



CX-3X2000

Flybarless 3 Axis
Gyro System

INSTRUCTION MANUAL



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1. Introduction

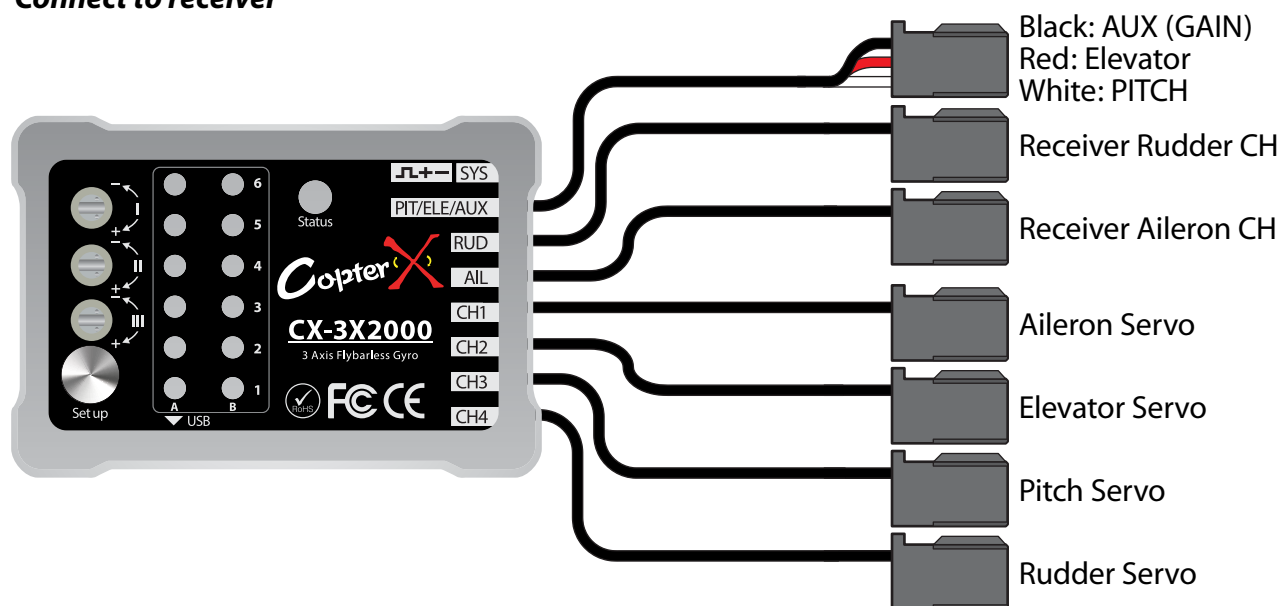
Thank you for your purchase of CopterX high performance 3 axis gyro CX-3X2000. With compact design, micro processor, anti vibration aluminum alloy casing, easy to use setup box, and future firmware update available via PC. Make this one of the most advance 3 axis gyro which will work with anything from EP100 to large scale nitro helicopter. Please keep a copy of this manual for future reference. Enjoy the high performance flight offer by CopterX CX-3X2000 gyro system.

2. Specification

- Operating voltage: DC 3.5V-9V
- Operating current drain: 60mA
- Operating temperature: -15 ~65
- Maximal angular velocity: 800 degrees/sec
- Tail servo compatibility: 1.52ms analog servo, 1.52ms digital servo, 760us digital servo, 960us digital servo
- Swash plate servo compatibility: 1.52ms analog servo, 1.52ms digital servo
- Radio compatibility: PPM, PCM, 2.4G
- Supporting firmware upgrade
- Supporting Multi-Blade Rotor Head / Quad / Airplane
- Dimensions: 37.2mm*25.2mm*13mm
- Weight: 20g

3. Connections

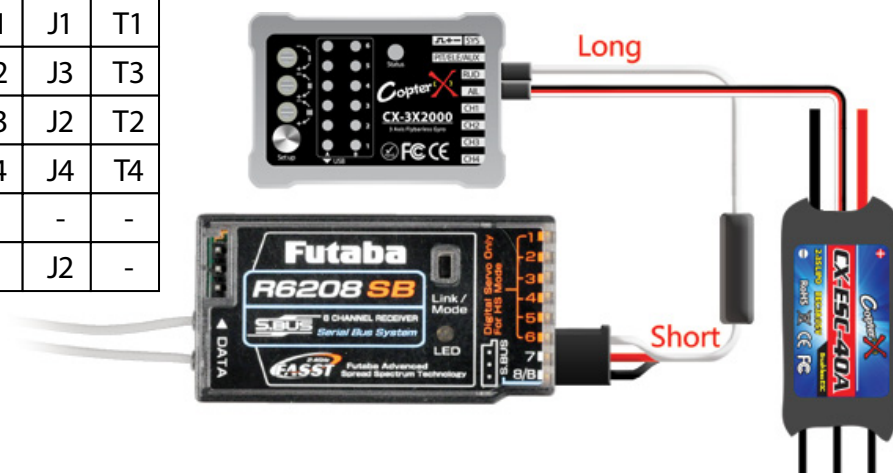
Connect to receiver



FUTABA S-BUS

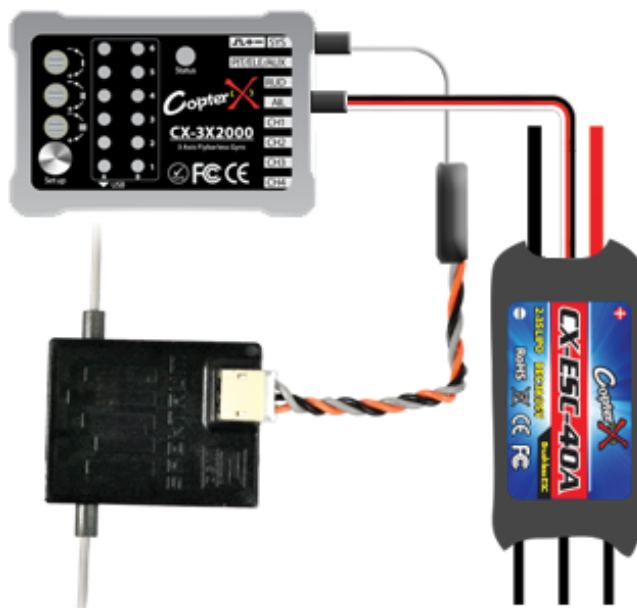
Plug the short end of the S-Bus adapter cable to your receiver's S-Bus port and plug the long end to the CX-3X2000's SYS port. Enter the "FUNCTION" menu of your transmitter, define the sequence of the channels as below.

		Mode 2		Mode 1	
1	AILERON	J1	T1	J1	T1
2	ELEVATOR	J2	T2	J3	T3
3	THROTTLE	J3	T3	J2	T2
4	RUDDER	J4	T4	J4	T4
5	GYRO	-	-	-	-
6	PITCH	J3	-	J2	-



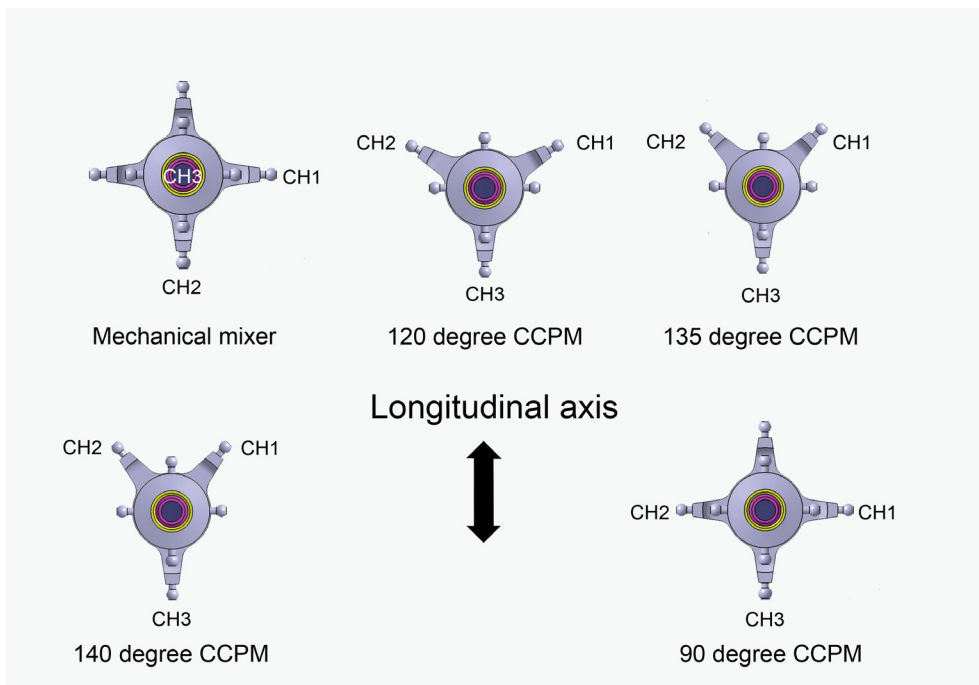
Spektrum DSM

- DSM2-1: transmitter is DX7, etc. (recommend to bind by 6 or 7 channels receiver)
- DSM2-2: transmitter is DX8, DSX9, etc. (recommend to bind by 6 or 7 channels receiver)
- DSM2-3: transmitter is DX8, DSX9, etc. (recommend to bind by 9 channels receiver)
- DSM2-4: transmitter with DM8, DM9 module (recommend to bind by 6 or 7 channels receiver)
- DSMJ: transmitter is in DSMJ format (recommend to bind by matched receiver)
- DSMX-1: transmitter is DX8, etc. (11ms mode, recommend to bind by matched receiver)
- DSMX-2: transmitter is DX8, etc. (22ms mode, recommend to bind by matched receiver)



Connect to servos

Connect the tail servo to CH4 and connect swashplate servos to CH1, CH2, CH3 according to the type of the swashplate.



4. LED Indication

Steady Red	Gyro is in AVCS mode
Steady Blue	Gyro is in normal mode
All A/B LED flash synchronously	Gyro is not receiving signal from receiver
A/B LED flash alternatively	Gyro is initializing, keep the gyro steady, rudder, aileron, elevator stick centered
Flashing Red	Error occur during initialization, restart gyro

5. Gyro Mounting

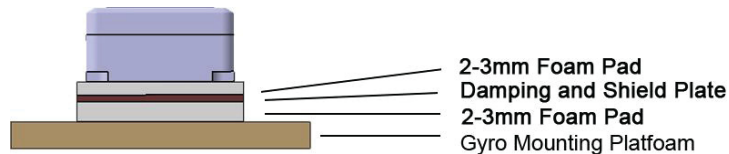
The gyro should mount to a steady platform which is perpendicular to the main shaft and far away from the engine and other electric devices.

Mount the gyro to the platform by using a soft foam pad, relax the cable of gyro to reduce transmission of vibrations through the cable. Do not allow the gyro case to touch other parts of the helicopter.

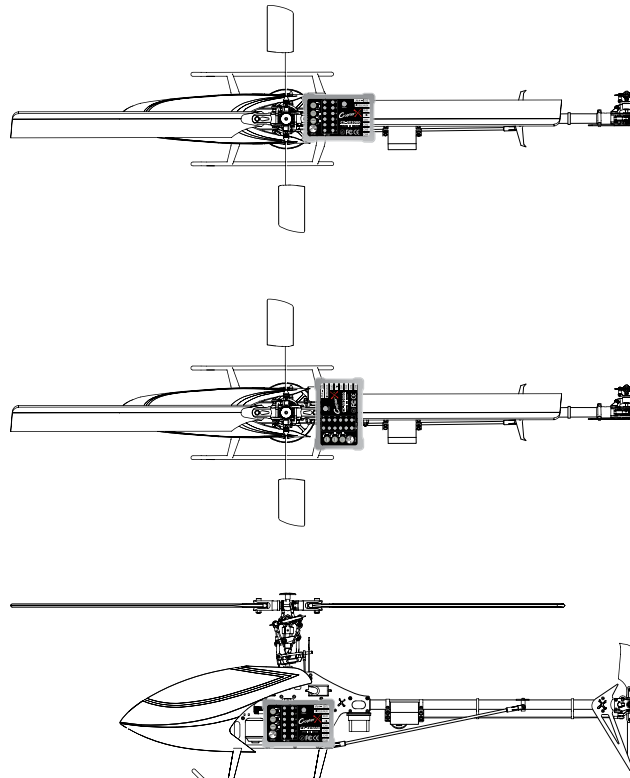
Mounting on a small electric helicopter: just use a 2-3mm foam pad.



Mounting on a large or a High vibration helicopters: use a foam pad on each side of the damping shield plate.



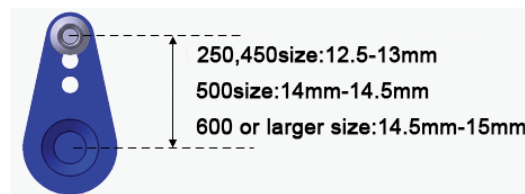
There are three directions can be selected for mounting the gyro.



6. Installation of Servo Horns and Linkages

Make sure all the mechanical parts of the rotor head, the swashplate and the tail rotor are installed correctly, all parts can move smoothly, and all the servos are installed firmly.

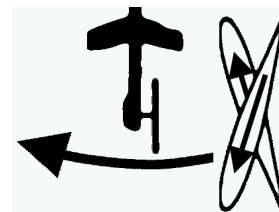
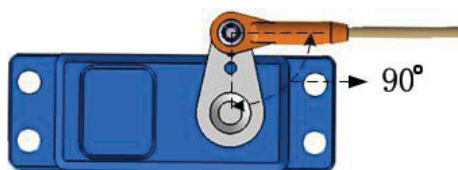
Mount control balls to swashplate servo horns. We recommend the distance from the ball to center is: 12.5-13mm (250,450size), 14-14.5mm (500size), 14.5-15mm (600 or larger size).



Mount control ball to tail servo horn. We recommend the distance from the ball to center is: 4.5mm (250size), 7.5-10mm (450, 500size), 13.5-15mm (600 or larger size).



Install the horn to tail servo temporarily, adjust the horn position to make it perpendicular to the linkage, then set the tail pitch to be approximately 8° in the direction that compensates the main rotor torque by adjusting the linkage length.



Notice: Don't connect servos to the gyro until finishing the servo type configuration.

7. Set Parameters by using Transmitter

7.1. Transmitter configuration

Power on the transmitter and create a new helicopter model, set the trims and sub-trims of all the channels to be zero. Set the swashplate mode as a no mixing mode (Futaba: H1; JR: 1 servo NORM) in your transmitter. Make sure all the mixing functions related to swashplate and tail are turned off. Do not adjust the collective pitch curve now, remain it as a straight line.

Take DX7 and 8FG for example, conservative configuration shown below.

DX7		
Parameter	Path	Value
Type of gyro sensitivity adjustment	GYRO SENS	RUDD D/R
Tail sensitivity adjustment	GYRO SENS->RATE	0: 28% 1: 71%
Tail sensitivity switch	INPUT SELECT->GEAR	GYRO SYS
All the channel travel adjust	TRAVEL ADJUST	100%
All the channel sub trim	SUB TRIM	0
All the channel dual rate	D/R&EXP->D/R	100%
Aileron elevator exp	D/R&EXP->EXP	+40%

8FG		
Parameter	Path	Value
Gyro sensitivity in each condition and mode	Model-> Gyro Rate In each condition and mode	35%
All channel end point	Linkage->End Point	100
All the channel sub trim	Linkage->Sub Trim	0
All the channel dual rate	Model->Dual Rate	100
Aileron elevator exp	Model->Dual Rate-EXP	-40

7.2 Configuration of system menu and setup menu

There are two menus in programming mode: system menu and setup menu.

Notices:

- Always exit programming mode before attempting to fly the model.
- The items of the two menus can be called circularly.
- When complete a setup, press the SET button to save the setup and enter the next item.
- If the servo type is not selected, disconnect the servos to the gyro.
- When complete and save all the setup, restart the gyro to exit programming mode.

7.2.1 Configuration of system menu

Enter the system menu

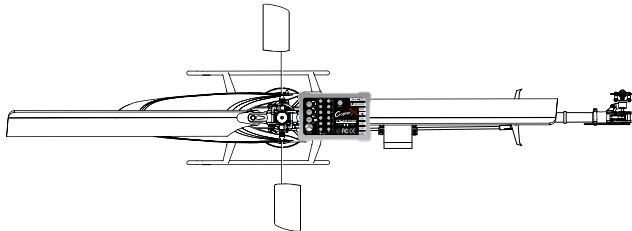
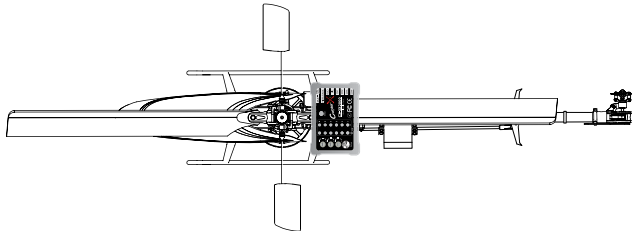
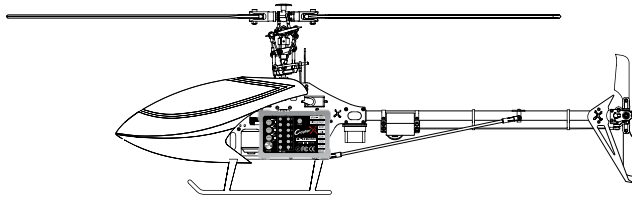
Please make sure aileron travel and Dual Rate are set to 100%.

Turn on the transmitter, connect the gyro to receiver, power on the gyro, hold aileron stick full left or right until the A/B led start flashing, center the stick. Now the gyro enters the system menu, press the SET button to the first item.

Change a parameter, save the parameter and switch to next item.

Move aileron stick left or right can change a parameter;

Press the SET button can save the parameter and switch to next item.

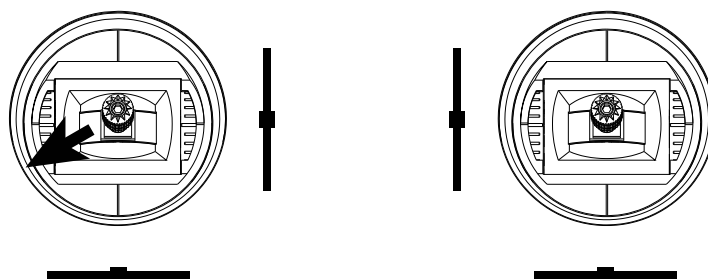
Indication LED	Item	Description of parameter and condition (Move aileron stick left or right can Change a parameter, *Factory default setting)
1	Installation direction of gyro	<p>1: Direction 1*</p>  <p>2: Direction 2</p>  <p>3: Direction 3</p> 
2	Parameter group selection	<p>1: parameter group 1 is selected (Beginner, for beginner we recommend selecting this option. If the helicopter is not in good condition or the tail servo is slow, tail wag, select this option too)*</p> <p>2: parameter group 2 is selected(F-3C)</p> <p>3: Parameter group 3 is selected(3D soft)</p> <p>4: Parameter group 4 is selected(Hardcore)</p> <p>5: Parameter group 5 is selected(Extreme)</p>

3	Servo type	<p>Before completing the servo type selection, don't connect the servo to the gyro. It may damage the servos and gyro.</p> <p>1: All the tail and swashplate servos are 1520us analog.*</p> <p>2: Tail servo is 1520us digital, swashplate servos are 1520us analog.</p> <p>3: Tail servo is 1520us digital, swashplate servos are 1520us digital.</p> <p>4: Tail servo is 760us digital, swashplate servos are 1520us analog.</p> <p>5: Tail servo is 760us digital, swashplate servos are 1520us digital.</p> <p>6: Tail servo is 960us digital, swashplate servos are 1520us digital.</p>
4	Swashplate type	<p>1: mechanical mixer</p> <p>2: 120 degree CCPM*</p> <p>3: 135 degree CCPM</p> <p>4: 140 degree CCPM</p> <p>5: 90 degree CCPM</p>
5	Pirouette optimization	<p>1: positive 1: negative*</p> <p>In this item, the swashplate tilts to a direction. Now you can consider the swashplate to be a compass, the direction of tilt is the compass orientation. Pick up helicopter and rotate it around its main shaft for 90 degrees, check the swashplate compass orientation, if it maintains it's orientation, the sign of "Pirouette optimization" is right, if it goes to the opposite orientation, reverse the sign of "Pirouette optimization".</p>
6	Data reset	<p>Move aileron stick right and left quickly for several times, until the blue lamp flashes fast, then all the parameters of system menu and setup menu is reset to the factory default settings.</p>

7.2.2 Configuration of setup menu

Enter setup menu

Turn on the transmitter, connect the gyro to receiver and connect servos to gyro (do not install the horns to servos), power on the gyro, hold rudder stick full left or right until A/B LED flash, center the stick. Now the gyro enters the setup menu, press the SET button to the first item.



Rapidly hold rudder stick full left or right until the three lamps flash alternately

If you can't enter the setup menu, please set TRAVEL and Dual Rate for rudder CH to 100!

Change a parameter, save the parameter and switch to next item

Move aileron stick left or right can change the sequence number of the parameter in a item; Move rudder stick left or right can change the parameter; Press the SET button can save the parameter and switch to next item.

Indication LED	Item	Description of parameter and condition
1	Servo direction	Use Aileron stick to switch between 4 servos, Use Rudder stick to switch direction. Red LED: servo move in normal direction Blue LED: servo move in reverse direction
2	Servo Trim	Set pitch curve to 50%, Use Aileron stick to switch between 4 servos, Use Rudder stick to set the trim. Adjust so all servo horns are perpendicular to the push rod.
3	Servo Limit	Use Aileron stick to switch between 4 travel limits. Servo will make to limit automatically. Use rudder stick to adjust the limits.



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4	Gyro Compensation Direction	Use Aileron stick to swich between 3 axis. Use Rudder stick to select the direction. Red LED: compensate in normal direction Blue LED: compensate in reverse direction Please note you need to exit the setup mode to check for compensation direction. Check direction after setup and before flight, or serious injury may occure
5	Collective pitch range	Move rudder stick to adjust the collective pitch range travel (default value 60, adjustment range -125 to +125)
6	Compensation of pitch to tail	Move rudder stick to adjust this value, (default 0, adjustment range -40 to +40). Move the throttle stick to check for compensation direction and travel.

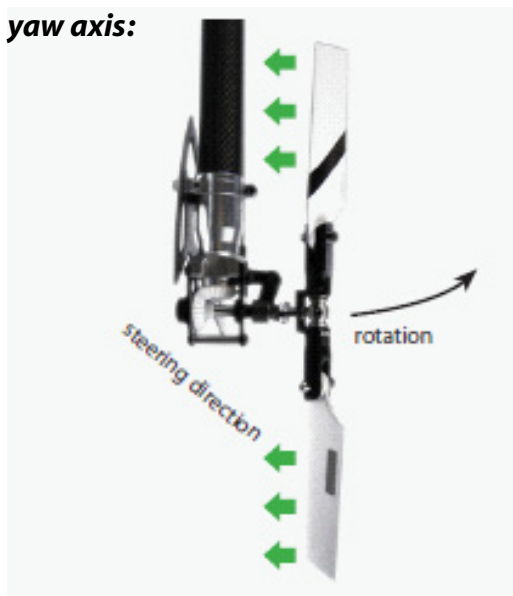
8. Check Before Flight

8.1 Check before first flight

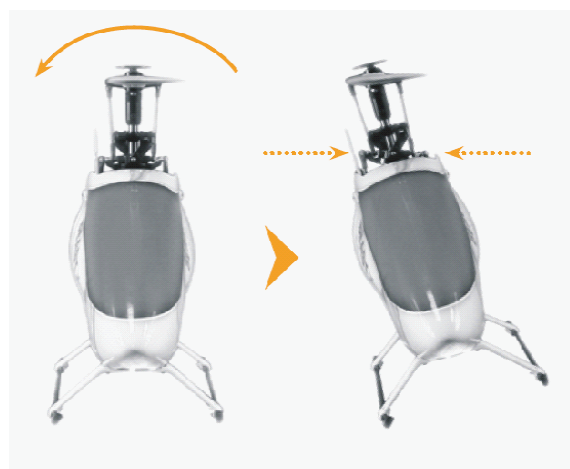
Disconnect the speed controller and motor, power on the transmitter and the helicopter, move all the stick to check the servo direction.

Pick up helicopter and rotate it around its 3 axis, check the Gyro Compensation Direction. Enter the system menu ,check the Pirouette optimization direction again.

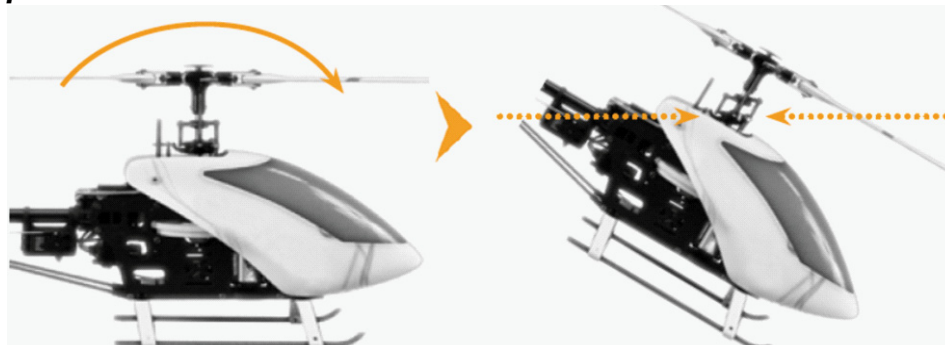
yaw axis:



roll axis:



pitch axis:



8.2 Check before each flight

- Always check the transmitter and receiver battery voltage to ensure they have enough remaining capacity to complete the flight.
- Verify that the gyro is operating correctly.
- Verify that the gyro compensates in the correct direction
- Verify that the gyro is operating in the desired mode.
- Verify that the gyro mounting pads are in good condition.
- Verify that the gyro wires are not contacting the frame of the helicopter.

9. FAQ

Tail oscillate quickly(tail wag, hunting).

- Make sure the helicopter is in good mechanical condition. All shafts must absolutely straight. Limit the vibration as low as possible. Make sure the tail rotor pushrod is straight.
- Decrease the gyro sensitivity setting on transmitter until 15%(JR:57%).
- Select parameter group 1 (F3C mode) in system menu

Helicopter swing randomly.

- Make sure the helicopter is in good mechanical condition. All shafts must absolutely straight. Limit the vibration as low as possible.
- Use the accessory shield plate and mounting pad. A coin also is OK.
- Decrease the setting of Rsp parameter within gyro.

Rotate uncontrollable.

- Check the Installation direction of gyro
- Check the Gyro Compensation Direction
- Move all the stick to check the servo direction.

Rotate on a direction slowly and continually, drift.

Remain the airframe immobile and the aileron elevator and rudder stick centered during initialization

Red lamp keep flashing

Error occur during Initialization, restart the gyro

Helicopter unstable when fast Pirouette

Enter the system menu ,check the Pirouette optimization direction again

About gyro initialization

When power on, the gyro needs several seconds to initialize. During initialization, Remain the airframe immobile and the aileron elevator and rudder stick centered, red yellow and blue lamps flash synchronously. When initialization complete, the tail servo will move right and then left to indicate.

Quickly dial the gain switch between Normal Mode and AVCS Mode for several times, the gyro will initialize again



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