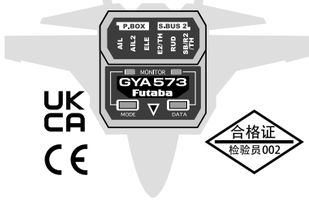
1M23N40802

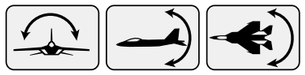
Futaba

GYA573
6-Axis Flight Control

Instruction Manual



For models



GYA573 Ratings

(Integrated sensor type rate gyro)
- Gyro sensor: MEMS vibrating structure gyro
- Operating voltage: DC 3.8 V to 8.4 V
- Current drain: 27 mA (excluding a servo)
- Operating temperature range: -10ºC to +45ºC
- Dimensions: 28 x 26 x 16 mm (1.10 x 1.02 x 0.63 in)
- Weight: 8.5 g (0.30 oz)

Before using your new gyro, please read this manual thoroughly and use the gyro properly and safely. After reading this manual, store it in a safe place.

- No part of this manual may be reproduced in any form without prior permission.
- The contents of this manual are subject to change without prior notice.
- Futaba is not liable for any potential damage (accidental or otherwise) that may occur after installation.

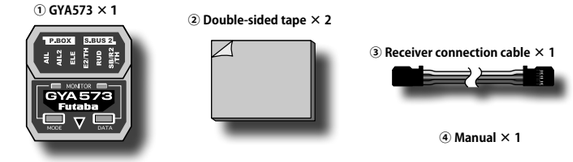
Set Contents

① GYA573 × 1

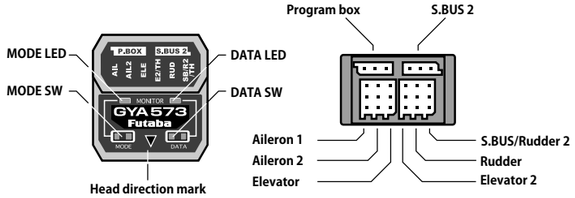
② Double-sided tape × 2

③ Receiver connection cable × 1

④ Manual × 1

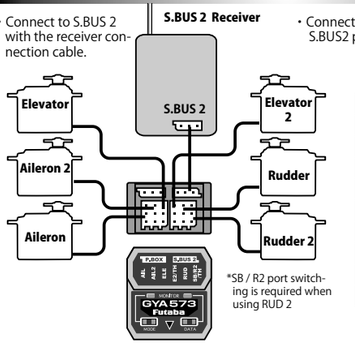


Each Part



Connection

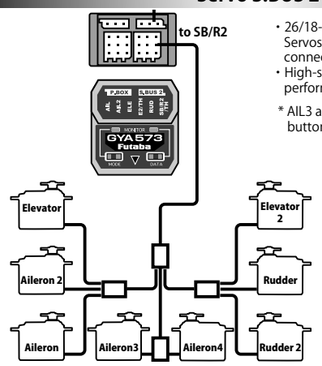
- Connect to S.BUS 2 with the receiver connection cable.
- Connect the telemetry sensor to the receiver's S.BUS2 port, not the GYA573.



Transmitter function

CH1	Aileron
CH2	Elevator
CH4	Rudder
CH5	Aileron Gain
CH6	Aileron 2
CH7	Elevator Gain
CH8	Rudder Gain
CH9	Elevator 2
CH10	Recovery mode ON/OFF
CH11	Rudder 2

Servo S.BUS 2



- 26/18-channel S.BUS signal output terminal. Servos other than gyro channels can also be connected.
- High-speed S.BUS2 output brings out gyro performance.

* AIL3 and AIL4 settings cannot be set with the button settings on the GYA573 main unit.

Servo selection

Use Futaba S.BUS2 compatible servos.

S.BUS/S.BUS2 non-compatible servos cannot be used with S.BUS2 connections. Use it by connecting each servo individually to the gyro.

Thank you for purchasing the GYA573 airplane gyro. Compact and lightweight, the GYA573 is designed to control the ailerons (roll axis), elevators (pitch axis) and rudders (yaw axis). In addition, the GYA573 is equipped with a recovery mode to avoid danger. Features include simple set-up and S.BUS2 connectivity.

Features of GYA573

- **Remote gain function.**
- **4 flight modes. (Auto recovery/Normal/AVCS/ Gyro OFF)**
- **Supports 4 ailerons, 2 eleveters and 2 rudders types.**
- **Supports a various wing types, includes Flying Wing.**
- **Supports Gasoline planes and EP planes.**
- **Supports FASSTest26CH**
- **Supports 4D flight**
- **Supports roll flat**
- **Air brake mixing**
- **Camber mixing**

These functions must be set from a transmitter that supports the GYA573 settings or from the GPB-1.

* Gyro control is not possible if the aircraft stalls.
* Do not set the fail-safe function of the transmitter to the channel used by the gyro.
* GYA573 can only be used in combination with Futaba products.
* GYA573 requires a transmitter system of 10 CH or more.
* GYA573 requires an S.BUS2 receiver.

Precautions

⚠WARNING

Failure to follow these safety precautions may result in severe injury to yourself and others.

❗ Check that there is sufficient transmitter battery capacity for flight.
- Determine the operating time of the receiver, gyro, and servo battery in the adjustment stage and decide the number of flights with a margin to spare.

❗ Analog servos cannot be used while in "digital servo" mode.
- Analog servos may break down if "digital servo" mode is selected.

⃠ Do not operate the airplane and transmitter sticks for about 6-7 seconds after turning on the GYA573 (When shared with the receiver).
- GYA573 initialization and neutral position reading. The GYA573 is initialized when the power is turned on. In the AVCS mode, the neutral position is also read at the same time. If initialization ends normally, the operator is informed by two repetitive movements of the servo to the left and right (a little).

❗ Always check the direction of operation of the gyro.
- Attempting to fly with the operating direction reversed is extremely dangerous. Always check your gyro's direction to ensure safe flights.

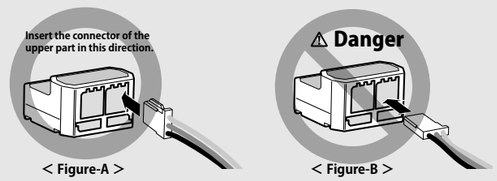
⃠ Do not strike the gyro with a hard object. Do not drop it onto a concrete surface or other hard floor.
- The sensor may become damaged during strong impacts.

⃠ Do not use trims or mixing in AVCS mode.
- In the AVCS mode all corrections are made by the gyro. Therefore, if trimming and mixing, are turned on, operation will be the same as deviating from the neutral position.

⃠ Do not use the GYA573 for applications other than RC airplanes.
- This gyro is designed for RC airplanes only. Do not use it for other applications.

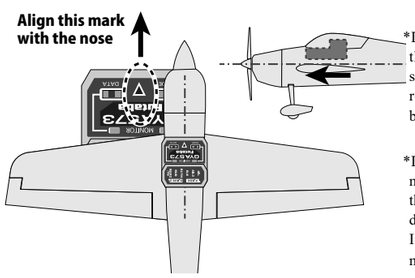
⃠ Do not place gyro near heating equipment (engine, motor, ESC, battery, servo, etc.).
- Always allow the gyro to adjust to the surrounding environmental temperature before flight. A large temperature change during use will cause drift and other operational issues.

⃠ Do not insert the connector in the orientation shown in Figure-B.
- It will short-circuit and ignite, burn out, or break down.



Mounting to the Airplane

Firmly stick the gyro to the fuselage with the double sided tape supplied. Install the gyro at a level place near the center of gravity where there is little vibration. It can also be installed at the side or rear of the fuselage. In this case, change the gyro mount direction setting.

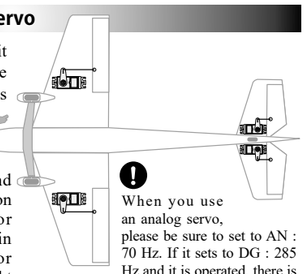


*Do not use a product other than the double sided tape supplied. Vibration may result, causing the plane to become uncontrollable.

*Depending on the airframe material such as balsa, etc., the adhesive strength of the double sided tape may drop. In this case, prepare the mounting surface well.

Servo

Link the servo in accordance with the kit instruction manual. Adjust the linkage rod so that the trim amount is as small as possible.



<2nd servo operating direction>
During aileron mode operation the 2nd aileron servo moves in the same direction as the aileron servo. In the elevator mode, the 2nd elevator servo moves in the opposite direction of the elevator servo. Mount the servos as left and right objective linkage.

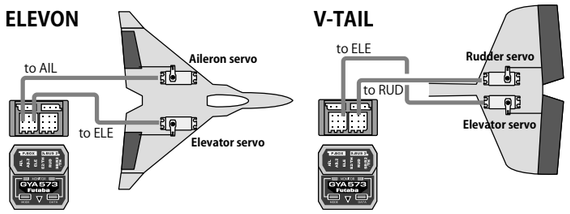
❗ When you use an analog servo, please be sure to set to AN : 70 Hz. If it sets to DG : 285 Hz and it is operated, there is a danger that a servo will be destroyed.

Digital/Analog servo selection
Selection of an analog and digital servo is performed in a palameter settings.

Parameter Settings: 2. Servo type is as follows.
Digital servo → DG : 285 Hz Analog servo → AN : 70 Hz
The stability of digital-servo mode of a flight increases in order to perform a high-speed control action.

ELEVON/V-TAIL Connection

Set with the wing type of GYA573. The wing type of the transmitter is not used and is normal.
- Turn off (INH) the elevon / V-tail mixing (Wing type) on the transmitter side.
- Do not use transmitter sub-trim. Adjust using the gyro neutral offset.
- When using the S.BUS servo, you can also use the neutral offset function of the S.BUS servo setting parameters.



GYA573 Start up time

When the GYA573 is started, it takes **6 to 7 seconds** to accurately grasp the attitude of the aircraft. During that time, **do not move the aircraft** by fixing it at an inclination of **30 ° or less** horizontally. If it is tilted by 30 ° or more, a startup error will occur and the LED will blink red. In this case, return the aircraft to the horizontal position. GYA573 will restart when it is returned to the horizontal position. Fix the aircraft within 30 ° horizontally even when restarting.

Servo Operation on the Ground

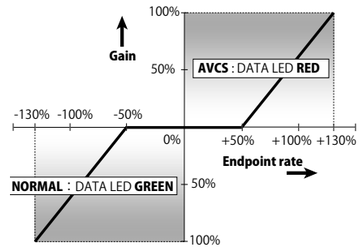
If the stick is moved when the airplane is on the ground, the servo will move to the limit position. In the AVCS mode, the servo will not return to the neutral position even if the stick is set to the neutral position, but this is normal.
If the stick is moved fully to the left or right three or more times within one second, the servo will temporarily return to the neutral position.

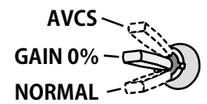
Monitor LED display

	State	MODE LED	DATA LED	Reference
1	No signal	OFF	2 flash	Face up：Blue Face left：Yellow Face down：Green Face right：Red
2	Warm-up	OFF	Fast blink	
3	After initialization	Every 2 seconds Red (roll axis) Green (pitch) Blue (yaw) Red (roll) ... repeated	AVCS：Red Normal：Green	
4	Neutral offset		Orange	
5	Gain OFF		OFF	
6	Axis rotating		Right roll, right yaw rotation:Green Left roll, Left yaw rotation:Red UP:Green Down:Red	
7	Recovery mode	Slow blinking White	OFF	
8	Roll Flat	Fast blinking White		
9	Startup error	OFF	Red blink	Tilt more than 30 degrees
10	Low battery	Slow blinking Violet	OFF	Less than 3.8 V
11	Memory error	OFF	Red-Green blink	

Gyro Sensitivity and AVCS Switching

The gyro has two operation modes: NORMAL mode and AVCS mode.
In the AVCS mode, angle control is performed at the same time as NORMAL mode rate (rotating speed) control. **In the AVCS mode,** the neutral keeping force is stronger than the NORMAL mode and the flight attitude of the aircraft is forcefully maintained. During knife-edge flying, idiosyncrasies of the aircraft when climbing will be compensated automatically. On the other hand since the rudder follows when the aircraft stalls, pay special attention to the elevator axis. To be safe, switching to the NORMAL mode when taking off and landing is recommended. When the remote gain function is used normally and AVCS mode switching is performed in accordance with the direction of operation of the transmitter's remote gain channel. At the + rate side, the AVCS mode is selected and at the – rate side, the NORMAL mode is selected. The sensitivity is changed by adjusting the end point rate. If the transmitter has a gyro sensitivity setting mixing function, the sensitivity setting is performed directly. The sensitivity setting criteria by end point is shown in the figure below. The sensitivity becomes zero between end point -50% to +50% and becomes 100% at end point 130%. Refer to the transmitter instruction manual and set the end point. When AVCS is used, setting the 3-positions switch to the sensitivity CH (there are types which cannot be set by transmitter) and setting it as shown above is recommended. In the case of a 2-positions switch, inhibiting the gyro at 0% sensitivity such as NORMAL mode and sensitivity 0% and AVCS mode and 0% sensitivity is safe.

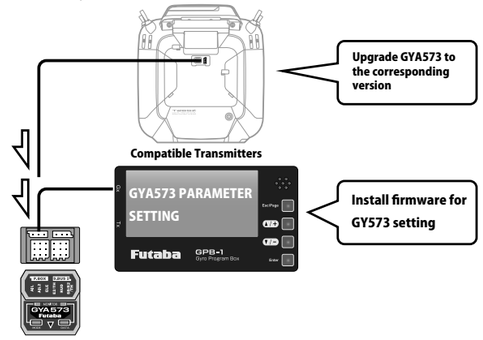




When AVCS is used we recommend that the sensitivity CH be set to the 3-position.

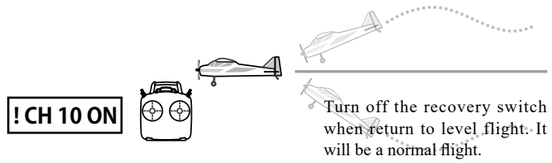
GYA573 settings from the transmitter or program box

Connect the separately sold gyro program box GPB-1 to the P.BOX port of GYA573, you can set the parameters of GYA573 in the program box. However, GPB-1 needs to be updated for GYA573 from the Futaba website. (CIU-3 / 2 is required) For details, refer to the Futaba website.



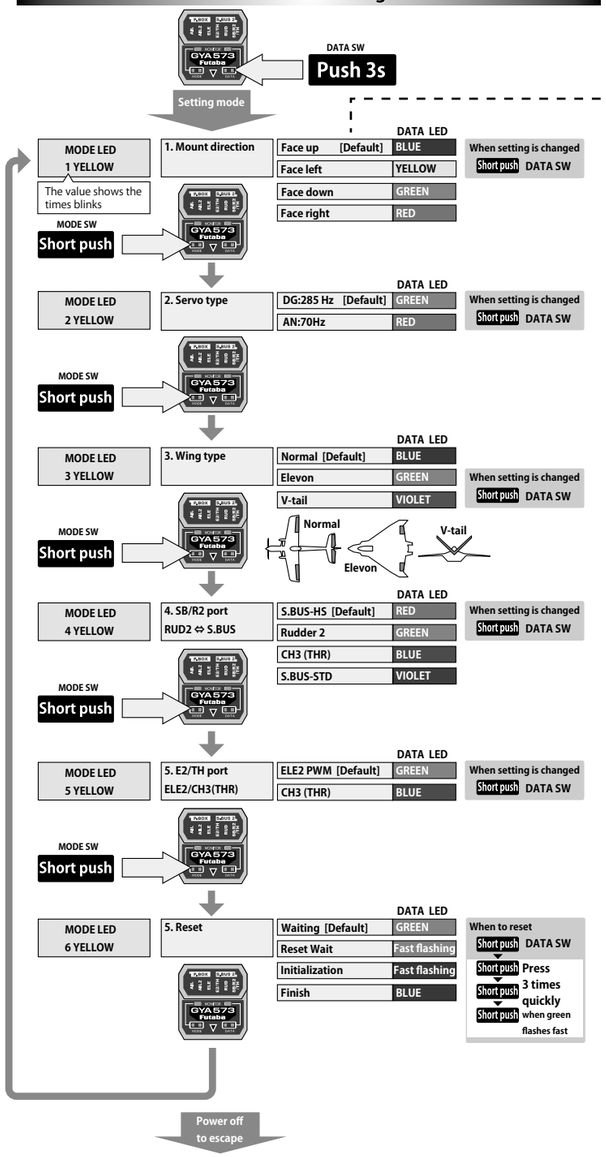
Recovery mode

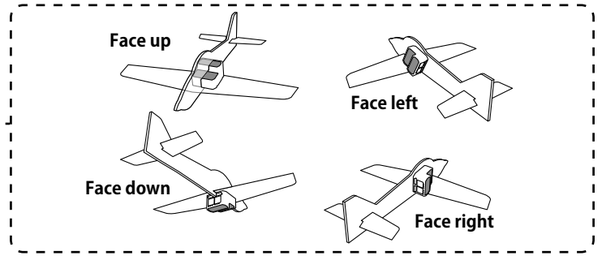
By turning on the CH10 switch of the transmitter, it is possible to automatically return to level flight. It is used in the unlikely event that you lose track of the direction of the aircraft. NORMAL / AVCS / GYRO OFF Recovery mode starts in any state.



Maneuvering is possible even when the recovery switch is ON, but the operation differs as follows.
- When the recovery switch is ON, release the stick to neutral and the aircraft will be in level flight.
- When the recovery switch is ON, the roll and pitch tilt angle is limited to 70 ° when the transmitter travel rate is 100%. Inverted flight is not possible. Decreasing the travel rate of the transmitter will reduce the maximum tilt angle of the aircraft. The maneuvering feels dull and the turning radius increases. If the recovery switch is turned off when turning, the operation will suddenly take effect and the aircraft will tilt and become dangerous. Turn off the recovery switch when the stick is in neutral.
- When the recovery switch is ON, the MODE LED flashes white.
- A momentary type switch is recommended for the recovery mode.

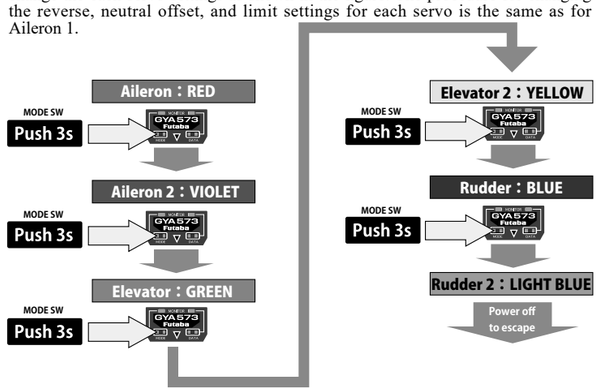
Parameter Settings





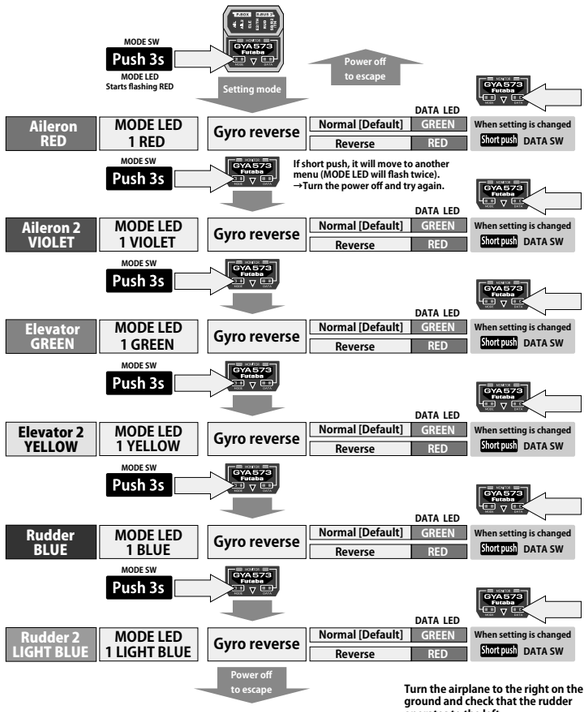
To change the control surface for each servo

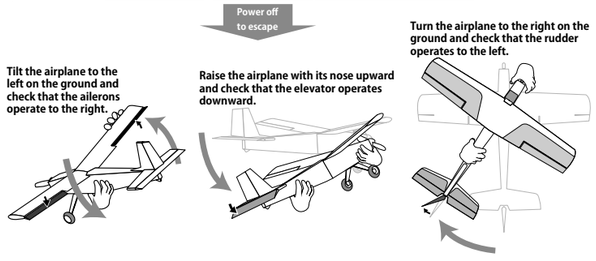
[From Setting mode] Pressing and holding the MODE switch for 3 seconds will change the each servo settings as shown in the figure. The procedure for changing the reverse, neutral offset, and limit settings for each servo is the same as for Aileron 1.



Gyro reverse

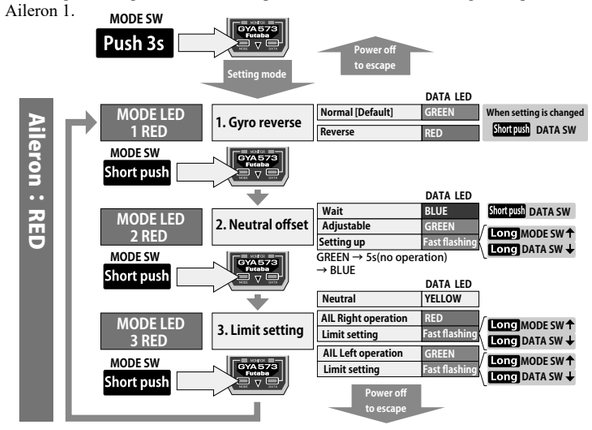
It is the direction setting of the gyro. **3-Axis Settings → 1. Gyro reverse** of the 3 axes. Be careful as it will crash if the direction is reversed.
For dual aileron, dual elevator, and dual rudder aircraft, check the operating direction of each second aileron/elevator/rudder.





3-Axis Settings

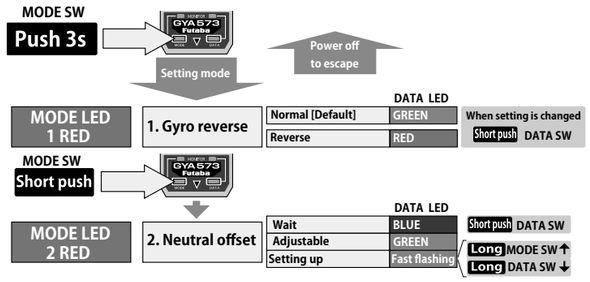
Gyro reverse, neutral offset and limit setting for each servo can be set by the gyro. If settings are required, follow the procedure below. The setting example is for Aileron 1.



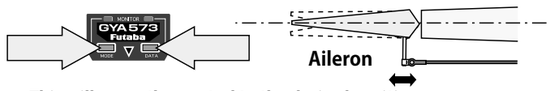
Neutral offset

Neutral position setting for each servo. Set each of the three axes at **3-Axis Settings → 2. Neutral offset**.

Aileron1 setting example



1. DATA LED BLUE → DATA SW Short push → GREEN
2. Press and hold MODE SW or DATA SW to adjust to the neutral position.



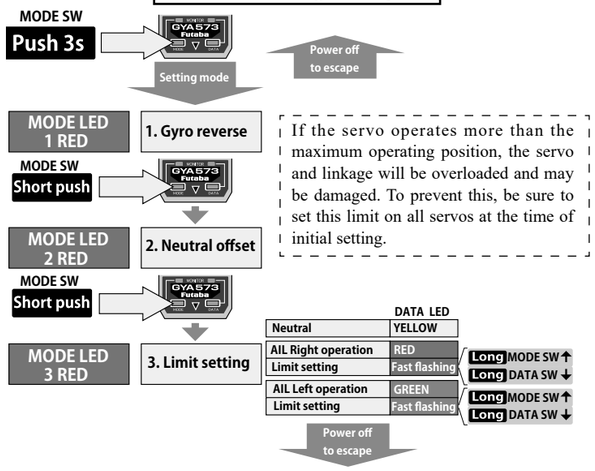
This will move the neutral to the desired position.

*The DATA LED will fast flashing green while neutral is being set.
*When the neutral setting limit is reached, the DATA LED will change to fast flashing red.

Limit setting

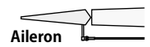
This is the limit setting for each servo. The position of the maximum operation is read into the gyro in the first setting. Set to each of the 3 axes with **3-Axis Settings → 3. Limit setting**.

Aileron setting example

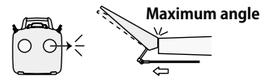


If the servo operates more than the maximum operating position, the servo and linkage will be overloaded and may be damaged. To prevent this, be sure to set this limit on all servos at the time of initial setting.

1. DATA LED YELLOW→Neutral

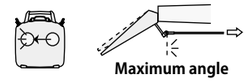


2. Stick to full right — **DATA LED→RED**



Press and hold MODE SW or DATA SW to adjust to the maximum angle

3. Stick to full left — **DATA LED→GREEN**



Press and hold MODE SW or DATA SW to adjust to the maximum angle

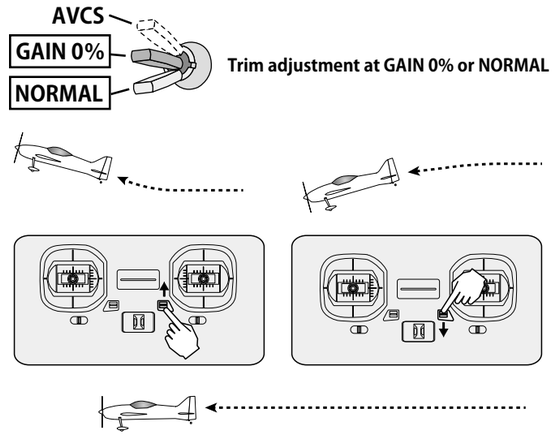
The limit will now be stored in the gyro.

Flight Adjustment

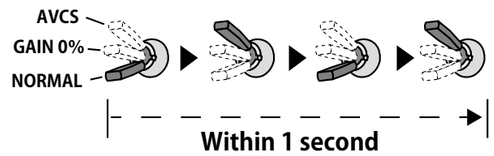
Adjust the transmitter and gyro while repeatedly taking off and landing and with the aircraft on the ground.

Transmitter adjustments must not be made while flying because it is dangerous.

1 Fly the plane and adjust the trim with GAIN 0% or NORMAL.



2 After trimming, switch the gain switch between 0% sensitivity (or NORMAL mode) and the AVCS mode three times at an interval of within one second and then set the gain switch to the AVCS mode position. This memorizes the AVCS mode neutral trim position at the gyro. In the AVCS mode, do not perform trimming during flight.



3 Adjust the gyro sensitivity so that hunting (deflection of the aircraft in small increments) does not occur in the control axis direction. The gyro sensitivity is different depending on the area of the aircraft rudder, air speed, and gyro used. Initially try changing the sensitivity in 5% steps. If hunting is excessive, the aircraft may be damaged. Hunting tends to stop when the airspeed is lowered.

⚠WARNING

⊘ Do not operate trim in AVCS mode. No mixing is used in AVCS mode.
- In AVCS mode, all corrections are performed by the gyro. Therefore, turning on trim operation or mixing will result in the same behavior as neutral deviation.

⊘ Do not set up the transmitter during flight or while the engine or motor is running.
- Unexpected movements during flight or while the engine or motor is rotating can be extremely dangerous.

GYA573 Update

GYA573 can be updated from a PC by connecting the separately sold CIU-3 / 2. Please check the Futaba dealer in your country website for the latest firmware and update method.

https://futabausa.com/

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Percentage of Waste Paper pulp 80%

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