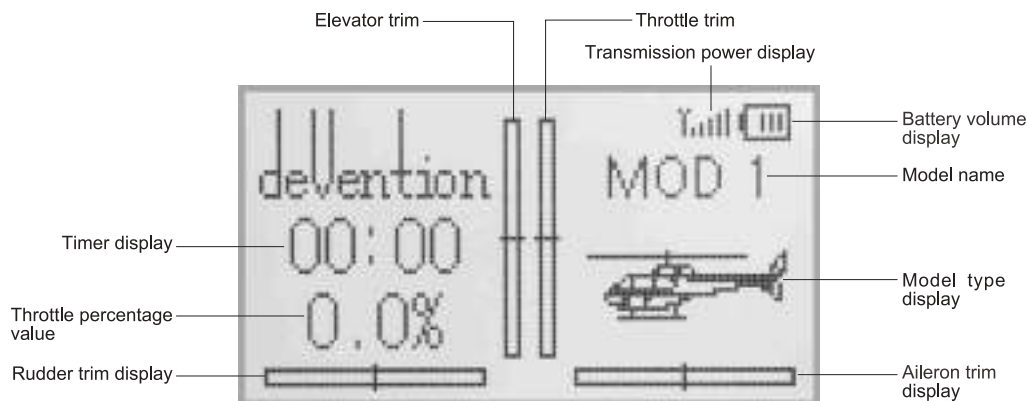
▲ Tail gear



▲ User Handbook

5.1 DEVO-10(standard radio) setting

5.1.1 Boost Screen

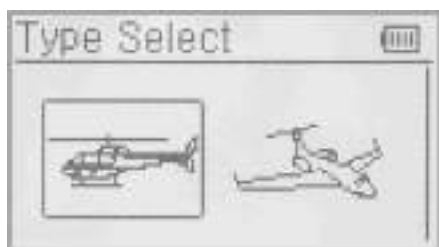


5.1.2 Type Select

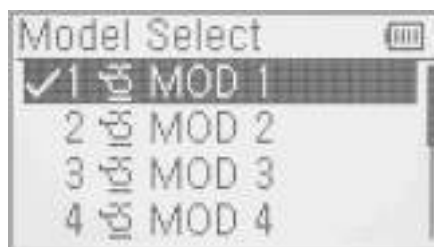
Press ENT to get Main Menu and press UP or DN to select Model Menu. Press ENT to enter and press UP or DN to select Type Select and press ENT to enter setting interface. Press R or L to get the icon of Helicopter and press ENT to confirm, then press EXT to exit.

5.1.3 Model Select

Press UP or DN to select Model select in Model Menu, press ENT to get the Model Select setting interface; press UP or DN to select MOD 1, then press ENT to confirm and then press EXT to exit.



5.1.2 Type Select



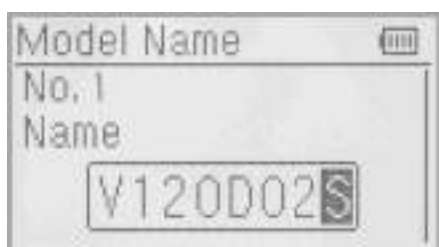
5.1.3 Model Select

5.1.4 Model Name

Press UP or DN to select Model Name in Model Menu, press ENT to get the Model Name setting interface. Press UP or DN to select the character and figure which are needed to be changed, press R or L to change character and named V120D02S. press EXT to exit after finished.

5.1.5 Swash Type

Press UP or DN to choose SWASH in Model Menu, press ENT enter to Swash setting interface. press UP or DN to choose 1 Servo Normal, and press ENT to confirm and then press EXT to exit.



5.1.4 Model Name



5.1.5 Swash Type



05

Transmitter setup

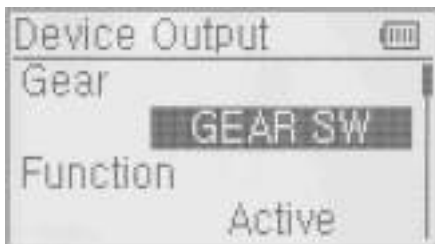
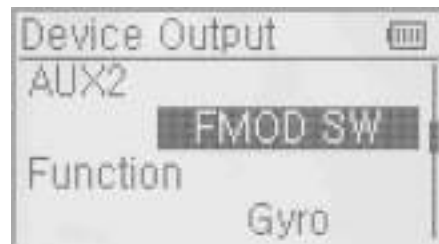


05

Transmitter
setup

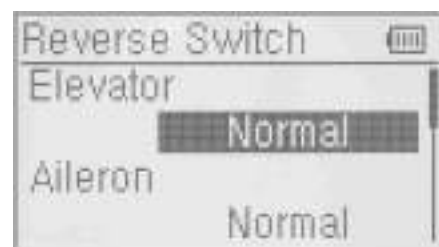
5.1.6 Device Output

Press UP or DN to select Output Device in Model Menu and press ENT to enter Output Device interface; press UP or DN to select "GEAR SW" "Activate", and "FMOD SW" "Gyro". Press ENT to confirm and then press EXT to exit.



5.1.7 Reverse Switch

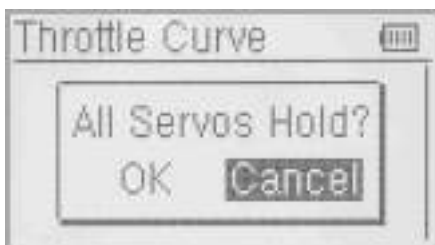
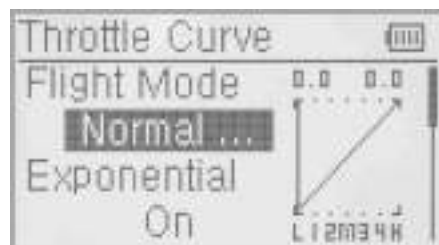
Press UP or DN to select Function Menu in Main Menu, press UP or DN to choose Reverse Switch and press ENT to enter into Reverse Switch interface; press UP or DN to choose channel, press R or L to shift the status between normal and reverse, and press ENT to confirm and then press EXT to exit.



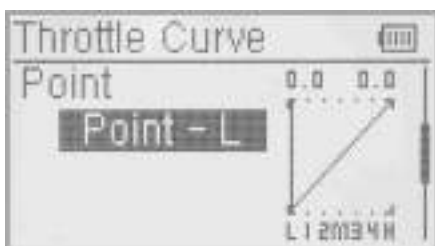
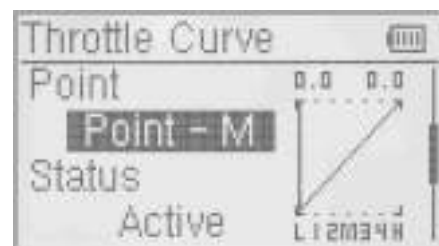
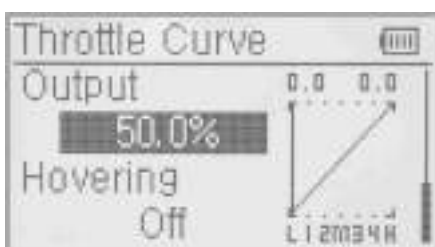
Channel	Elevator	Aileron	Throttle	Rudder	Gear	Pitch	Gyro	AUX3	AUX4	AUX5
Status	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal

5.1.8 Throttle Curve

Press UP or DN to select Throttle Curve in Function Menu, press ENT, the enquiry dropdown is shown "All servos hold?" press R or L to choose Cancel, and press ENT to confirm. There are total three flight modes: Normal Flight, Stunt1 and Stunt2, and the flight mode can be shifted by FMOD. Press DN, you can choose ON or OFF, press R/L to choose ON.



Press DN, there will interface of Curve Point, can choose L M H by press R/L. press DN, there will be Output Setting. press R/L to choose the value of point, and press ENT to confirm and then press EXT to exit.



Flight mode \ point output	point		
	L	M	H
Normal Flight	0.0%	50.0%	100.0%
Stunt 1	100.0%	75.0%	100.0%
Stunt 2	100.0%	75.0%	100.0%

5.1.9 Pitch Curve

Press UP or DN to choose Pitch Curve in Main Menu, a dropdown pops up " All servos hold? " to enter the interface, press R/L to choose Cancel,and press ENT to confirm.There are Normal mode, Stunt 1, Stunt 2 , 3 flight modes. The flight mode can be shifted by FMODE. Press DN , you can choose Pitch curve ON or OFF, press R/L to choose ON.



Press DN, there will interface of Curve Point, choose L M H by press R/L. press DN, there will be Output Setting. Press R/L to choose the value of point,and press ENT to confirm and then press EXT to exit.

Flight mode	point output		
	L	M	H
Normal Flight	-20%	+20%	+56%
Stunt 1	-56%	+0%	+56%
Stunt 2	-56%	+0%	+56%

5.1.10 Gyro Sensor

Press UP/DN to choose Gyro Sensor in Functional Menu, then press ENT into Gyro Sensor interface,press R or L to choose Manual Setting;press DN, SWITCH will be shown, press R or L to choose MIX SW; press DN, "position 0" will be show first,and press R/L to increase/decrease value individually.Press DN "position 1" and "position 2" will be show after finishing "position 0".and press ENT to confirm and then press EXT to exit.

Mode	Manual
Switch	MIX SW
Pos 0	80.0%
Pos 1	75.0%
Pos 2	50.0%



05

Transmitter setup



05

Transmitter setup

5.2 DEVO-6/7/8S/12S(optional radio) settings

5.2.1 Type:Helicopter

5.2.2 Swash type:1 Servo Normal

5.2.3 Device Output

DEVO-6			DEVO-7			DEVO-8S			DEVO-12S		
Gear	GEAR SW	Gyro	GEAR	GEAR	ACT	Gear	GEAR SW	Active	Gear	GEAR SW	Active
Pitch	System	Active	AUX2	AUX2	GYRO	Pitch	System	Active	Pitch	System	Active
						AUX2	FMOD SW	Gyro	AUX2	AUX2 Lever	Gyro
						AUX3	RUDD D/R	Active	AUX3	AUX3 Lever	Active
									AUX4	AUX4 Lever	Active
									AUX5	AUX5 Lever	Active
									AUX6	AUX6 Knob	Active
									AUX7	AUX7 Knob	Active

5.2.4 Reverse switch settings

DEVO-6		DEVO-7		DEVO-8S		DEVO-12S	
Elevator	Normal	ELEV	NORM	Elevator	Normal	Elevator	Normal
Aileron	Normal	AILE	NORM	Aileron	Normal	Aileron	Normal
Throttle	Normal	THRO	NORM	Throttle	Normal	Throttle	Normal
Rudder	Normal	RUDD	NORM	Rudder	Normal	Rudder	Normal
Gyro	Normal	GEAR	NORM	Gear	Normal	Gear	Normal
Pitch	Normal	PITCH	NORM	Pitch	Normal	Pitch	Normal
		GRYO	NORM	Gyro	Normal	Gyro	Normal
				AUX3	Normal	AUX3	Normal
						AUX4	Normal
						AUX5	Normal
						AUX6	Normal
						AUX7	Normal

5.2.5 Throttle curve

Flight mode	L	M	H
Normal Flight	0.0%	50.0%	100.0%
Stunt 1	100.0%	75.0%	100.0%
Stunt 2	100.0%	75.0%	100.0%

5.2.6 Pitch curve

Flight mode	L	M	H
Normal Flight	-20%	+20%	+56%
Stunt 1	-56%	+0%	+56%
Stunt 2	-56%	+0%	+56%

5.2.7 Gyro sensor

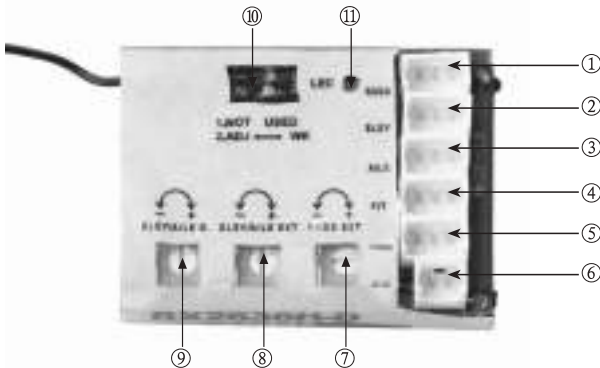
Mode	Manual
Switch	MIX SW
Pos 0	80.0%
Pos 1	75.0%
Pos 2	50.0%



Setup of the RX2636H-D receiver

6.1 RX2636H-D receiver features

- (1) The RX2636H-D receiver uses 2.4GHz spread spectrum technology with automatic scanning, code paring and LED bind indication functions.
- (2) The use of a high performance receiver dramatically reduces the possibility of signal loss and ensures the accuracy and reliability of signal reception.
- (3) 6-channel output makes multiple functions with fine control available.
- (4) Gyro sensitivity and servo extent controls permit fine and customized adjustment to exactly match your operating requirements.
- (5) Adopting 6-Axis gyro and flybarless control system, amending flight status automatically, and suitable for beginner to get used to practice F3D.



6.2 Function of receiver

S/N	Name for short	Full name	Function
1	RUDD	Rudder servo	Connects to the rudder servo and transmits the control signal of rudder servo.
2	ELEV	Elevator servo	Connects to the elevator servo and transmits the control signal of elevator servo.
3	AILE	Aileron servo	Connects to the aileron servo and transmits the control signal of aileron servo.
4	PIT	Pitch servo	Connects to the PIT servo and transmits the control signal of PIT servo
5	THRO	Throttle	Connects to the brushless ESC and transmits the control signal to the brushless ESC (Electronic Speed Controller).
6	AUX	AUX	After the receiver upgrade into telemetry function,the receiver can connect with the temperature sensor to test the motor temperature.
7	RUDD EXT.	Rudder servo extent dial	Rudder servo extent dial is used to set up the servo travel.
8	ELEV/AILE EXT.	Elevator/Aileron servo extent dial	Elevator/Aileron servo extent dial is used to set up the servo travel.
9	ELEV/AILE G.	Elevator/Aileron gyro sensitivity adjust dial	Adjusts the Elevator/Aileron gyro sensitivity, changes the flight effect.
10	ADJ - WK	Flight mode switch	Set up flight mode ,ADJ or WK. (Use Switch2,Switch 1 is Idle)
11	LED	LED	Displays the status of signal reception and binding.

6.3 Flight mode setting

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

- (1) Adjustment mode: Move the flight mode switch 2 to the ADJ position after successfully binding with the transmitter. The receiver and helicopter are now in adjustment mode. This mode is used to set the servo horns and swashplate parallel and horizontal.Once correctly setup, make sure to move the switch 2 back to WK. ADJ mode cannot be used for flying.



06

Setup of the RX2636H-D receiver

- (2) Gyro stabilized flight: Switch the flight mode switch 2 to the WK position. Not only does the rudder servo have the AVCS heading lock function, but the ELEV/AILE also have the stabilization function. First turn the ELEV/AILE extent adjust knob and ELEV/AILE gyro sensitivity 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 flexible the movement of the ELEV/AILE servos, and vice-versa. If you increase the sensitivity of the elev/aile gyro, it will increase the stability of the helicopter (It's best to have no shake). If the helicopter starts to shake, reduce the setting slightly.

6.4 Adjustment of receiver

- (1) Receiver LED indicator: Quick flashing indicates the reception of a new signal; a solid light means connection is completed successfully; slow flashing indicates failure to receive a signal, please disconnect and reconnect the battery.
- (2) Servo extent knob: CW rotating towards (+) increases the servo travel and CCW rotating towards (-) decreases the travel.
- (3) Gyro turning knob: CW rotating towards (+) increases the gyro sensitivity and CCW rotating towards (-) decreases the gyro sensitivity.
- (4) Receiver fixed ID cancellation: Insert the supplied BIND PLUG into the ELEV channel in the receiver, and then power on the receiver. The red light of receiver will flash slowly. This means the fixed ID code has been cancelled. Remove the BIND PLUG.
- (5) Upgrade receiver: please plug the three-colored wire (black, red and blue) terminal into ELE channel on receiver, meanwhile plug the other three-colored wire (black, red and yellow) terminal into Aileron channel (the fix ID will probably be cleared after upgrading).

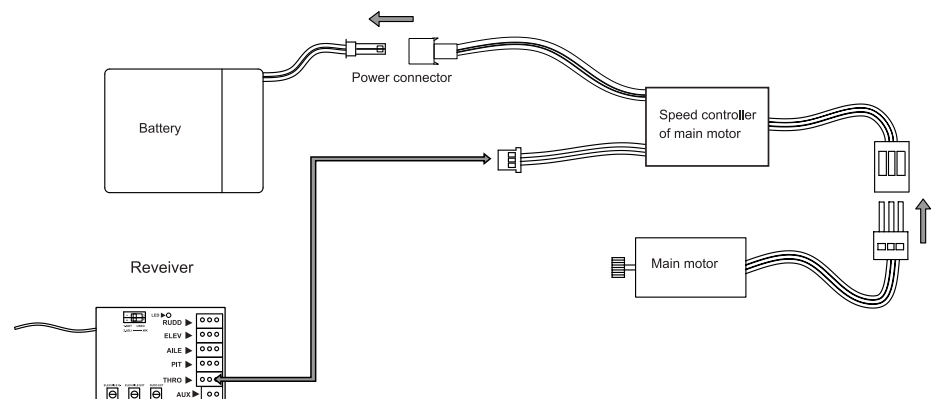
6.5 Channel connection of receiver

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
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 the correct way. Misconnection will result in failure to receive signal and even damage the receiver.
- (2) Use the special adjustment pen supplied to rotate the servo extent dial and gyro sensitivity dial in order to avoid damaging the adjustment dials.
- (3) The helicopter must be placed in horizontal level when matching code.
- (4) Please always strictly follow the sequence of "power on the transmitter first, then connect the battery". Turn on the transmitter, then connect the battery to the receiver within 10 seconds, the red indicator on the receiver will begin to flash in 1-3 seconds. The flashing red indicator turns to solid, after the transmitter finished pairing with the receiver, the red indicator flashes again. If the red indicator turns solid and a mechanical BEEP sound can be heard from the servos/ESC, it means the receiver has successfully received the signal from the transmitter and their codes match.

6.7 Brushless ESC and motor connection diagram



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

A servo is an electro-mechanical device that converts a signal from the receiver into mechanical movement. By means of a sensor the accurate control of its direction and speed is possible.

7.2 Connection and adjustment of servos

7.2.1 Connection of servos

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

7.2.2 Adjustment of servos

Before departure from the factory, all the servos have been correctly adjusted and are locked in the correct position. In general no adjustment is needed.

7.2.3 Matters needing attention

- (1) All the plugs should be correctly connected. An incorrect connection will cause the servos not to function or to operate in a direction which is different from the one required.
- (2) Please ensure that the travel extents of the servo bell cranks are all within the permitted maximum range after maintenance, replacement or adjustment of servo linkages. Failure to do this could cause a servo to jam at maximum travel causing loss of control, damage and possibly injury.



07

Servo setup
and
adjustment



08

Steps of flight

8.1 Installation of battery pack

Install the battery pack into the battery compartment in the direction of the arrow.

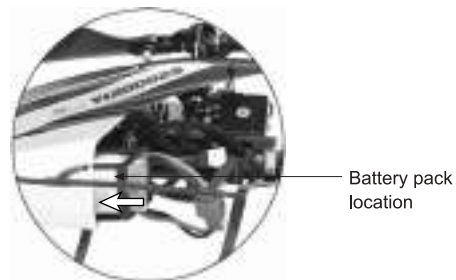
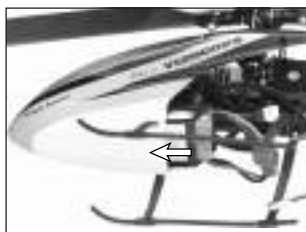


Diagram of battery installation.

8.2 Turn on the power

8.2.1 Turn on the power



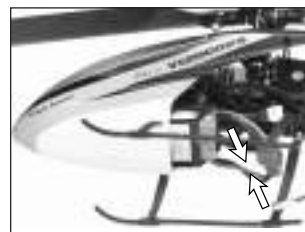
1. Install the battery pack in the battery compartment.



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 the helicopter and wait to receive the signal from the transmitter. The helicopter should be placed on flat ground or surface during code paring (binding). Do not move the transmitter sticks or the helicopter until binding has completed.

8.2.2 Matters needing attention

- (1) Please always strictly follow the sequence of "power on the transmitter first, then connect the battery". Turn on the transmitter, then connect the battery to the receiver within 10 seconds, the red indicator on the receiver will begin to flash in 1-3 seconds. The flashing red indicator turns to solid, after the transmitter finished pairing with the receiver, the red indicator flashes again. If the red indicator turns solid and a mechanical BEEP sound can be heard from the servos/ESC, it means the receiver has successfully received the signal from the transmitter and their codes match.
- (2) If more than 10 seconds passed before the power cable was connected binding will fail. When binding fails, disconnect the battery, turn off the transmitter and repeat step (1).

8.2.3 Trouble shooting a flashing receiver LED after connecting the power cable

Possible causes	Solutions
Code pairing failed.	Turn transmitter off then on and re-connect helicopter power cable.
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-code pair.
The transmitter battery is low or empty.	Replace transmitter battery and re-code pair (re-bind).
The helicopter battery is low or empty.	Replace the helicopter battery with a fresh pack and re-code pair.
No function in receiver or transmitter.	Replace faulty receiver or transmitter and re-code pair.

8.3 Adjustment before flight

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

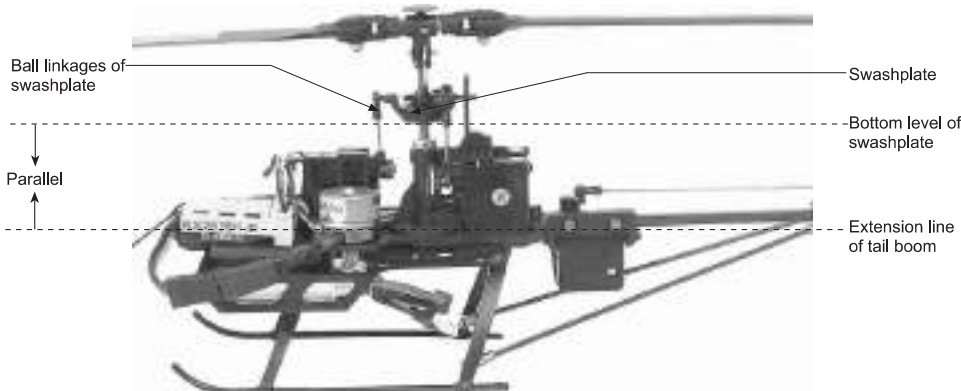
Matters needing attention: Before departing the factory, all of the components have been correctly adjusted. Normally it is not necessary to make any adjustment. However, due to disturbance during long-distance transportation, some joints, screws or parts may be loose or even damaged. For safety's sake, please refer to section 2.3 - "attention before flight" and strictly follow the helicopter checks described.

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.

Place your helicopter on a spacious flat ground. Move the transmitter throttle stick and throttle trim to the lowest position. Move the elevator trim, aileron trim, and rudder trim to the neutral position. Turn on the transmitter first and then connect the power cable of the helicopter. After the LED on the receiver stops flashing and the beeps of the servos are heard, the transmitter and receiver are successfully connected. Next, check if the bottom plane of the swashplate is parallel to the longitudinal axis (front to back) of the helicopter - the extension line of the tail boom. Also check if the plane of the swashplate is parallel to the lateral axis (left to right) of the helicopter.



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 during the check above it is found that the swashplate is not level with either axis it can be adjusted using the following 2 steps:

- (1) Adjust the servo bellcrank. First disconnect the helicopter power cable and turn off the transmitter. Unscrew the screw in the bellcrank of the servo and remove the bellcrank. Re-turn on the transmitter and re-connect the helicopter power cable in sequence. After code pairing, replace the servo bellcrank so it is horizontal and check the swashplate is now level. If the swashplate is still angled or not at the center of travel, replace and re-tighten the bellcrank screw and move to step (2).
- (2) Adjust the servo ball linkage. Adjust the length of the ball linkages of each servo until the swashplate is level and in the centre of the range of travel.



08

Steps of flight



08

Steps of flight

8.4 Adjustment of main rotor blades

The aim of adjustment is to equalize the weight and centre of gravity of the main rotor blades and to ensure the blades are at the same level when rotating. Correct adjustment of the blades reduces vibration which improves performance and durability.

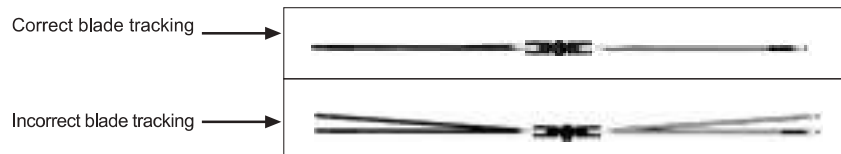
8.4.1 Color decal (tracking tape)

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

8.4.2 Tracking inspection

Note: For safety, please keep the helicopter main rotor blades at least 3 meters away from the pilot, and others, when checking the tracking.

Slowly push up the throttle stick on the transmitter and ensure the pilots line of sight and the main rotor blades are at the same level horizontally. When the main rotor blades are spinning, please observe whether or not the two blades, one with red and one with blue decals are superposed in the same level. If there is only a single line superposition, tracking is correct; if not, there is a tracking problem and adjustment is required.



8.4.3 Adjustment of blade tracking

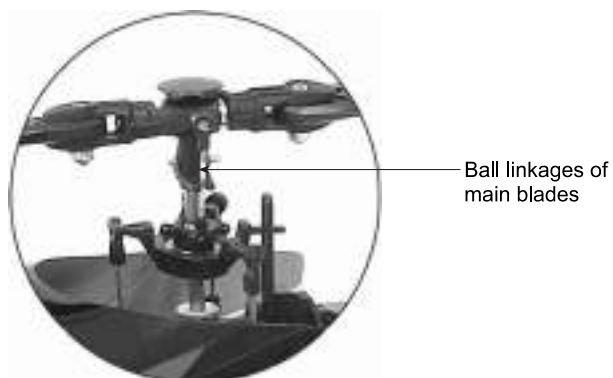
Below are the main causes for incorrect blade tracking:

- (1) The weights of the two blades are unequal.
- (2) The gravity center distribution of the two blades is unequal.
- (3) The lengths of ball linkages of the two blades are set improperly.
- (4) When blades are too loose in the grips, the blades shake due to excessive clearance or the blade grips are distorted.

When the main rotor blades tracking is incorrect, the ball linkage connected to the higher blade should be lengthened (to reduce blade pitch) and/or the linkage on the lower blade should be shortened (to increase blade pitch). Take care not to unscrew the link rod too far from the ball connectors.

If the main rotor blades appear to be normal at low speed and abnormal at high speed or abnormal at low speed and normal at high speed, please check the grips for distortion or excessive clearance. If the blades are loose, please tighten the grips, if the grips are distorted please replace them immediately. Only by repeating this process and making small adjustments is it possible to avoid tracking problems.

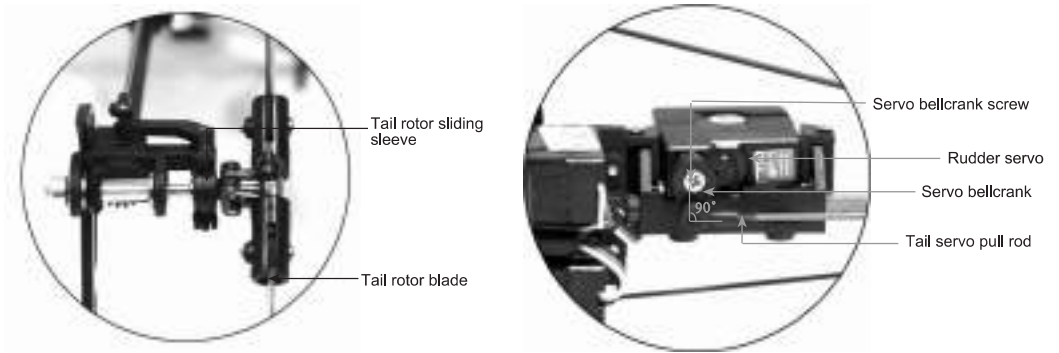
When there is a blade tracking problem the lengths of the ball linkages need to be adjusted. If the high blade has the red decal, please increase the length of the ball linkage of the red blade and/or decrease the length of the blue blade's linkage. If the high blade has the blue decal, please increase the length of the ball linkage of the blue blade and/or decrease the length of the red blade's linkage.



8.5 Rudder Servo Adjustment

Move 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 left and right after repositioning the 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. When 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 correctly adjusted.

If this is not the case,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 to 90 degrees and then tighten servo bellcrank screw.



Step 1: disconnect the power cable of the helicopter.

Step 2: turn off the transmitter.

Step 3: Remove the battery pack.



08

Steps of flight



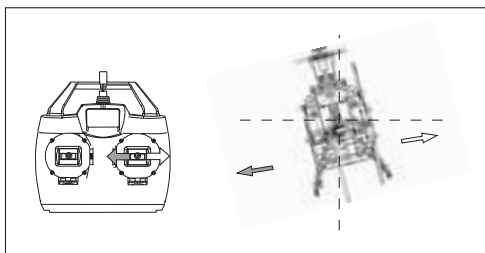
09

Flight over

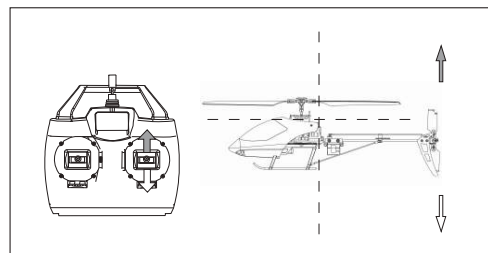


Appendix 1- Flight control

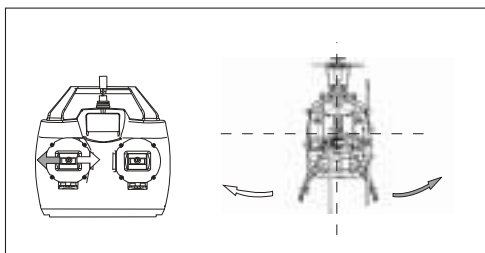
Mode 1 (throttle stick at right hand)



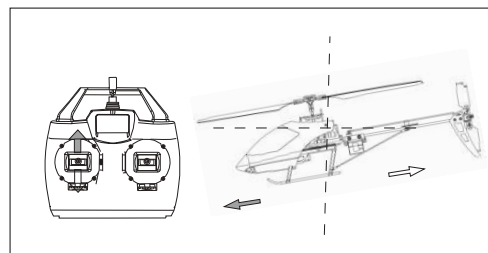
1. When moving the aileron stick left or right, the helicopter accordingly flies left or right.



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

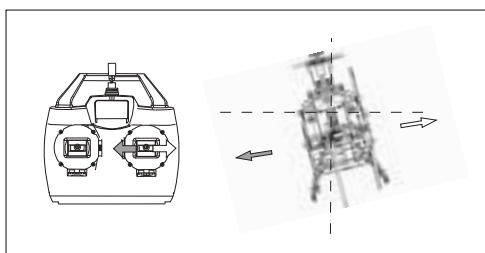


3. When moving the rudder stick left or right, the head of helicopter accordingly rotates to the left or right.

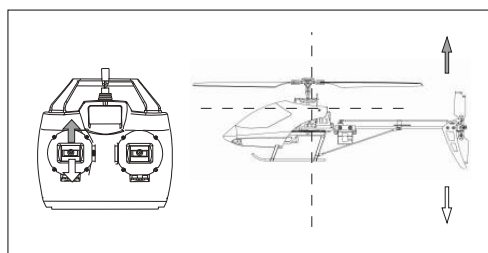


4. When moving the elevator stick up or down, the helicopter accordingly flies forward or backward.

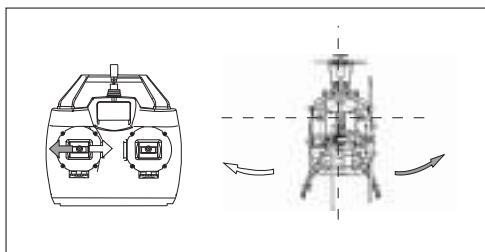
Mode 2 (throttle stick at left hand)



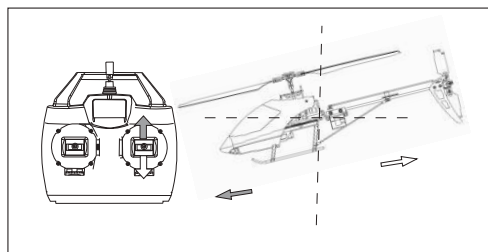
1. When moving the aileron stick left or right, the helicopter accordingly flies left or right.



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 rotates to the left or right.



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

1 Flight practice for the beginner

1.1 Matters needing attention

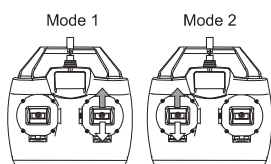
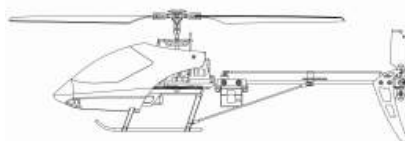
- (1) Beginners should be supervised and guided by skilled pilots when learning.
- (2) For the sake of safety, people should keep at least 5 meters away from the helicopter during practice.
- (3) Choose a spacious open ground without people and obstacles as the flight practice field.
- (4) This is a 3D helicopter. We kindly suggest that the knowledge of flying 2D/ coaxial helicopter is a pre-requisite before flying this model.
- (5) The use of a suitable training gear attachment is recommended while learning.

1.2 Steps

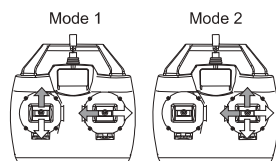
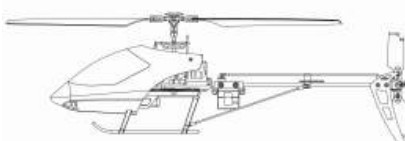
(1) Practicing throttle control - stationary flight

Start by standing directly behind the helicopter, tail closest to you and head/nose pointing away. Practice taking off from the ground and then by slowly pulling down on the throttle stick, land it softly and horizontally. Repeat this step until the throttle can be finely and carefully controlled.

When hovering, the 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.

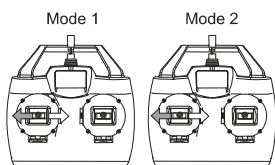
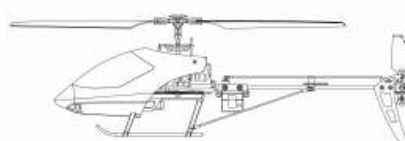


(2) Practice of aileron and elevator control



First increase throttle and enter a stable hover as practiced in the previous section. Next, use the elevator and aileron sticks to purposely fly the helicopter in a 'cross pattern' forwards, backwards, to the left and to the right. In between each direction, return to hover over the take off point. Continue to repeat this step until it can be completed with ease.

(3) Practicing rudder control

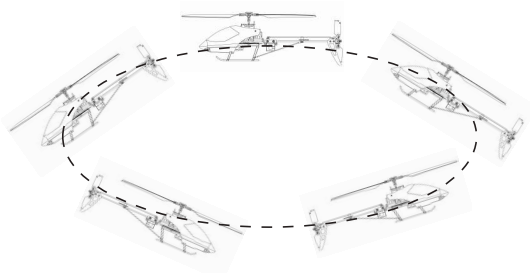


Enter a stable hover as practiced in step one, then practice rotating the head of the helicopter to face left then back to face right and back to facing forwards (away from the pilot). Start with a rotation angle of 30 degrees or less and gradually increase it as you become more comfortable and more experienced.

(4) Practicing circular flight

After mastering steps (1) to (3) with ease, please draw or mark a large circle on the ground. Fly your helicopter along this circular track until the flight is smooth and controlled.

You may wish to stand inside the circle at first to practice circular flight before needing to control the nose in orientation. Fly circles in both directions and at a constant altitude to be comfortable with this step.



Appendix 2 – Flight practice

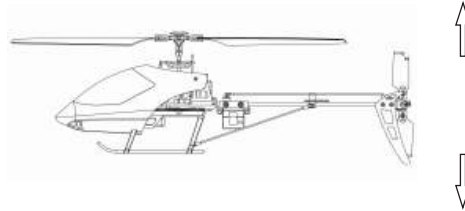


Appendix 2 – Flight practice

2 Advanced practice

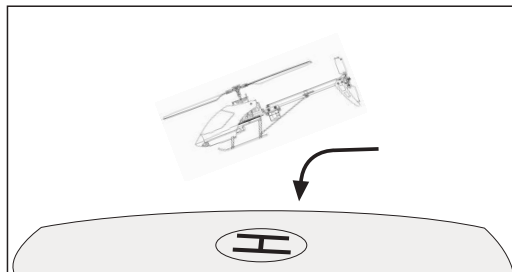
2.1 Frog-hopping practice

Repeat the take off and landing action using the throttle stick whilst maintaining a vertical path. Increase your rate of ascent and descent gradually as you become more comfortable with the exercise. Be sure to slow down in time when landing!



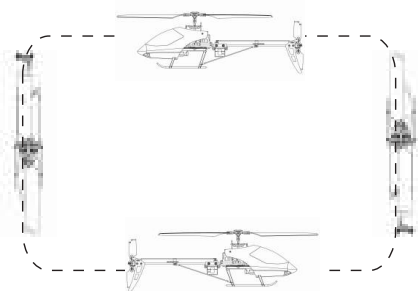
2.2 Controlled take off and landing practice

Mark out an area on the ground as a landing pad to help practice deliberately taking off and landing from a set location. The process of take off and landing should be kept stable and as close to vertical as possible.



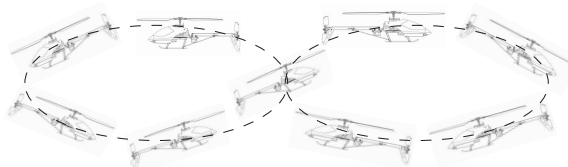
2.3 Square flight practice

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 a 90 degree rotation at each corner of the quadrangle to adjust the flight direction. Train your straight flight skills and 90 degree flight course control. Fly in both directions around the circuit until familiar with the maneuver.



2.4 Figure eight practice

Once you have mastered the previous steps you can try flying smooth flat figure eights. Try to maintain the same altitude during the entire flight path. Take care when flying where there is wind as it may cause the helicopter to suddenly rise or fall unexpectedly.

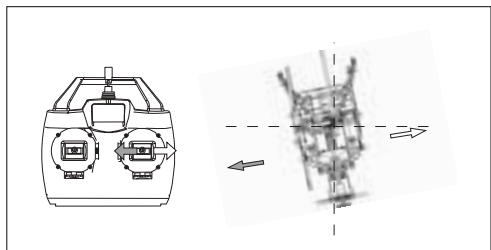


2.5 Aerobatic flight

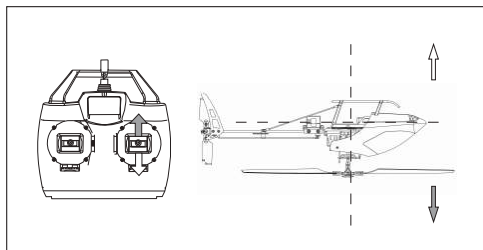
Your NEW V120D02S can perform breathtaking and exciting aerobatic flight such as dives and inverted 3D.

Inverted flight

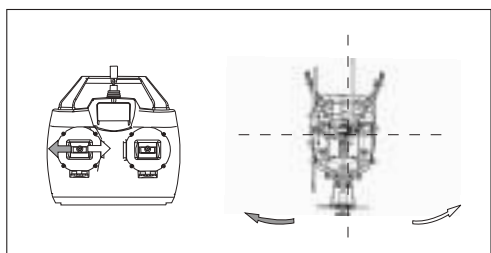
Mode 1 (throttle stick at right hand)



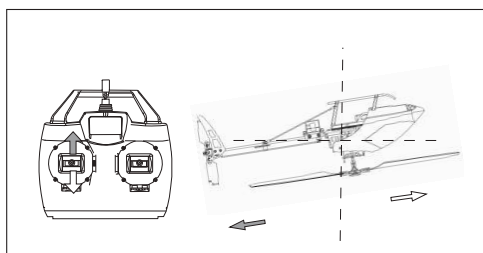
1. When moving the aileron stick left or right, simultaneously your helicopter flies left or right, respectively. Orientation is normal.



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

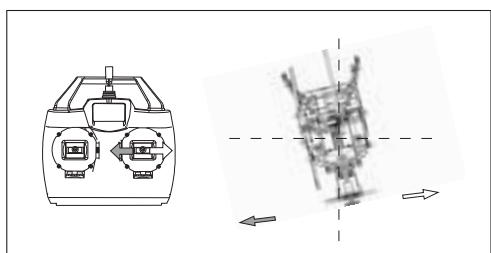


3. When moving the rudder stick left or right, your helicopter simultaneously flies right or left, respectively. Orientation is inverted.

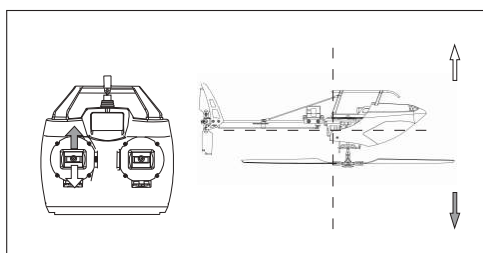


4. When moving the elevator stick up or down, your helicopter simultaneously flies backward or forward, respectively. Orientation is inverted.

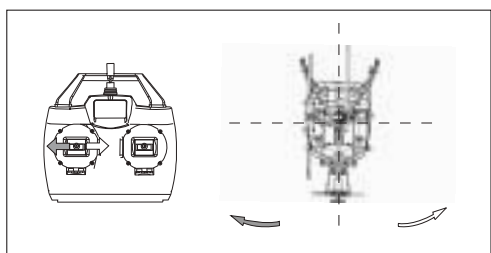
Mode 2 (throttle stick at left hand)



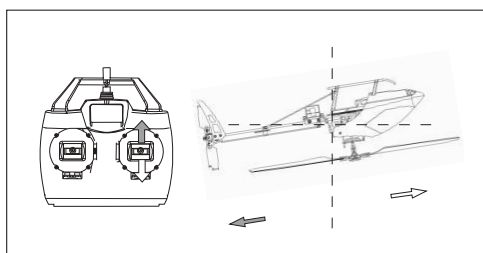
1. When moving the aileron stick left or right, your helicopter simultaneously flies left or right, respectively. Orientation is normal.



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



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



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



Appendix 2 – Flight practice

The specifications of the R/C aircraft
may be altered without notice.



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