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DUALSKY®
ADVANCED POWER SYSTEMS

《FC150》

FC150 Flight Control System Instruction Manual

FC150固定翼飞行控制器使用说明书

Made in China 21ZX14E1810

#21274
http://www.dualsky.com

Thank you for selecting Dualsky FC150 Flight Control System. This gyro equipped with latest MEMS gyro & G-sensor chipset, 32-bit MCU and Dualsky original algorithm. It features at mini dimensions, high sensitivity and friendly user interface, see more detailed features in below list:

● Mini dimension, MEMS 3 axis gyro and 3 axis accelerometer in one chipset, only 8 grams
● 32-bit high performance ARM MCU
● Original advanced airplane active attitude stabilization algorithm
● Support single/double aileron, fly wing and V-tail aircraft
● Independent sensitivity adjustment of each axis
● Support Futaba S. BUS Link
● Support mode switch via extra channel, can switch between different mode
● Programmable via button and LEDs
● Support HV input

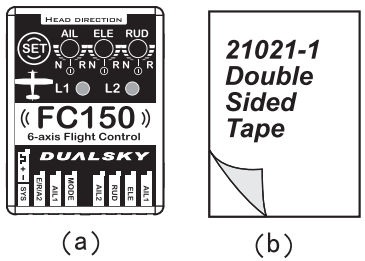
Caution - FC150 will take over all control channels except the throttle channel, if the setting of FC150 is inappropriate, it might cause property damage or damage yourself. Please read the caution items and the rest of this manual carefully before using FC150.

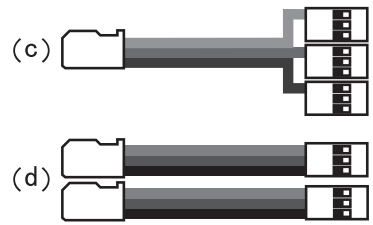
● Recommend to use this gyro on electric powered model airplane or unpowered model glider
● FC150 need 2~3 sec start-up time after connect to the power, please remain the airplane still during this process
● Servos will only work after the FC150 start-up process finished, this is normal

● In self-stability mode, the control surfaces of model which is still on the ground may move to maximum travel. This is NORMAL.

Packing List

(a) FC150 Gyro x 1 (b) Anti-shock double sided tape x 1	(c) 3-signal wire (long) x 1 (d) Single-signal wire (long) x 2





Radio equipment

You need a 4-channel or higher transmitter. If transmitter only has 4 channels, FC150 will work under basic mode by default, cannot switch mode during flight. We recommend to use 5 channels or higher transmitter, so CH.5 (usually the GEAR channel) can be used as switching mode channel.

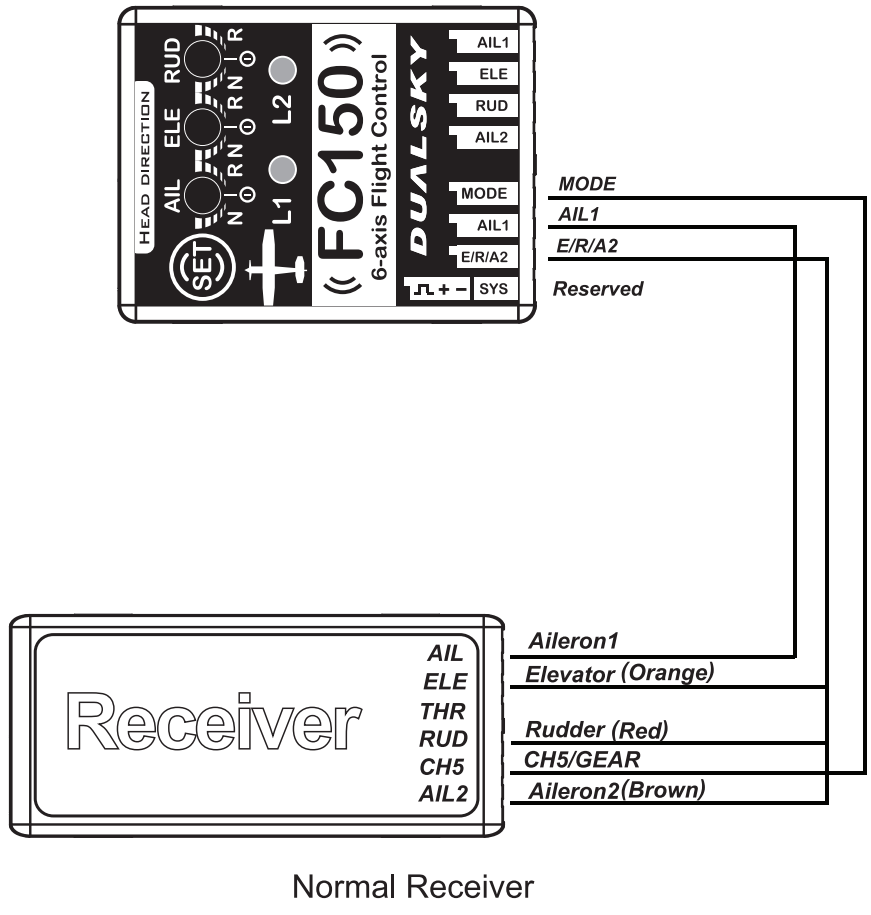
*** Before install FC150, please test fly your airplane, make sure all channel directions and trims are set to the correct position.**

Installation instruction

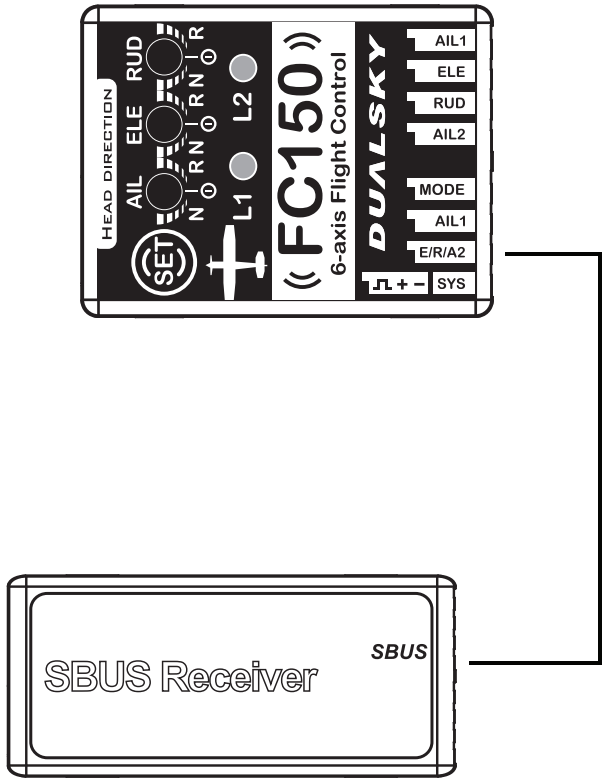
1. FC150 installation principal:

● FC150's heading direction must be the same as airplane heading direction
● FC150 MUST be mounted in line with the flight path perfectly. Otherwise the airplane will yaw
● FC150 should be installed inside of the airplane, close to the receiver and CG
● Install platform must be parallel to horizontal tail, rugged (recommend to use plywood), but do not use servo platform
● Must use the double sided tape comes with FC150, do not use belt, velcro or 3M Dual-Lock
● Do not use foam to cover FC150
● FC150 cannot be touched by servo horn, linkage or other movable parts
● FC150 must stay away from motor, engine, ESC and batteries
● FC150 cannot be installed at the outside of airplane, such as wings or tail

2. Connect the FC150 to receiver as shown below



Normal Receiver



S.BUS Receiver

● Input/output signal wires are close to the top of FC150, middle is VDD and bottom is GND.

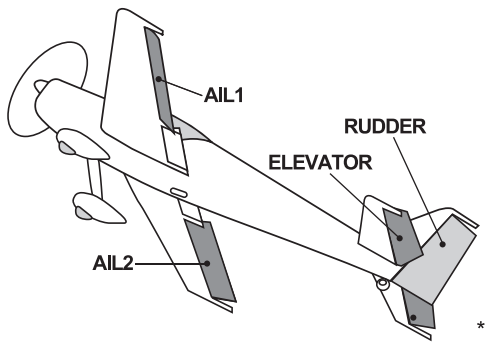
● Input signal supports Futaba S.BUS, only one wire is needed to connect to SYS port on FC150 when using S.BUS link. SYS port has higher priority than other input ports. When SYS port is using, other input ports won't work, transmitter channel sequence must be the same as following chart:

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

Caution: Futaba and S.BUS is the trademark and technology or Futaba Corp., we don't provide technical support to future incompatibility.

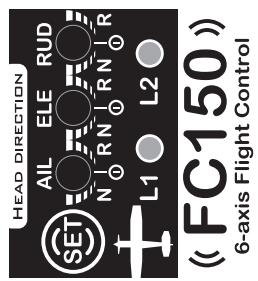
3. FC150 corresponding control surface

● Normal type airplane with single or double ailerons



* Diagram show double aileron airplane

Normal Airplane

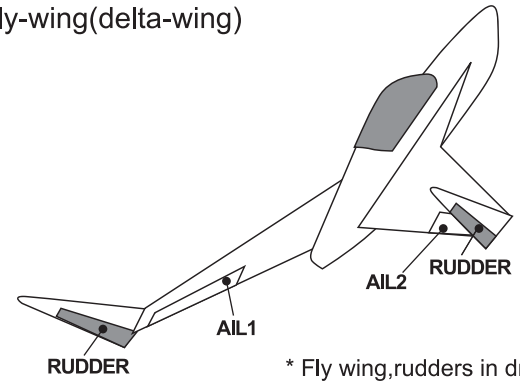


PIN Location

		TOP	MIDDLE	BOTTOM
OUTPUT	AIL1	**Aileron**	VDD	GND
	ELE	**Elevator**	VDD	GND
	RUD	**Rudder**	VDD	GND
	AIL2	**Aileron 2**	VDD	GND
INPUT	MODE	**Switch**	VDD	GND
	AIL1	**Aileron**	VDD	GND
	E/R/A2	**Elevator**	**Rudder**	**Aileron 2**
	SYS	**S.BUS**	VDD	GND

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

● Fly-wing(delta-wing)



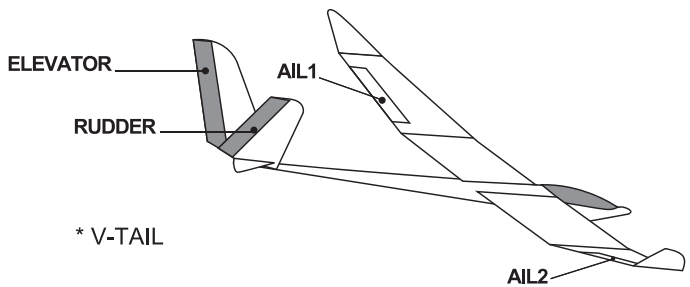
* Fly wing,rudders in dragram are paralleled by Y-wire

Fly-wing/Delta-wing

		PIN Location		
		TOP	MIDDLE	BOTTOM
OUTPUT	AIL1	Aileron	VDD	GND
	ELE	N/A	VDD	GND
	RUD	Rudder	VDD	GND
	AIL2	Aileron2	VDD	GND
INPUT	MODE	Switch	VDD	GND
	AIL1	Aileron	VDD	GND
	E/R/A2	Elevator	Rudder	N/A
	SYS	S.BUS	VDD	GND

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

● V-tail airplane



* V-TAIL

V-tail Airplane

		PIN Location		
		TOP	MIDDLE	BOTTOM
OUTPUT	AIL1	Aileron	VDD	GND
	ELE	Elevator	VDD	GND
	RUD	Rudder	VDD	GND
	AIL2	Aileron2	VDD	GND
INPUT	MODE	Switch	VDD	GND
	AIL1	Aileron	VDD	GND
	E/R/A2	Elevator	Rudder	Aileron2
	SYS	S.BUS	VDD	GND

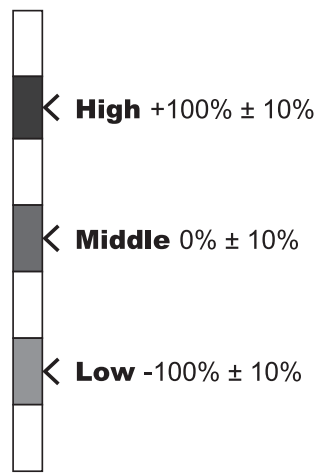
* VDD is positive lead. *GND is negative lead.

4. FC150 Power Supply

FC150 supports 4.8V-8.4V power input, share same power input with receiver, input power voltage should meet the requirements of receiver, too. Power supply could be battery or ESC.

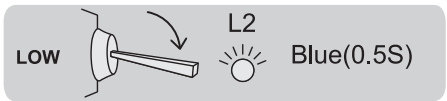
Set mode switch

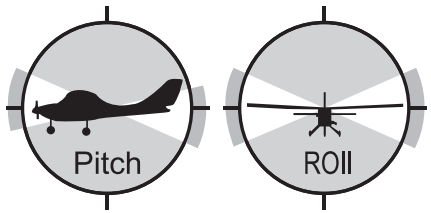
Connect a switch channel to the Mode/SW port. Then you can switch the flying model with it.
Please assign a 3-position switch to mode channel and make sure that channel doesn't have other function.
Switch channel pulse width range should be low 1020~1180us, middle 1420~1580us, high 1820~1980us.
If the mode channel is not connected, the FC150 will work in Beginner mode.



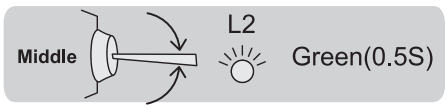
NOTE: If the positive pulse width of mode channel is out of the range that mentioned above, the FC150 will enter “recovery mode”, please see the “recovery mode” section

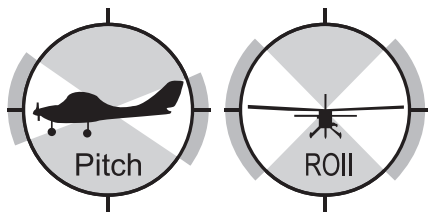
Beginner Mode: position low, self-stability, low rate(small angle limit), roll to pitch mixing



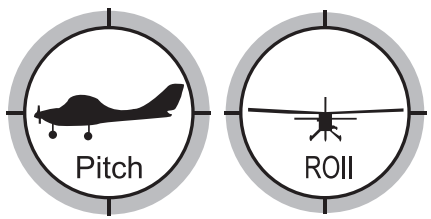


Advance Mode: position middle, self-stability, high rate(large angle limit)





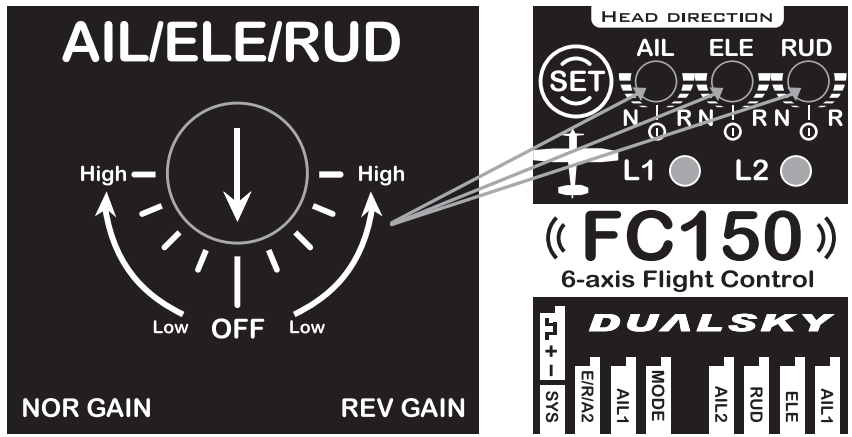
Aerobatic Mode: Position high, 3 axis gyro only, you can do loops and rolls



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

How to setup the gain and correction direction?

There are 3 pots for aileron(roll), elevator(pitch) & rudder(yaw) channel to physically adjust the correction direction and gain setting. Please see the below sketch.



- Correct Gain setting requires test flight to determine, it’s recommend to use more conservative Gain (low) during test flight
- Fly in aerobatic mode at safety altitude, accelerate the airplane to its maximum speed, observe if there is oscillation in Pitch, Roll and Yaw axis. If there is oscillation, it indicates the Gain is too high, please slow down the airplane, decreasing the Gain after landing
- Please do not adjust the Gain too much a time, it’s recommend to adjust 5-10 degrees a time
- Gain too low will cause the airplane become blunt, a basic principal

is - Gain cannot be too low to decrease the maximum travel of control surface

Ground Test

● Please do a ground test before 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 RED for 0.5 sec, now FC150 is under Aerobatic mode (Gyro only)
● Test gyro moving direction. Rotate the model on each axis, corresponded control surface should have excursion the same as moving direction. If moving direction is different, please reverse the pot of that axis
● Test transmitter moving direction. Move the sticks (except the throttle) to observe if each control surface moving at correct direction

Trim system

● Please trim model under Beginner/Advanced mode firstly, then trim model under Aerobatic mode
● Normally, it is not necessary to trim a RTF model under Beginner/Advanced mode

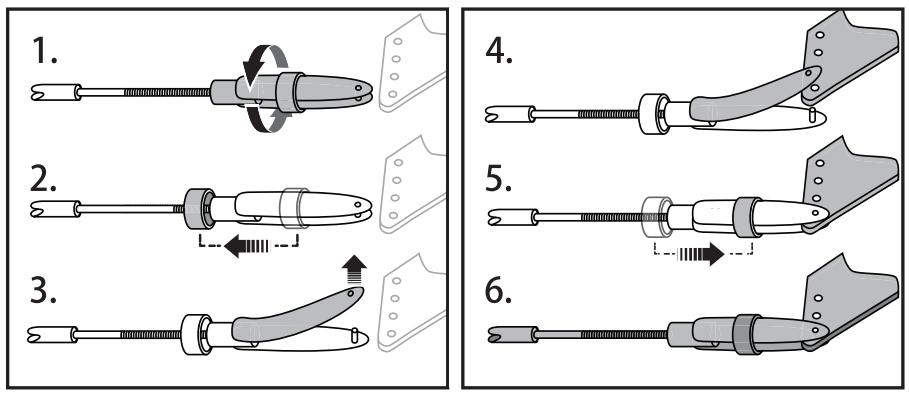
How to trim the neutral point offset of beginner/advanced mode?

● Turn on the radio, ZERO the trim/sub-trim in radio
● Connect the power to the model
● Take off and fly the model in beginner mode(not advanced mode)
● Don't switch to Advanced or Aerobatic mode during the flight
● Adjust/Trim neutral point(offset) of accelerometer if model don't fly

horizontally
● Record the offset after landing. Note: don't turn off the model or radio
● Fast toggle the mode switch until the LED1 turn off, then turn on in bule. The offset will be saved automatically
● "Zero" the trim of radio, and fly and trim the model in Aerobatic Mode

How to trim the model under Aerobatic mode

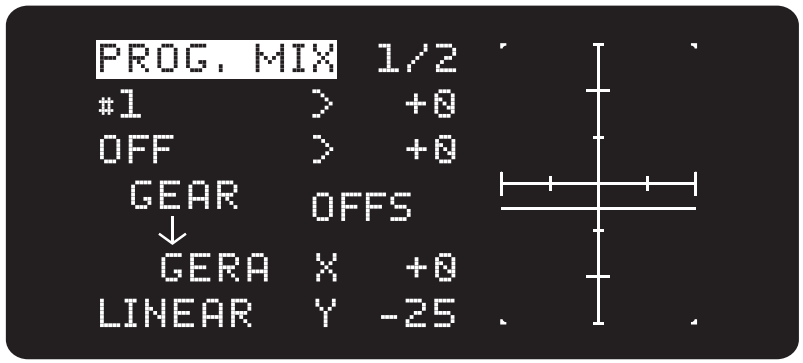
● We prefer disable FC150, fly and trim model without gyro
● If trim is larger than four steps. Zero the trim. Turn the clevis on the linkage to change the length of the linkage between the servo arm and the control horn



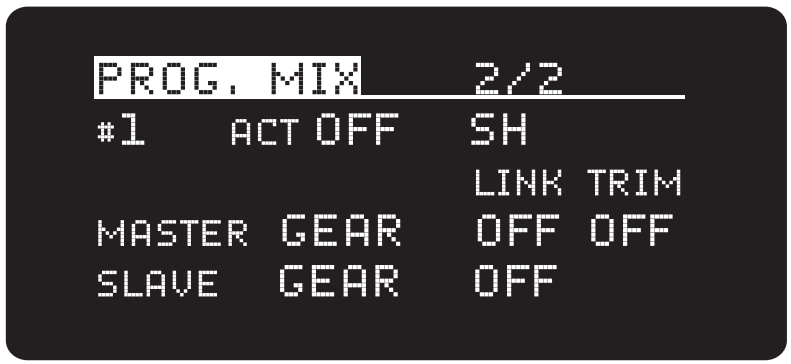
● Enable FC150
● The new neutral point of Aerobatic mode will not take effect in Beginner or Advance model after FC150 is restarted. FC150 will map sub-trim to neutral point of accelerometer under Beginner/Advanced mode

Recovery mode

Setup a “Recovery Mode” with transmitter. When “Recovery” switch is triggered in any flight mode, the airplane will roll wings level and pull out of a dive.

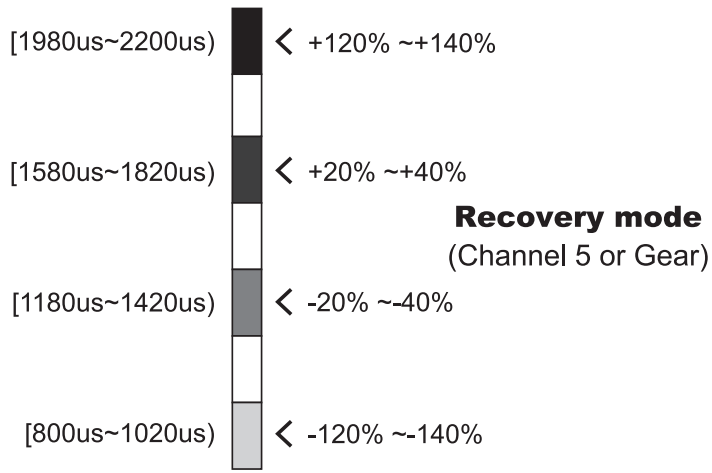


Futaba setting example(1)



Futaba setting example(2)

Tactic setting example



As mentioned earlier: When receiver is connected to FC150 mode channel, you can set the flight mode. When mode signal is in the four regions of above image(outside of normal signal range), "recover mode" is activated.

How to set "recovery mode" switch on the transmitter?

The "Recovery Mode Switch" and "Mode Switch" are different switches, but they both act on mode channel. You need to set up a "mixi" to activate "recovery mode":
Master channel: CH5/GEAR
Slave channel: CH5/GEAR
OFFSET: -25%
Mix Trigger Switch: SF (we recommend using an "automatic release" toggle switch to activate this feature.)

FC150 Setting

1. How to enter Setting Mode: Turn on radio controller, move the throttle to lowest position; turn on power to the model, wait until the L1 LED finishes flashing Green and then changes to RED; Long Press “SET” button(2 sec) to enter Setting Mode. After you enter Setting Mode, L1 displays the corresponding SETTING ITEM menu attributes (color), and L2 displays the corresponding SETTING VALUE menu attribute (color).

2. “SET”Button usage:

- Long Press (more than 2 sec) under flight mode: enter Setting Mode
- Single Click under Setting Mode: switch between SETTING ITEM
- Double Click (finish within 0.5 sec) under Setting Mode: change SETTING VALUE
- Long Press (more than 2 sec) under Setting Mode: Save and Quit to flight mode

3. Please check the below chart for all settings

ITEM		VALUE			
L1(LED)		L2(LED)			
		Blue(default)	Green	Red	Yellow
Blue	Install Direction	Face up	Face down	Face right	Face left
Green	Stability Mode (In Aerobatic mode)	Aileron-normal Elevator-normal Rudder- normal	Aileron-heading hold Elevator-heading hold Rudder-normal	Aileron-heading hold Elevator-heading hold Rudder-heading hold	
Red	Airplane Type	Trainer-Cannot inverted flight	Sport-Can inverted flight		
Yellow	Wing Type	Normal	Delta Wing	V-Tail	

NOTE: Some settings will take effect after the FC150 is restarted. Cut the power to the FC150 and reconnect after 5 seconds to apply the new settings.