司南飞控 SN_FAST

产品使用说明书

Lefei rc

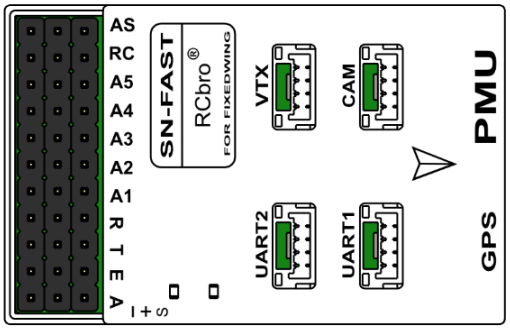
V3.0

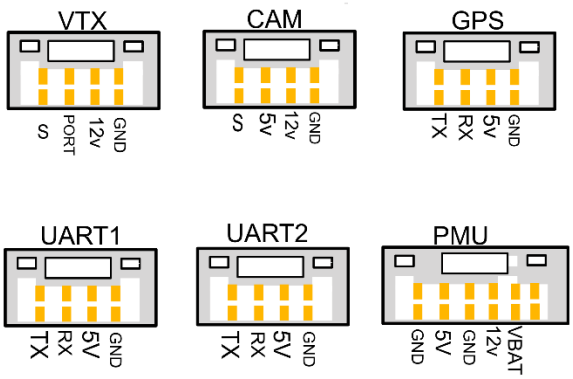
警告：

请严格遵守国家相关法律法规，进行安全飞行。我们不提倡飞多高，飞多远，在充分安全的环境下体验航模的乐趣，创造良好的航模运动的环境！使用飞控前必须要充分了解各个安全细节，深刻地认识到飞行是带有一定的风险性。飞机上的设备和任何电子产品都不可能做到完全的可靠，使用司南(SN_FAST)固定翼飞控你应对该产品做出评估，并按相关法规使用本系统，系统提供者不对任何使用该产品造成的直接或间接损失和后果负责。

目录

1. INTERFACE





➢ **Power**

- VTX, Camera, be powered by 12v of PMU module.
- Flight Controller and GPS, RECEIVER, UART1/2, be powered by 5v of PMU module.
- Servo be powered by independent 5v BEC module.

➢ **LED**

GREEN	GPS
	GPS disconnect
	GPS unfixed
	GPS fixed

RED	RC
	lost signal
	Connect

- **Port Function**

A	Ail servo
E	Ele servo
T	ESC
R	Rud servo
A1	AUX
A2	
A3	
A4	
A5	
RC	SBUS,IBUS,CRSF
AS	Air-Speed Meter

- **VTX**

S	Connect to Video in port of VTX module
PORT	Connect to data port of VTX, support SMART, IRCTRAMP
12V	Power 12v
GND	GND

- **CAM**

Cammera

S	Connect to video port of cammera
5V	5V
12V	12V
GND	GND

- **GPS**

Support UBLOX module, etc. M8030,M8N.., auto configure .

TX	Connect to RX of GPS
RX	Connect to TX of GPS
5V	5V
GND	GND

- **UART1/2**

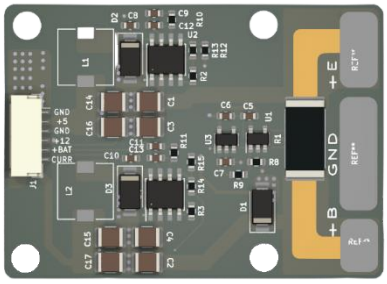
TX	Connect to RX of telem
RX	Connect to TX of telem
5V	5V
GND	GND

Support mavlink, DJI air unit , CRSF telemtery, and SN_LINK for SN_GCS protocol.

Do not set two serial ports to the same function.

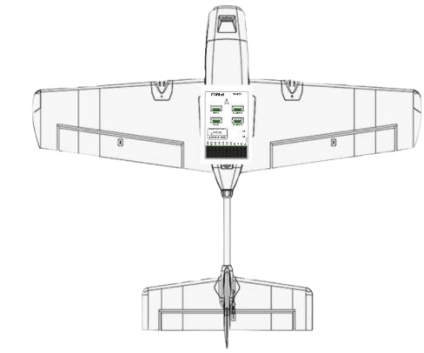
2. PMU AND INSTALL

- **PMU**



1. Max input 12s battery.
2. +B is battery, +E is ESC
3. Continuous out 2A, max 2.5A。
4. Measure current range 0-100A。

- **Install close to the center gravity, away from vibration**



- **Install direction**

0°	Arrow point to head
180°	Arrow point to rear
90°	Arrow point to left
270°	Arrow point to right
B-0°	bottom up，Arrow point to head
B-180°	bottom up，Arrow point to rear
B-90°	bottom up，Arrow point to left
B-270°	bottom up，Arrow point to right

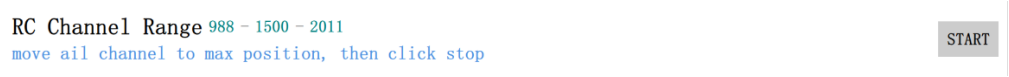
3. Remote Cotroller

1) Protocol

- **SBUS WBUS**
  Do not support SBUS2 or WBUS2
- **CRSF**
  Support CRSF telemetry.
- **IBUS**

2) Set Channel Range

- **Do not set any mixing on the remote controller.**
- **Why need set channel range?**
  The flight controller needs to know exactly the position of the joystick, and many logics need to be combined with the user's operation to complete。
- **SET IN GCS**



- **SET IN OSD MENU**
  Enter Remote Controller.

3) RSSI

Step1: Please confirm whether the receiver supports RSSI output before use.

Step2: Set the RSSI channel of the remote control in the signal. For example, the TBS module can set the RSSI channel to 12.

Step3: SET RSSI channel

Step4: After the setting is completed, the flight controller will automatically calculate the percentage according to channel range, without calibration.

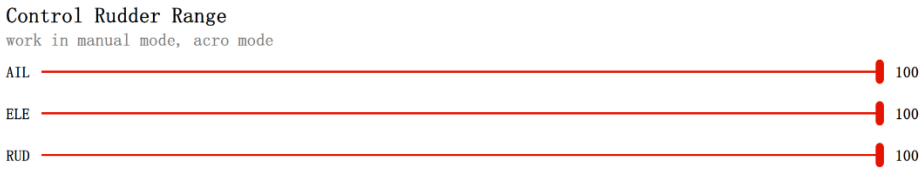
4) Flight Mode

- **Two 3 segment switch can use 5 mode**
- **Default mode switch is 5th CH.**
- **Default sub mode switch is 6th CH.**
- **Mode info**

MANUAL	Remote control directly controls the aircraft
STAB	Auto level
HORIZON	ACRO mode + STAB mode(aircraft attitude will follow stick commands with stabilization)
RTH	Return to home position
HOVER	Altitude hold and circle in loiter。
ALTHOLD	Aircraft hold altitude and flight route (with GPS)
ACRO	Gyro mode (aircraft attitude will follow stick commands)
VTOL	VTOL mode
WAY POINT	Way point mode
SUB-MODE	Switch mode to slave mode

5) RC Channel Range

- **Only works in Manual Mode and Acro Mode.**
- **Set in GCS**



- **Set in OSD**
  1. Enter <REMOTE CONTROLLER>
  2. Select <AIL MANUAL RANGE>, change it.

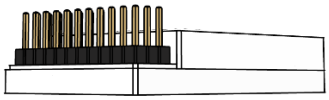
4. SENSOR

- **SIX-SIDE Calibrate**

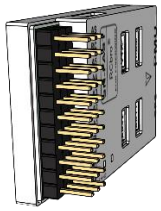
  Six-side calibration can help the flight controller to correct the sensor's measurement range, better calculate the accelerometer health value, make the angle measurement more accurate.

  Every time you change install direction, you need re-calibrate sensor.

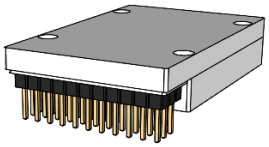
  Step1: place the plane on a level surface

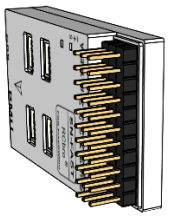
  Step2: turn 90°to the right form the horizontal state

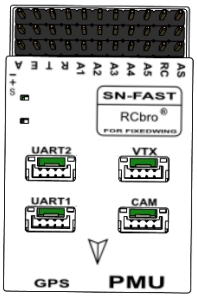
  Step3: turn 180 form the horizontal state

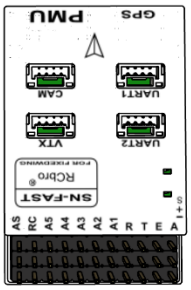
  Step4: turn 90°to the left form the horizontal state

Step5: nose down



Step6: nose up



- **Calibrate Level**
  Level the plane, hold still, then calibrate.
- **After a long period of non-calibration, or after changing the aircraft, please calibrate.**

5. SERVO

1) Set Frequency

- 50HZ, be used for analog servo.
- 100/200HZ, be used for digital servo.
- The higher the frequency, the faster the servo response.

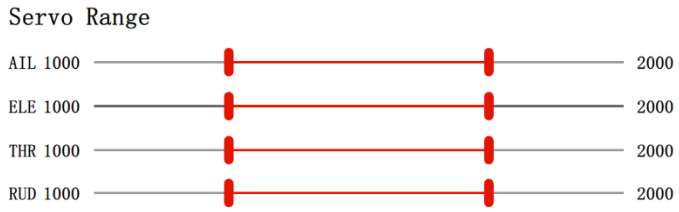
When using the analog servo, do not set it to 100/200HZ, it will damage the servo

2) Servo Connect

	NORMAL	V-TAIL	WING
AIL	AIL servo 1/2	AIL servo 1/2	AIL servo 1
ELE	ELE servo	Tail servo 1	AIL servo 2
THR	ESC	ESC	ESC
RUD	RUD servo	Tail servo 2	RUD servo

3) SET SERVO MOVE RANGE

- 90° servo move range is 1000-2000us
- 180° servo move range is 500-2500us



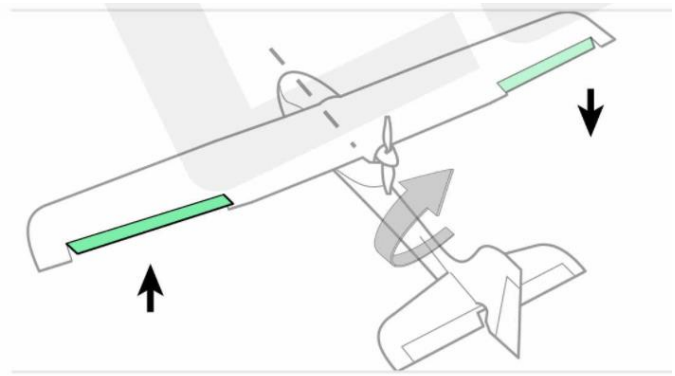
6. Check List Before TakeOff

1) THROTTLE & AEMED

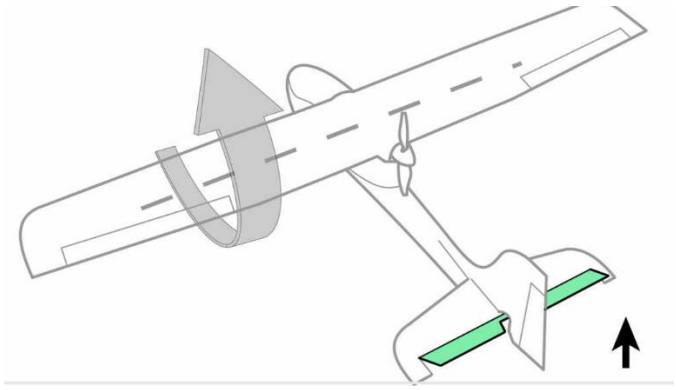
- IN manual mode you can directly control throttle.
- If you connect GPS, you need wait until GPS fixed.
- If disconnect GPS, you can directly control throttle.

2) Servo direction

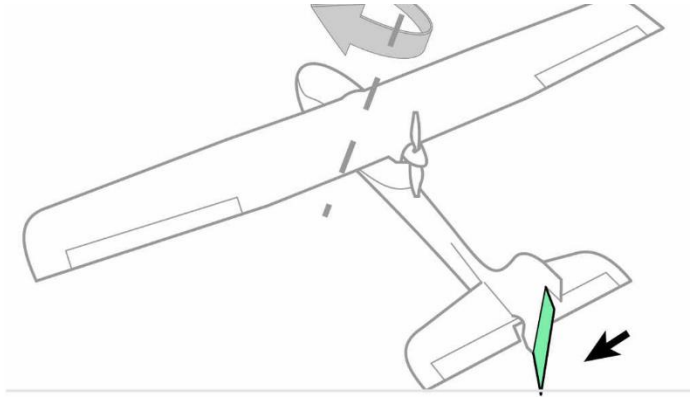
- **AIL servo stabilize direction**



- **ELE servo stabilize direction**



- **RUD servo stabilize direction**

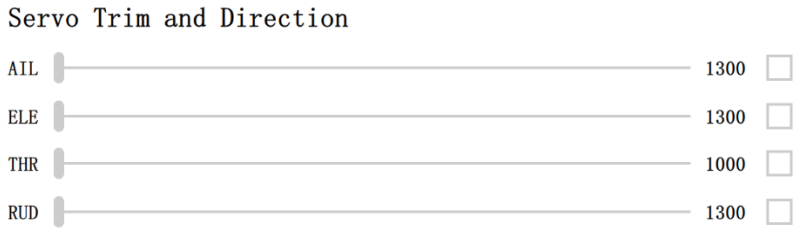


- **V-Tail and Wing servo direction**

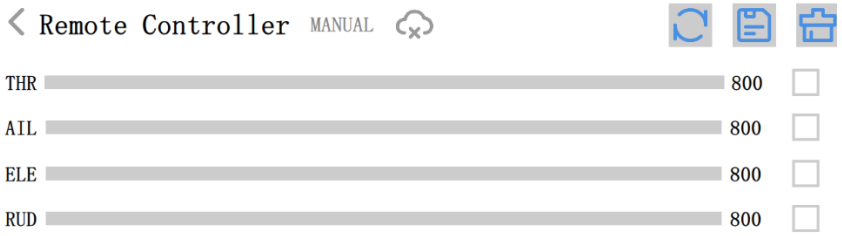
If you cant set the correct direction, please swap the servo order.

➢ **How to set the servo direction**

Step1： switch to stab mode, according picture reference, if servo direction is not correct, please enter OSD servo menu or GCS to change it.



Step2： after step1, you need check RC control direction, if control direction is not correct please change it in your RC or GCS.



Make sure set correct stabilize direction at first, then set remote controller control direction.

3) Stabilize Gain

Span (m)	Base Gain
<0.8	30-45
<1.2	45-65
<2	65-85

➢ **Large Wing Span Plane**

Do not set a small stab-gain for a large wingspan plane.

➢ **Speed Factor**

When flying at high speed, the plane is prone to jitter. This value affects the degree of stabilize gain reduction at high speed.

You can set it in GCS or OSD menu. The default value is 50.

4) Check For Vibration

- When the aircraft is in level flight, ensure that the vibration curve is within a reasonable range

GOOD

BAD

5) Attitude and Altitude

- Make sure the horizon in OSD matches the reality.
- Check altitude is matches the reality.

6) Failsafe

- Power off remote controller, make sure flight mode can switch to RTH mode, when GPS fixed.
- If can't switch to RTH mode when power off remote controller.
  Step1: make sure receiver fail safe mode is not hold mode, it should be switch to a fixed position.
  Step2: power off remote controller.
  Step3: now the flight mode will switch to a mode which you set.
  Step4: replace that mode with RTH mode.

7) Assisted TakeOff

- ALTHOLD MODE
  Push up throttle, aircraft will auto climb to 30m.
- RTH MODE
  Step1: Push up throttle.
  Step2: shake the plane, until motor auto start. The power of motor is controlled by your throttle position.
  Step3: takeoff, aircraft will climb.

7. Flight Mode

- **Return to Home (RTH)**

  You can't control plane in RTH mode, but you can control throttle. When you want the speed is controlled by plane itself please push throttle down.

  The speed is controlled by <CURISING SPEED>.

- **AltHold Mode**

  Althold mode is control altitude and direction; when throttle at mid position, the speed is <CURISING SPEED>, when push up throttle the speed will up, when push down throttle the speed will down. You can control plane, after you release, it will keep altitude and direction.

- **Stab Mode**

  You can control plane but it has a angle limit, you can change angle limit in OSD menu or GCS; after you release, plane will keep level.

- **Acro Mode**

  Plane will keep attitude when you release rc.

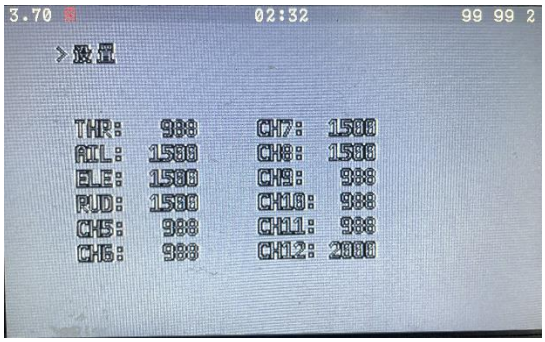
8. OSD

- **Operate OSD menu**

Enter OSD menu	Quick switch flight mode
Exit or back	Ail channel left
Enter	Ail channel right
Up and down	Ele channel

Can't enter menu after takeoff.

In Remote Controller menu, you need keep ail channel left or right for a moment to exit or enter.



- **OSD Info**

1	RSSI,	9	altitude
2	L-left，R-right，rth angle	10	Accel health
3	Flight direction	11	Up is actual attitude, down is desired attitude
4	Voltage	12	Home distance
5	Current	13	speed
6	maH	14	voyage
7	One cell voltage	15	throttle
8	RC		

9. Connect to GCS

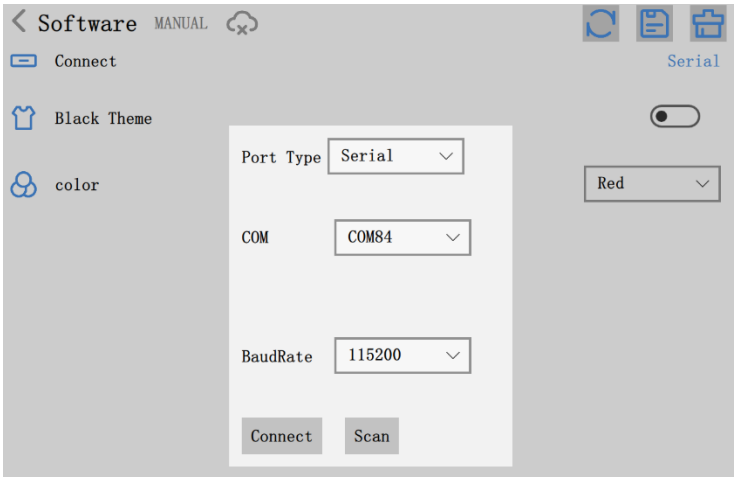
➢ **Connect with serial port**

Step1： Power on SN_Fast(FC)。

Step2： connect FC to Computer through USB

Step3： open SN_GCS

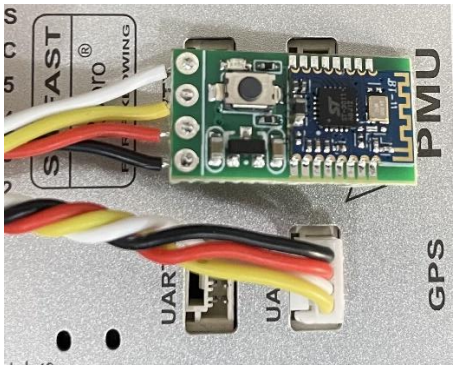
Step4： click “Serial”



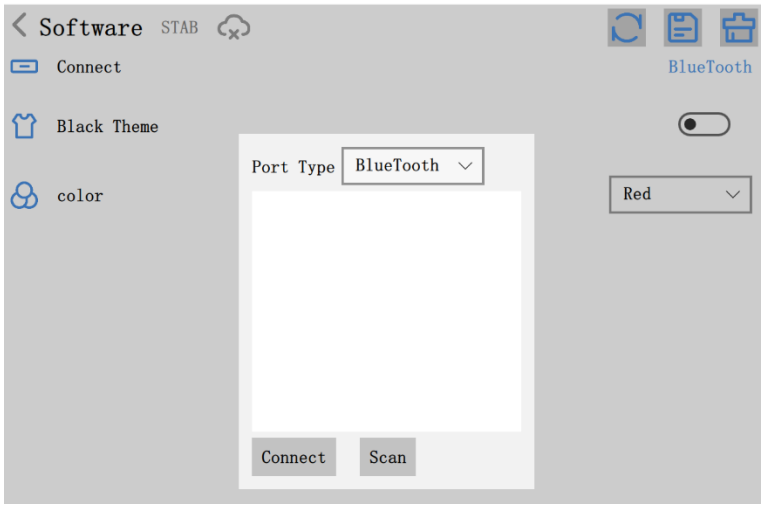
Step5： select COM port and clink “connect”, if connect success, it will be like this:

➢ Bluetooth

Step1: connect to UART1, UART1 default is SN_LINK, baud rate 115200.



Step2: Select port type as Bluetooth



Step3: click "Scan" button

⚠

***you need open the GPS location service in your android phone**

Step4: you need select "**lf-bt**", not "lf-bt-ble". Then click "connect" button.

10. Upgrade Firmware

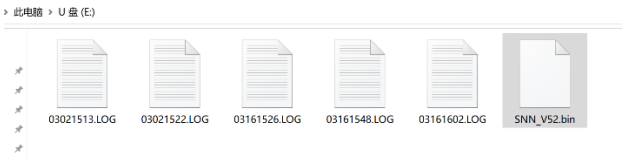
Get firmware and GCS from www.lefeirc.com

Step1: Power off SN_Fast.

Step2: connect to computer with USB.

Step3: it will install a U disk on your computer.

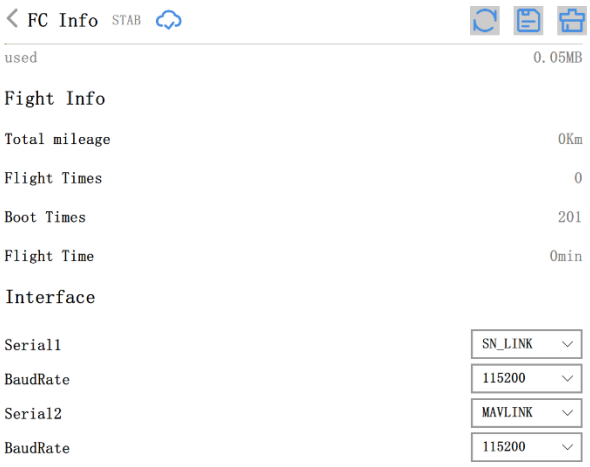
Step4: Copy the SN_FAST.bin to U disk



Step5: unplug the USB, power on FC with PMU , wait until complete, then FC will delete the firmware.

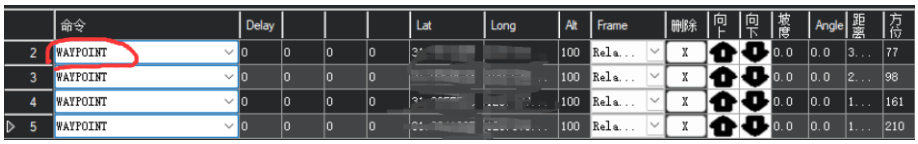
11. Set way point

Step1: set Serial2 as MAVLINK and baud rate is 115200.
Need reboot SN_Fast after change serial type.



Step2: connect to Qground or missionplanner with Bluetooth.

Step3: you only can set Waypoint to FC, other parameters cant set.



12. VTOL

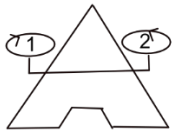
1) Armed and DisArmed

- RC channel 7 is Armed channel
- After armed the motor will start at a low speed.

Make sure before you takeoff at VTOL mode the GPS already fixed. And check you can control throttle in Stab mode.

Do not switch Vtol mode to RTH mode. But you can switch to Stab mode or Althold mode.

2) VTOL Type 1



- **Connect**

Motor 1	THR
Motor 2	RUD
Servo 1	AIL
Servo 2	ELE

- **How To Control**

Vtol mode:

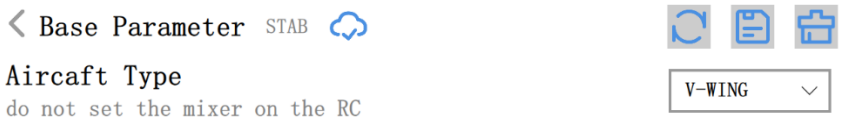
Roll	Keep stable with two motors
Pitch	Keep stable with two servo
Rud	Keep Yaw stable with two servo
Throttle	Be controlled by throttle channel

Fixed-wing mode:

Set aircraft type as wing mode.

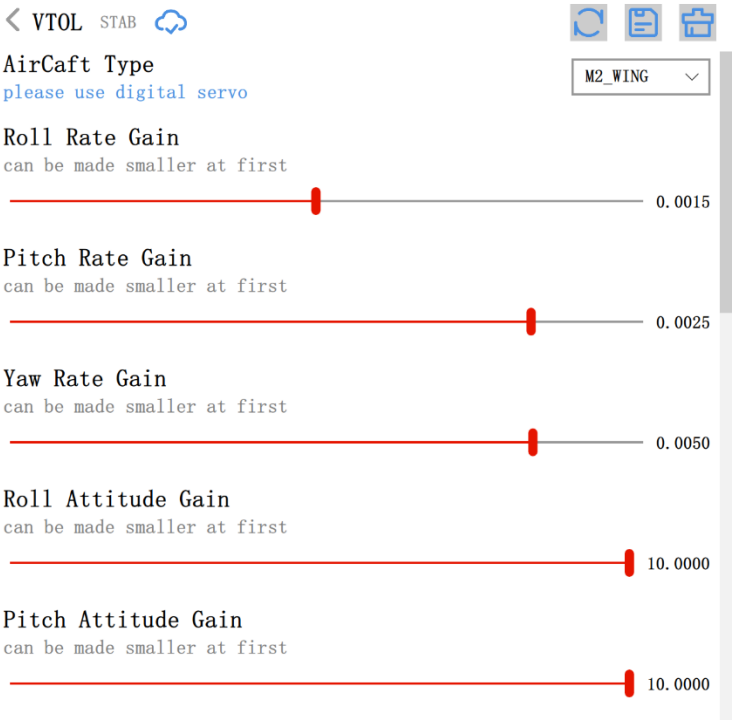
➢ **How To Configure**

Step1:

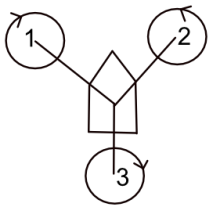


Step2:

Step3:



3) Y3 VTOL



- **Connect**

MOTOR 1	Head Left	AUX1
MOTOR 2	Head Right	AUX2
MOTOR 3	Rear	AUX3
SERVO 1	Head Left	AUX4
SERVO 2	Head Right	AUX5

- **How To Control**

Don't put throttle to the lowest position during the landing, it will directly lose power.

Roll	Motor1 and motor2 keep roll stable
Pitch	Motor1 motor2 and motor3 keep roll stable
Yaw	Servo1 and servo2 keep yaw stable
Altitude	Throttle channel control altitude, keep throttle channel at middle position, will keep altitude, throttle up and down control altitude increase and decrease.

- **How to Switch Mode**

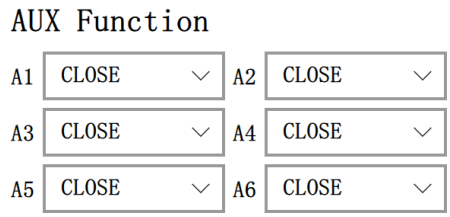
① Switch Vtol mode to Fixed wing mode, recommended height not less than 50m. and do not switch to RTH mode. Better switch to stab or althold mode.

② Switch fixed wing mode to vtol mode, please keep throttle at middle position.

- **How to Confighre**

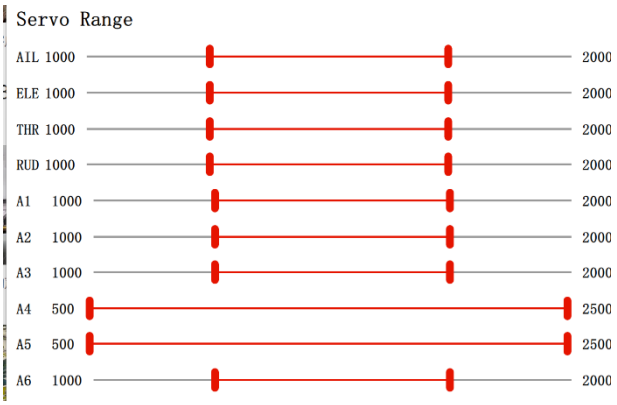
Step1:

Step2:

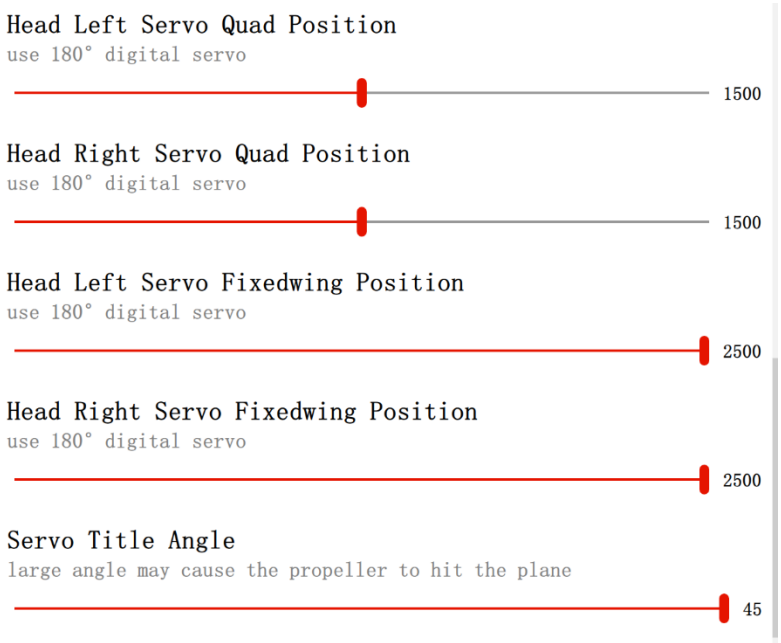


Step3:

Step4:



Step5:



Step6:

Q&A:

Q: why motor can't control?

A: GPS unfixed.

Q: why in RTH mode，servo shakes, underground?

A: it is normal !

Q: why GPS cant get satellites?

A: make sure the GPS icon on OSD is flicker, if not, it means GPS is not recognized.
Keep away from camera and vtx module, make sure the antenna is facing the sky.

Q: why crash after switch to stab mode?

A: servo feedback direction error.

Q: why I can't change mode after recover from lost signal?

A: you need move ail or ele channel to cancel failsafe mode. Then you can change mode.

Q: how to reset?

A: connect FC to computer, enter U disk mode, create a txt file named "erase.txt". then reboot FC.