

FLYBARLESS SERIES V450003



User Handbook

Specifications:

Main Rotor Dia. : 712mm

Tail Rotor Dia. : 150mm

Overall Length: 676mm

All-up Weight: 816g (Battery included)

Battery: 11.1V 2600mAh Li-Po

Standard transmitter: DEVO-7

Optional transmitter: DEVO-6/7E/8S/10/12S

Recommend Environment: Outdoor

Product type: 450 size 6 channel 3D helicopter

Recommend Experience Level: Intermediate and Advanced Level

Gyro: 6-Axis

Receiver: RX2703H-D

Brushless Motor: WK-WS-28-010

Brushless Speed Controller: WK-WST-40A-2

Servo: WK-09-9 / weight 13g / speed 0.12sec/60° (4.8V) / torque 1.6kgf.cm (4.8V) / dimension 22.5×11.8×25.5mm

Servo: WK-2601H / weight 24.5g / speed 0.18sec/60° (4.8V) / torque 3.5kgf.cm (4.8V) / dimension 34.8×15.3×29.5mm

Features:

- 1) Adopting new flybarless system, features fast response and great efficiency improvement.
- 2) Generation II 6-Axis stability enhance Control system, automatic correct flight attitude, ensures stable and precise flight.
- 3) The autorotation landing system made of high quality one-way bearing maximally protects your helicopter from damage.
- 4) Belt driven system ensures easy adjustment, stable flight and low noise.
- 5) High-performance brushless motor provides more powerful and durable flight. The 11.1V 2600mAh high-capacity lipo battery provides about 8 minutes flight.
- 6) The RX firmware can update through Walkera homepage (UP02 and UP02 adapter are needed).

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01

Forewords



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 V450D03 RC helicopter, please read the user handbook carefully and then keep it in a safe place for future consultation and reference.

V450D03 takes advantage of reinforced metal and 2.4G spread spectrum technology of 3-in-1 combination of receiving circuit, gyro and CCPM mixing. It features vigorous power, stable flight, prompt response, and strong anti-jamming capacity.

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

The 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 lightning.



- (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

The 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.



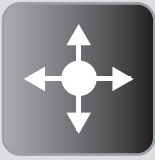
2.3 Attention before flight

- (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 lose 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

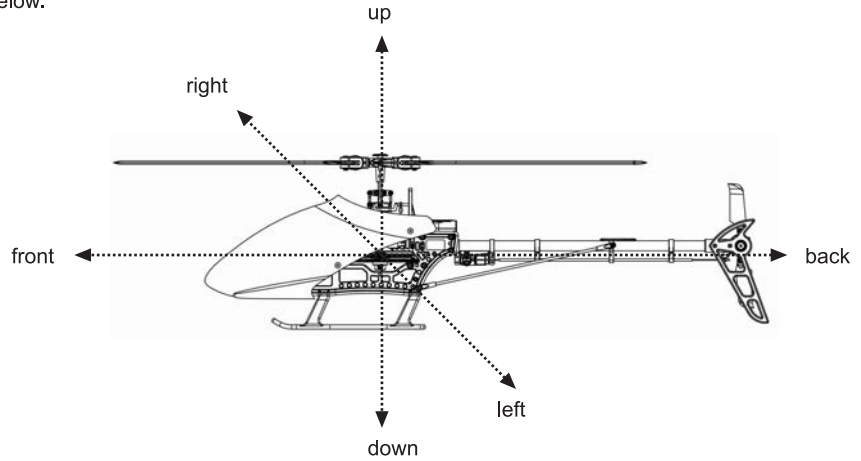
**Safety matters
needing
attention**



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 equipments



▲ Helicopter



▲ Transmitter



▲ Li-polymer battery pack



▲ Tool kit



▲ Wall adapter /Power supply



▲ GA005 balance charger



▲ User handbook



▲ PIT Gauge

5.1 RX2703H-D receiver features

- (1) The RX2703H-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) makes fine actions and powerful functions available.
- (4) Controlled by 6-axis gyro,with flybarless balance electronic system, amend flight status automatically, makes more stable flight and flexible 3D performance.



05

Setup of the RX2703H-D receiver

5.2 Functions of receiver

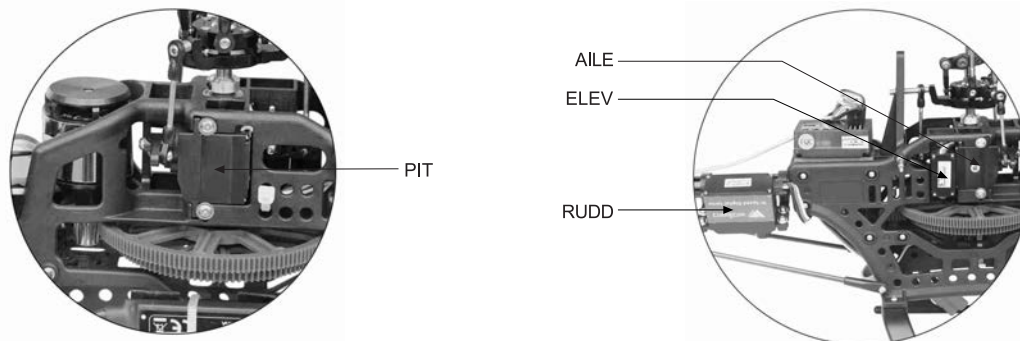
S/N	Name for short	Full name	Function
1	ELEV	Elevator servo	Connects to the elevator servo and receives the control signal of elevator servo.
2	AILE	Aileron servo	Connects to the aileron servo and receives the control signal of aileron servo.
3	PIT	Pitch servo	Connects to the PIT servo and receives the control signal of PIT servo.
4	RUDD	Rudder servo	Connects to the rudder servo and receives the control signal of rudder servo.
5	THRO	Throttle	Connects to the ESC and receives the control signal of ESC.
6	Not used	Not used	Not used
7	Not used	Not used	Not used
8	Not used	Not used	Not used
9	Not used	Not used	Not used
10	RUDD. EXT.	Rudder servo extent dial	Rudder servo extent dial is used to set up the servo travel.
11	ELEV/AILE G.	Elevator/Aileron gyro sensitivity adjust dial	Adjusts the Elevator/Aileron gyro sensitivity, changes the flight effect.
12	ELEV/AILE EXT.	Elevator/Aileron servo extent dial	Elevator/Aileron servo extent dial is used to set up the servo travel.
13	ADJ - WK	Flight mode switch	Set up flight mode ,ADJ or WK. (Use Switch1,Switch 2 is Idle)
14	STATUS	Status LED	Indicating receiver signal status



05

Setup of the RX2703H-D receiver

5.3 Channel connection of receiver



S/N	Receiver terminal	Connection method	Wire direction
1	ELEV	Connects to the plug of elevator servo signal wire	The white wire is facing back
2	AILE	Connects to the plug of aileron servo signal wire	The white wire is facing back
3	PIT	Connects to the plug of pitch servo signal wire	The white wire is facing back
4	RUDD	Connects to the plug of tail servo signal wire	The white wire is facing back
5	THRO	Connects to the plug of ESC signal wire	The white wire is facing back
6	Not used	Not used	
7	Not used	Not used	
8	Not used	Not used	
9	Not used	Not used	

5.4 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.

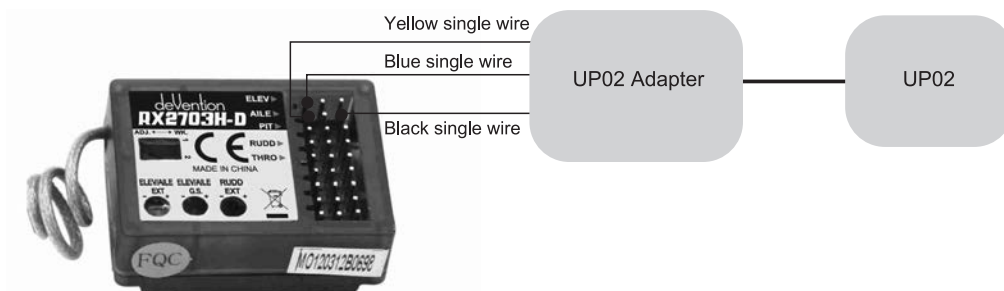
- (1) Adjustment mode: Move the flight mode switch 1 to the ADJ position after successfully binding with the transmitter. The receiver and helicopter are now in adjustment mode. This mode is used to set the servo horns and swashplate parallel and horizontal. Once correctly setup, make sure to move the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

5.5 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) Gyro turning knob: CW rotating towards (+) increases the gyro sensitivity and CCW rotating towards (-) decreases the gyro sensitivity.
- (3) Servo extent knob: CW rotating towards (+) increases the servo travel and CCW rotating towards (-) decreases the travel.
- (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) Receiver upgrade:
 - (5.1) V450D03 control program upgrade can be downloaded online at Walkera Official Website: www.walkera.com.
 - (5.2) V450D03 control program upgrade tool including UP02 cable and UP02 Adapter.



- (5.3) Connect blue single wire plug to ELEV signal position, yellow single wire plug connect to AILE signal position; black single wire plug connect to AILE position of earth wire (fixed ID may clear after upgrading).



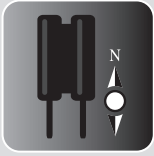
5.6 Matters needing attention

- (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 binding.
- (4) 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 turns solid in 1-3 seconds, after the transmitter finishes binding, 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 binding successfully.



05

Setup of the RX2703H-D receiver



06

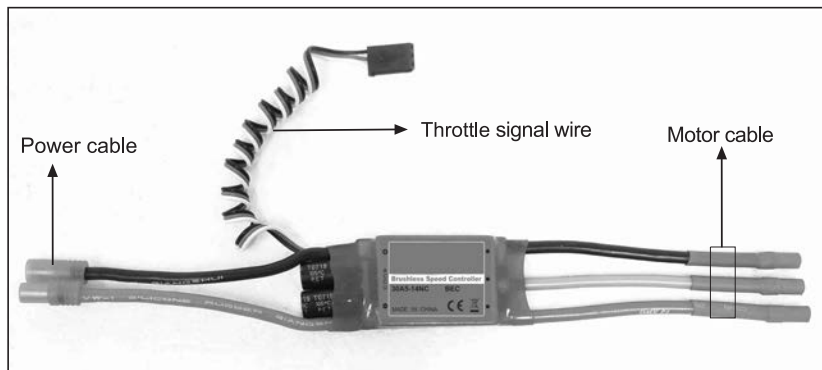
Instruction of ESC

6.1 Function of ESC

Electronic Speed Controller (ESC), mainly used in EP helicopter as a drive output device, is an electronic control circuit for the revolution speed and CW- and CCW-rotation of the motor. It will magnify the proportional signal it receives into voltage and current that can be directly exploited by the motor, the advantages of which, compared with the traditional mechanical speed controller, include compact dimension, long longevity, high efficiency and high output power.

6.2 Brushless ESC Connection Instruction:

1. **Throttle signal wire:** connects to THRO channel of Receiver.
2. **Power cable:** Connect to the battery.
3. **Connection of the brushless motor wires:** connects to the brushless motor. The motor's 3 connection wires can at random connect to the brushless motor, and it is not necessary for them to match colors with each other. You just exchange any two of the three wires to reverse the brushless motor spinning direction.



7.1 Specification and function of servo

7.1.1 Specification of servo

	Weight	Voltage	Torque	Speed	Dimension	PW(Pulse width)
WK-09-9	13g	4.8~6V	1.6kgf.cm	0.12sec/60°	22.5×11.8×25.5mm	1500US
WK-2601H	24.5g	4.8~6V	3.5kgf.cm	0.18sec/60°	34.8×15.3×29.5mm	1500US

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

Please refer to the channel connection shown as the sketch map in the section 5.3.

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

7.2.2 Adjustment of servos

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 to make any adjustment. If we need to make adjustment to the main rotor blades or flybar paddle, please shorten or prolong the lengths of servo linkages: prolonging the length of linkage increases PIT angle, and shortening the length decreases PIT angle.

7.2.3 Matters needing attention

- (1) All the plugs should be correctly connected. Otherwise wrong connection will make servos not work 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.
- (3) The servos for swashplate and rudder must be digital servos, pulse width 1500µS, or the servos will be damaged.



07

Servo setup and adjustment



08

Instruction and attention of GA005 balance charger

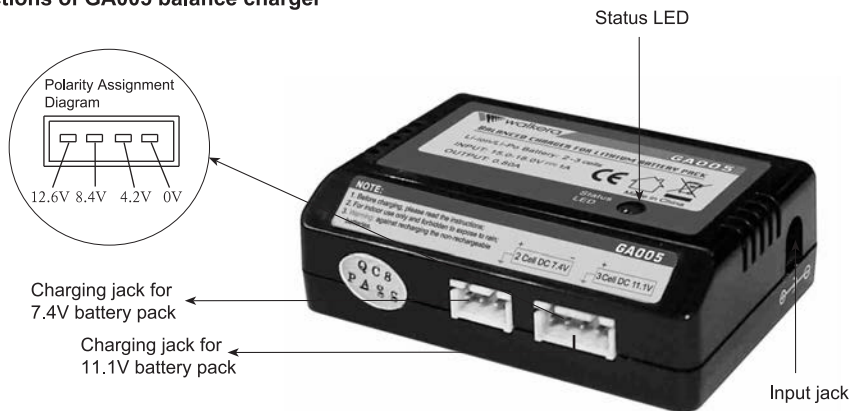
8.1 Parameters of GA005 balance charger:

Input voltage	Input current	Output current	Dimension	Weight
DC15-18V	1000mA	≤800mA	62.5×47×20.8mm	46g

8.2 Features of GA005 balance charger

- (1) GA005 utilizes microcomputer chips to monitor and control over the whole charging process in a balanced way with LED indicating light to display the real-time charging status.
- (2) Connects to an input power supply (DC 15-18V 1000 mA).
- (3) GA005 is suitable for 2-3S (7.4V/ 11.1V) Li-ion or Li-polymer battery pack.
- (4) Automatically detects 2-3S Lithium battery pack. GA005 will automatically charge when the voltage of any cell among the LiPo pack is excessively low. At the same time LED displays charging status (flash in red). The voltage of any cell LiPo is controlled at the level of $4.2 \pm 0.05V$ to ensure the maximum voltage difference of single cell in the battery pack is less than 50 mV.

8.3 Instructions of GA005 balance charger



8.4 Operation steps



Plug the wall adapter into the mains power supply. Its output end connects to GA005. Then its LED is lighting in solid red.



Insert the balanced pin of LiPo battery pack into GA005.



During charging, Red LED is continuously flashing. If saturated, Red LED becomes solid green lighting.

8.5 Charging status corresponding to LED

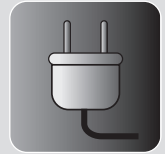
steps	Operation	LED Status	Charging status
1	Insert the wall adapter into the mains power supply, and then its output is connecting to GA005.	LED is in red solid lighting	Power on
2	Step 1 + connect the battery pack to GA005	LED is flashing in red	Charging
		LED turns red to solid green.	Saturated

8.6 Matters needing attention

- (1) During charging, GA005 should be put in dry and ventilated place and be far away from heat sources and inflammable and explosive substances.
- (2) GA005 is only used to charge a 2S or 3S Li-ion or Li-polymer battery pack. It is forbidden to simultaneously charge two or more sets of battery packs. Either the charger or battery may be damaged.
- (3) When charging, the battery pack should be removed from your helicopter. Never leave the charger unsupervised during the process of charging in order to avoid risk of accidents.
- (4) Never immediately charge your battery pack as soon as the flight is finished, or when its temperature doesn't cool down. Otherwise the battery will take a risk in swelling, even a fire.
- (5) Ensure the correctness of polarity before connecting the battery to charger.
- (6) Avoid drop and violence during the process of charging. Drop and violence will result in internal short circuit of the battery.
- (7) For the sake of safety, please use original charging equipment (wall adapter + GA005 balance charger) and battery pack. Please change new one in time when the old battery pack is becoming swollen due to long time usage.
- (8) If it is retained in the charger for a long time after saturated, the battery may automatically discharge. When the charger detects that the voltage of individual cells is lower than the rated voltage, it will re-charge until saturated. Frequently charging and discharging will shorten the lifetime of your battery pack.

8.7 Maintenance of battery pack

- (1) The battery pack should be put in dry and ventilated place. The storage temperature of the environment is ranged from 18° C to 25° C.
- (2) Please avoid frequent charging and excessive discharging the battery pack in order to prolong its life cycle.
- (3) It is a must to maintain the battery pack before long-term storage. That is to charge the battery to the level of 50-60% saturation.
- (4) If the storage term is over 1 month, it is advised to monthly check the voltage of every cell of the battery pack. The voltage of every cell should be not less than 3V. Otherwise, please refer to the above article (3).
- (5) From the view point of protection, new battery pack should be motivated before usage. That is to charge and discharge 3-5 times, but discharge is not less than the level of 70% saturation. This process will make the battery lifetime longer and voltage more stable.



08

**Instruction
and
attention
of GA005
balance
charger**

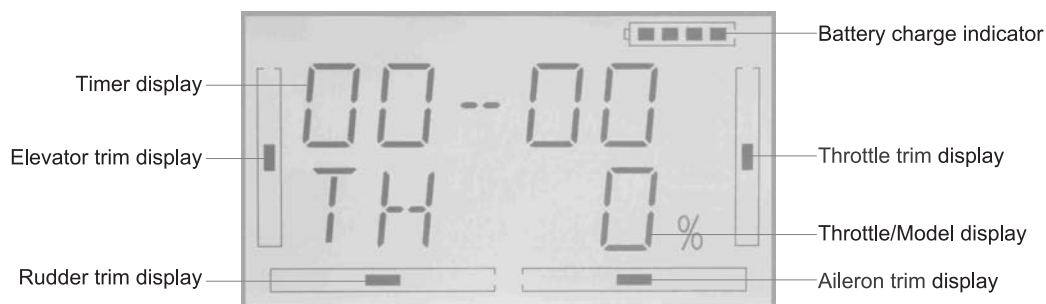


09

Transmitter setup

9.1 DEVO-7(standard radio) setting

9.1.1 Boot Screen



9.1.2 Model Type(TYPE)

Press the ENT button to enter the Main Menu, press UP or DN until MODEL starts to flash, then press ENT button to enter the Model Menu. Press the UP or DN button until TYPE starts to flash. Press the ENT button to choose between Helicopter and Aeroplane types. Press the R or L button to select HELI, press ENT to confirm and EXT to go back to the previous menu.

9.1.3 Model Select(SELEC)

Press UP or DN key under the MODEL menu until SELEC starts to flash. Press ENT, the model options will be shown. Press UP or DN to choose MOD 1, press ENT to confirm and EXT back to previous menu.



9.1.2 Model Type



9.1.3 Model Select

9.1.4 Model Name(NAME)

In the MODEL menu, press UP or DN until the NAME starts to flash. Press ENT to access the model serial No. and default name options. Press UP or DN to select the characters or numbers that you wish to change, use the R or L key to change the characters or numbers to "450D3". Press ENT to confirm and EXT to go back to the previous menu.

9.1.5 Swash Type(SWASH)

Press the ENT button to enter the MODEL Menu and press UP or DN until SWASH starts to flash and then press ENT key. The Swashplate type will be shown. Press UP or DN to choose 1-NRM and after setting, press ENT to confirm and EXT to go back to the previous menu.



9.1.4 Model Name



9.1.5 Swash Type

9.1.6 Device Output(OUTPU)

Press UP or DN under the MODEL menu, it comes out the flashing "OUTPU" menu. Press "ENT" to the submenu of "output". Press DN or UP to choose "AUX2 AUX2", and press ENT to confirm. Press DN to choose "AUX2 GYRO", and press ENT to confirm. Press EXT to exit to the main interface.





09

Transmitter setup

9.1.7 Reverse Switch(REVSW)

Press ENT to enter the Main Menu, press UP or DN until FUNCTION starts to flash, then press ENT to access the function menu. Press UP or DN until REVSW starts to flash. Press ENT to display the channel name and the reverse status. Press R or L to change between NOR and REV settings. Press DN to display each channel AILE, THRO, RUDD, GEAR, PITCH, GYRO and their corresponding reverse setting. Set each channel as shown in the table below. Once complete, press ENT to confirm and EXT to go back to the previous menu.

ELEV	AILE	THRO	RUDD	GEAR	PITCH	GYRO
NORM	NORM	NORM	NORM	NORM	NORM	NORM



9.1.8 Throttle Curve

In the FUNCTION menu press UP or DN until THCRV is flashing. Press ENT to display the servo lock screen, press R or L to display NO then press ENT to confirm.



The flight mode options are displayed, there are three flight modes, NORM, ST 1 and ST 2. Press R or L to select the flight mode you want to setup.



Press DN to display the EXP option, press R or L to select ON.

Press DN to display the Point option. Press R or L to select the L, M, H point. Press DN to display the point output setting. Press R or L to increase or decrease the point setting value. Press ENT to confirm and press UP to go back to other point settings. After inputting all settings, press ENT to confirm and press EXT to go back to the previous menu.



Flight mode	point output		
	L	M	H
NORM	0.0%	50.0%	100.0%
ST 1	100.0%	75.0%	100.0%
ST 2	100.0%	75.0%	100.0%

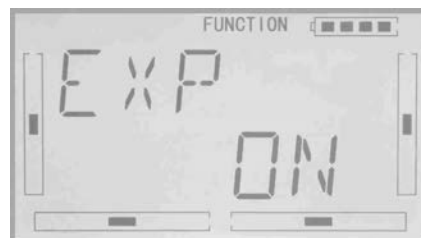
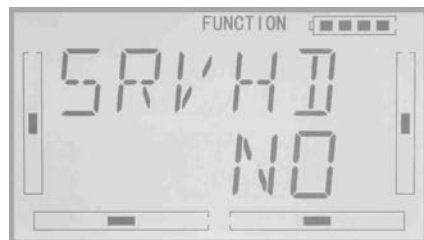
9.1.9 PIT Curve(PTCRV)

In the FUNCTION menu, press UP or DN until PITCRV is flashing, press ENT to display the servo lock screen, press R or L to display NO, then press ENT to confirm.



09

Transmitter setup



The flight mode options are displayed, there are three flight modes, NORM, ST 1 and ST 2. Press R or L to select the flight mode you want to setup. Press DN to display the EXP option, press R or L to select ON.

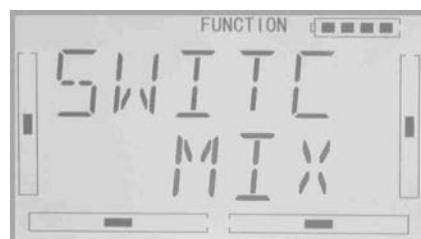
Press DN to display the Point option. Press R or L to select the L, M, H point. Press DN to display the point output setting. Press R or L to increase or decrease the point setting value. Press ENT to confirm and press UP to go back to other point settings. After inputting all settings, press ENT to confirm and press EXT to go back to the previous menu.



Flight mode	point		
	L	M	H
NORM	-16%	+20%	+55%
ST 1	-55%	0%	+55%
ST 2	-55%	0%	+55%

9.1.10 Gyro Sensor(GYRO)

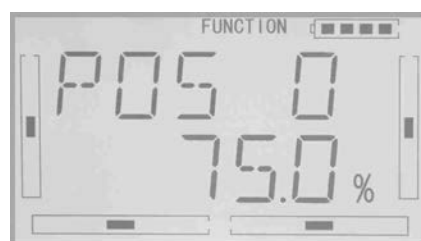
In the FUNCTION menu, press UP or DN until GRYO is flashing. Press ENT to display the gyro mode setting screen. Press R or L to select MANU for manual setting.



Press DN to display the control switch options, press R or L to select MIX.

Press DN to display the switch position value. The first position is POS 0, press R or L to change the gyro value setting. Press DN to display POS 1 and POS 2. Set the values as per the table below. After finishing the setup, press ENT to confirm and EXT to go back to the main menu.

Switch Position	POS0	POS1	POS2
Gyro Value	75.0%	70.0%	50.0%



9.2 DEVO-6/7E/8S/10/12S(optional radio) settings

9.2.1 Type:Helicopter

9.2.2 Swash type:1 Servo Normal

9.2.3 Device Output

DEVO-6			DEVO-7E			DEVO-8S			DEVO-10			DEVO-12S		
Gear	GEAR SW	Gyro	Gear	HOLD SW	Active	Gear	GEAR SW	Active	Gear	GEAR SW	Active	Gear	GEAR SW	Active
Pitch	System	Active	AUX2	FMOD SW	Gyro	Pitch	System	Active	AUX2	FMOD SW	Gyro	Pitch	System	Active
						AUX2	FMOD SW	Gyro	AUX3	FMOD SW	Gyro	AUX2	AUX2 Lever	Gyro
						AUX3	FMOD SW	Gyro	AUX3	RUDD D/R	Active	AUX3	AUX3 Lever	Active
						AUX3	RUDD D/R	Active	AUX4	AUX4 KB	Active	AUX4	AUX4 Lever	Active
									AUX5	AUX5 KB	Active	AUX5	AUX5 Lever	Active
												AUX6	AUX6 Knob	Active
												AUX7	AUX7 Knob	Active

9.2.4 Reverse switch settings

DEVO-6		DEVO-7E		DEVO-8S		DEVO-10		DEVO-12S	
Elevator	Normal	Elevator	Normal	Elevator	Normal	Elevator	Normal	Elevator	Normal
Aileron	Normal	Aileron	Normal	Aileron	Normal	Aileron	Normal	Aileron	Normal
Throttle	Normal	Throttle	Normal	Throttle	Normal	Throttle	Normal	Throttle	Normal
Rudder	Normal	Rudder	Normal	Rudder	Normal	Rudder	Normal	Rudder	Normal
Gyro	Normal	Gear	Normal	Gear	Normal	Gear	Normal	Gear	Normal
Pitch	Normal	Pitch	Normal	Pitch	Normal	Pitch	Normal	Pitch	Normal
		Gyro	Normal	Gyro	Normal	Gyro	Normal	Gyro	Normal
				AUX3	Normal	AUX3	Normal	AUX3	Normal
						AUX4	Normal	AUX4	Normal
						AUX5	Normal	AUX5	Normal
								AUX6	Normal
								AUX7	Normal

9.2.5 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%

9.2.6 Pitch curve

Flight mode	L	M	H
Normal Flight	-16%	+20%	+55%
Stunt 1	-55%	0%	+55%
Stunt 2	-55%	0%	+55%

9.2.6 Gyro sensor

DEVO-7E		DEVO-6/8S/10/12S	
Mode	Manual	Mode	Manual
Switch	HOLD SW	Switch	MIX SW
Pos 0	75.0%	Pos 0	75.0%
Pos 1	50.0%	Pos 1	70.0%
		Pos 2	50.0%

Note: DEVO-7E provides two flight modes:Normal Flight and Stunt Flight.



09

Transmitter setup



10

Steps of flight

10.1 Installation of battery pack

Take off the canopy and install the battery pack into the battery compartment along the arrow direction, and then tie and position it there.

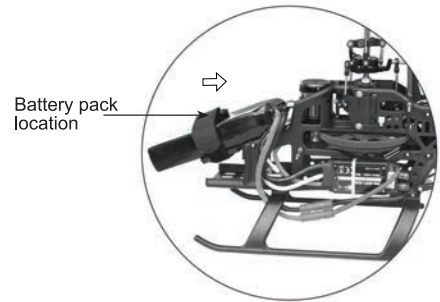
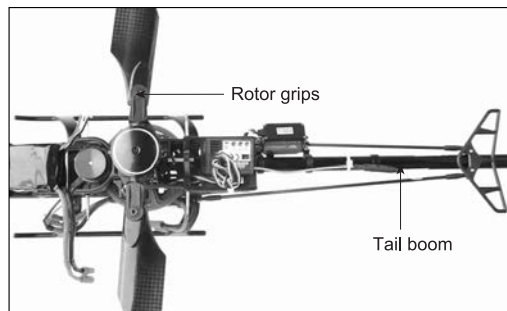


Diagram of battery installation.

10.2 Center of Gravity adjustment

Place the helicopter in the horizontal level, make its head face the pilot and assure the rotor grips is vertical to the tail boom. Keep the main rotor blades stretched in line, and assure the main rotor blades are parallel to the tail boom. Then use two index fingers to horizontally lift the rotor grips of helicopter.

If the head of helicopter goes down, it means the CG is too close to the foreside. Please move the battery pack a little backward. If the tail boom goes down, it means the CG is too close to rear end. Please move the battery pack a little forward.



Sketch map of CG adjustment

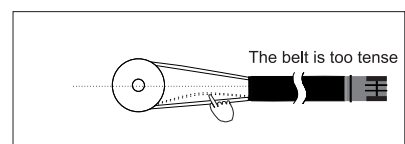
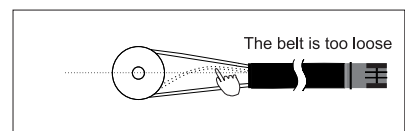
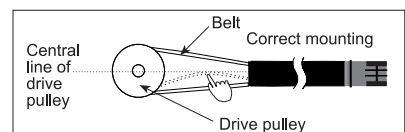
10.3 Inspection of synchronous toothed belt

1. Direction inspection of synchronous toothed belt

When CW rotating the rotor head of your helicopter, the installation of synchronous toothed belt is correct if the tail rotor spins backward. Otherwise the belt is wrongly twisted.

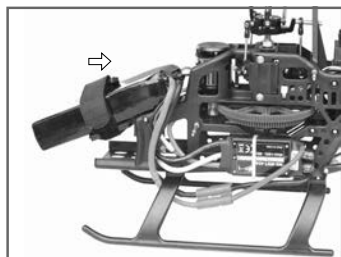
2. Extension inspection of synchronous toothed belt

Use one finger to lightly press the belt. It is loose if the pressed belt gets cross the central line of the pulley; it is a little tight if the pressed belt doesn't reach the central line. Either loose extension or tight extension needs re-adjustment until the pressed belt is just at the central line.



10.4 Turn on the power

10.4.1 Turn on the power



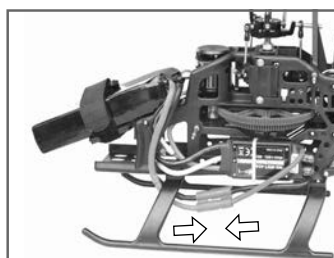
1. Take off the canopy, and install the battery pack in the battery compartment.



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

10.4.2 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 within 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 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).

10.4.3 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.

10.5 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.



10

Steps of flight



10

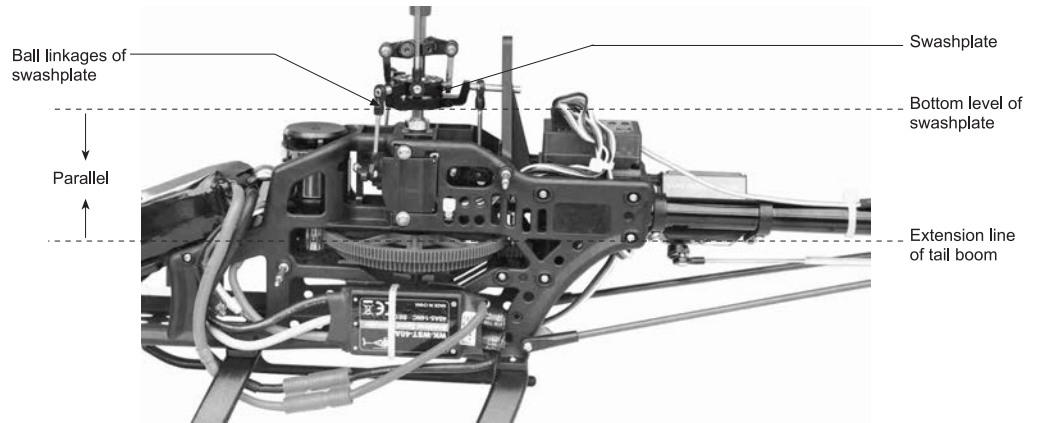
Steps of flight

10.5.1 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 keeps solid 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 paring, 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.

10.6 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.

10.6.1 Color decal (tracking tape)

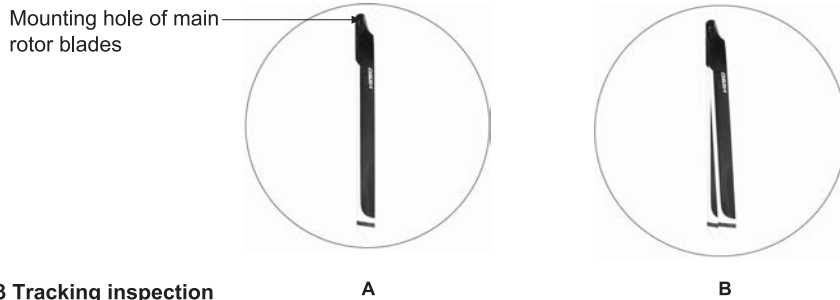
Two different colored blade tracking decals (red and blue) should be placed 20 mm away from the end of each blade tip. The purpose is to identify the position of each spinning blade in the following blade tracking inspection process.

10.6.2 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, or move the low end stick to the high end until balanced.



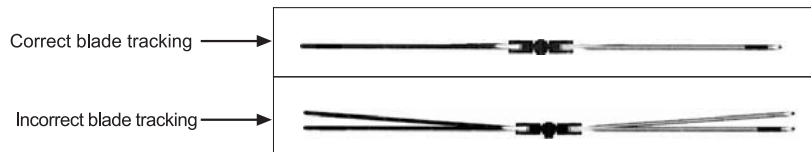
(2) Longitudinal inspection of gravity center. Shown as below, take the mounting hole of main rotor blades as the fulcrum to vertically hang in the air. If the two main rotor blades are almost superposed, it means normal (shown as Fig. A); otherwise abnormal.



10.6.3 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.

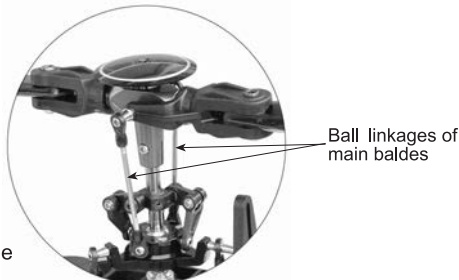
Slowly push up the throttle stick on the transmitter and ensure the pilots line of sight and the main rotor blades are at the same level horizontally. When the main rotor blades are spinning, please observe whether or not the two blades, one with red and one with blue decals are superposed in the same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



10.6.4 Adjustment of blade tracking

Below are the main causes for incorrect blade tracking:

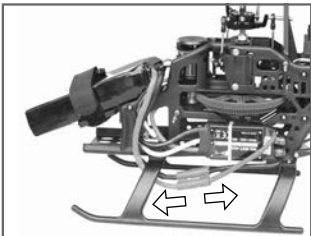
- (1) The weights of the two blades are unequal.
- (2) The gravity center distribution of the two blades is unequal.
- (3) The lengths of ball linkages of the two blades are set improperly.
- (4) When blades are too loose in the grips, the blades shake due to excessive clearance or the blade grips are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




When the main rotor blades tracking is incorrect, the ball linkage connected to the higher blade should be shortened (to reduce blade pitch) and/or the linkage on the lower blade should be lengthened (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.

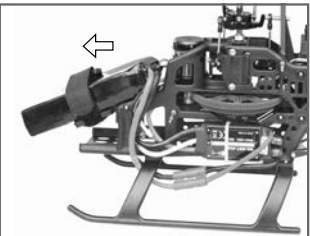
When there is a blade tracking problem the lengths of the ball linkages need to be adjusted. If the high blade has the red decal, please decrease the length of the ball linkage of the red blade and/or increase the length of the blue blade's linkage. If the high blade has the blue decal, please decrease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



Step 1: disconnect the power cable of helicopter.



Step 2: turn off the power of transmitter.



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



10

Steps of flight



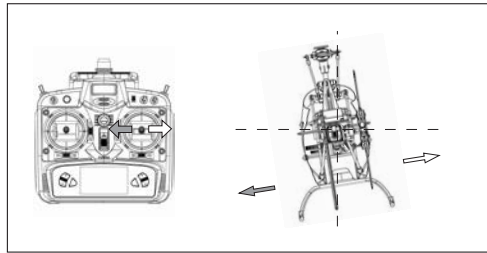
11

Flight over

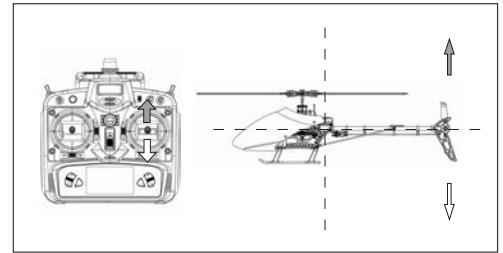


**Appendix 1-
Flight control**

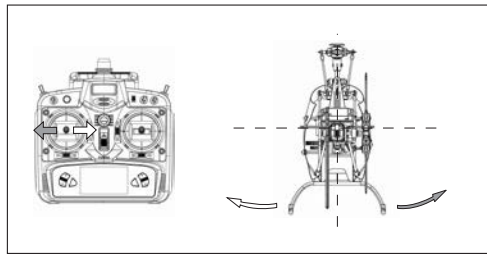
Mode 1 (throttle stick at right hand)



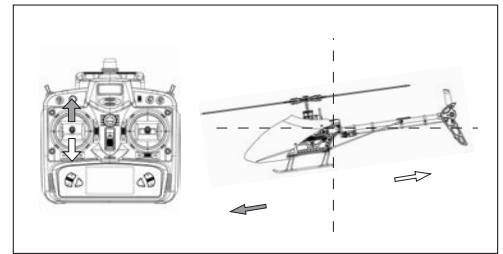
1. When moving the aileron stick left or right, the helicopter accordingly flies left or right.



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

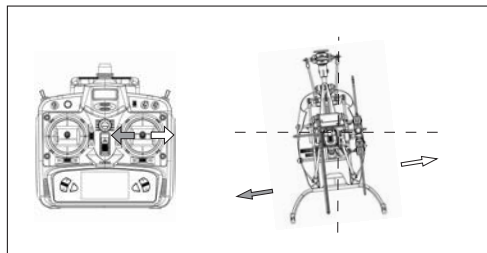


3. When moving the rudder stick left or right, the head of helicopter accordingly rotates to the left or right.

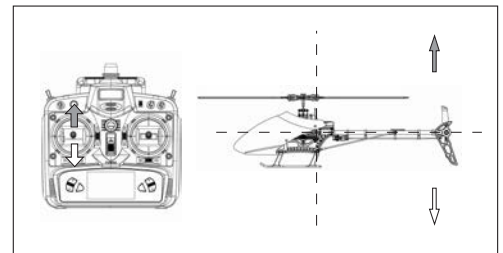


4. When moving the elevator stick up or down, the helicopter accordingly flies forward or backward.

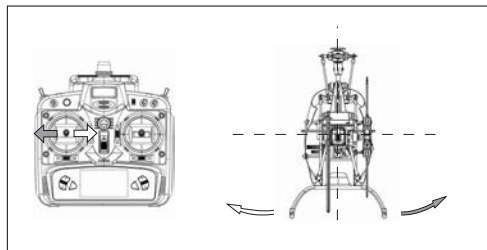
Mode 2 (throttle stick at left hand)



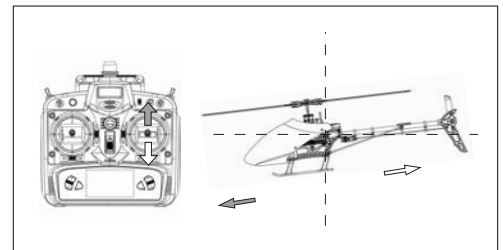
1. When moving the aileron stick left or right, the helicopter accordingly flies left or right.



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 according 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

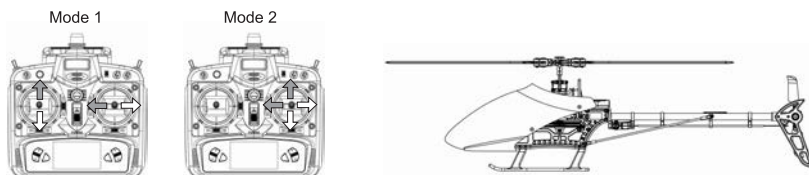
(1) Practicing throttle control - stationary flight

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.

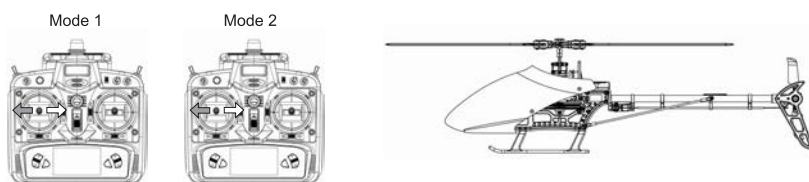


(2) Practice of aileron and elevator control



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

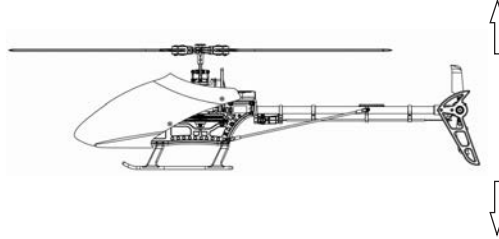


Appendix 2 – Flight practice

2 Advanced practice

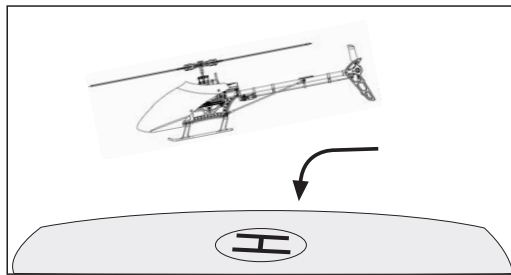
2.1 Frog-hopping practice

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!



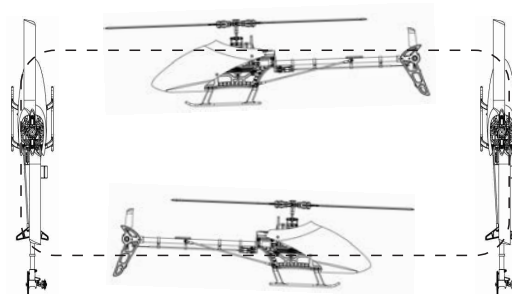
2.2 Controlled take off and landing practice

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.

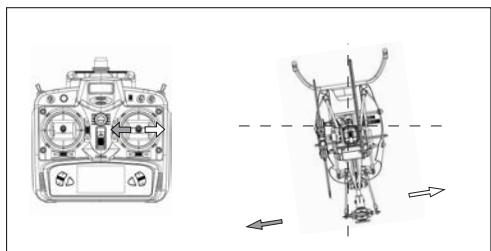


2.5 Aerobatic flight

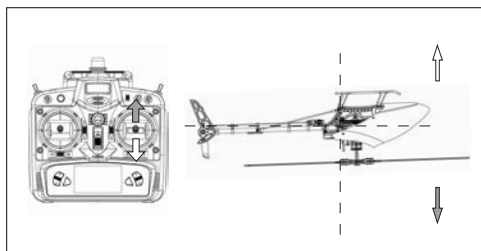
Your V450D03 can perform such breathtaking and exciting aerobatic flight as dive's and 3D inverted.

Inverted flight

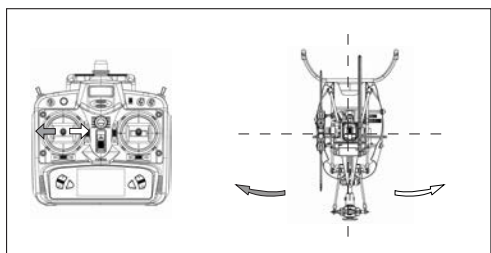
Mode 1 (throttle stick at right hand)



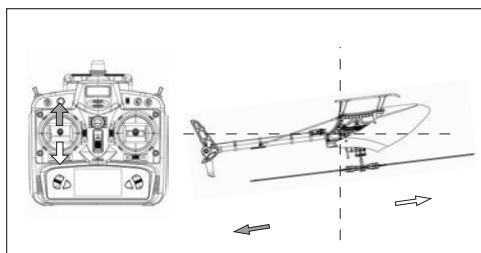
1. When moving the aileron stick left or right, simultaneously your helicopter flies left or right, respectively. Orientation is normal.



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

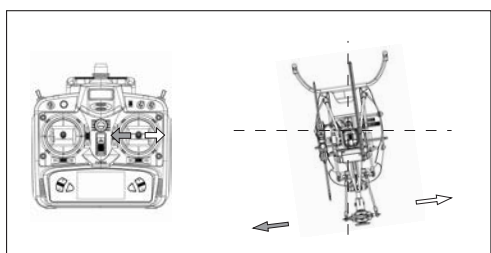


3. When moving the rudder stick left or right, your helicopter simultaneously flies right or left, respectively. Orientation is inverted.

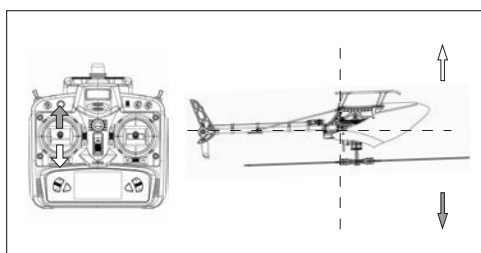


4. When moving the elevator stick up or down, your helicopter simultaneously flies backward or forward, respectively. Orientation is inverted.

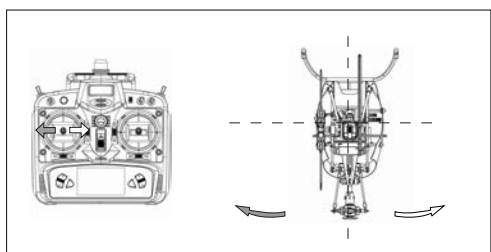
Mode 2 (throttle stick at left hand)



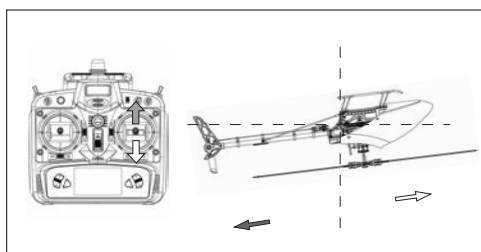
1. When moving the aileron stick left or right, your helicopter simultaneously flies left or right, respectively. Orientation is normal.



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



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

