



# CX-3X1000

Flybarless 3 Axis  
Gyro System

# INSTRUCTION MANUAL



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# MENU

<b>Table of content</b>	<b>1</b>
<b>1. Introduction</b>	<b>2</b>
<b>2. Specifications</b>	<b>2</b>
<b>3. Connections</b>	<b>2</b>
<b>4. LED Indication</b>	<b>3</b>
<b>5. Gyro Mounting</b>	<b>4</b>
<b>6. Installation of Servo Horns and Linkages</b>	<b>5</b>
<b>7. Set Parameters by using Transmitter</b>	<b>6</b>
<b>8. Check Before Flight</b>	<b>12</b>
<b>9. FAQ</b>	<b>13</b>

## 1. Introduction

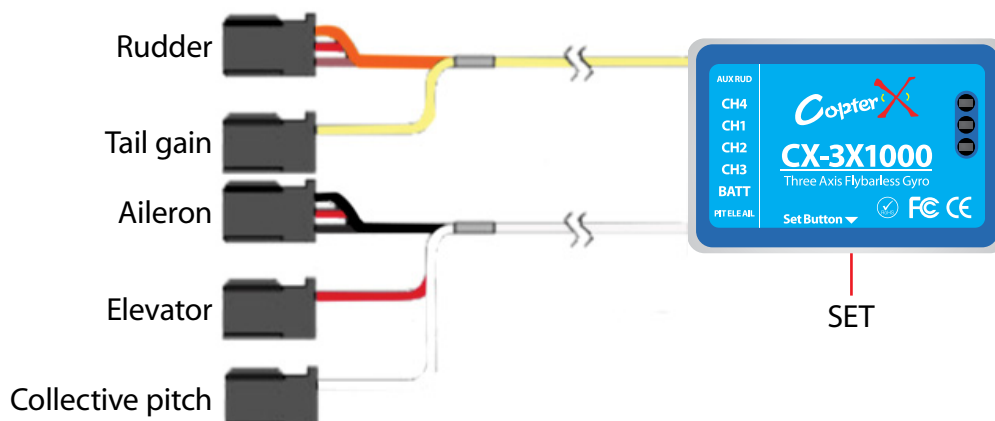
Thank you for your purchase of CopterX high performance 3 axis gyro CX-3X1000. With compact design, micro processor, anti vibration aluminum alloy casing, easy to use setup box, and future firmware update available via PC. Make this one of the most advance 3 axis gyro which will work with anything from 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-3X1000 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
- Dimensions: 37.2mm\*25.2mm\*13mm
- Weight: 20g

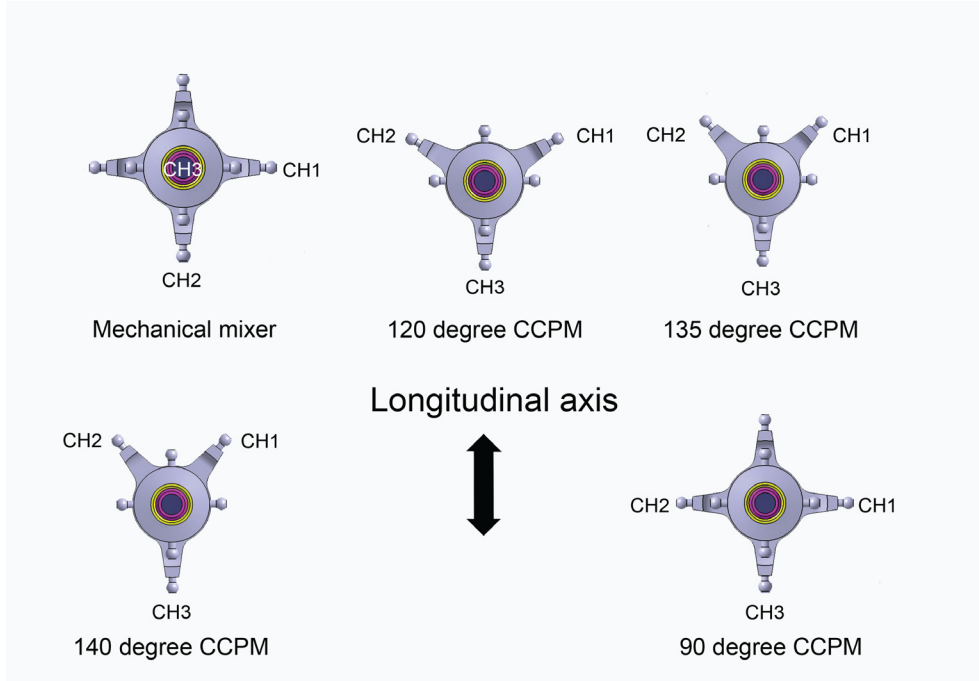
## 3. Connections

**Connect to 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
Steady Red and Blue	Gyro is waiting for receiver's signal
Blue and Red LED are flashing synchronously	Gyro is initializing, keep the gyro steady, rudder stick centered
Red LED is flashing	Error occur during Initialization, restart the gyro

## 5. Gyro Mounting

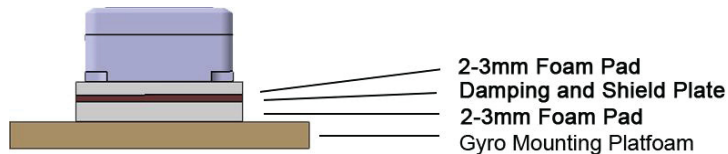
The gyro should mount to a steady platform which is perpendicular to the main shaft and far away from the engine and other electric devices.

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.

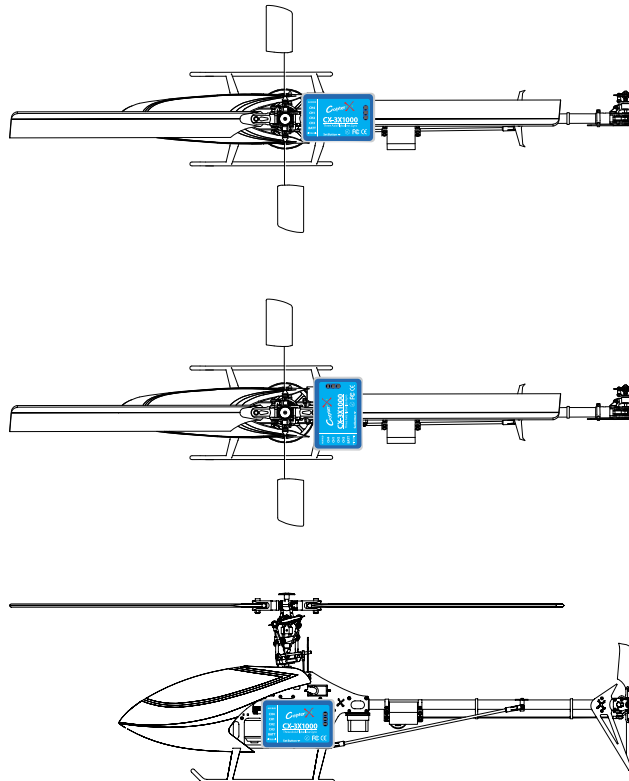
Mounting on a small electric helicopter: just use a 2-3mm foam pad.



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



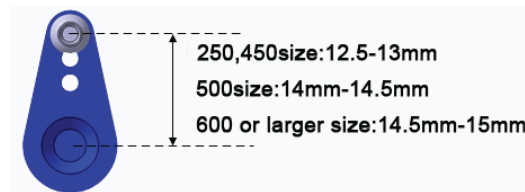
There are three directions can be selected for mounting the gyro.



## 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.

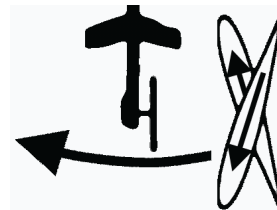
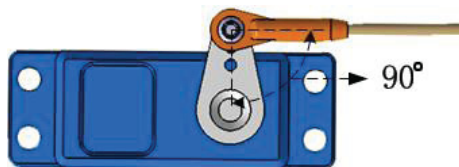
Mount control balls to swashplate servo horns. We recommend the distance from the ball to center is: 12.5-13mm (250,450size), 14-14.5mm (500size), 14.5-15mm (600 or larger size).



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.

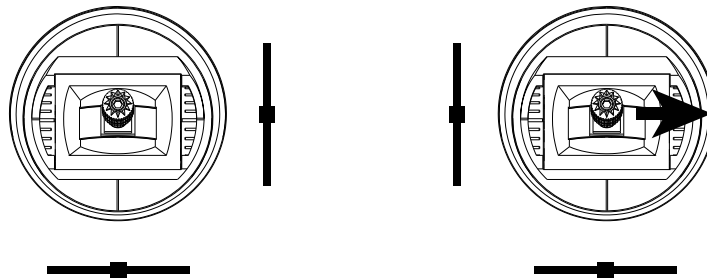
Notices:

- 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*

Turn on the transmitter, connect the gyro to receiver, power on the gyro, rapidly hold aileron stick full left or right until the three lamps flash alternately, center the stick. Now the gyro enters the system menu, press the SET button to the first item.



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

If you can't enter the system menu, please check of the setting of endpoint and dual rate setting on transmitter.

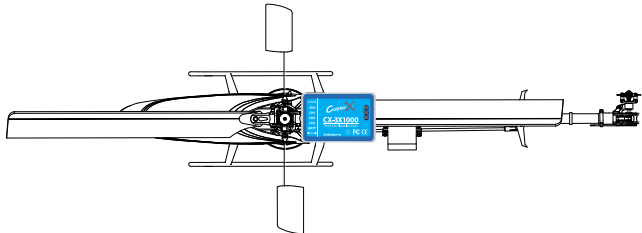
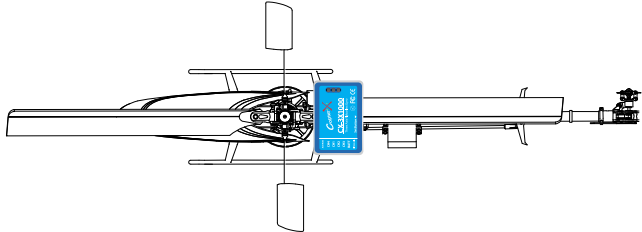
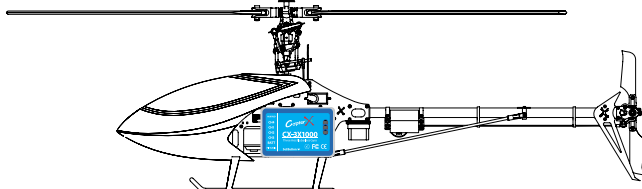
*Change a parameter, save the parameter and switch to next item*

Move aileron stick left or right can Change a parameter; Press the SET button

Can save the parameter and switch to next item. When the lamps flashing, all the operation of stick and button take no effect.

*LED indication*

The three lamps flash synchronously: switch to a new item, the number of flashes is the sequence number of the item.

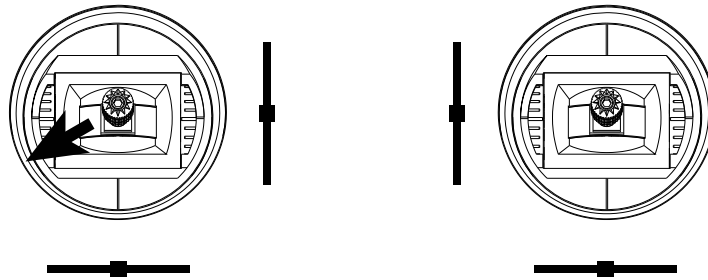
Number of The three lamps flash synchronously	Item	Description of parameter and condition (Move aileron stick left or right can Change a parameter, *Factory default setting)
1 flash	Installation direction of gyro	<p><b>Yellow, 1 flash: Direction 1*</b></p>  <p><b>Yellow, 2 flashes: Direction 2</b></p>  <p><b>Yellow, 3 flashes: Direction 3</b></p> 
2 flashes	Parameter group selection	<p><b>Yellow, 1 flash:</b> parameter group 1 is selected (F3C mode, 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><b>Yellow, 2 flashes:</b> parameter group 2 is selected(3D mode)</p>

3 flashes	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><b>Yellow, 1 flash:</b> All the tail and swashplate servos are 1520us analog.*</p> <p><b>Yellow, 2 flashes:</b> Tail servo is 1520us digital, swashplate servos are 1520us analog.</p> <p><b>Yellow, 3 flashes:</b> Tail servo is 1520us digital, swashplate servos are 1520us digital.</p> <p><b>Yellow, 4 flashes:</b> Tail servo is 760us digital, swashplate servos are 1520us analog.</p> <p><b>Yellow, 5 flashes:</b> Tail servo is 760us digital, swashplate servos are 1520us digital.</p> <p><b>Yellow, 6 flashes:</b> Tail servo is 960us digital, swashplate servos are 1520us digital.</p>
4 flashes	Swashplate type	<p><b>Yellow, 1 flash:</b> mechanical mixer</p> <p><b>Yellow, 2 flashes:</b> 120 degree CCPM*</p> <p><b>Yellow, 3 flashes:</b> 135 degree CCPM</p> <p><b>Yellow, 4 flashes:</b> 140 degree CCPM</p> <p><b>Yellow, 5 flashes:</b> 90 degree CCPM</p>
5 flashes	Pirouette optimization	<p><b>Yellow, 1 flash: positive</b></p> <p><b>Blue, 1 flash: negative*</b></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". If the configuration is not complete in 40 second, the swashplate will go to level, you must press SET button 6 times to enter this item again. (This is the last item of configuration, you must complete all the other configuration before this item)</p>
6 flashes	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, rapidly hold rudder stick full left or right until the three lamps flash alternately, 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 check the setting of endpoint and dual rate setting on transmitter.

*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 an item; Move rudder stick left or right can change the parameter; Press the SET button can save the parameter and switch to next item. When the lamps are flashing, all the operation of sticks and buttons take no effect.

### LED indication

The three lamps flash synchronously: switch to a new item, the number of flashes is the sequence number of the item.

In an item, red flash indicates the sequence number of the parameter.

In item 1, 3, 4, 6, 7, fast red flashes indicate parameter value increasing, fast blue flashes indicate value decreasing. One flash means the change is one.

Number of The three lamps flash synchronously	Item	Description of parameter and condition
1 flash	Gyro gain of 3 axis	Move aileron stick left or right can switch the gain of 3 axis; Move rudder stick left or right can change the value; adjustment range is 10~125. <b>Red, 1 flash:</b> tail gain (default value: F3C 70, 3D 100) <b>Red, 2 flashes:</b> roll gain (default value: F3C 40, 3D 40) <b>Red, 3 flashes:</b> pitch gain (default value: F3C 40, 3D 40)

2 flashes	Servo reverse	<p>Move aileron stick left or right can switch the 4 servos, Move rudder stick left or right can Change the direction of the servo;</p> <p><b>Yellow, 1 flash: positive</b>  <b>Blue, 1 flash: negative</b></p> <p>Move the collective pitch stick and check if the swashplate moves horizontally up and down. Otherwise adjust the signs of "CH1", "CH2", "CH3".</p> <p>Red, 1 flash: CH1(default: negative)  Red, 2 flashes: CH2(default: positive)  Red, 3 flashes: CH3(default: positive)  Red, 4 flashes: CH4(default: negative)</p>
3 flashes	Servo trim	<p>Move aileron stick left or right can switch the 4 servos, Move rudder stick left or right can Change the value;</p> <p>Center the collective pitch stick, Adjust the values of "CH1", "CH2", "CH3".and the horns positions to make them perpendicular to the linkages. (all the default values are 0, adjustment range is -125~125.)</p> <p><b>Red, 1 flash: CH1</b>  <b>Red, 2 flashes: CH2</b>  <b>Red, 3 flashes: CH3</b>  <b>Red, 4 flashes: CH4</b></p>
4 flashes	Servo limit	<p>Move aileron stick left or right can switch the 4 limits, Move rudder stick left or right can Change the value; adjustment range is 20~125.</p> <p><b>Red, 1 flash:</b> direction A of tail servo(default: 70)  <b>Red, 2 flashes:</b> direction B of tail servo(default: 70)  <b>Red, 3 flashes:</b> roll limit of swashplate(default: 80)  <b>Red, 4 flashes:</b> pitch limit of swashplate(default: 80)</p>
5 flashes	Gyro Compensation Direction	<p>Move aileron stick left or right can switch the 3 axis; Move rudder stick left or right can Change the direction.</p> <p><b>Yellow, 1 flash: positive</b>  <b>Blue, 1 flash: negative</b></p> <p><b>Red, 1 flash:</b> yaw axis(default value: positive)  <b>Red, 2 flashes:</b> roll axis (default value: positive)  <b>Red, 3 flashes:</b> pitch axis (default value: positive)</p> <p>Notices: Exit the setup mode to check the Compensation Direction, make sure the Direction is right, otherwise will cause damage.</p>

6 flashes	collective pitch range	Move rudder stick left or right can Change the value; (default: 60, adjustment range is -125~125). you can also use the servo travel function to setup the collective, it can take the same effect.
7 flashes	Compensation of pitch to tail	Move rudder stick left or right can Change the value; (default: 0, adjustment range is -40~40). move the collective pitch stick up and down to check the value and direction of compensation

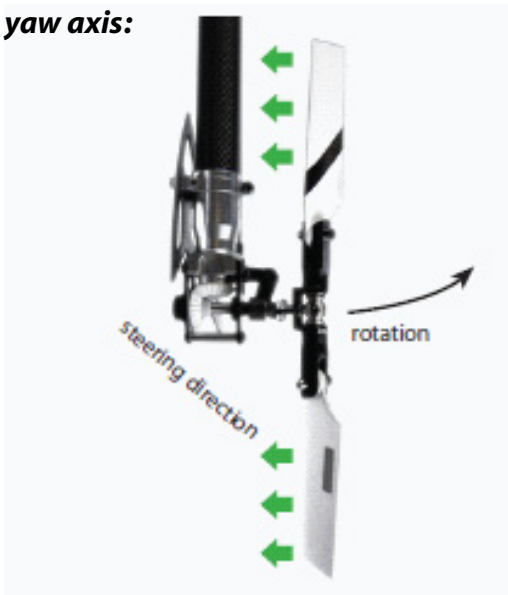
## 8. Check Before Flight

### 8.1 Check before first flight

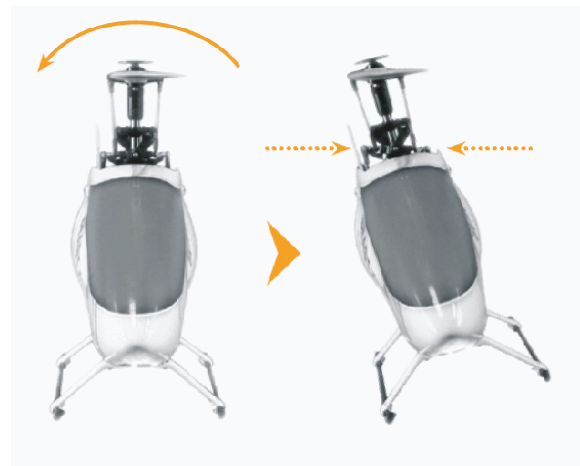
Disconnect the speed controller and motor, power on the transmitter and the helicopter, move all the stick to check the servo direction.

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.

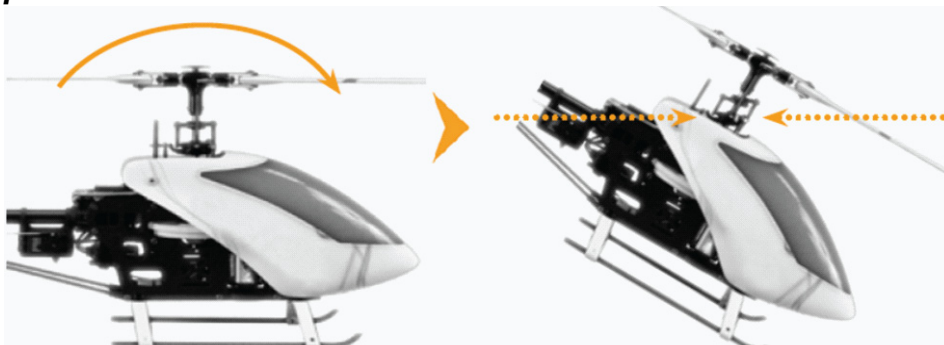
**yaw axis:**



**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 Rsps 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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