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DUALSKY®
ADVANCED POWER SYSTEMS

《FC120》

FC120 Flight Control System Instruction Manual

FC120固定翼飞行控制器使用说明书

#21435
http://www.dualsky.com

Made in China 41ZX15E2810

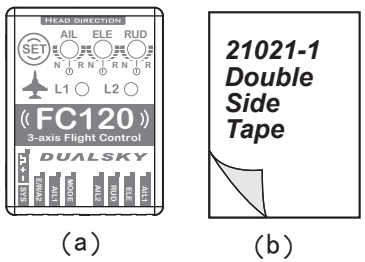
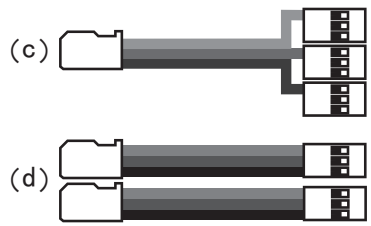
Thank you for using Dualsky FC120 Flight Control System. This gyro is equipped with latest MEMS gyroscope, 32-bit MCU and Dualsky original algorithm. It features at mini dimensions, high sensitivity and friendly user interface, more features are listed below:

- Mini dimension, MEMS gyroscope and accelerometer in one chip, only 8 grams
- 32-bit high performance ARM MCU
- Original advanced flight control algorithm
- Support single/double aileron, fly wing and V-tail aircraft
- Support flaperon mixing
- Support aerobatic/3D airplanes
- Independent sensitivity adjustment of all 3 axes
- Support Futaba S. BUS protocol
- Gyro can be turned off
- Program via button and LEDs
- Support HV inputs

Caution: FC120 will take over all control channels except throttle, if the setting of FC120 is inappropriate, it might cause property damage or personal injury. Please read the caution items and the rest of this manual carefully before using FC120.

- Recommended to use this gyro on electric powered airplane models or unpowered glider models
- FC120 need 2~3 sec start-up time after powered on, please keep the airplane still during the process
- Servos will only work after the FC120 start-up process ends, this is normal.

Packing List

(a) FC120 Gyro x 1 (b) Anti-shock double side tape x 1	(c) 3-signal wire (long) x 1 (d) Single-signal wire (long) x 2
	

Radio equipment

You need an at least 4-channel transmitter. If transmitter only has 4 channels, FC120 will work in aerobatic mode by default and can't be turned off during flight. We recommend you for 5 channel transmitter so that the 5th channel (usually the GEAR channel) can be used for turning off the gyro.

Installation instruction

1.FC120 installation principle:

● FC120's heading direction must be the same as airplane heading direction

● FC120 must be mounted parallel to flight path, otherwise airplane will yaw.

● FC120 should be installed inside of the airplane, close to the receiver and CG

● Install platform must be parallel to horizontal tail, solid (recommend to use plywood), but do not use servo mount platform

● Use accessary double side tape to fix FC120, do not use strap, patch or 3M Dual-Lock

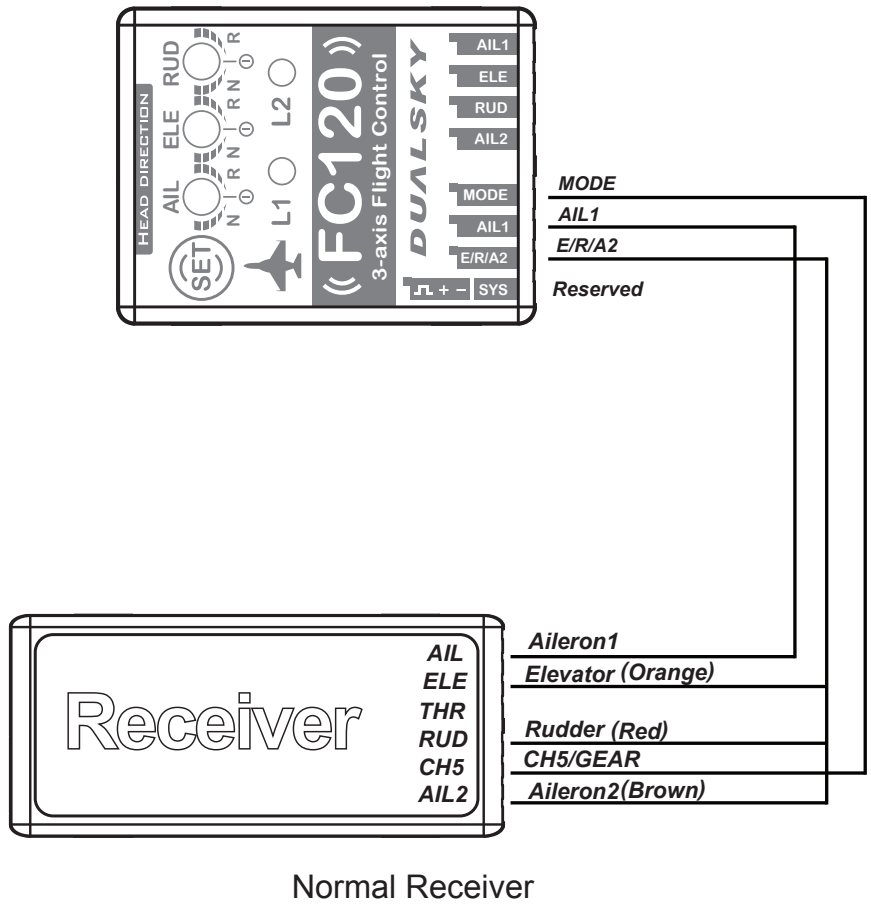
● Do not wrap FC120 in foam

● FC120 cannot be touched by servo horn, linkage or other moveable parts

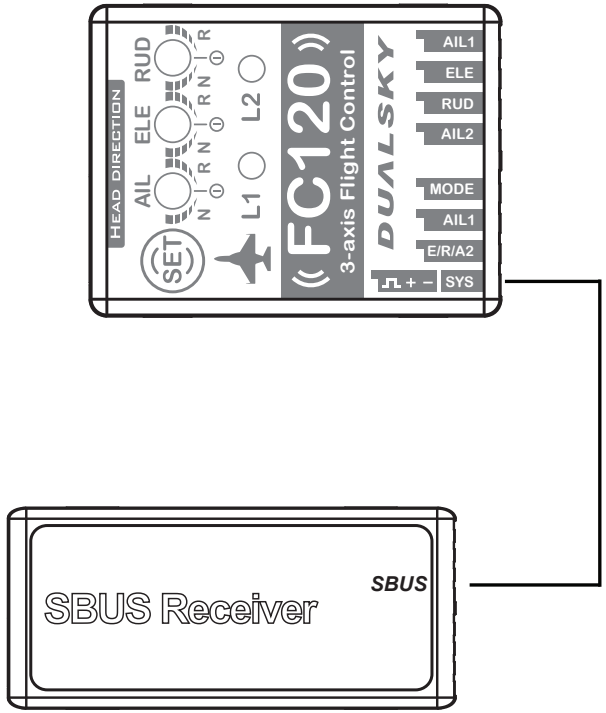
● FC120 must stay away from motor, engine, ESC and batteries

● FC120 cannot be installed outside the airplane, such as wings or tail

2.Connect the FC120 to receiver as shown below



Normal Receiver



S.BUS Receiver

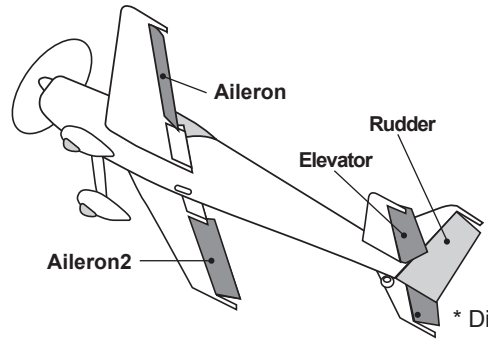
● Input/output signal wires are close to the top of FC120, middle is VDD and bottom is GND.

● Input signal supports Futaba S.BUS and S.BUS2, only need single-signal wire to connect SYS and receivers' SBUS port. SYS port has higher priority than other input ports. When using SYS port, other input ports won't work, transmitter channel sequence must be the same as following chart:

Sequence Channel	CH1	CH2	CH3	CH4	CH5	CH6
	Aileron 1	Elevator	Throttle	Rudder	Mode Switch	Aileron 2

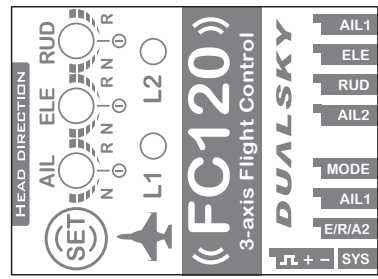
3.FC120 corresponding control surface

● Normal type airplane with single or double ailerons



* Diagram show double aileron airplane

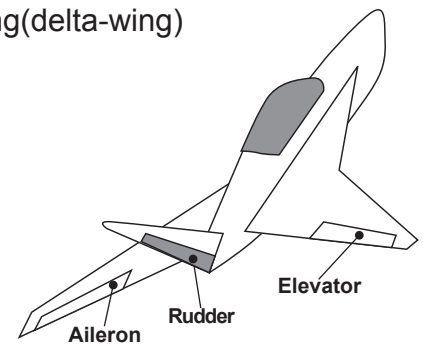
Normal Airplane



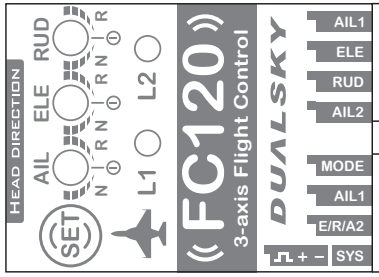
		PIN (Socket) Location		
		TOP	MIDDLE	BOTTOM
OUTPUT	**Aileron**	VDD		GND
	Elevator	VDD		GND
	Rudder	VDD		GND
	Aileron 2	VDD		GND
INPUT	**Switch**	VDD		GND
	Aileron	VDD		GND
	Elevator	**Rudder**		**Aileron 2**
	S.BUS	VDD		GND

* VDD is positive lead. *GND is negative lead.

● Fly-wing(delta-wing)



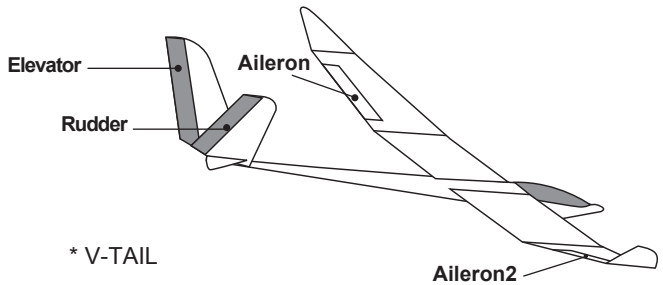
Fly-wing/Delta-wing



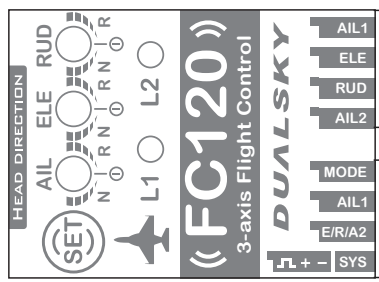
PIN (Socket) Location			
	TOP	MIDDLE	BOTTOM
OUTPUT	Aileron	VDD	GND
	Elevator	VDD	GND
	Rudder	VDD	GND
	N/A	VDD	GND
INPUT	Switch	VDD	GND
	Aileron	VDD	GND
	Elevator	Rudder	N/A
	S.BUS	VDD	GND

* VDD is positive lead. *GND is negative lead.

● V-tail airplane



V-tail Airplane



PIN (Socket) Location			
	TOP	MIDDLE	BOTTOM
OUTPUT	Aileron	VDD	GND
	Elevator	VDD	GND
	Rudder	VDD	GND
	Aileron2	VDD	GND
INPUT	Switch	VDD	GND
	Aileron	VDD	GND
	Elevator	Rudder	Aileron2
	S.BUS	VDD	GND

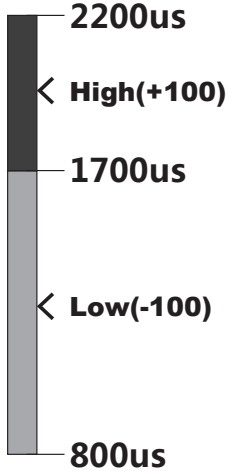
* VDD is positive lead. *GND is negative lead.

4. FC120 Power Supply

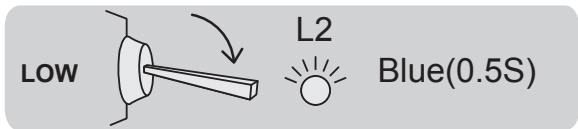
FC120 supports 4.8V-8.4V voltage input, share the same power with receiver, input voltage should meet the requirements of receiver, too. Power supply could be battery or ESC.

Set mode switch

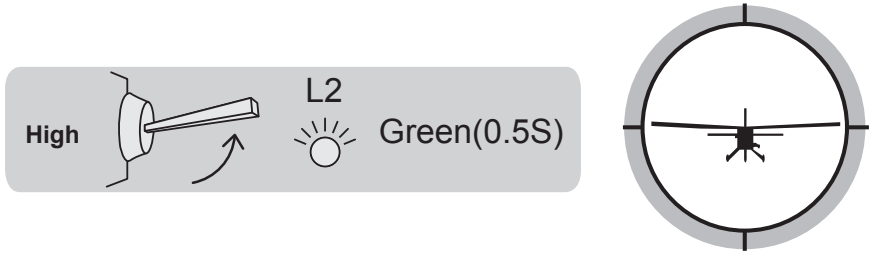
Mode select switch is used for turning on or turning off the gyro. Please assign a 2-position switch to mode channel and make sure that channel doesn't have other functions. Switch channel pulse width range should be low 800~1700us, high 1700~2200us. If the mode channel is not connected, the FC120 will work in aerobatic mode.



Gyro Off Mode: Position low, FC120 outputs receiver's signal directly



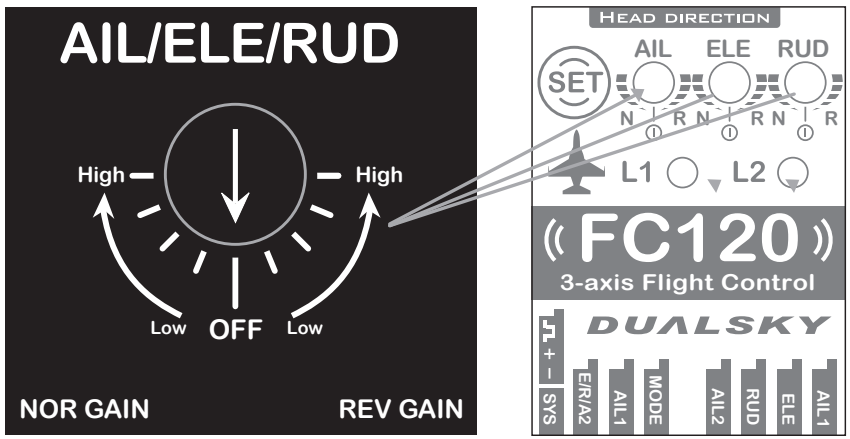
Aerobatic Mode: Position high, 3 axis gyroscope working



NOTE: You may need to reverse mode channel for correct switch operation.

How to setup gains and correction directions?

There are 3 pots to adjust the correction directions and gains for aileron (roll), elevator (pitch) and rudder (yaw) channel. Please see the sketch below.



● It needs a few testing fly to determine appropriate gains, we recommend starting from conservative gains (low) first

● Fly in aerobatic mode at safety altitude, accelerate the airplane to its maximum speed to see if there is oscillation in pitch, roll or yaw axis. oscillation indicates the gain is too high, please slow down the airplane, decreasing the gain after landing

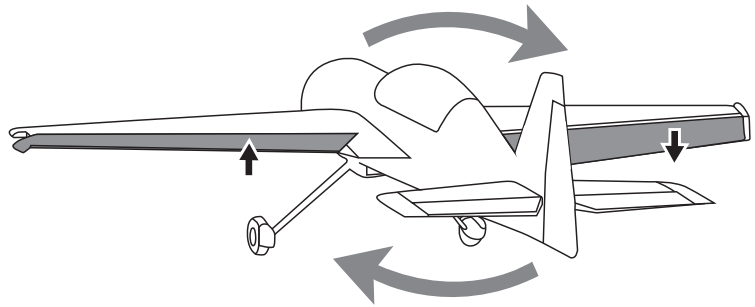
● Please don't adjust the gain too much one time, it's recommend adjusting 5-10 degrees one time

Ground Test

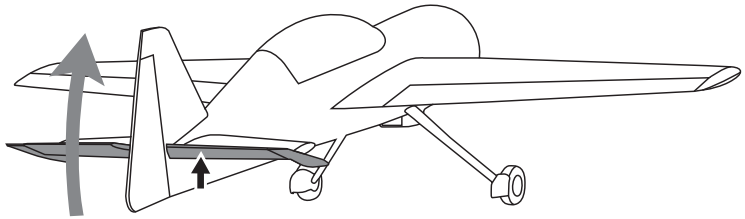
● Please do a ground test before first flight.

● Test if the mode switch is working properly. Do not turn on the motor/engine, toggle the mode switch on the transmitter to high position, LED2 will turn GREEN for 0.5sec, now FC120 is in Aerobatic mode.

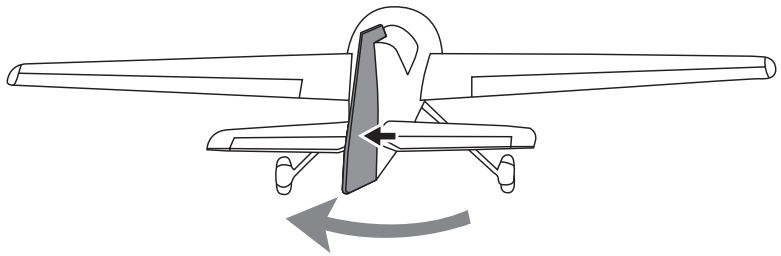
● Test gyro correction direction. Rotate the model on each axis, corresponding control surface should act to against that rotation. If the action is wrong, please reverse the pot of that axis.



Roll & Aileron Movement



Pitch & Elevator Movement

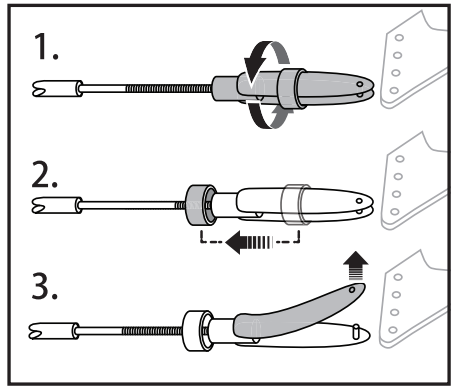


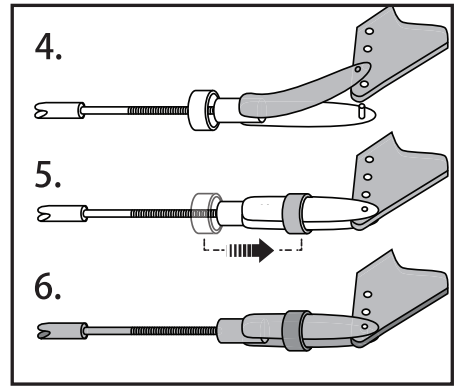
Yaw & Rudder Movement

● Test transmitter moving direction. Move the sticks (except the throttle) to see if each control surface is working rightly.

Trim system

● First please trim model directly on your transmitter in gyro off mode. But if transmitter trim is too large, please zero the trim and adjust the model by changing the length of the linkage between the servo arm and the control horn.





● Do not directly switch to Aerobatic mode after trimming in gyro off mode, you need to land the plane and power on your plane again.

● There is no need to trim in Aerobatic mode if last step finished.

FC120 Setting

● **How to enter Setting Mode:** Turn on the transmitter, move the throttle to its minimum; power on the model, wait until the L1 green LED ends flashing; Long Press “SET” button (2sec) to enter Setting Mode. After that, L1 displays the corresponding SETTING ITEM and L2 shows the corresponding SETTING VALUE.

● **“SET”Button usage:**

⑴.Long Press (more than 2 sec) : enter Setting Mode
⑵.Single click in Setting Mode: switch between SETTING ITEM
⑶.Double click (finish within 0.5sec) in Setting Mode: change SETTING VALUE
⑷.Long Press in Setting Mode: Save and quit to flight mode

● **Please check the chart below for all settings**

Item		L2(LED)			
L1(LED)		Blue (default)	Green	Red	Yellow
Blue	Install direction	Face up	Face down	Face right	Face left
Green	Airplane type	Normal	Delta wing	V-tail	

LED Status

LED1 STATUS	FC120 STATUS
Green flashing	Initializing
Green solid	Initialization completed, signal OK
Red solid	Initialization completed, no signal

LED2 STATUS	FC120 STATUS
Blue on for 0.5 second	In gyro off mode
Green on for 0.5 second	In aerobatic mode