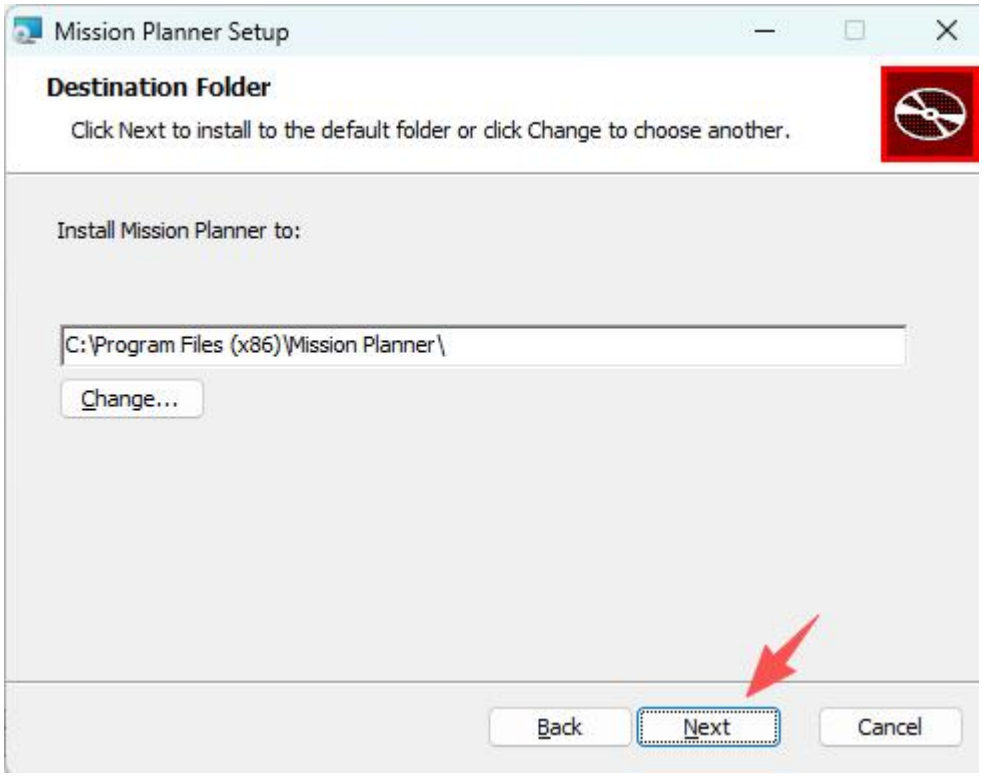
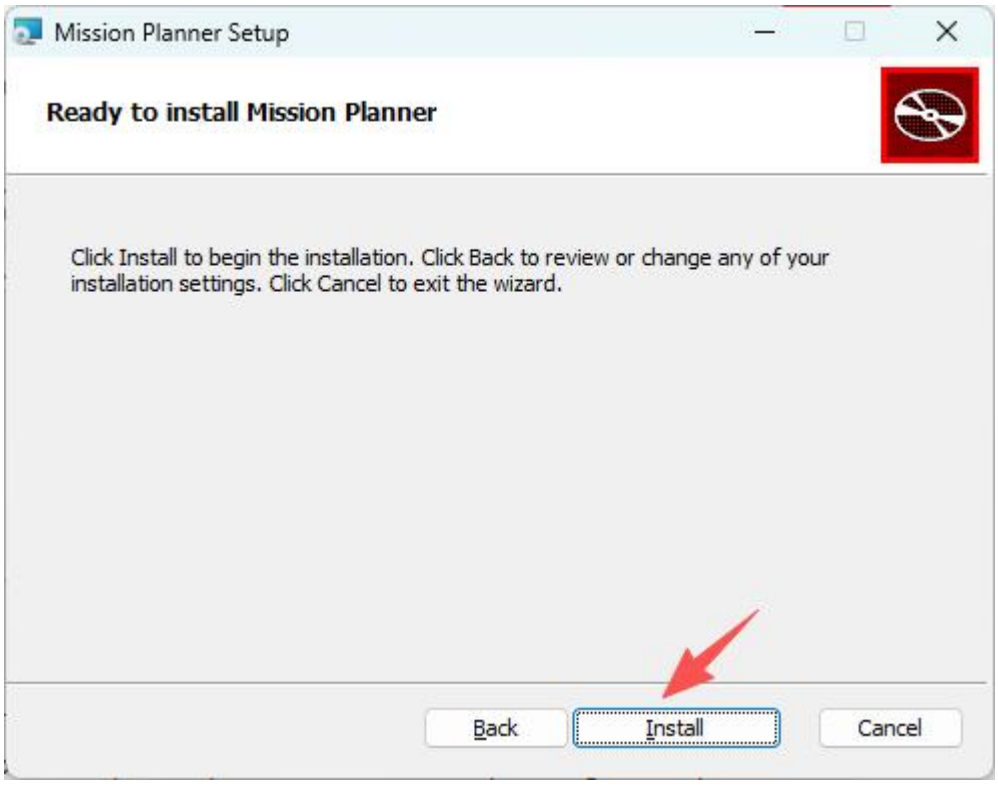
1.Mission Planner

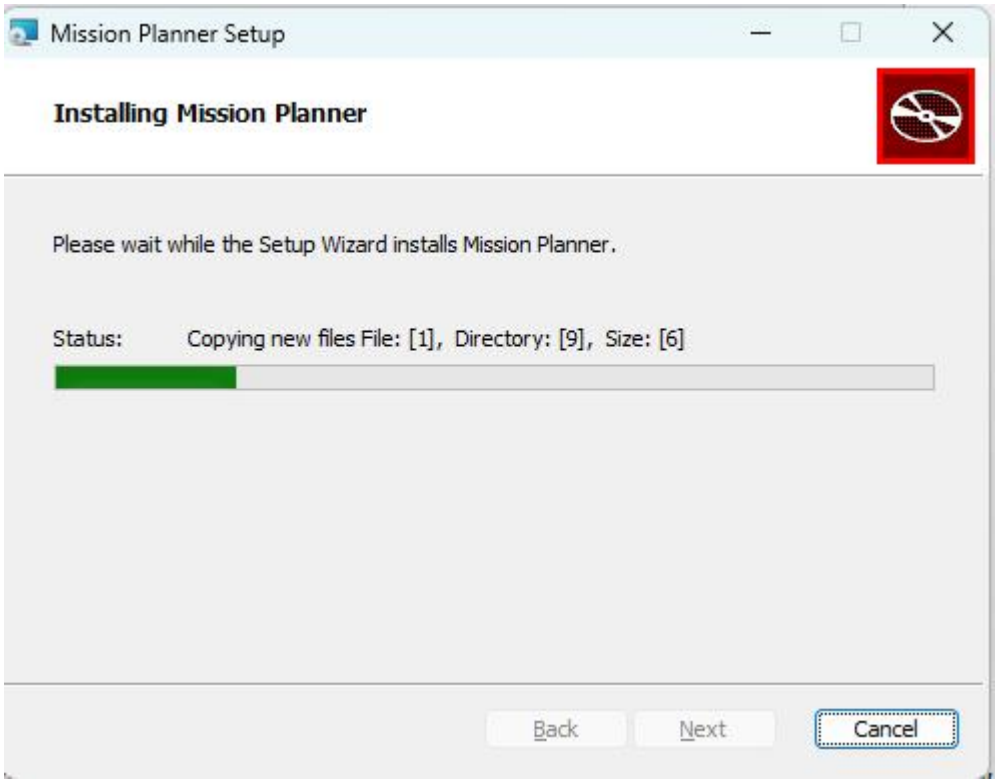
1.1Install Mission Planner

Please contact the manufacturer to provide the software. The manufacturer's email is flishhuang@163.com.

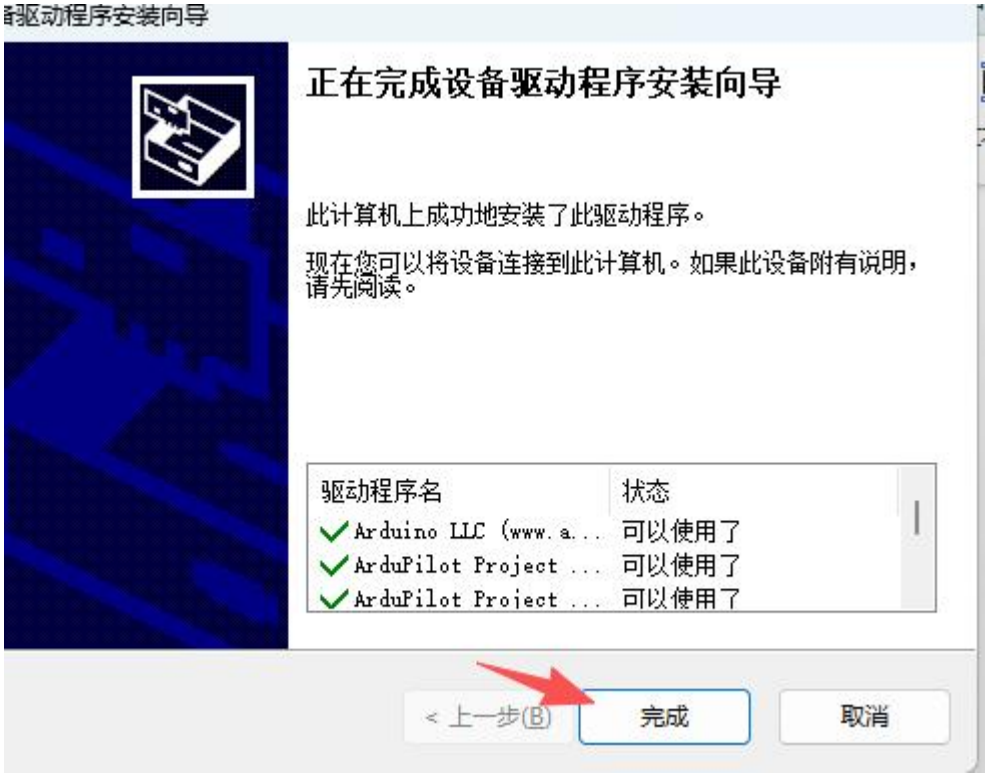
Open the Microsoft installer file and select Run to run the installation utility.

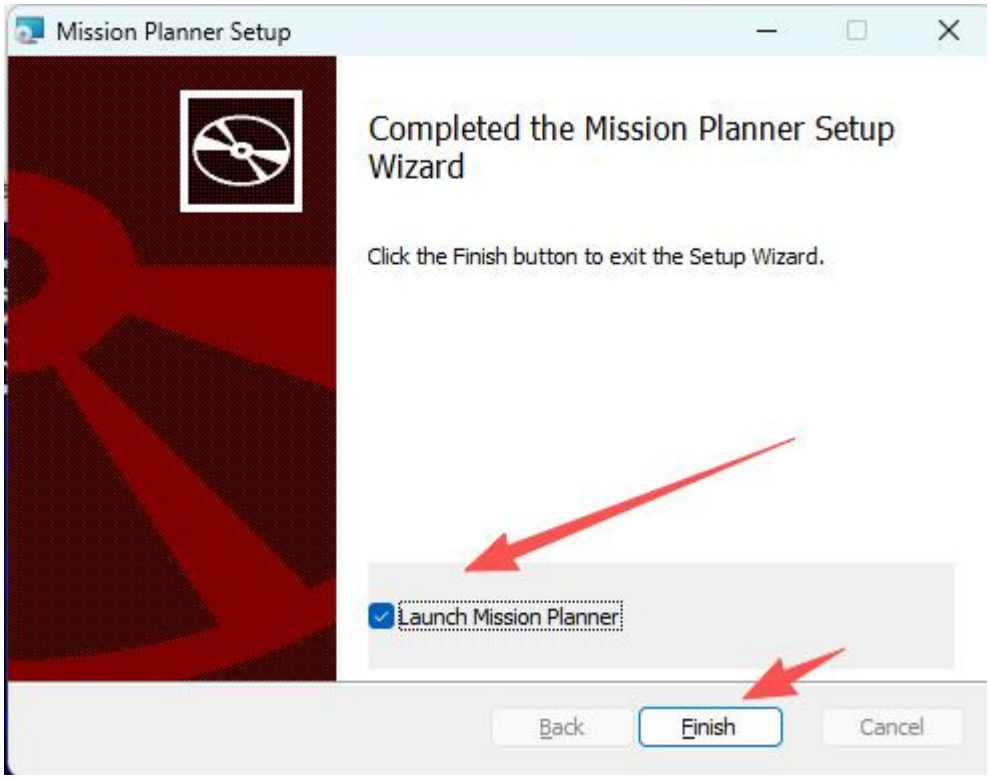

Mission Planner Setup
Destination Folder
Click Next to install to the default folder or click Change to choose another.
Install Mission Planner to:
C:\Program Files (x86)\Mission Planner\
Change...
Back
Next
Cancel


Mission Planner Setup
Ready to install Mission Planner
Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.
Back
Install
Cancel


Mission Planner Setup
Installing Mission Planner
Please wait while the Setup Wizard installs Mission Planner.
Status: Copying new files File: [1], Directory: [9], Size: [6]
Back
Next
Cancel


设备驱动程序安装向导
欢迎使用设备驱动程序安装向导!
此向导帮助您安装软件驱动程序。没有这些驱动程序，有些计算机设备无法运行。
要继续，请单击“下一步”。
< 上一步(B)
下一页(N) >
取消





1.2Mission Planner Introduction

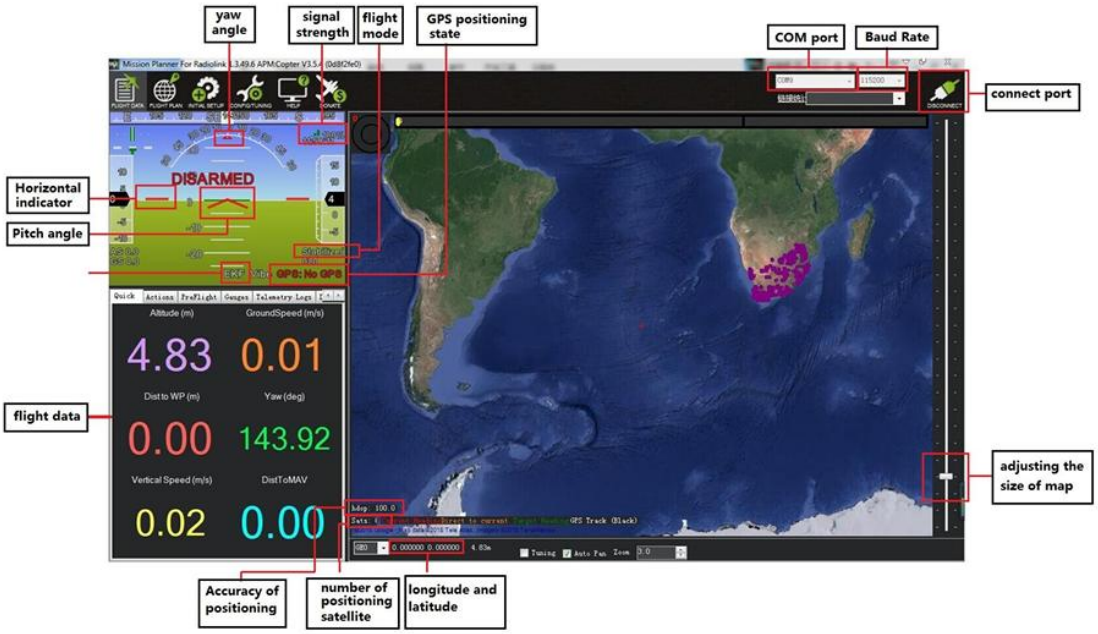
Once installation is complete, open Mission Planner by clicking on its system icon.

There are six Menu Button in main menu.

FLIGHTDATA: flight attitude and data will show in real time on

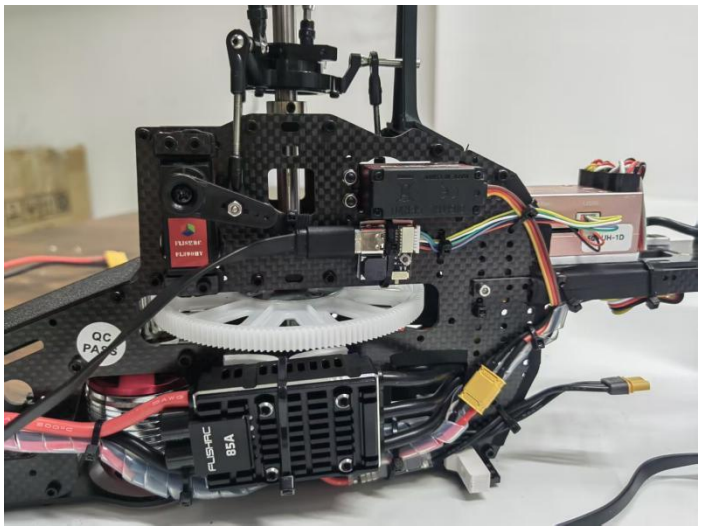
MPFLIGHTPLAN: planning the flight mission

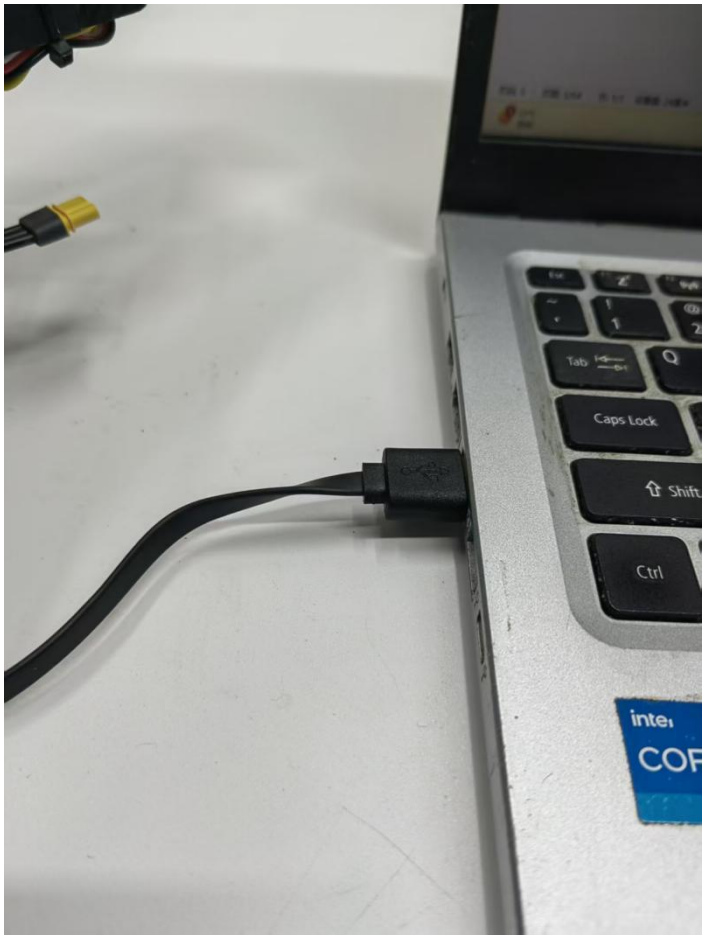
INTIAL SETUP: for firmware installation and update, Mandatory Hardware and Optional Hardware setupCONFIG/TUNING: including detailed PID setup and parameters changeSIMULATION: make L7 work as a simulator after upgrade a special simulation firmware



1.3 Connecting the L7 Flight Controller to Mission Planner

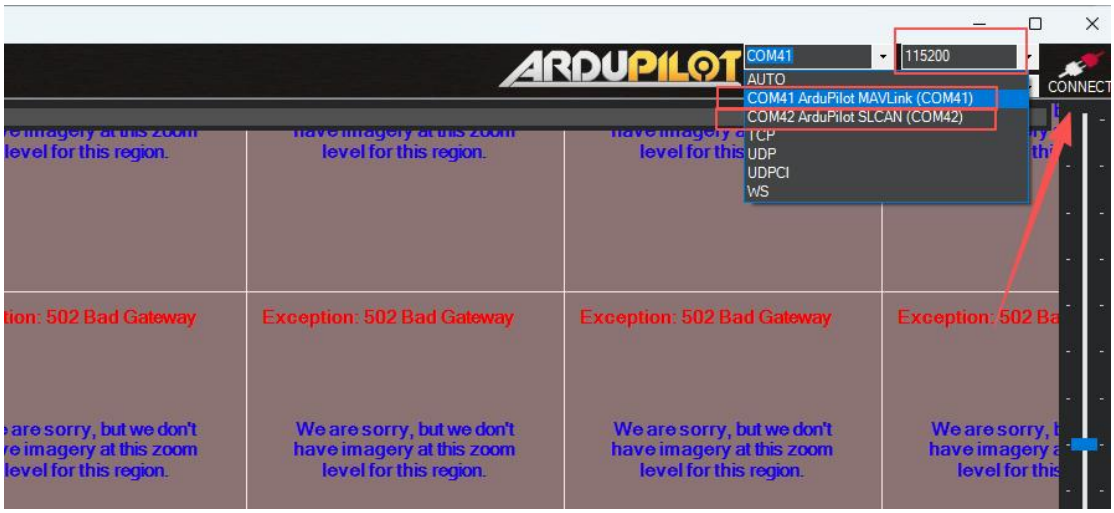
Please take the data cable and connect it to your helicopter and computer respectively，As shown in the figure.





When connecting the new L7 flight controller to your computer for the first time, please unplug and replug the data cable from the computer twice so that the COM port appears. Follow the steps below: When you connect the L7 to the computer via the data cable, the buzzer on the L7 will sound. Then, disconnect the L7 from the computer and reconnect it to the computer. Wait for the buzzer on the L7 to sound again. At this point, click the dropdown list in the Mission Planner software, and you will see two or more ports labeled with "COM". Select the second largest numerical value, then set the Baud Rate to 115200. Next, click the "CONNECT" button to establish the connection. If the connection

is successful, the "CONNECT" button will turn green. If it fails, try selecting another port labeled with "COM" until the connection is successful. As shown in the figure.



After a successful connection, the "CONNECT" button will turn green.

1.4 Accelerometer Calibration

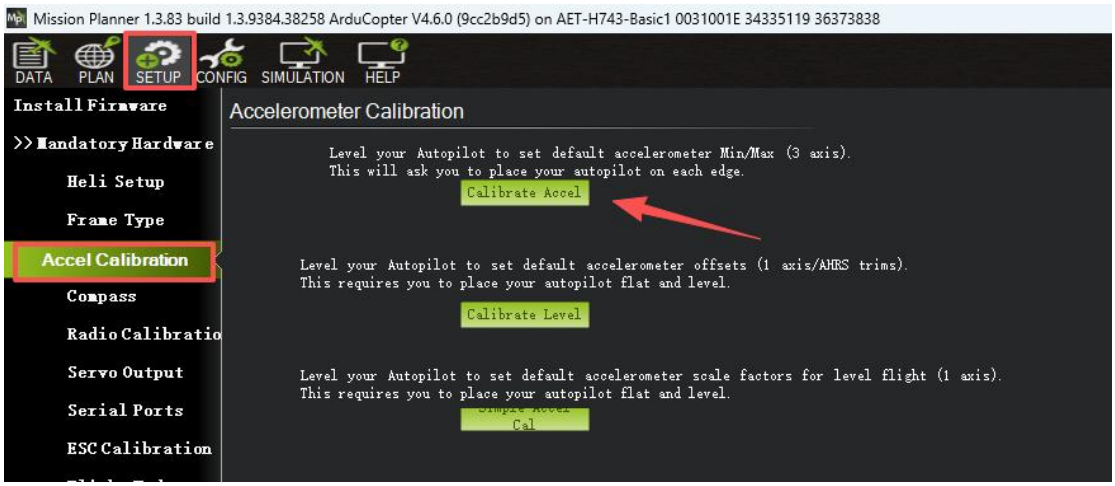
Note: The L7 flight controller has already been calibrated for acceleration before leaving the factory, so you do not need to perform accelerometer calibration when using it for the first time.

Situations where accelerometer calibration is required:

1. You have updated or replaced the firmware of the L7 flight controller.

2. The L7 flight controller prompts you that accelerometer calibration is needed.

Make sure the CrossFlight is keeping horizontal when do the accel calibration.



2. Remote control settings（遥控器设置）

RC transmitters are used to control vehicle movement and orientation. Copter and Plane minimally control throttle, pitch, roll and yaw, while on Rover we just control throttle and roll. Each of these control signals are mapped to transmitter stick/switch(s) and in turn to autopilot channels from the connected receiver.

Calibrating each of the transmitter controls/channels is a straightforward process - simply move each of the enabled sticks/switches through their full range and record the maximum and minimum positions.

There are two main transmitter configurations:

Mode 1: left stick controls pitch and yaw, the right stick will control throttle and roll.

Mode 2: left stick controls throttle and yaw; the right stick will control pitch and roll.

Copter default channel mappings are:

Channel 1: Roll

Channel 2: Pitch

Channel 3: Throttle

Channel 4: Yaw

Channel 5: Flight modes

Channel 6: Idle channel controls landing gear retraction and extension, LED control, etc.

Channel 7： One-key return switch

Channel 8： Start and ignition switch

Using the FlySky FS-i6S transmitter in Mode 2 as an example

1.1The protocol settings of the remote control are shown in the figure below.


Run
ATT
6G
FUNC
SYSTEM
Student mode
Output mode
Sticks mode


Run
ATT
6G
OUTPUT MODE
Output
PWM
PPM
Serial
i-BUS
S.BUS

1.2The joystick calibration on the remote control is performed as shown in the figure.

1.3REUERSE (Servo Phase Setting): On the REUERSE page, set the channel directions for CH3 and CH5 to reverse, as shown in the figure.

1.4Aux. channels (function switch settings): Map channel 5 to switch C (flight mode switch), map channel 7 (RTL return switch) to switch D, and map channel 8

(enable/disable switch) to switch A.


Run
GPS
ATT
6G
AUX. CHAN
Channel 7
SwD


Run
GPS
ATT
6G
AUX. CHAN
Channel 8
SwA

1.5Failsafe Setting (Return-to-Home on Signal Loss)，Set the parameters as shown in the figure.

1.6Flight Mode Settings，Set the parameters as shown in the figure.


Run
ATT
6G
T1 00:00:00
T2 00:00:00
TX
RX
FLY MODE:
OFF


Run
ATT
6G
FLY MODE
Channel:Null
On


Run
GPS
ATT
6G
off
home
FLY MODE
Channel: 5 Off
S1: SwC S2: Null
1: gqs 20 00

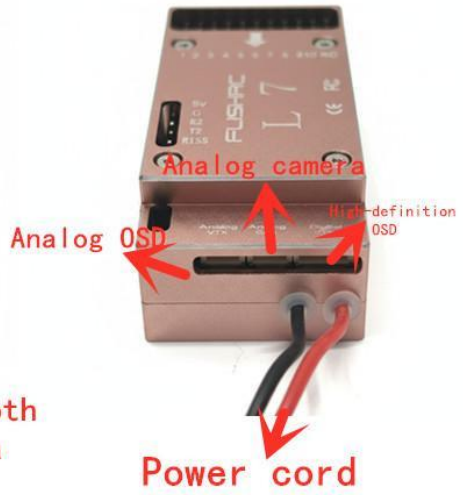

Run
GPS
ATT
6G
off
home
FLY MODE
Channel: 5 Off
S1: SwC S2: Null
2: att 15 00

Remote Control Setup Tutorial (for L7 Flight Controller) Link:

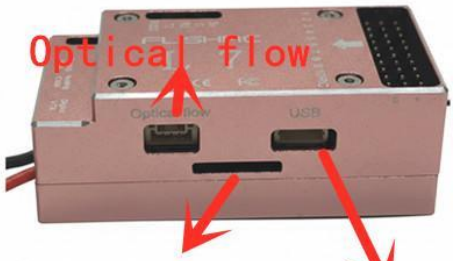
https://www.youtube.com/watch?v=fcLKmL3YCDA&list=PLRkxtVC1hmiUY2R27IZCnRGIlAZxqw65F&index=12

3. Flight Controller Port Introduction and Wiring Instructions（飞控端口介绍和接线说明）

Note: The L7 flight controller supports a maximum of 6S power. If you are using 8S or 12S, please refer to the wiring diagram in Section 5.3.



Connected to the power battery, supports up to 6S



(Please use a high-speed memory card of 16GB or less.)

RISS port

1. Left servo of the helicopter
2. Right servo of the helicopter
3. Front or rear servo of the helicopter
4. Tail ESC or tail servo of the helicopter
8. Main ESC of the helicopter

Connect the RC and SBUS receiver.

4.Tools to Prepare（要准备的工具）

4.1.Swashplate Leveler

4.2Pitch Gauge

4.3Hex screwdrivers: 1.5, 2.0, 2.5

5.Debugging the Helicopter（调试直升机）

5.1Wiring Instructions（接线说明）

Channel 1:Left servo of the helicopter（Aileron）

Channel 2:Right servo of the helicopter（Pitch）

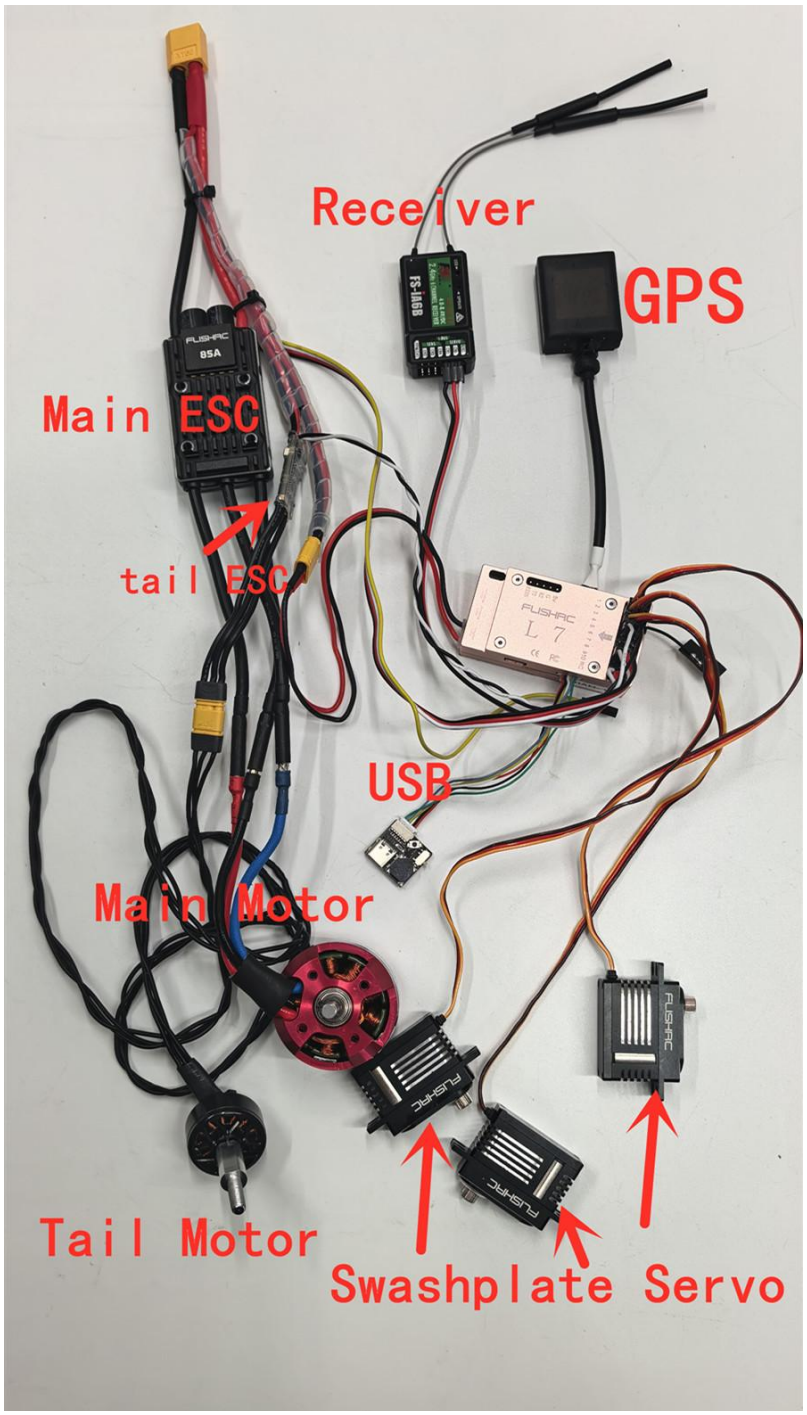
Channel 3:Front orrear servo of the helicopter（Elevator）

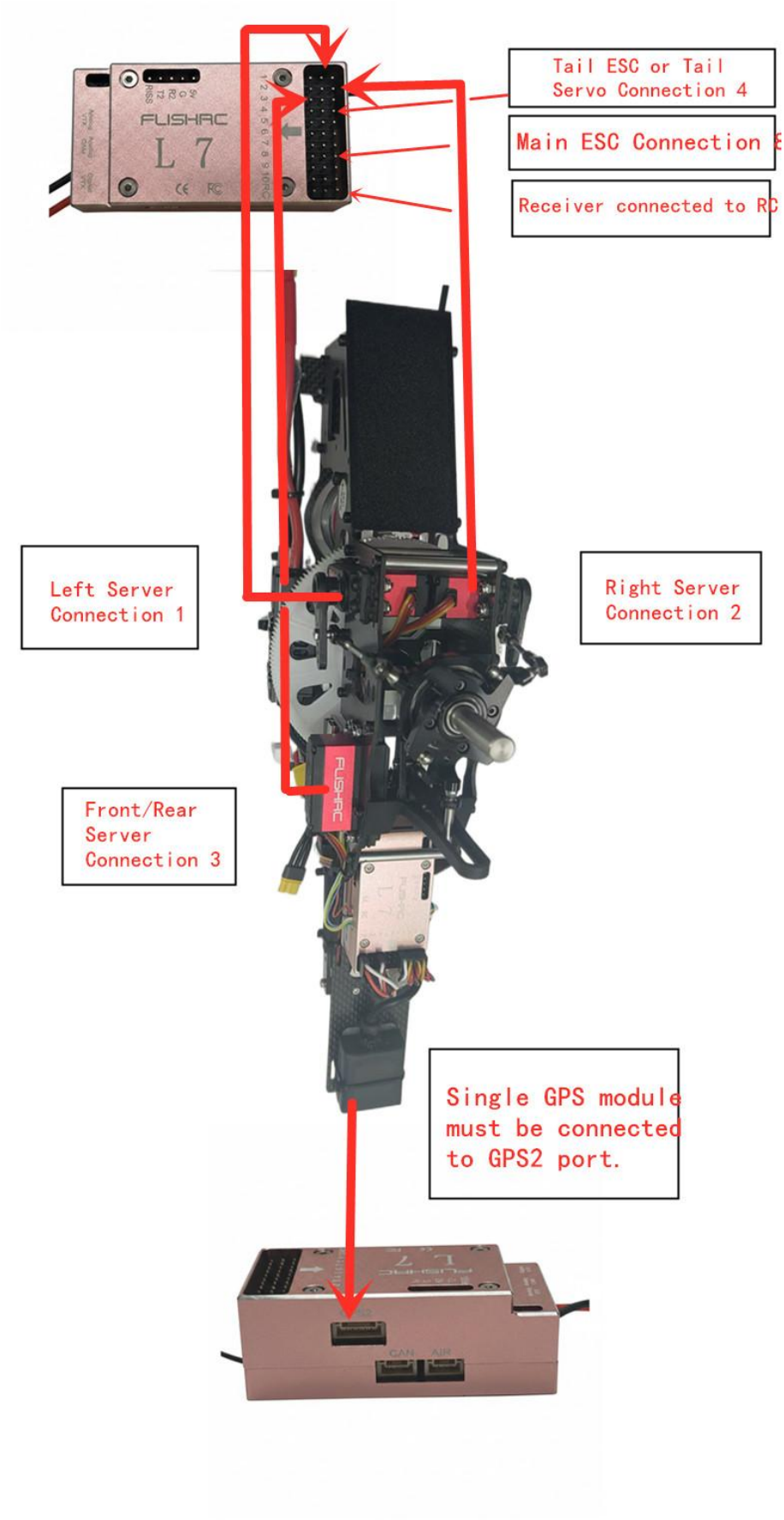
Channel 4:Tail ESC or tail servo of the helicopter

Channel 8: Main ESC（Controlling the Main Motor Speed)

Channel RC: the helicopter of Connect the RC and SBUS receiver.

Note: L7 flight controller servo Channel 1-10 and RC do not output voltage. Therefore, power must be supplied to the servos and receiver through an ESC containing a BEC. When an ESC with a BEC is plugged into channel 8, it will supply power to channels 1-10 and RC. If your ESC does not have a BEC, please use an independent BEC plugged into an unused channel, such as channel 9 or 10, to provide power. Ensure that the BEC voltage and current are sufficient and do not exceed the operating voltage of the servos and receiver.


Receiver
GPS
Main ESC
tail ESC
USB
Main Motor
Tail Motor
Swashplate Servo


Tail ESC or Tail Servo Connection 4
Main ESC Connection
Receiver connected to RC
Left Server Connection 1
Right Server Connection 2
Front/Rear Server Connection 3
Single GPS module must be connected to GPS2 port.
FUSHRC
L 7

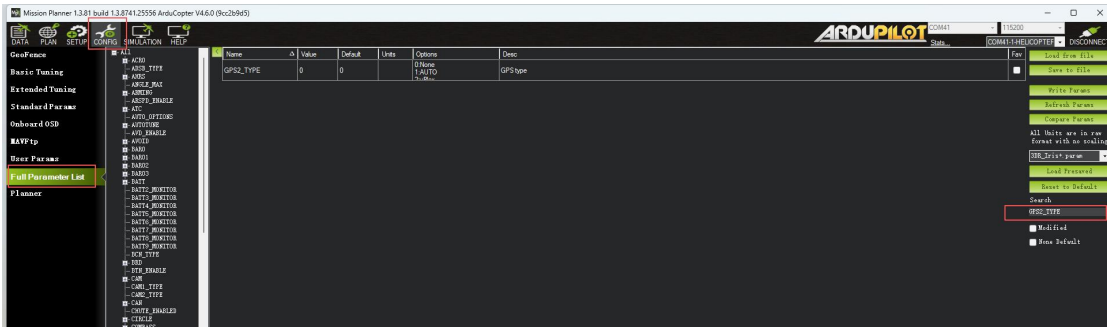
The wiring for dual GPS mode is the same as for single GPS mode. The only difference is that the second GPS module is plugged into the GPS1 port, and both GPS modules must be of the same specification and model.

Special Note: When using single GPS mode, the GPS module **must** be plugged into the **GPS2** port; otherwise, the flight controller will not recognize the GPS module. If you wish to plug the GPS module into the GPS1 port, please contact the manufacturer for technical support.

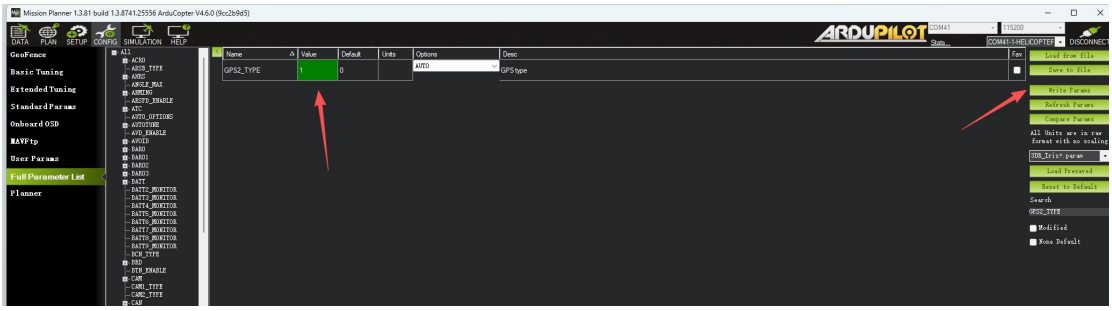
Note: The L7 flight controller can be used in either single GPS mode or dual GPS mode. The default configuration is single GPS mode. If you wish to use dual GPS, Please activate the dual GPS mode according to the following operations. The difference is that dual GPS mode only serves as a backup. It does not improve positioning accuracy; its main advantage is redundancy. In dual GPS mode, if one GPS unit fails, it can seamlessly switch to the other GPS unit. However, the probability of GPS mode failure is very low. Therefore, if you are using it for a 500-class helicopter or smaller, please use single GPS mode. Smaller aircraft also do not have extra space to install two GPS modules.

Method for Activating Dual GPS Mode（双GPS 模块激活方式）

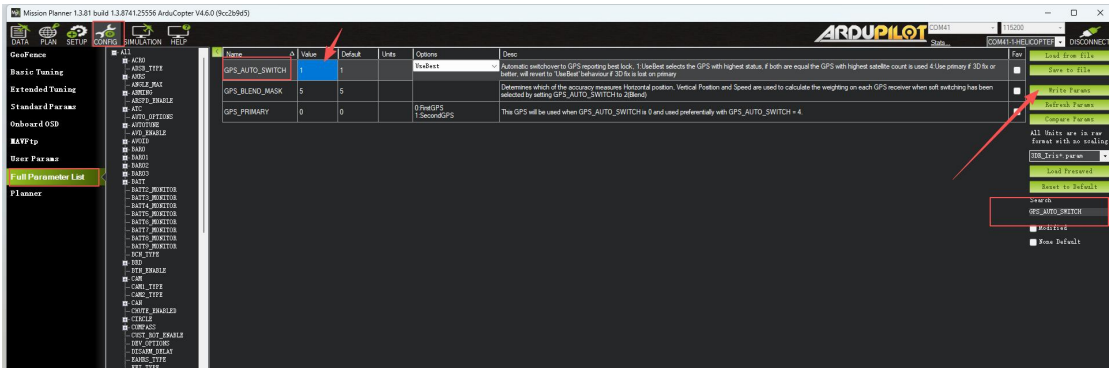
Click on CONFIGGPS》Full Parameter List》Search，and then enter“GPS2_TYPE”



Change the "GPS2_TYPE" Value to 1, then click Write Params to save the parameters to the L7 flight controller. This activates dual GPS mode.



Click on CONFIGGPS 》Full Parameter List 》Search， and then enter “GPS_AUTO_SWITCH”，Change the "GPS_AUTO_SWITCH" Value to 1, then click Write Params to save the parameters to the L7 flight controller.



5.3Calibrating the Remote Controller On the computer(校准遥控器)

This helicopter shows how to perform radio control calibration using Mission Planner.RC transmitters are used to control vehicle movement and orientation. Copter and Plane minimally controlthrottle, pitch, roll and yaw. Each of these control signals aremapped to transmitter stick/switch(s) and in turn to autopilot channels from the connected receiver.Calibrating each of the transmitter controls/channels is a straightforward process simply move each of theenabled sticks/switches through their full range and record the maximum and minimum positions.There are two main transmitter configurations:

Mode 1: left stick controls pitch and yaw, the right stick will control throttle and roll.

Mode 2: left stick controls throttle and yaw; the right stick will control pitch and roll.Copter default channel mappings are:

Channel 1: Roll

Channel 2: Pitch

Channel 3: Throttle

Channel 4:Yaw

Channel 5: Flight modes

Channel 6: (Optional) In flight tuning or camera mount\LED Control(mapped to transmitter tuning knob)Unused channels can be mapped to control additional peripherals.

For safety, you should disconnect the battery and/or remove propellers before preforming radio calibration.Bind your transmitter and receiver before calibrate radio, connect L7 Flight Controller to computer via USB cable and then turn on transmitter. The RC receiver ask to connect to the RC port of L7 Flight Controller.The transmitter will make I6S as an example in this manual.

（遥控器摇杆图片）

5.4 Radio Calibration Steps:

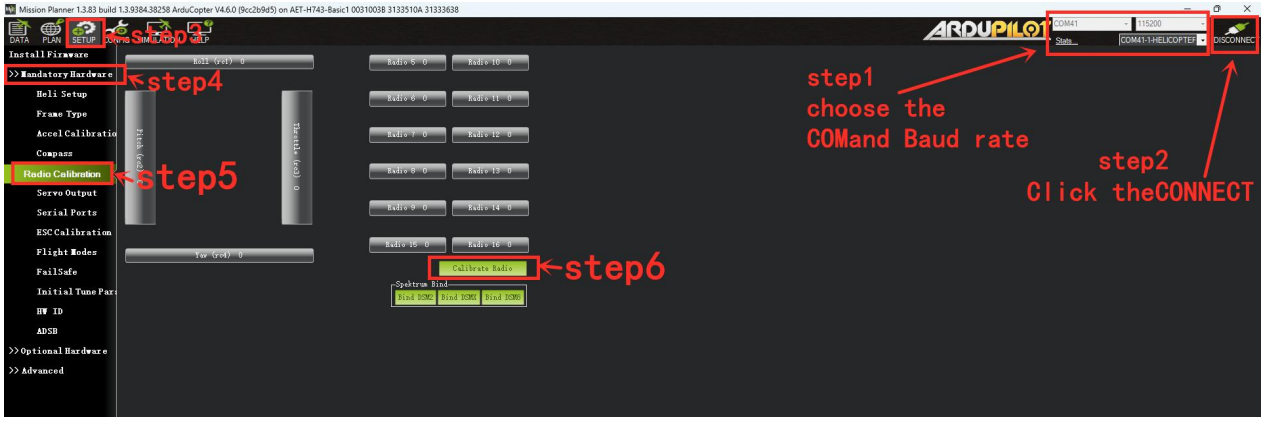
(1)Open Mission Planner

(2）Choose the right COM and Baud rate

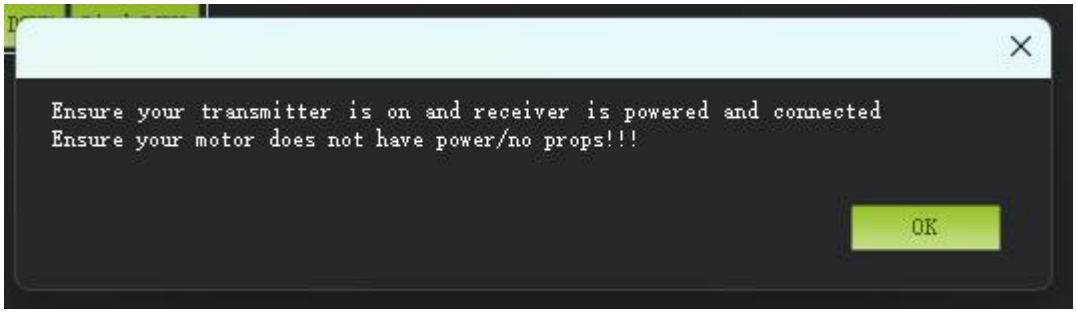
（3）Click the CONNECT

（4） Choose INITAIL SETUP-Mandatory Hardware-Radio Calibration

（5）Click "Calibrate Radio"



There are two tool pop-ups after you click "OK", one for make sure both your transmitter and receiverare powered on and connected, and the motor of your drone does not have power and withoutpropellers.



And then click "OK" and move all RC sticks and switches to their extreme positions so the red bars hit thelimits.

If the red bars have not any change when you move the sticks, please check the receiver have connectsuccess or not, make sure the receiver is output SBUS signal .

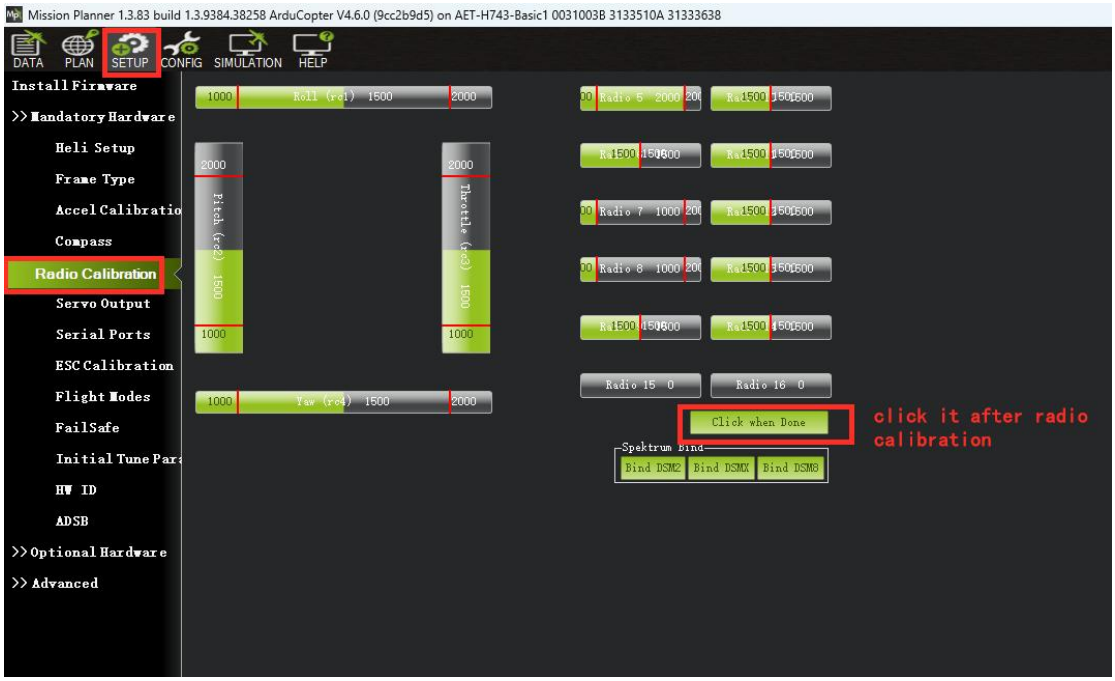
You can check if every corresponding red bar for every channel is work as below:

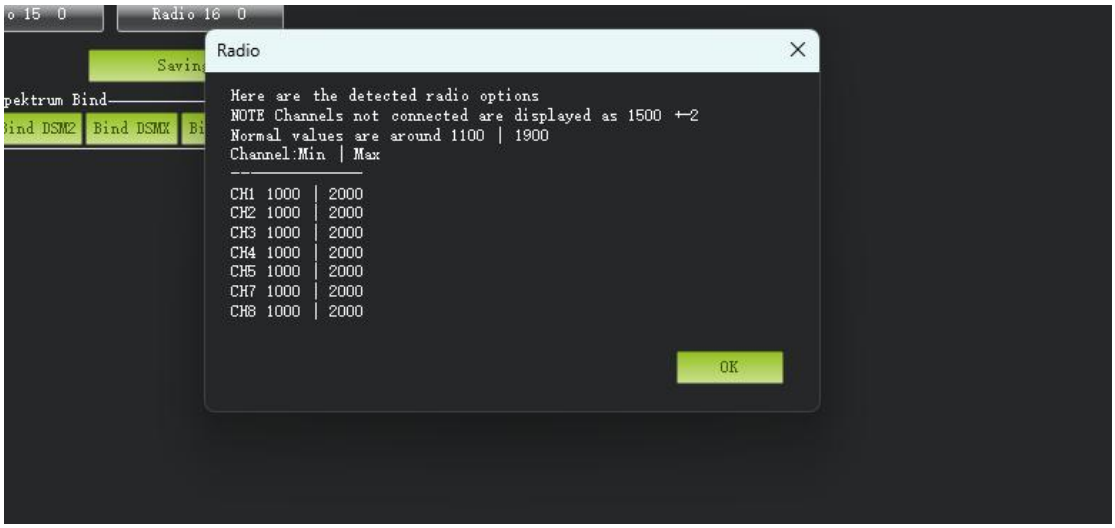
CH1: low position = roll (towards the left), up position= roll (towards the right).

CH2: low position =pitch(forward), up position =pitch(backwards)

CH3: low position =reduced speed, up position =speed up.

CH4: low position = yaw (towards the left), up position = yaw (towards the right).



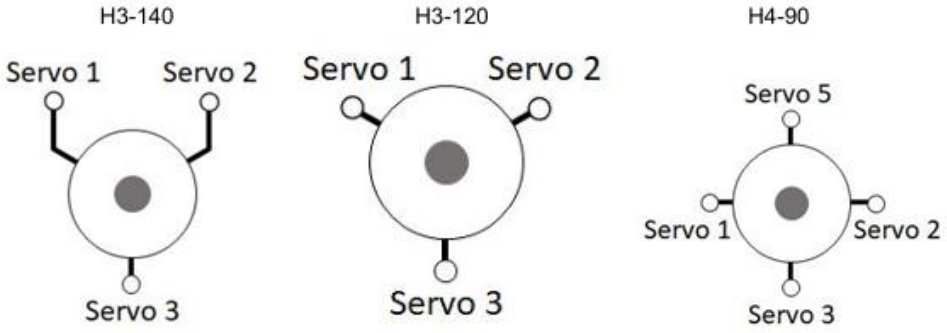


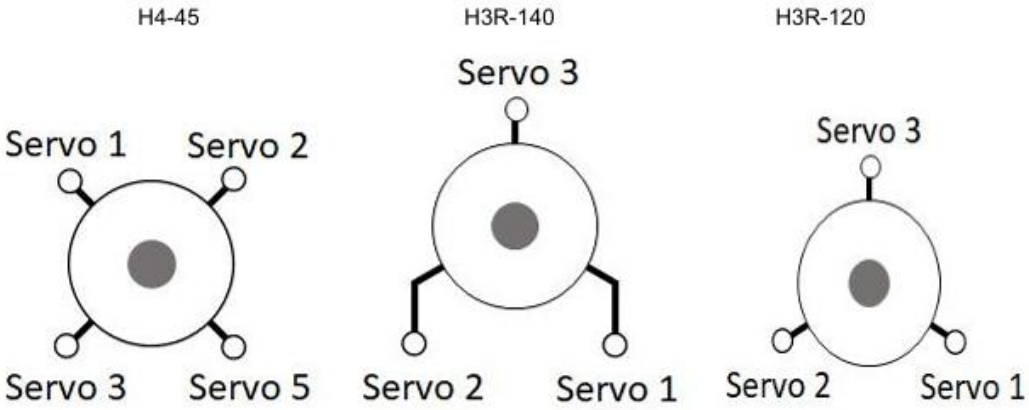
Click OK to save the radio calibration data.

5.5 Select Swashplate Type

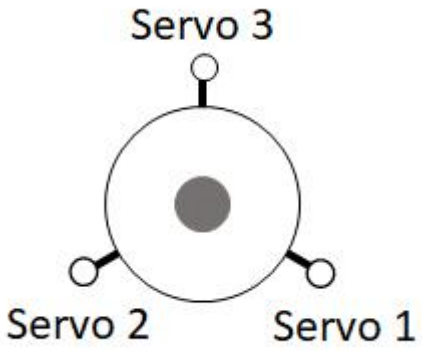
Select the helicopter swashplate type as shown in the figure.he diagrams shown label the servo attach positions as Servo 1, Servo 2 and Servo 3 for the three servo swashplate types. These also correspond to the default output functions for servo outputs 1 thru 3 on the autopilot for the servos used with these swashplate types.

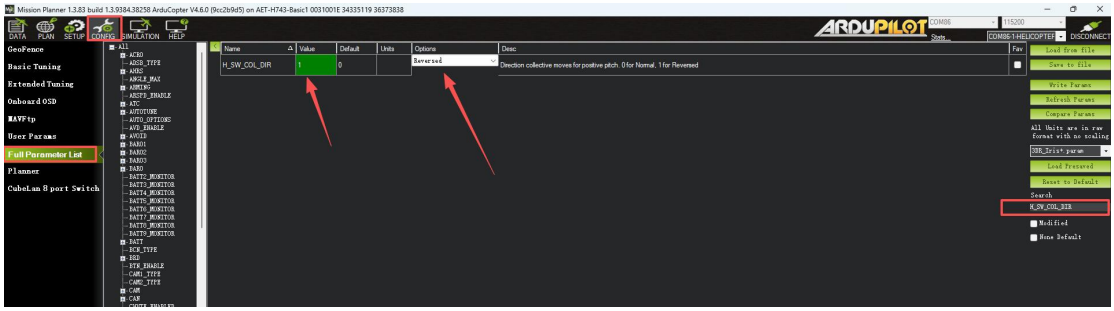
Set the helicopter's swashplate type according to your helicopter's swashplate type. Almost all helicopters use the H3-120, and the default configuration is H3-120.



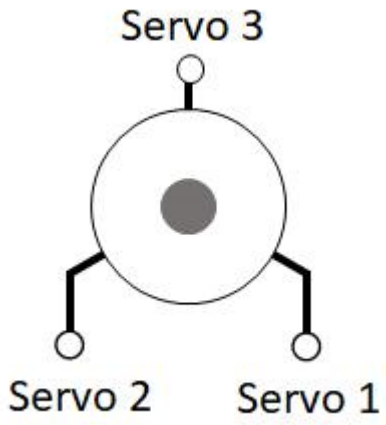


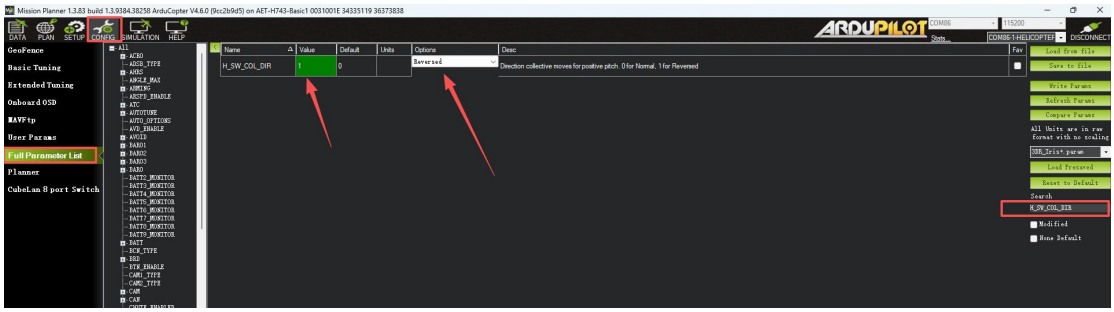
As shown in the figure below, if your helicopter's swashplate type is H3R-120, please set the swashplate type to H3-120 in the software, and then set the parameter H_SW_COL_DIR to "reversed", as shown in the second image.





As shown in the figure below, if your helicopter's swashplate type is H3R-140, please set the swashplate type to H3-140 in the software, and then set the parameter H_SW_COL_DIR to "reversed", as shown in the second image.





if your helicopter's swashplate type is H3-90 ， please set the swashplate type to H4-90 in the software- Use H4-90. Don't use one of the servo outputs.

•

5.6 Helicopter Servo Arm Level Installation（直升机舵机臂水平安装）

Before your first flight, please follow these pre-flight checks:

（1）Disconnect the three connecting wires between the ESC and the motor to ensure that the armed motor willnot rotate.

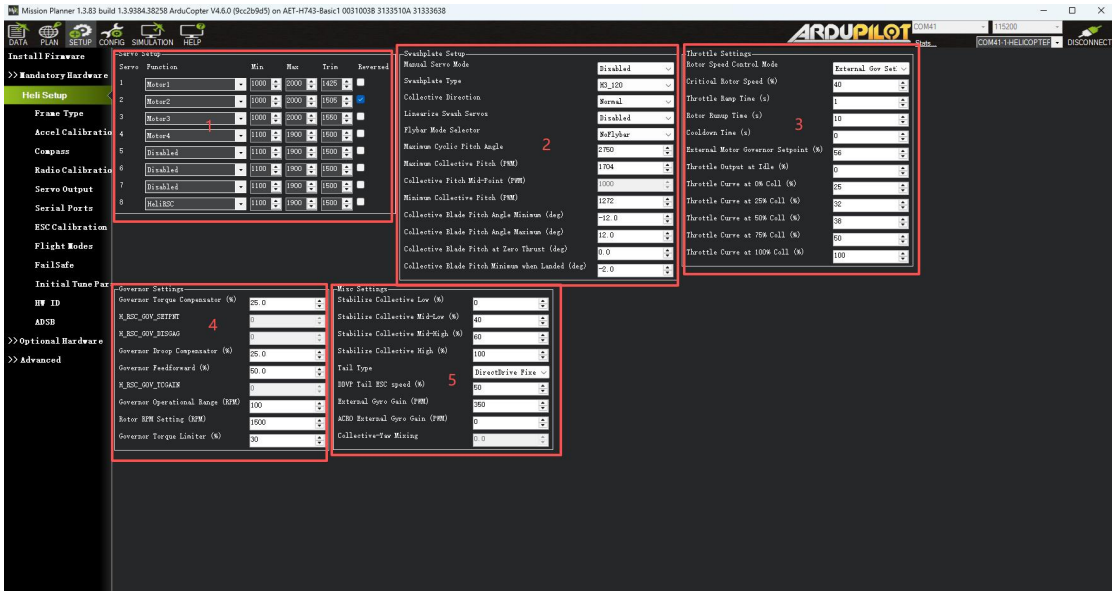
（2） Connect lithium battery for power supply.

（3） Connect the flight controller and Mission Planner on computer via USB.

（4） Open SETUP-> Mandatory Hardware-> Heli Setup in Mission Planner.

（5） Please note that the output control is only available in 6G mode (Stabilize mode)or 3D mode

(Acro mode), and the adjustment test cannot be performed in other modes.



Function introduction

（1）Servo Setup. The function of each PWM output channel can be set.

（2） Swashplate Setup

（3） Throttle Settings

（4） Governor Settings

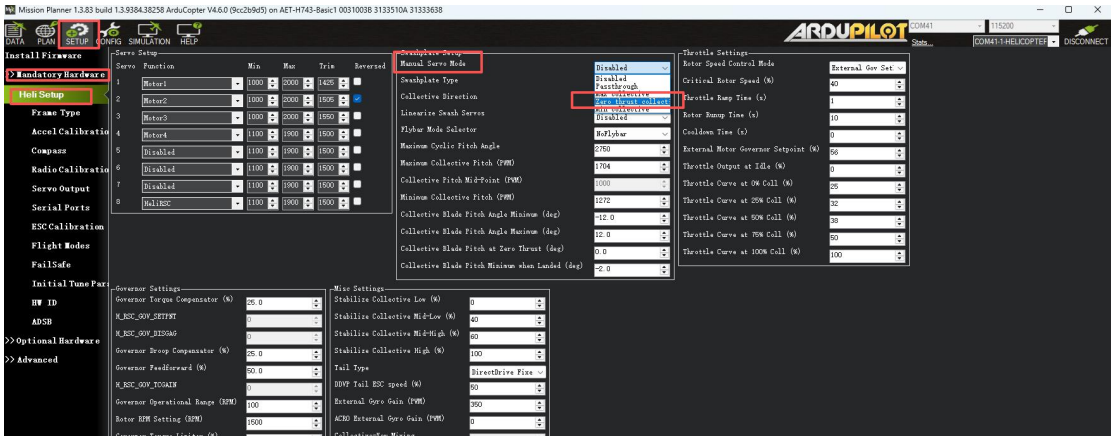
（5） Misc Settings

5.7 Servo Arm Installation（舵机臂安装）

（1）Power on the remote controller, then power on the helicopter.

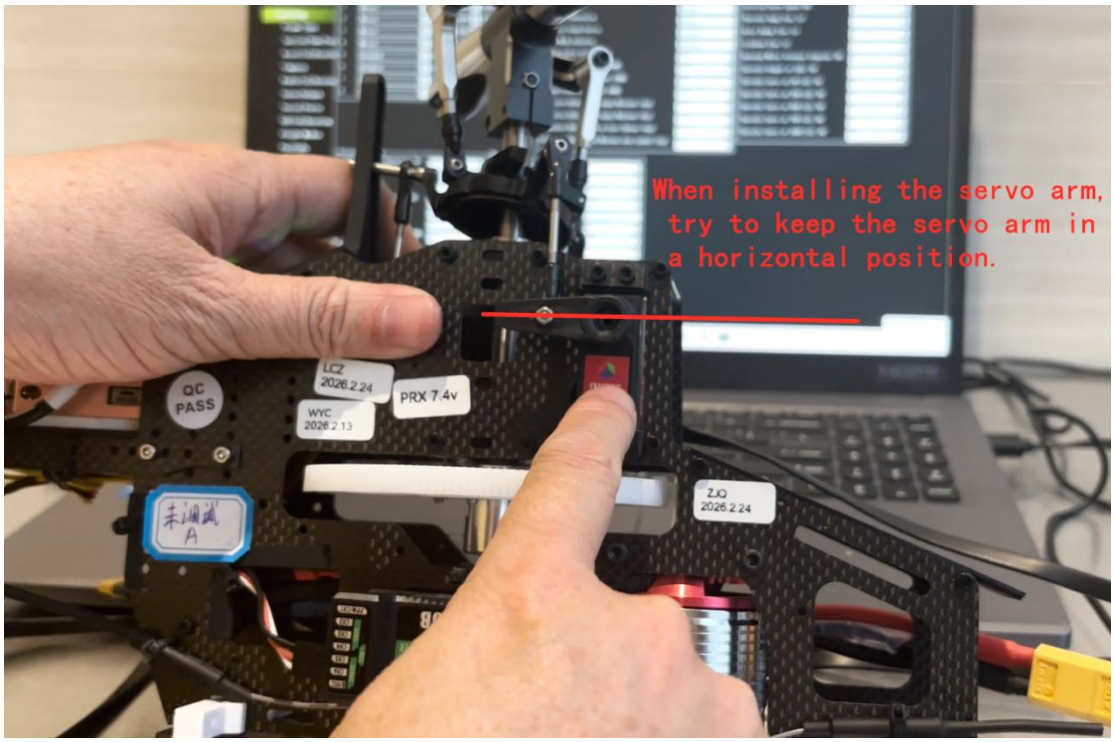
（2）The remote controller's flight mode switch is in the 6G mode (Stabilize mode).

（3）Set the "Manual Servo Mode" parameter to Zero thrust collective.As shown in the figure, the servo output gear will be fixed at the center point and will not be controlled, in preparation for installing the servo arm.



（4）When installing the servo arm, try to keep the servo arm in a horizontal position，

Install the other servo arms as shown in the figure and tighten the servo arm screws.

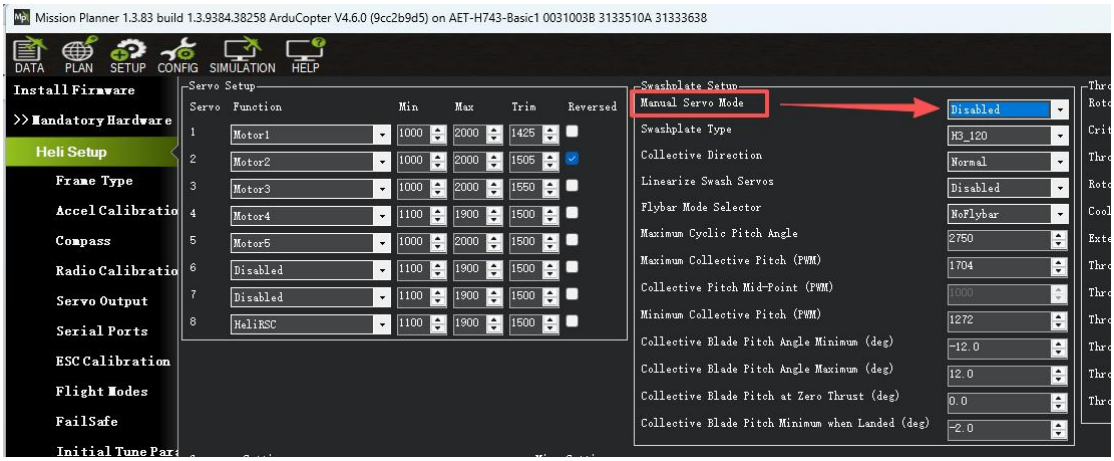


5.8 Helicopter Control Stick Direction and Sensitivity Direction Test（直升机方向测试）

（1）Check Proper Swashplate Movement.

Please power on the remote controller, and use the main battery to power the helicopter. Then set the remote controller's flight mode to mode

(Stabilize mode).mode (Stabilize mode).Set the "Manual Servo Mode" parameter to “Disabled ” As shown in the figure,



Use your transmitter to check for proper swashplate response to cyclic and collective inputs.Push forward on the elevator stick and swashplate tits forward; pull back on the elevator stick and swashplatetilts aft.

Push right on the aileron stick and the swashplate tilts right; Push left on the aileron stick and the swashplate

tilts left.Push up on the throttle stick (collective) and the swashplate will rise; pull down on the throttle stick (collective)and the swashplate will lower.

Set the SERVO1 REVERSED , SERVO2 REVERSED, SERVO3 REVERSED,

Correspond to the "Reversed" parameters for CH1, CH2, and CH3 in the image respectively. Use the "Reversed" parameter to change the servo's direction of movement.

If you find that the swashplate direction of the helicopter controlled by the remote controller is incorrect, please change the swashplate's direction of movement through the "Reversed" parameter.

（2）Check the swashplate sensitivity direction of the helicopter.(检查直升机的斜盘感度方向)

Lift the helicopter by hand and tilt it forward, backward, left, and right. Check whether the swashplate's movement direction is opposite to the tilting direction. Note that the swashplate's movement direction must be opposite to the helicopter's tilting direction (otherwise, the helicopter will roll over upon takeoff). If any direction (forward, backward, left, or right) is incorrect, please check whether the phase directions of the remote controller's channel 1, channel 2, and channel 3 are correct. If they are correct, modify the corresponding channels using the "Reversed" parameter in the image above until the swashplate's movement direction is opposite to the tilting direction.

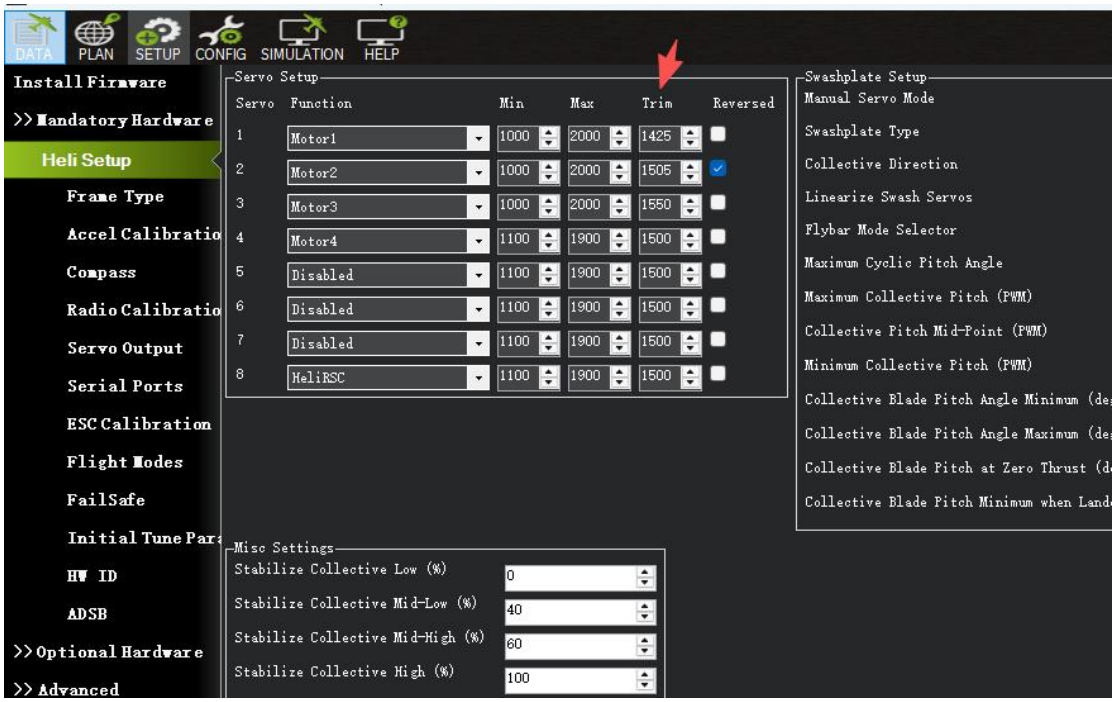
5.9 Debugging Helicopter Swashplate Level(十字盘调平)

(1) Using the Swashplate Leveler(斜盘调平器的使用)

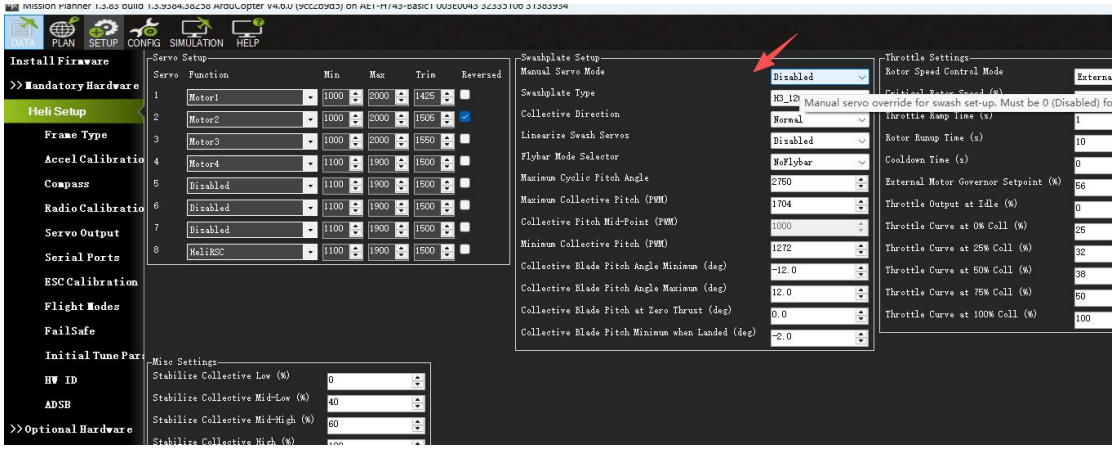
Clamp the swashplate leveler onto the main shaft. Confirm that the helicopter's

swashplate is level by observing whether the lower edge of the swashplate and the swashplate leveler are parallel to each other.

(2) As shown in the figure,If there is not enough space below the swashplate to insert the swashplate leveler, increase the servo arm height overall by simultaneously adjusting the trim for channels 1, 2, and 3. This will raise the swashplate to create more space underneath. Note: For channels where "reversed" is not checked, increasing the trim value raises the servo arm height. For channels where "reversed" is checked, decreasing the trim value raises the servo arm height.

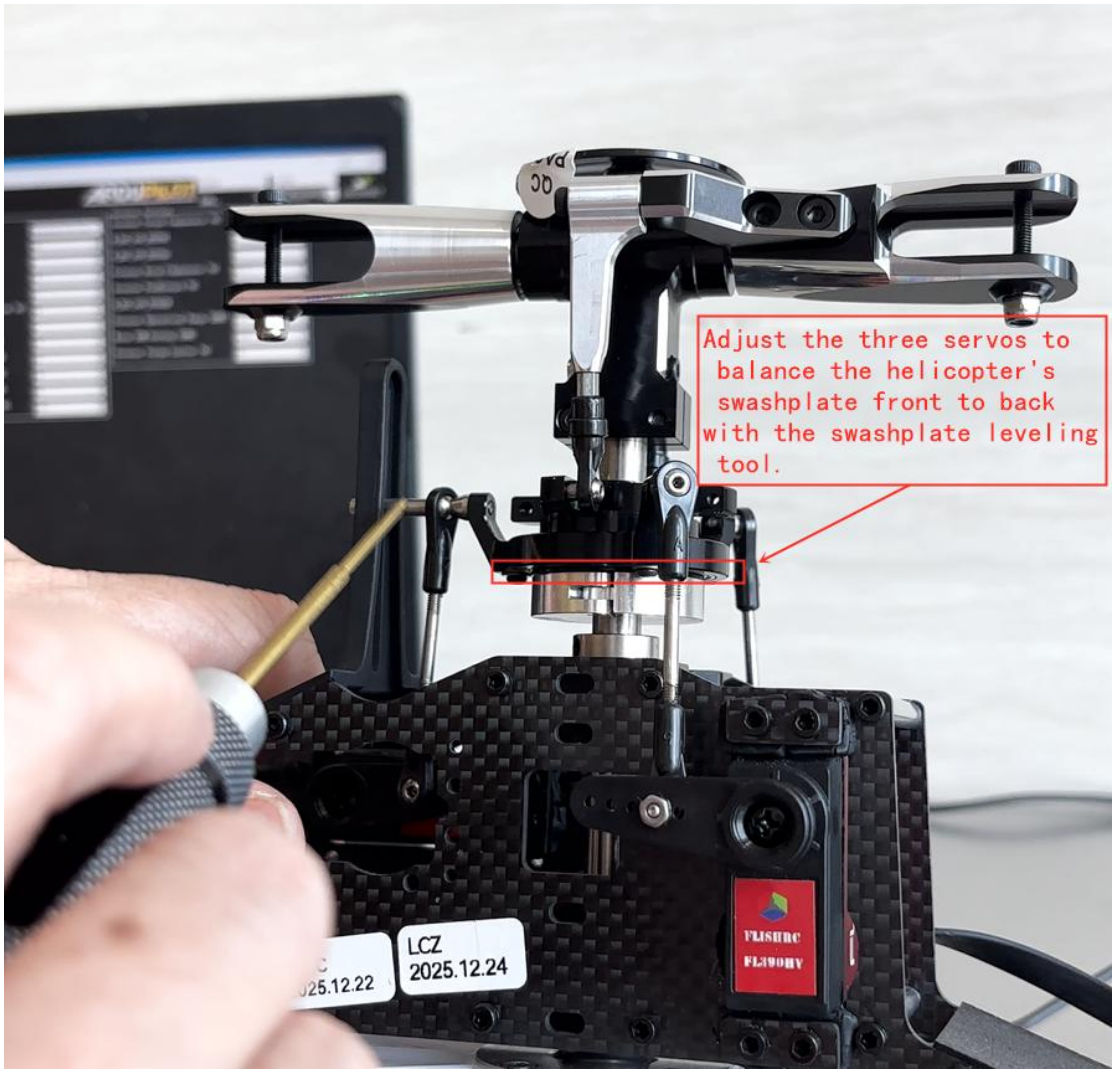


(3) Change the "Manual Servo Mode" parameter to "Zero thrust collective" to fix the swashplate at its center point, and then proceed with the swashplate leveling adjustment.



Install the swashplate leveling tool onto the main shaft, then move it up close to the swashplate. Adjust the trim parameters for channels 1, 2, and 3 to make the swashplate and the leveling tool relatively level. The criterion for levelness is that, As shown in the figure , when viewed from the side frame, the gaps between the swashplate and the leveling tool on the left, right, front, and back sides are either equal or there is no gap at all.

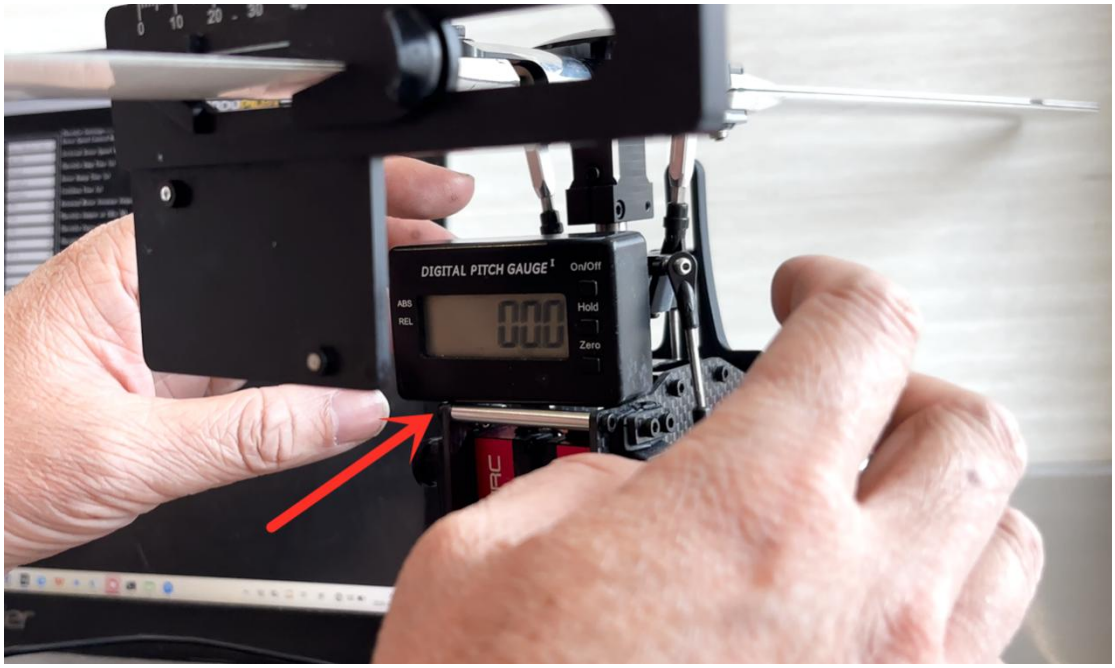

Adjust the three servos to make the helicopter's swashplate level left and right with the swashplate leveling tool.
FLISHRC
FLISHRC



5.10 Zero pitch adjustment.（零螺距调试）

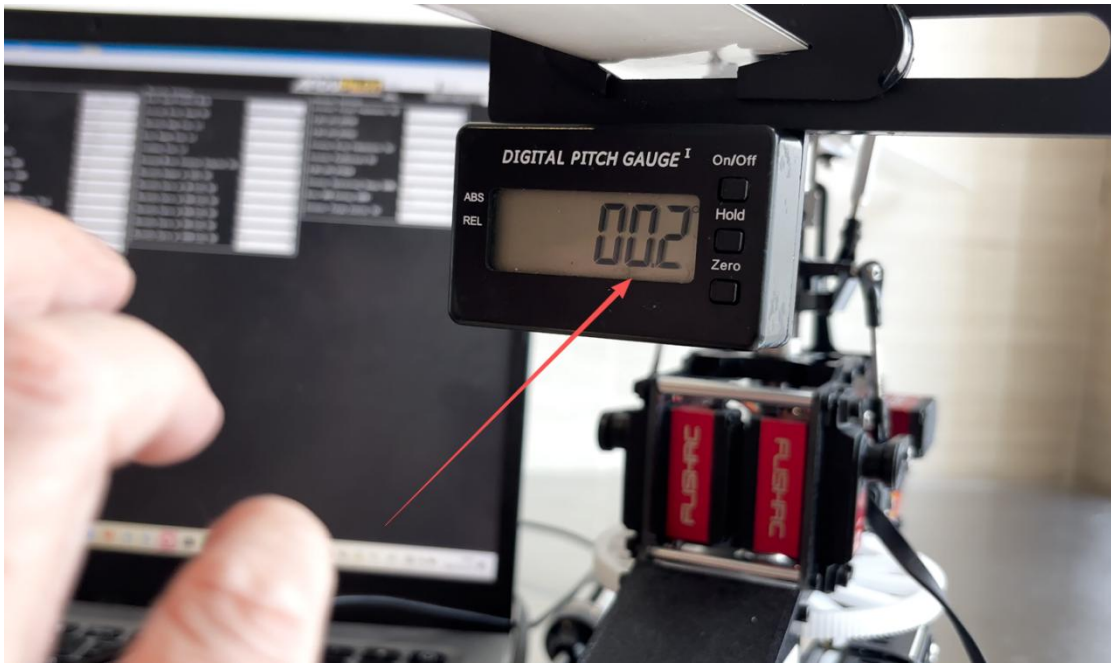
Remove the swashplate leveling tool. The next step is to adjust the 0 pitch. Install the main blades onto the helicopter, with the two main blades corresponding to the tail and the nose respectively.Please try to ensure that the helicopter is level horizontally.As shown in the figure.

As shown in the figure, take out the pitch gauge and place it on a surface perpendicular to the main shaft, then zero the pitch gauge.



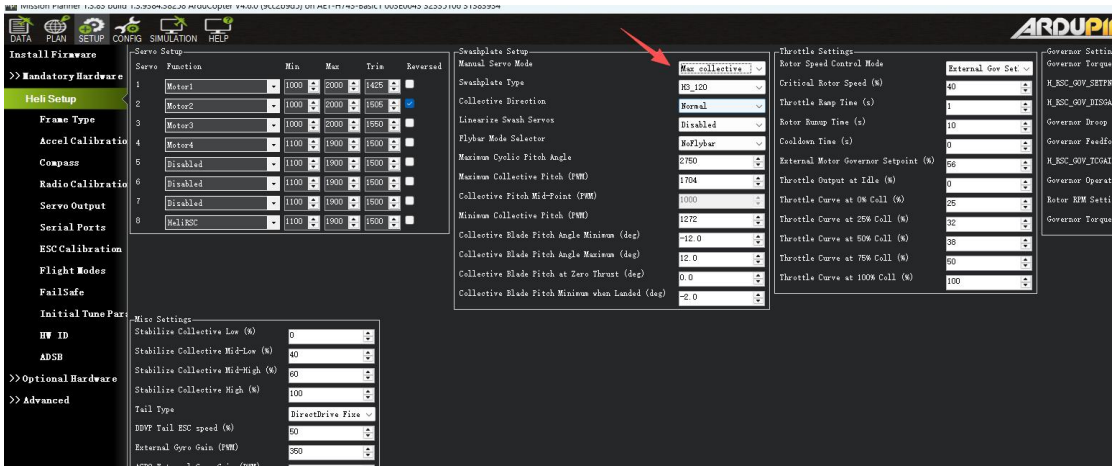
As shown in the figure, Attach the pitch gauge to the front rotor blade of the helicopter, with the display facing forward. By adjusting the "trim" values of channels 1, 2, and 3 uniformly, make the swashplate rise or lower as a whole until

the pitch gauge reads 0 or close to 0.(Note: For channels where "reversed" is not checked, increasing the trim value raises the servo arm height; for channels where "reversed" is checked, decreasing the trim value raises the servo arm height.)

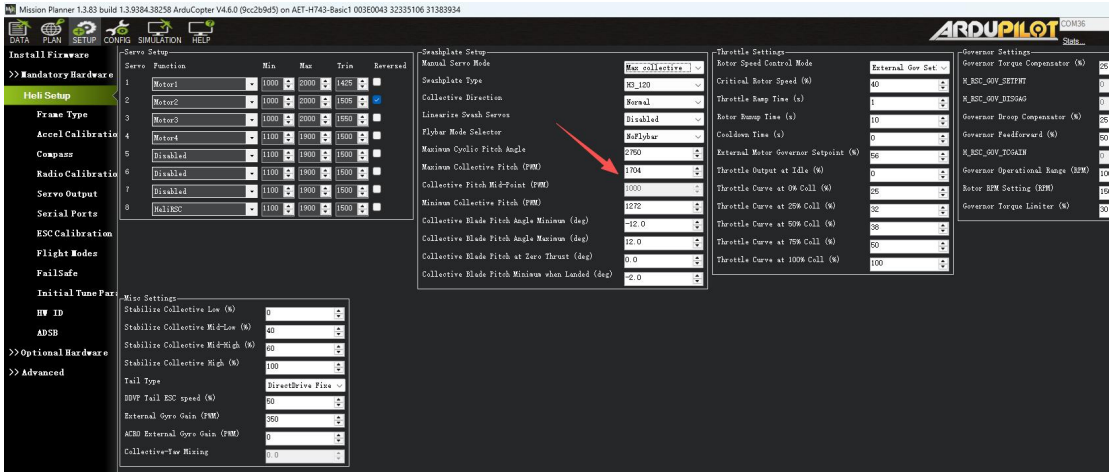


5.11 Adjustment of maximum and minimum pitch（最大和最小螺距的调节）

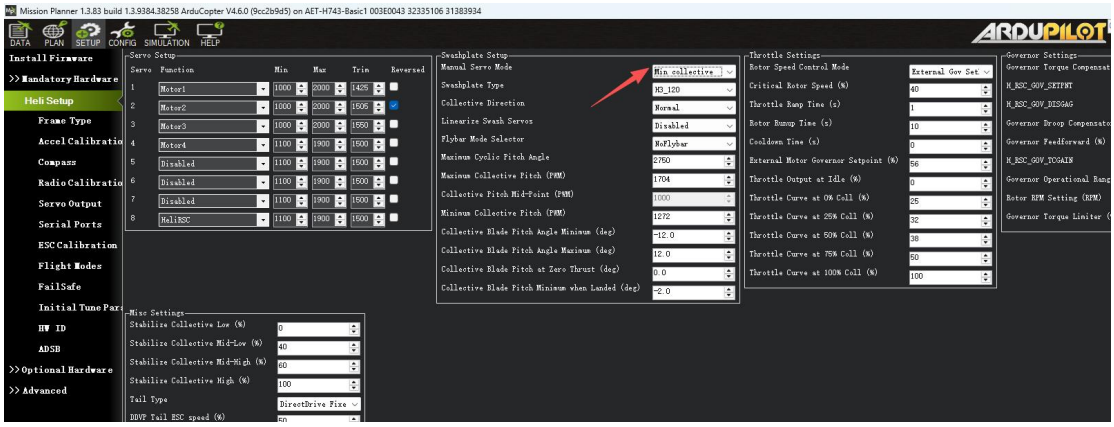
As shown in the figure， Change the parameter of Manual Servo Mode to "Max collective" to adjust the maximum pitch.



As shown in the figure , Adjust the maximum pitch to +12 or close to +12. by increasing or decreasing the parameter for Maximum Collective Pitch (PWM).



Change the parameter of Manual Servo Mode to "Min collective" to adjust the minimum pitch.

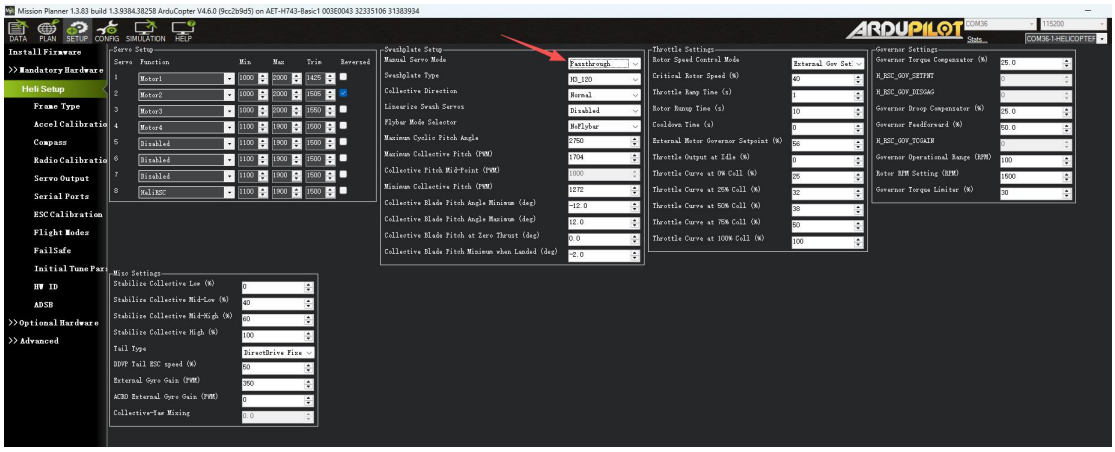


Adjust the minimum pitch to -12 or close to -12 by increasing or decreasing the parameter for Minimum Collective Pitch (PWM).

Note that the adjustment of maximum pitch and minimum pitch affects each other. Please continuously adjust the maximum pitch and minimum pitch until they are close to +12 degrees and -12 degrees respectively.

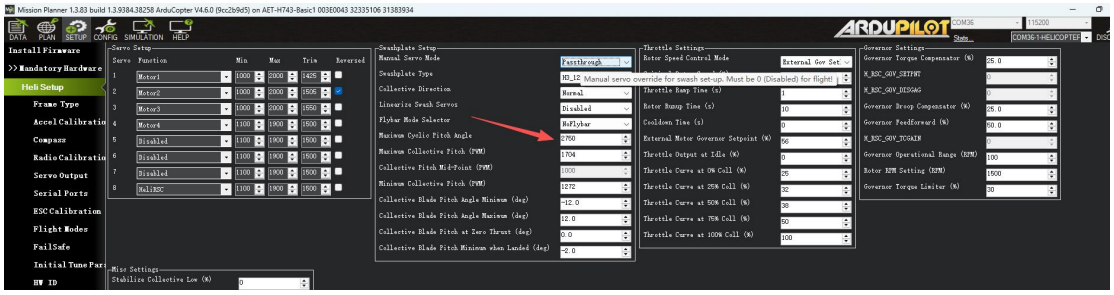
5.12 Cyclic pitch adjustment.（循环螺距的调节）

As shown in the figure, change the parameter of Manual Servo Mode to "Passthrough" to adjust the cyclic pitch.

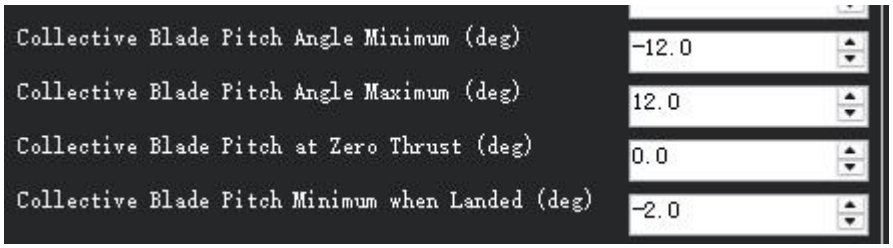


As shown in the figure, by moving the roll channel (Channel 1) on the remote control to the far Left ,

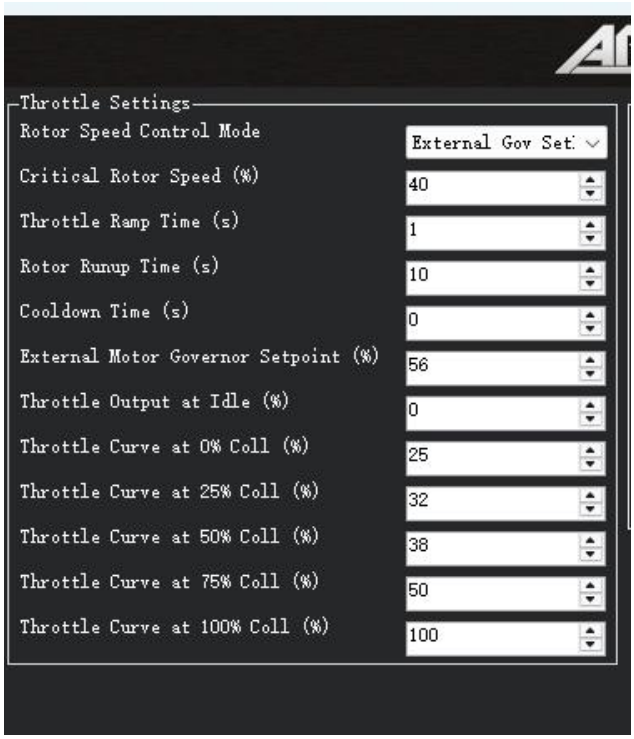
adjust the parameter for Maximum Cyclic Pitch Angle until the value is close to 8.



As shown in the figure, set other parameters according to the image.



5.13 Throttle Settings （油门的设置）



(1) Set the Rotor Speed Control Mode parameter to "External Gov Set" (constant RPM mode);

(2) Critical Rotor Speed (%) — this parameter refers to the minimum rotor head speed; set it to 40;

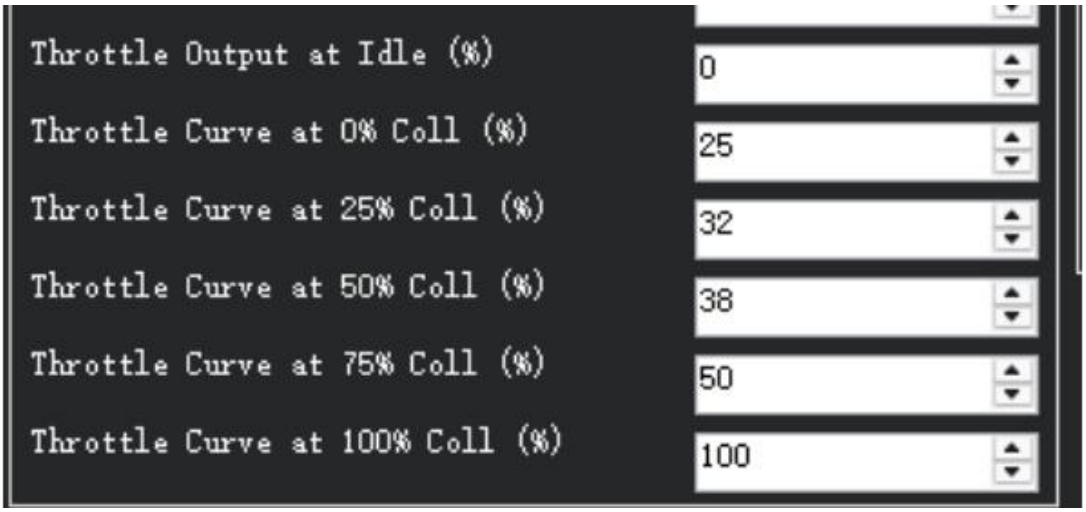
(3)Throttle Ramp Time (s) — this parameter refers to the time it takes for the ESC to go from 0 to the set throttle value (equivalent to soft start). If your ESC has a soft start function, please set it to 1 second; if not, please set it to a longer time，If your ESC does not have a soft start function, it is usually set to 10 seconds;

(4)Rotor Runup Time (s) — this parameter refers to the minimum time the helicopter rotor head must run after startup. Only after this time has elapsed will the helicopter accept takeoff commands. Note that this time must be greater than the Throttle Ramp Time (s).

(5)Cooldown Time (s)，Please set this parameter to 0;

(6)External Motor Governor Setpoint (%) — this parameter refers to the ESC throttle value. This value must be greater than the Critical Rotor Speed (%). By adjusting this throttle value, you can change the main rotor speed of the helicopter.

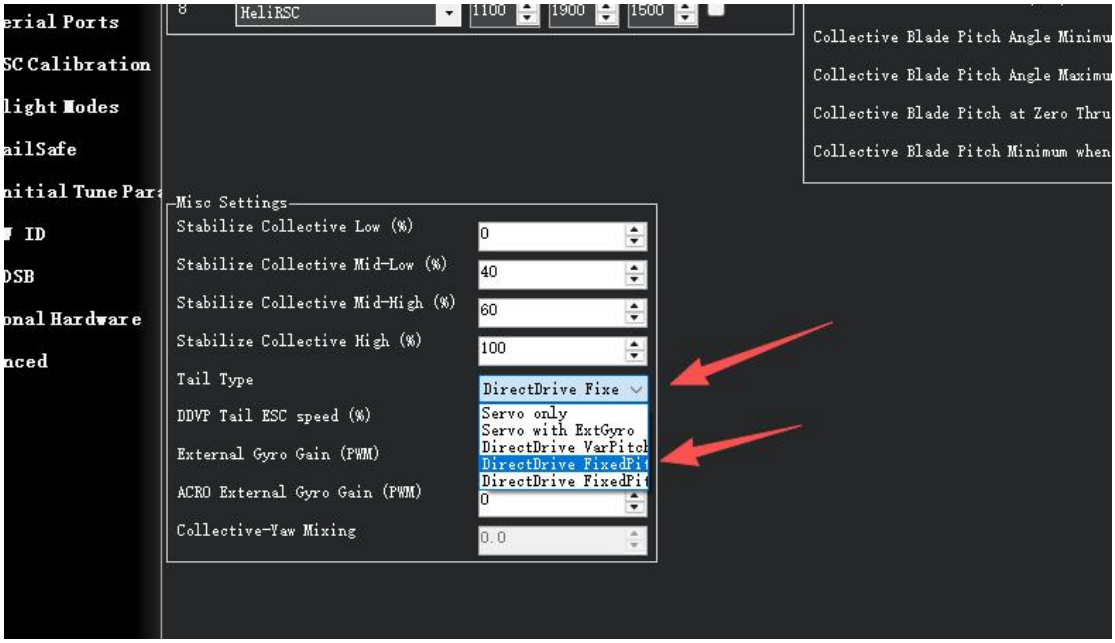
(7)The parameters below the image are the throttle curve parameters; please set them to the default values.



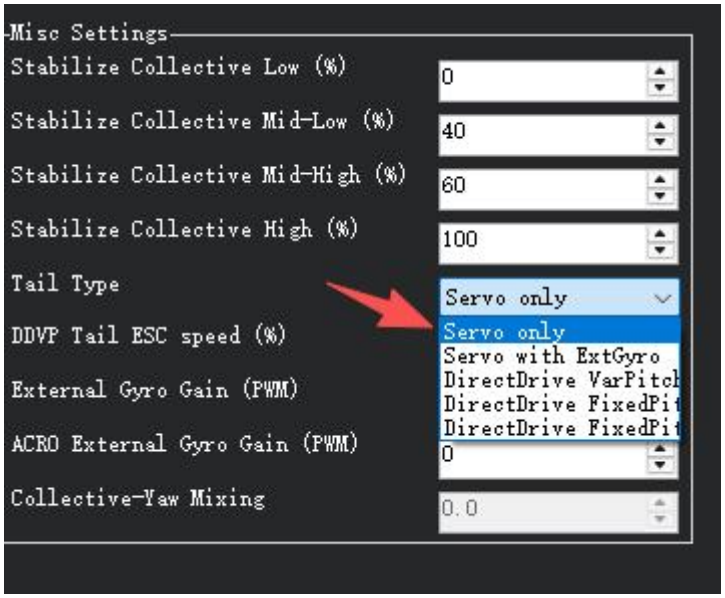
5.14 Tail setup（尾部设置）

Note: If you change the tail settings, please restart the L7 flight controller. For example, briefly disconnect the USB cable and remove all power supply lines from the flight controller. Only then will the settings take effect. If you set the tail type to "Servo only" and do not restart the flight controller, the tail servo will swing wildly back and forth when you connect it.

If your helicopter uses a tail motor, select the third option for Tail Type, as shown in the figure.



If your helicopter's tail is controlled by a servo, please select the Tail Type option as shown in the figure.



5.14.1Wideband Servo Setup (Tail Servo)

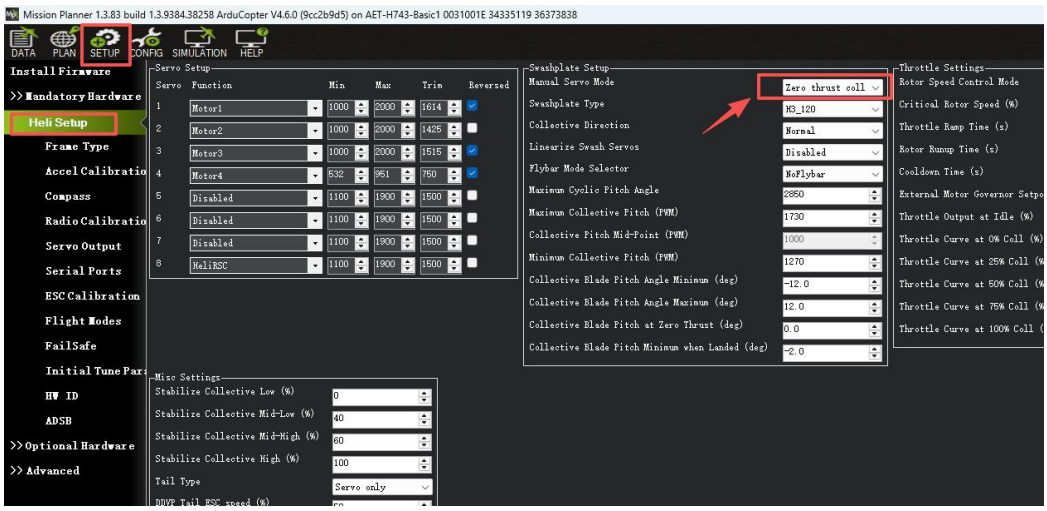
"Tail servo type”Only Servo” default wideband servo."

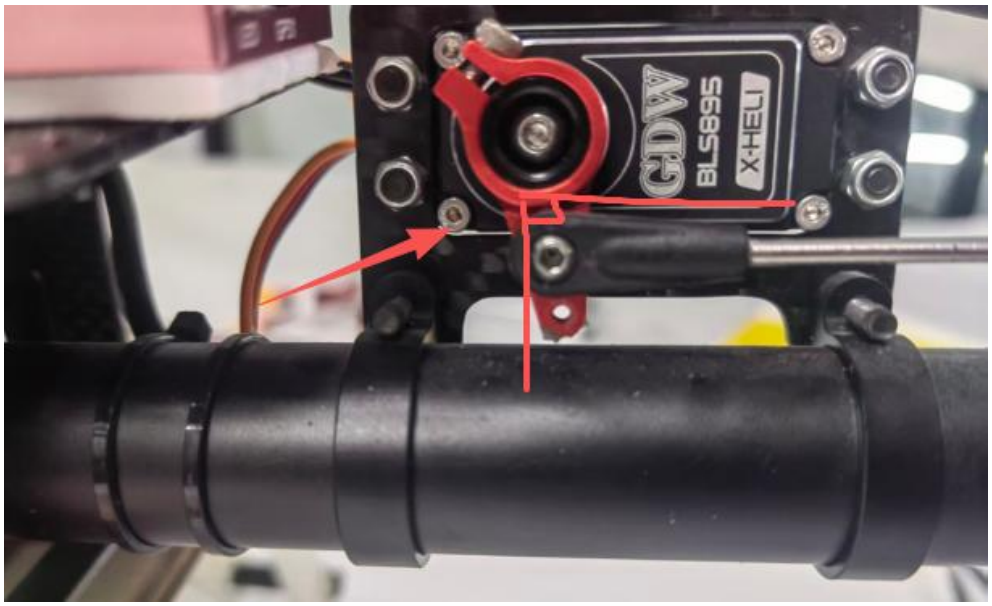
Note: If you change the tail settings, please restart the L7 flight controller. For example, briefly disconnect the USB cable and remove all power supply lines from

the flight controller. Only then will the settings take effect. If you set the tail type to "Servo only" and do not restart the flight controller, the tail servo will swing wildly back and forth when you connect it.

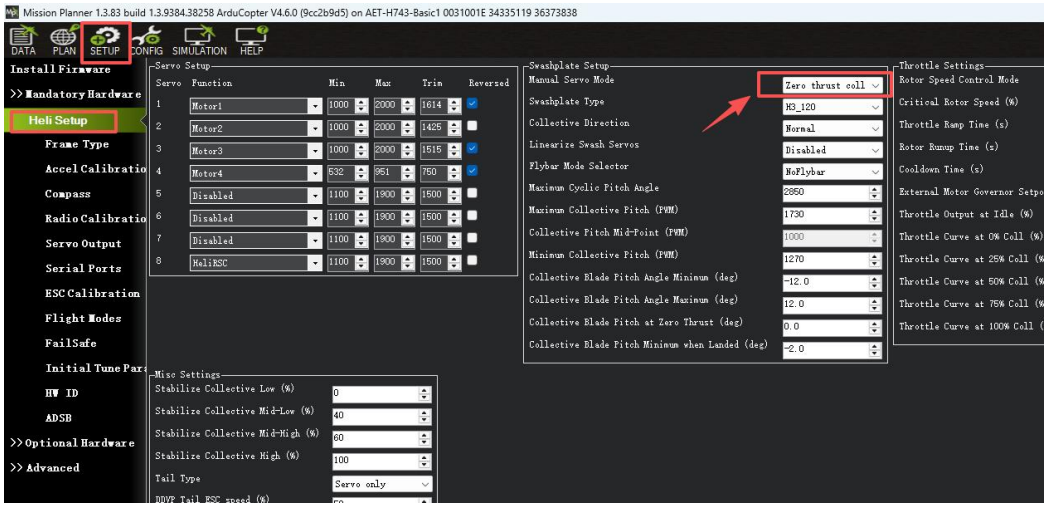
Tail servo travel adjustment

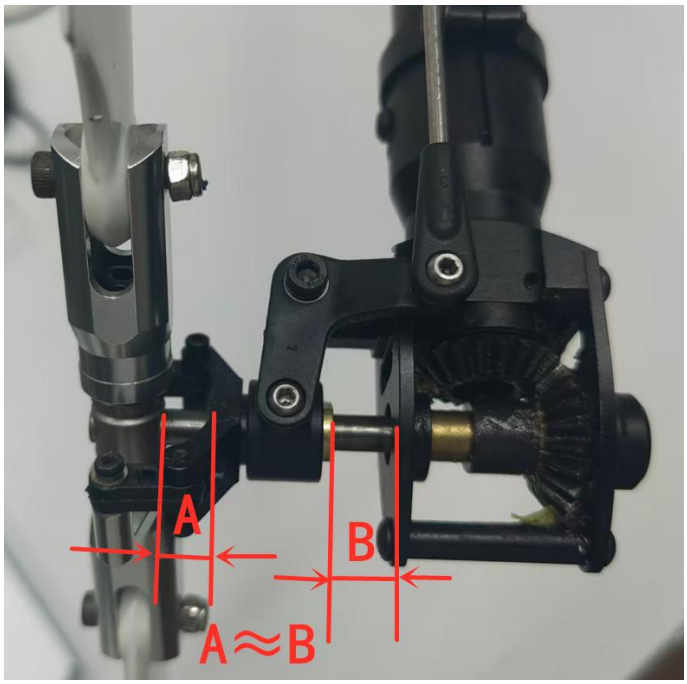
Power on the transmitter, with the transmitter flight mode set to 6G or 3D mode (if using other modes, you will not be able to control the tail servo). Power on the helicopter to supply power to the tail servo, then install the tail servo according to the instructions in your helicopter manual. As shown in the figure, set the "Manual Servo Mode" parameter in the software to Zero thrust collective， the servo arm and the servo are installed at a 90-degre angle.



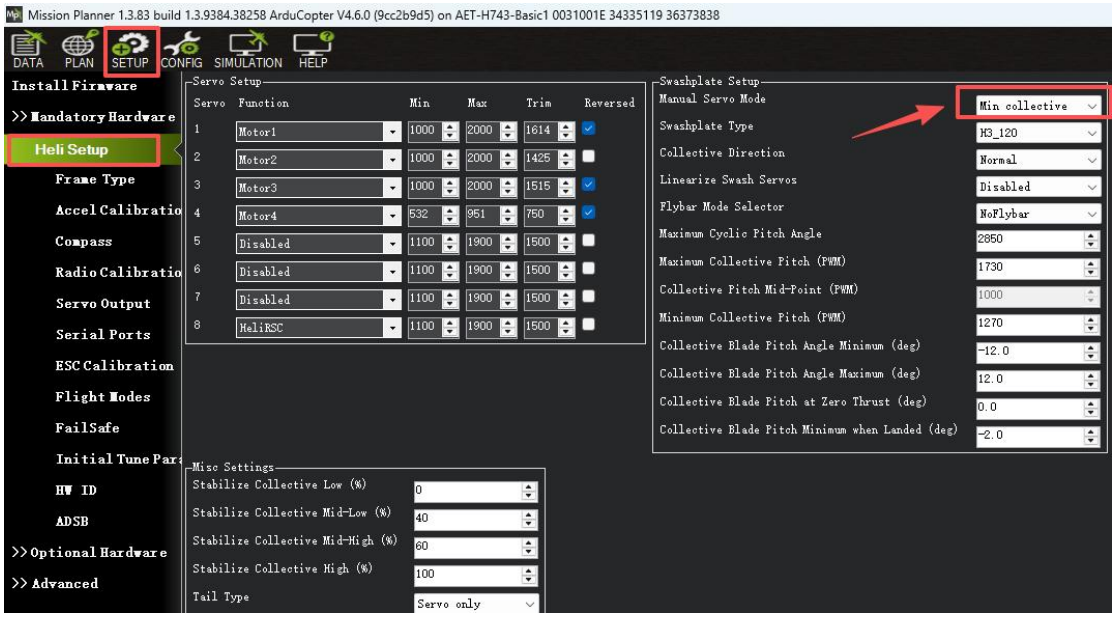


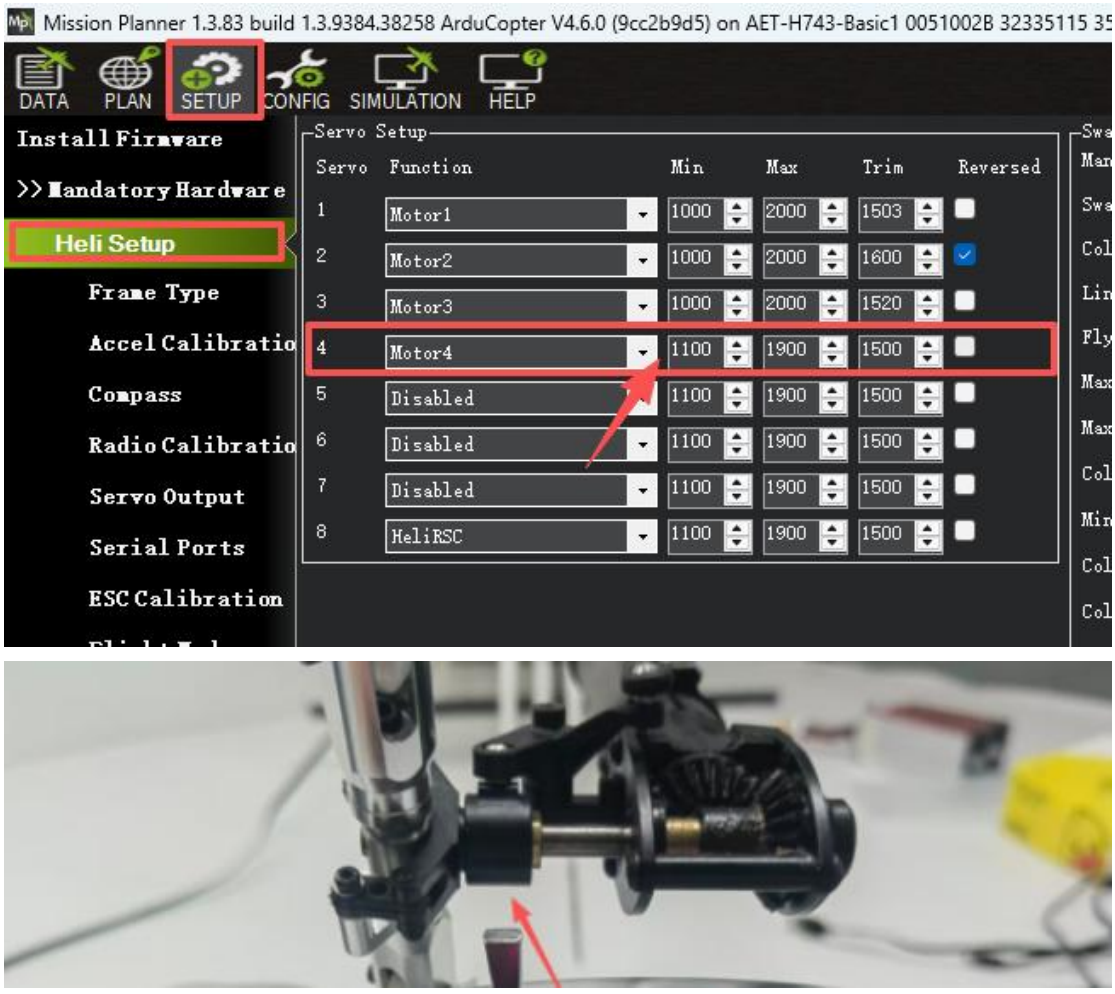
(1) Tail center point adjustment: Set the "Manual Servo Mode" parameter in the software to Zero thrust collective，Adjust the linkage rod length so that the tail slider is approximately at the center position, as shown in the figure, A ≈ B.



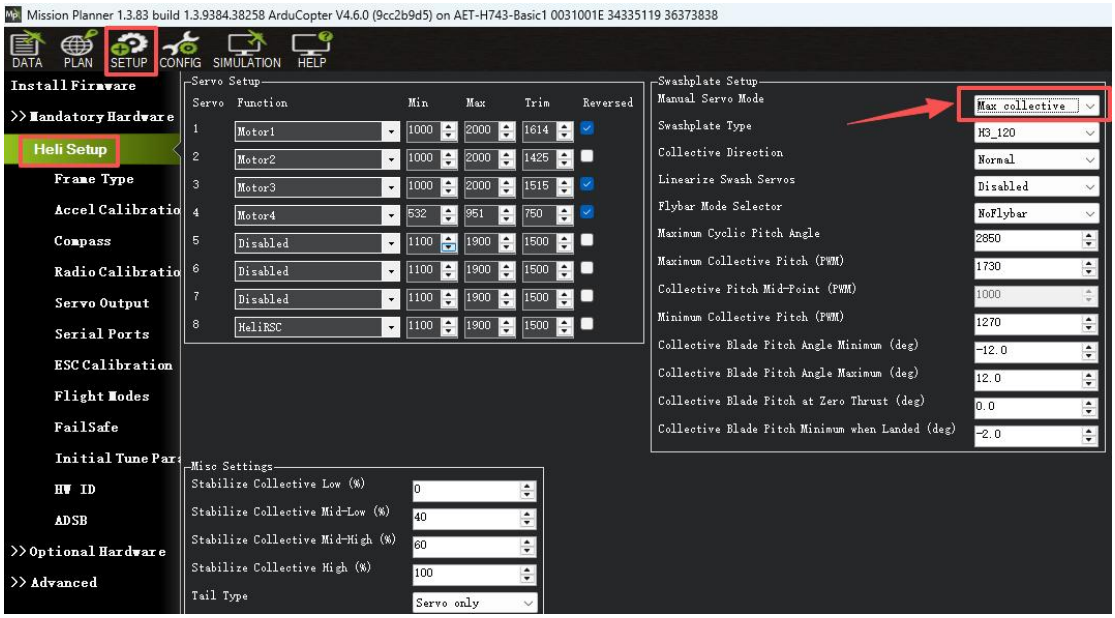


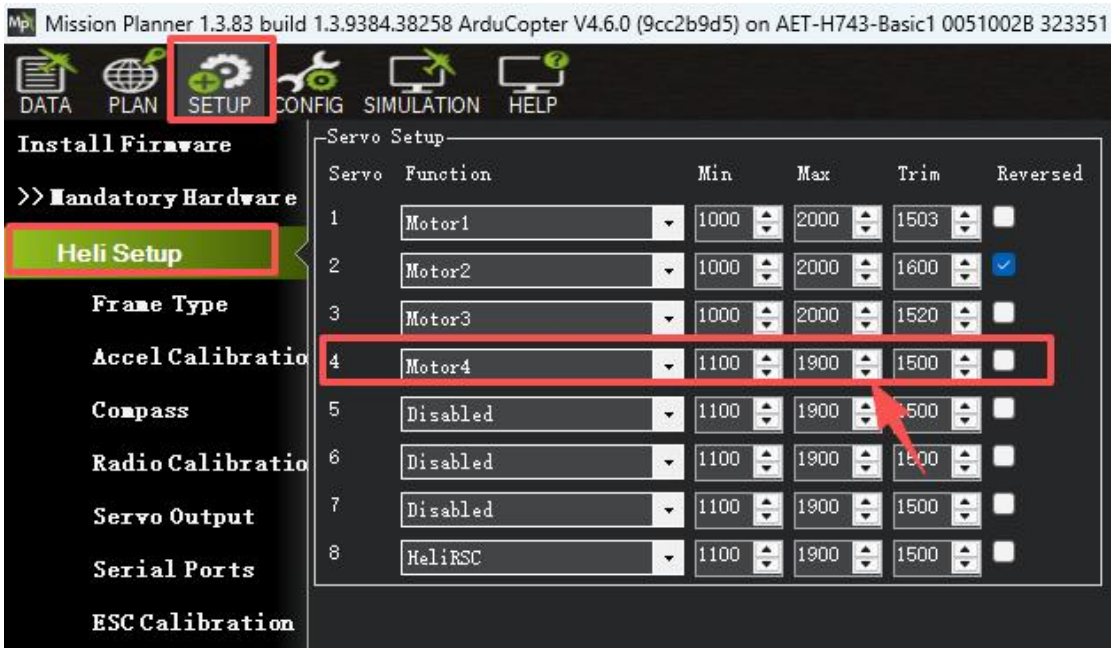
(2) Tail minimum travel adjustment (using Mode 2 as an example): Set the "Manual Servo Mode" parameter in the software to Min collective, then adjust the channel 4 minimum travel (min) value in the software to move the helicopter's tail slider until the distance between the tail slider and the leftmost side is close to 0 (a small gap can be left), as shown in the figure.

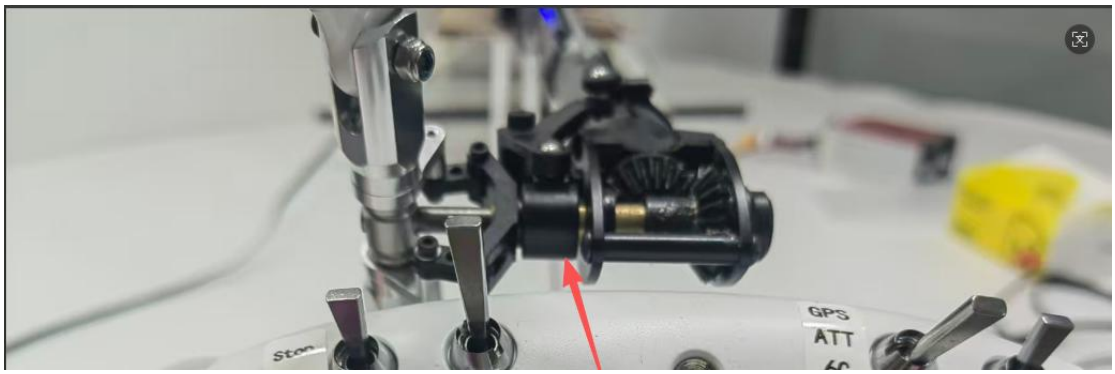




（3）Tail maximum travel adjustment (using Mode 2 as an example): Set the "Manual Servo Mode" parameter in the software to Max collective, then adjust the channel 4 maximum travel (max) value in the software to move the helicopter's tail slider until the distance between the tail slider and the rightmost side is close to 0 (a small gap can be left), as shown in the figure.







5.14.2 Narrow Frequency Servo Settings

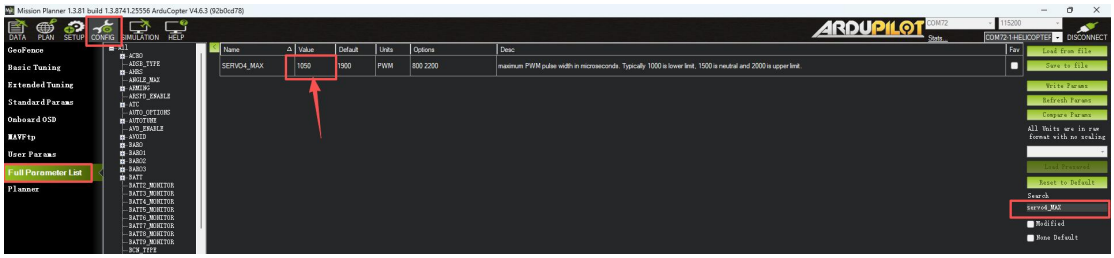
If you are using a narrow frequency servo, please set your helicopter's tail servo frequency according to the parameters below. Otherwise, the narrow frequency servo will not function properly，If the broadband is used and powered on for too long, the servo will overheat severely and burn out!

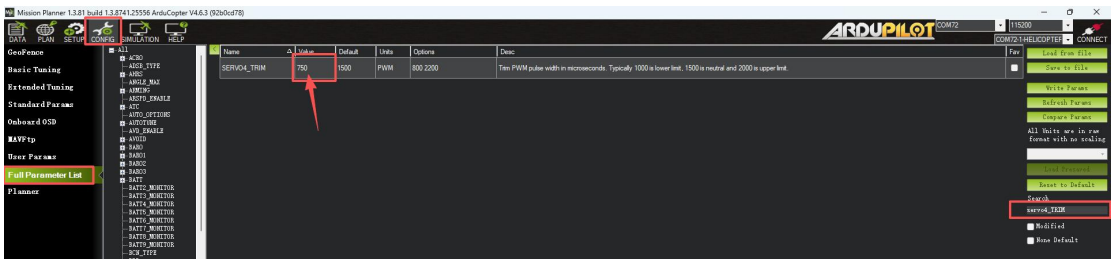
servo4_MAX　1050

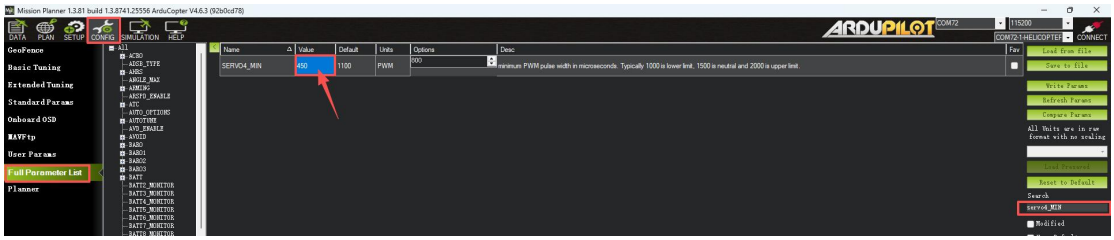
servo4_TRIM 750

servo4_MIN 450

Note: If you change the tail settings, please restart the L7 flight controller. For example, briefly disconnect the USB cable and remove all power supply lines from the flight controller. Only then will the settings take effect. If you set the tail type to "Servo only" and do not restart the flight controller, the tail servo will swing wildly back and forth when you connect it.

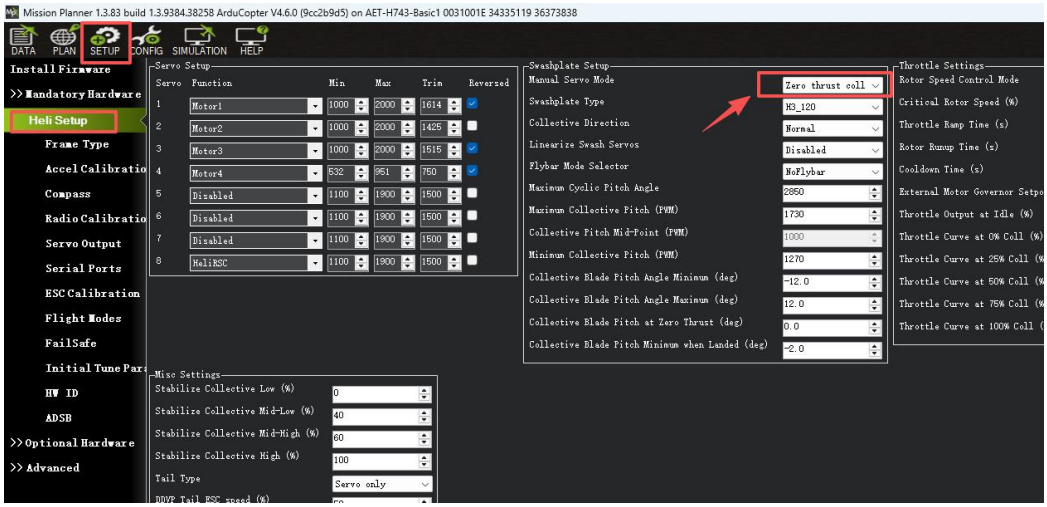


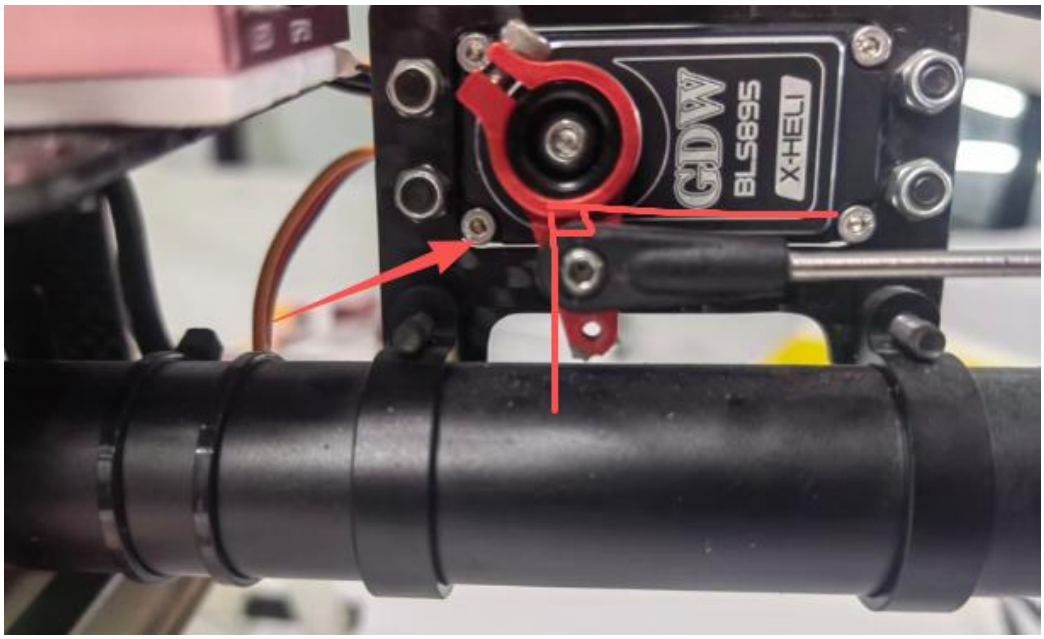




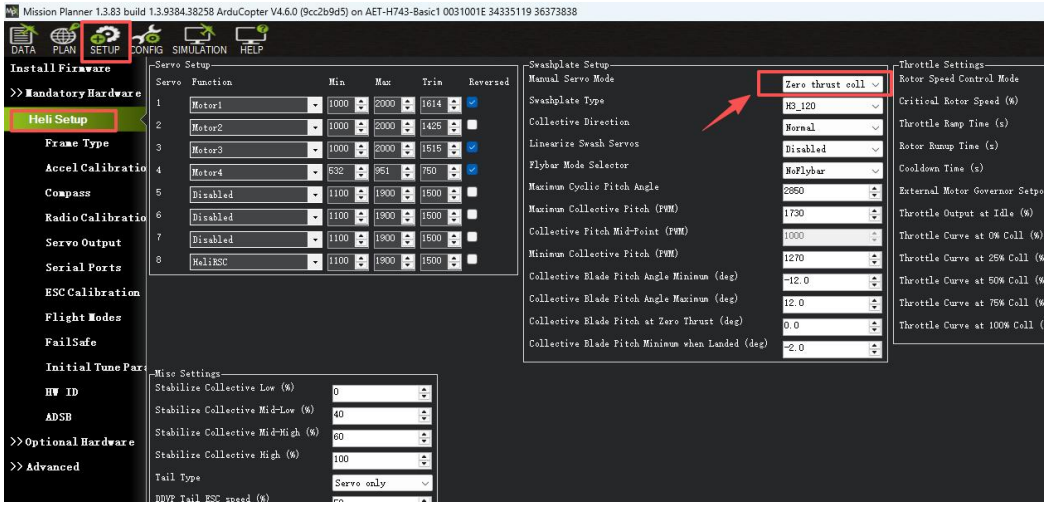
Narrowband tail servo travel adjustment

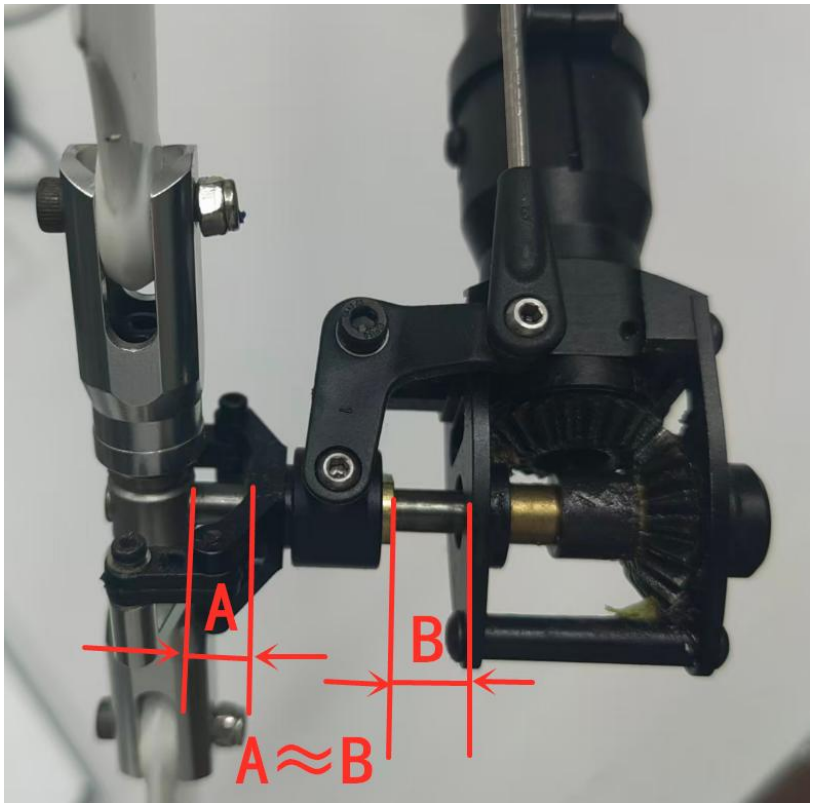
Power on the transmitter, with the transmitter flight mode set to 6G or 3D mode (if using other modes, you will not be able to control the tail servo). Power on the helicopter to supply power to the tail servo, then install the tail servo according to the instructions in your helicopter manual. As shown in the figure, set the "Manual Servo Mode" parameter in the software to Zero thrust collective， the servo arm and the servo are installed at a 90-degre angle.



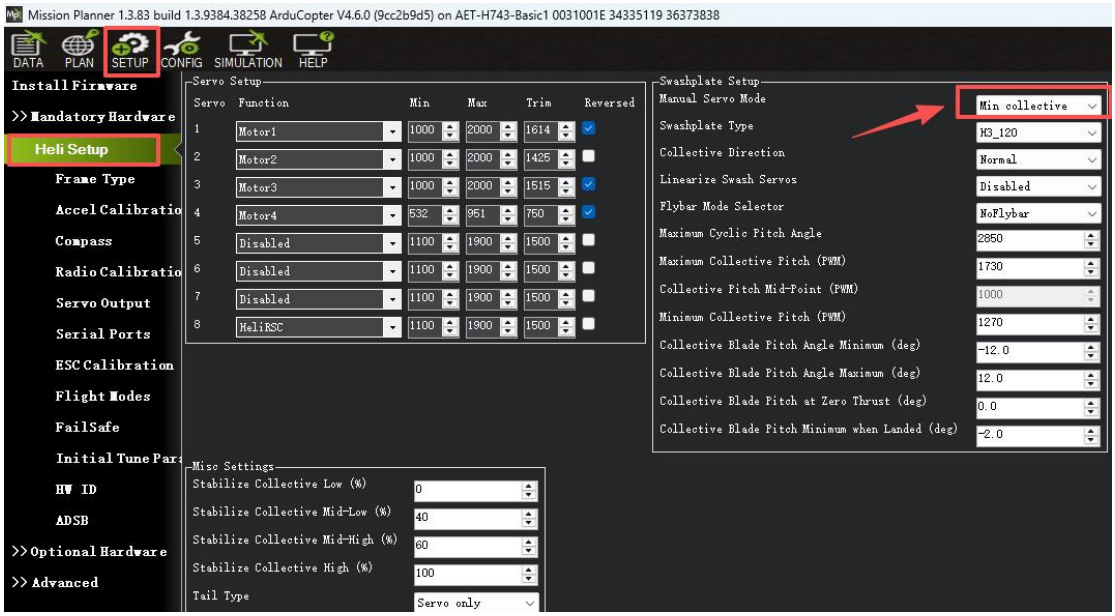


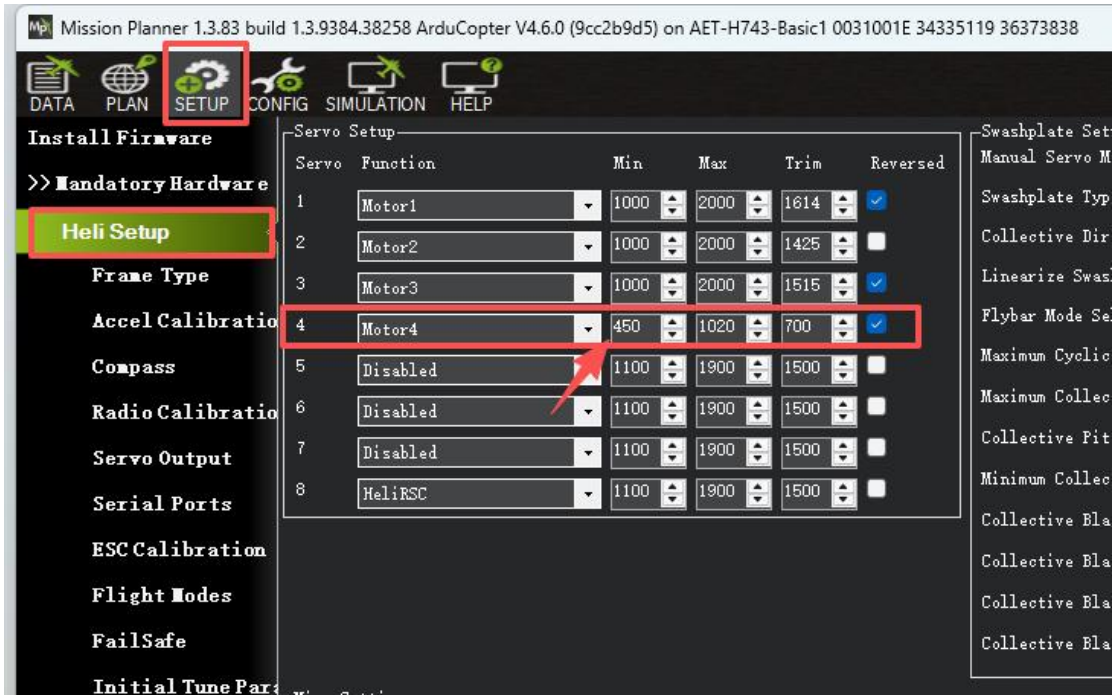
（1）Tail center point adjustment:set the "Manual Servo Mode" parameter in the software to Zero thrust collective， Adjust the linkage rod length so that the tail slider is approximately at the center position, as shown in the figure, A ≈ B.



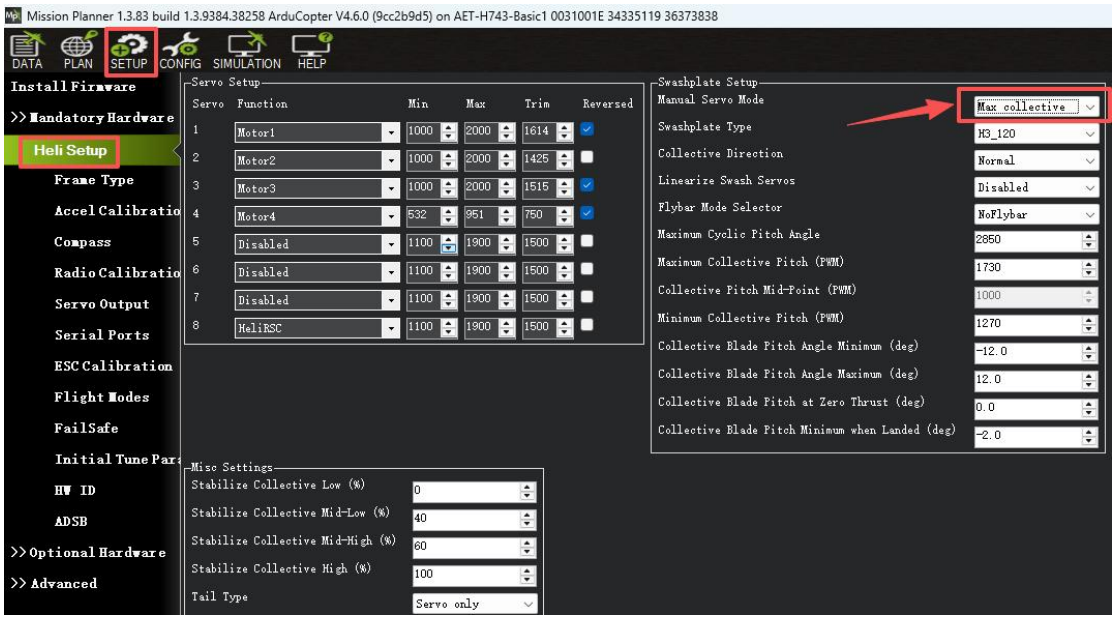


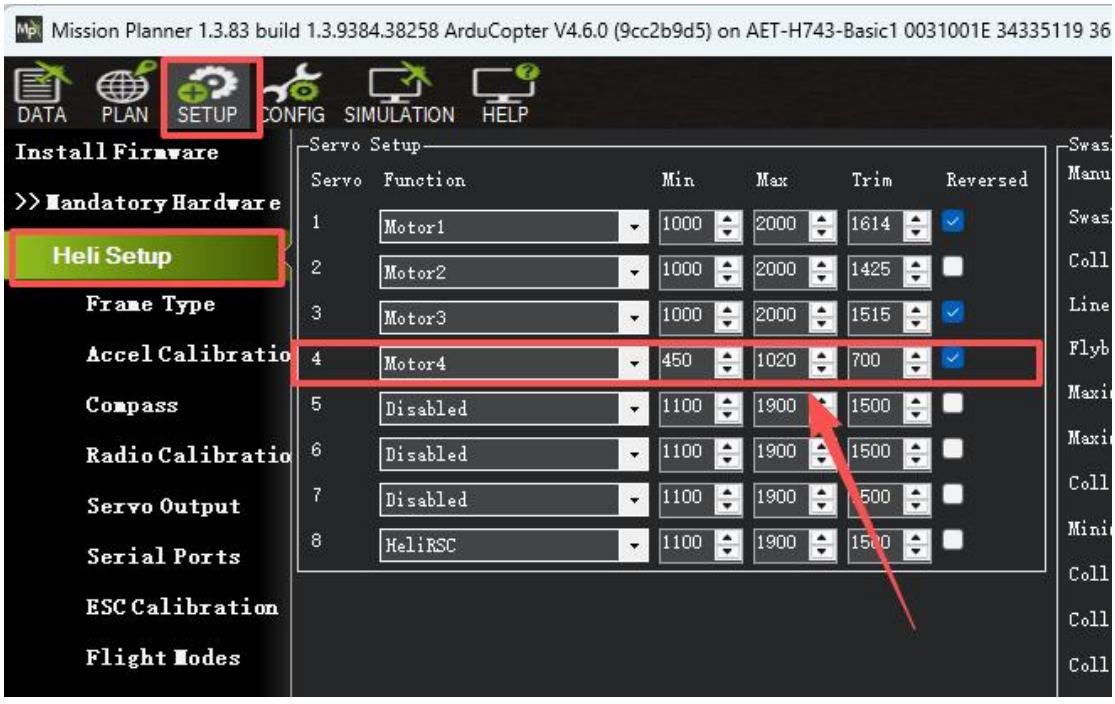
（2）Tail minimum travel adjustment (using Mode 2 as an example): Set the "Manual Servo Mode" parameter in the software to Min collective, then adjust the channel 4 minimum travel (min) value in the software to move the helicopter's tail slider until the distance between the tail slider and the leftmost side is close to 0 (a small gap can be left), as shown in the figure.

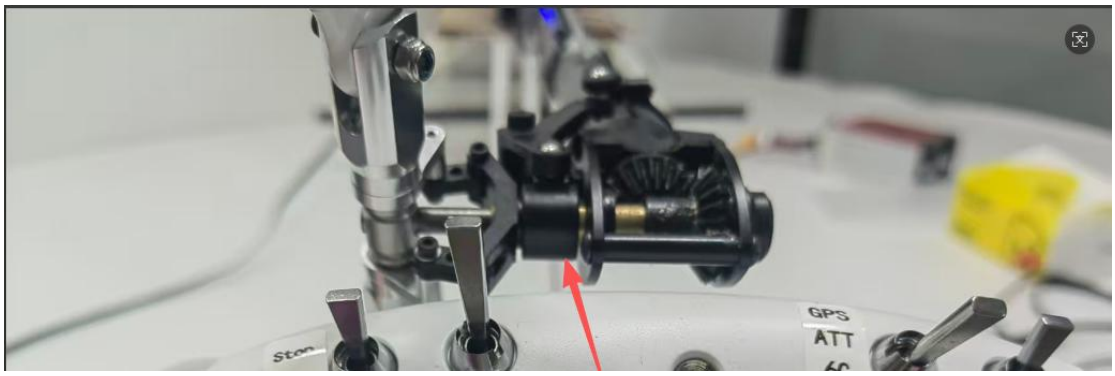

Mission Planner 1.3.83 build 1.3.9384.38258 ArduCopter V4.6.0 (9cc2b9d5) on AET-H743-Basic1 0031001E 34335119 36373838
DATA
PLAN
SETUP
CONFIG
SIMULATION
HELP
Install Firmware
>> Mandatory Hardware
Heli Setup
Frame Type
Accel Calibratio
Compass
Radio Calibratio
Servo Output
Serial Ports
ESC Calibration
Flight Modes
FailSafe
Initial Tune Par
HW ID
ADSB
>> Optional Hardware
>> Advanced
Servo Setup
Servo Function Min Max Trim Reversed
1 Motor1 1000 2000 1614
2 Motor2 1000 2000 1425
3 Motor3 1000 2000 1515
4 Motor4 532 951 750
5 Disabled 1100 1900 1500
6 Disabled 1100 1900 1500
7 Disabled 1100 1900 1500
8 HeliRSC 1100 1900 1500
Swashplate Setup
Manual Servo Mode Min collective
Swashplate Type H3_120
Collective Direction Normal
Linearize Swash Servos Disabled
Flybar Mode Selector NoFlybar
Maximum Cyclic Pitch Angle 2850
Maximum Collective Pitch (PWM) 1730
Collective Pitch Mid-Point (PWM) 1000
Minimum Collective Pitch (PWM) 1270
Collective Blade Pitch Angle Minimum (deg) -12.0
Collective Blade Pitch Angle Maximum (deg) 12.0
Collective Blade Pitch at Zero Thrust (deg) 0.0
Collective Blade Pitch Minimum when Landed (deg) -2.0
Misc Settings
Stabilize Collective Low (%) 0
Stabilize Collective Mid-Low (%) 40
Stabilize Collective Mid-High (%) 60
Stabilize Collective High (%) 100
Tail Type Servo only


Mission Planner 1.3.83 build 1.3.9384.38258 ArduCopter V4.6.0 (9cc2b9d5) on AET-H743-Basic1 0031001E 34335119 36373838
DATA
PLAN
SETUP
CONFIG
SIMULATION
HELP
Install Firmware
>> Mandatory Hardware
Heli Setup
Frame Type
Accel Calibratio
Compass
Radio Calibratio
Servo Output
Serial Ports
ESC Calibration
Flight Modes
FailSafe
Initial Tune Par
Servo Setup
Servo Function Min Max Trim Reversed
1 Motor1 1000 2000 1614
2 Motor2 1000 2000 1425
3 Motor3 1000 2000 1515
4 Motor4 450 1020 700
5 Disabled 1100 1900 1500
6 Disabled 1100 1900 1500
7 Disabled 1100 1900 1500
8 HeliRSC 1100 1900 1500
Swashplate Set
Manual Servo M
Swashplate Typ
Collective Dir
Linearize Swas
Flybar Mode Se
Maximum Cyclic
Maximum Collec
Collective Pit
Minimum Collec
Collective Bla
Collective Bla
Collective Bla
Collective Bla

（3）Tail maximum travel adjustment (using Mode 2 as an example): Set the "Manual Servo Mode" parameter in the software to Max collective, then adjust the channel 4 maximum travel (max) value in the software to move the helicopter's tail slider until the distance between the tail slider and the rightmost side is close to 0 (a small gap can be left), as shown in the figure.

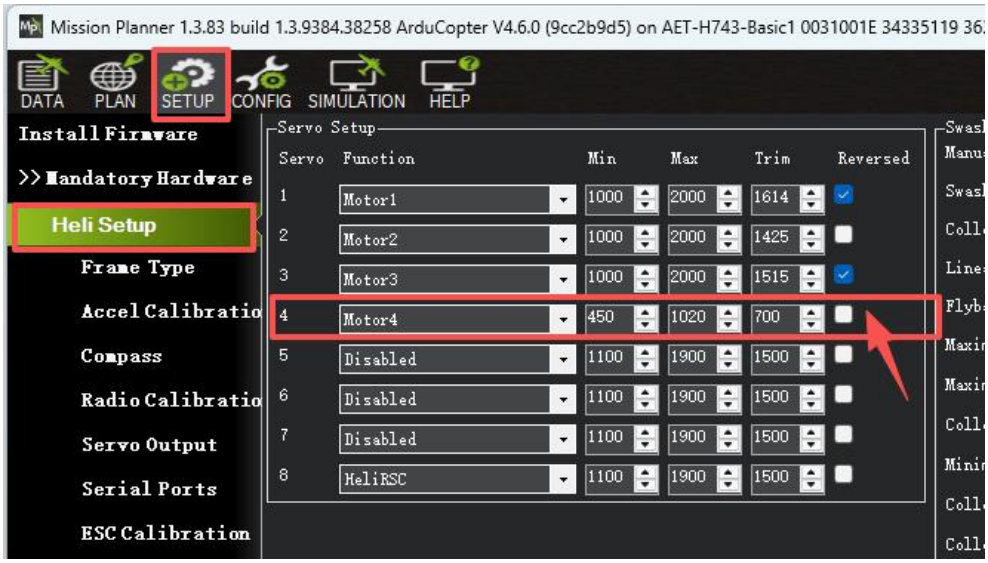


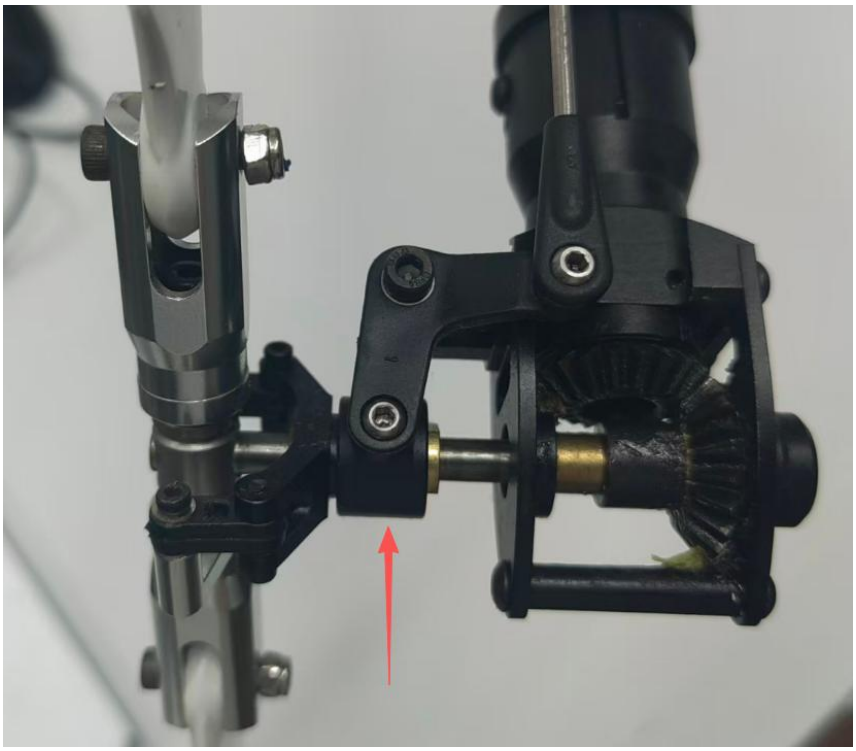




5.14.3 Tail Sensitivity Direction Test

Ensure that the main rotor head and tail rotor head are not installed with main rotor blades and tail rotor blades. Then, disarm the helicopter and start it. When the helicopter reaches maximum and constant RPM, swing the helicopter tail vigorously and observe the movement direction of the tail slider. Normally, the movement direction of the helicopter's tail slider is opposite to the direction in which the helicopter tail is swung. In this case, the tail gain direction is correct (some helicopters may have exceptions; please consult the helicopter frame manufacturer for details). If the tail gain direction is incorrect, check the channel 4 reverse button (Reversed) in the software as shown in the picture. This will correct the helicopter's tail gain direction. After making this setting, be sure to readjust the tail servo's maximum and minimum travel. (Note: Do not set channel 4 reverse on the transmitter. The tail gain direction is critical—incorrect tail gain direction will cause the helicopter to spin wildly as soon as it takes off.)



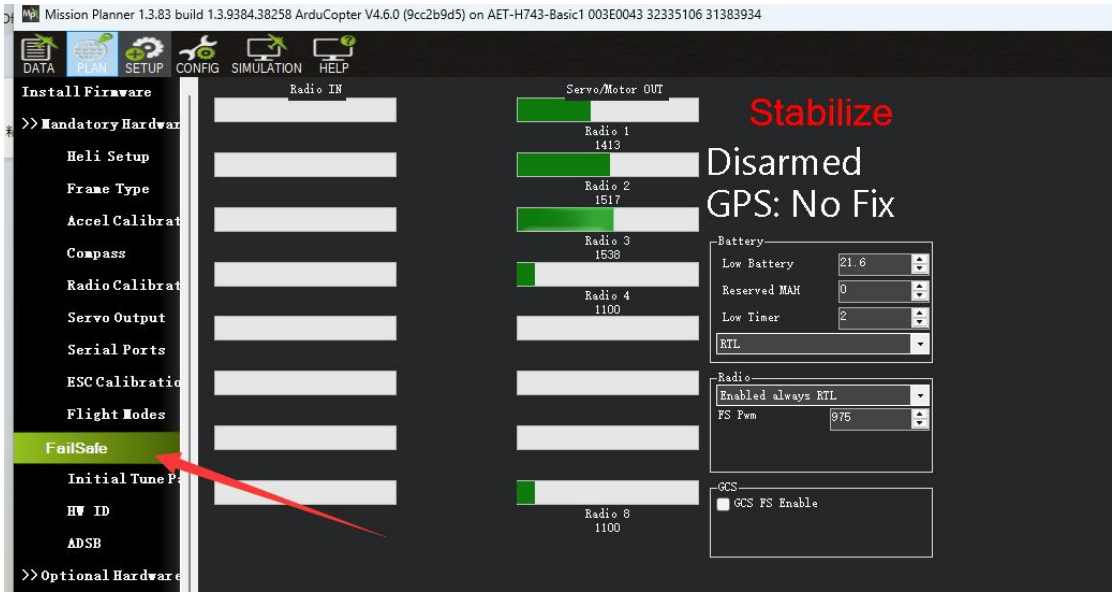


The following operation can be used to further confirm whether the helicopter's tail gain direction is correct. (The following operation carries certain risks. Our company assumes no responsibility for any consequences arising from this operation. Please proceed with caution.) Reduce the helicopter's RPM to 50% or even lower, then install the tail rotor blade, ensuring that the main rotor blades are not installed. Keep everyone away from the tail rotor blade. Disarm the helicopter and start it. When the

helicopter reaches a constant RPM, swing the helicopter tail. If the helicopter shows a tendency to lock the tail, then the gain direction is correct. If not, then the gain direction is reversed.

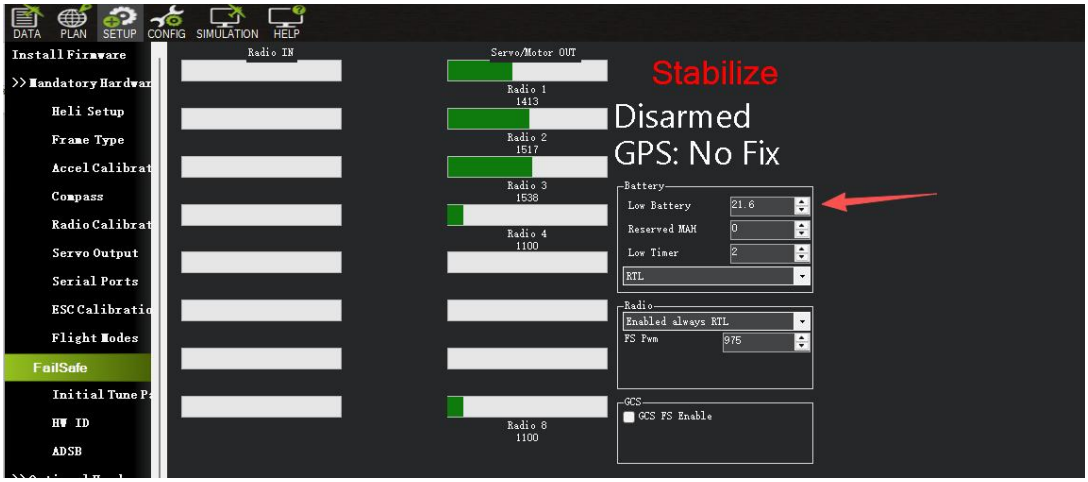
6.Fail-safe setting（失控保护设置）

Open SETUP-> Mandatory Hardware-> Fail-safe in Mission Planner;



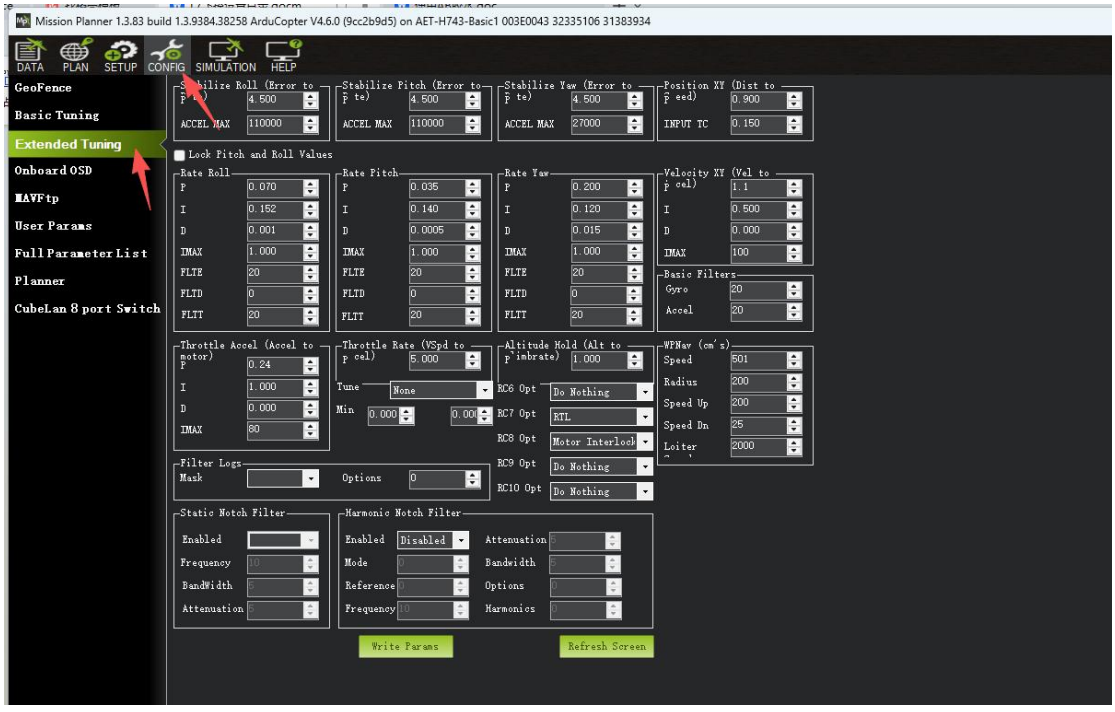
Low voltage return-to-home setting.

Low Battery is the low voltage return-to-home setting item. If your helicopter uses 6S power, the low voltage return-to-home can be set to 21.6V, as shown in the figure above. If your helicopter uses 4S power, the low voltage return-to-home can be set to 14.4V. Set other parameters as shown in the figure.



7.Helicopter gyro sensitivity adjustment.(直升机感度调节)

As shown in the figure., Open CONFIG-> Extended Tuning in Mission Planner;



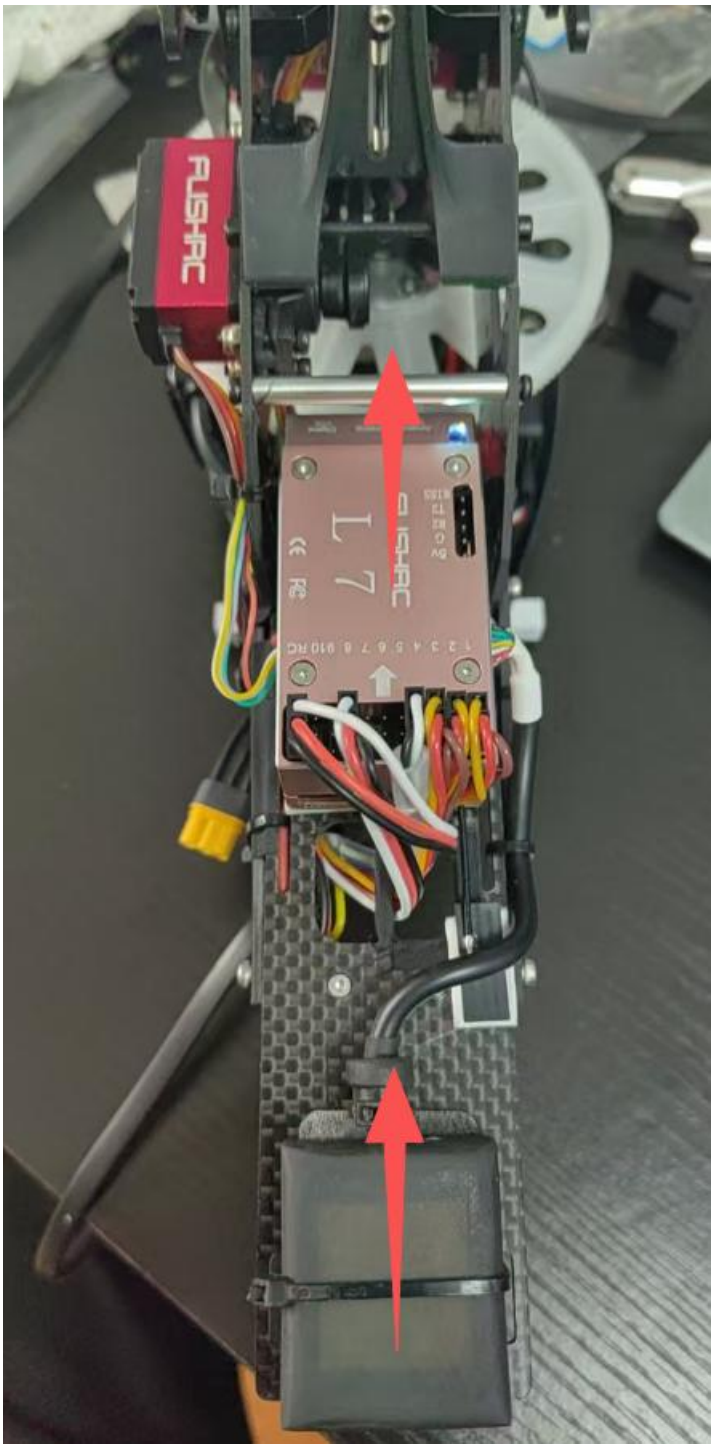
In the parameter table, ROLL, PITCH, and YAW correspond to the helicopter's left-right roll sensitivity, front-back pitch sensitivity, and heading sensitivity, respectively. Each corresponds to a PID. When adjusting the sensitivity, please

adjust the P value. Each increase should be by 0.01. Note that if the value is too high, it may cause the helicopter to oscillate violently in the corresponding direction. If oscillation occurs, please land as soon as possible and change the corresponding parameter to half of the value that caused the oscillation. If you have a 450 or 500 helicopter, you can use the default parameters for a test flight. Based on experience, note that the pitch value should not exceed 0.05, otherwise it may easily cause front-back oscillation during landing.

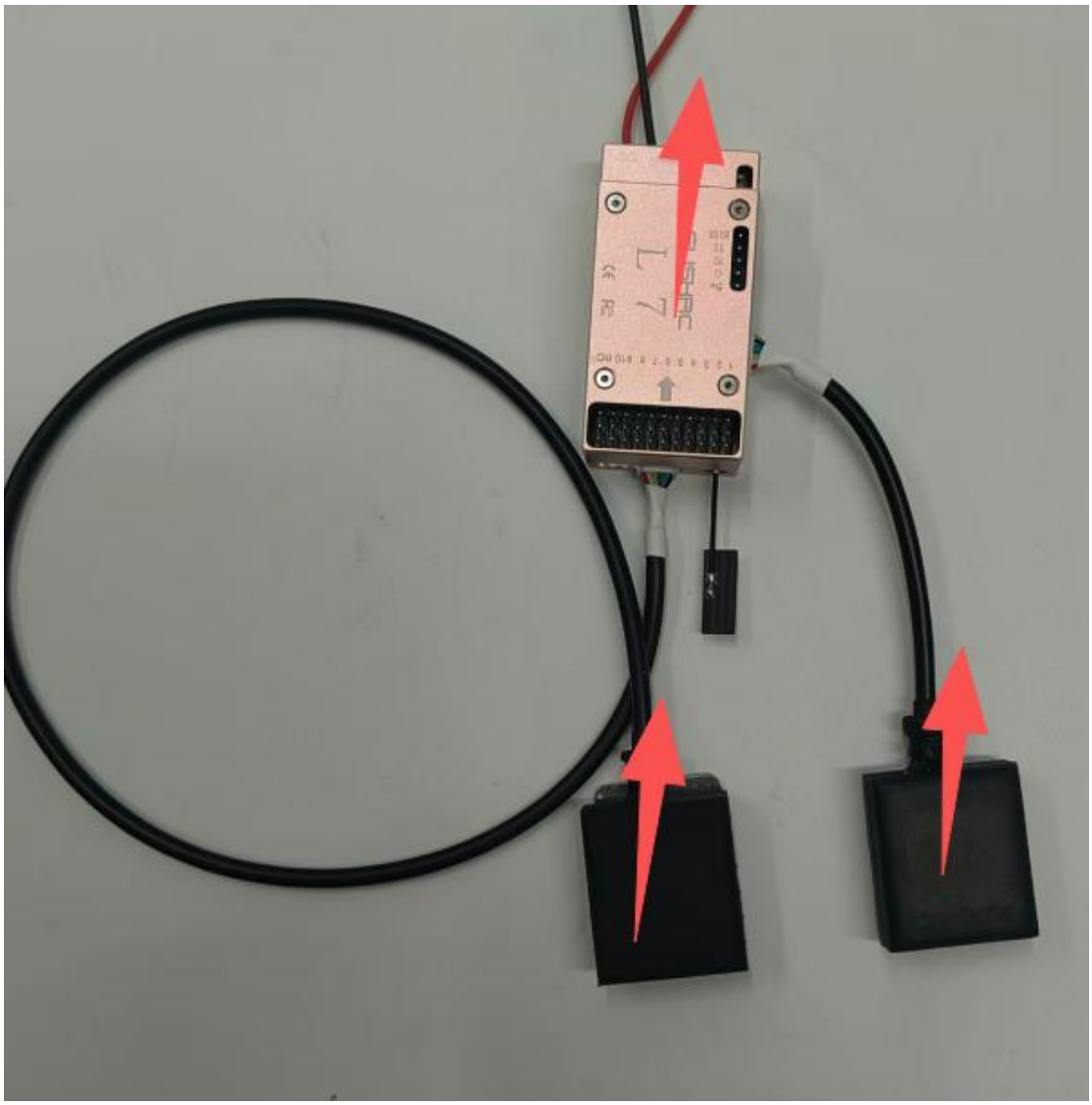
8.Helicopter compass calibration.（直升机的指南针校准）

The L7 flight controller does not have a built-in compass, which has the advantage of reducing interference with the internal compass of the flight controller. The compass is located on the GPS module of the L7 flight controller. This results in two scenarios: if you use a single GPS module, there will be one compass; if you use two GPS modules, there will be two compasses.

Single GPS mode: The installation orientation of the L7 flight controller and GPS module is as shown in the figure.

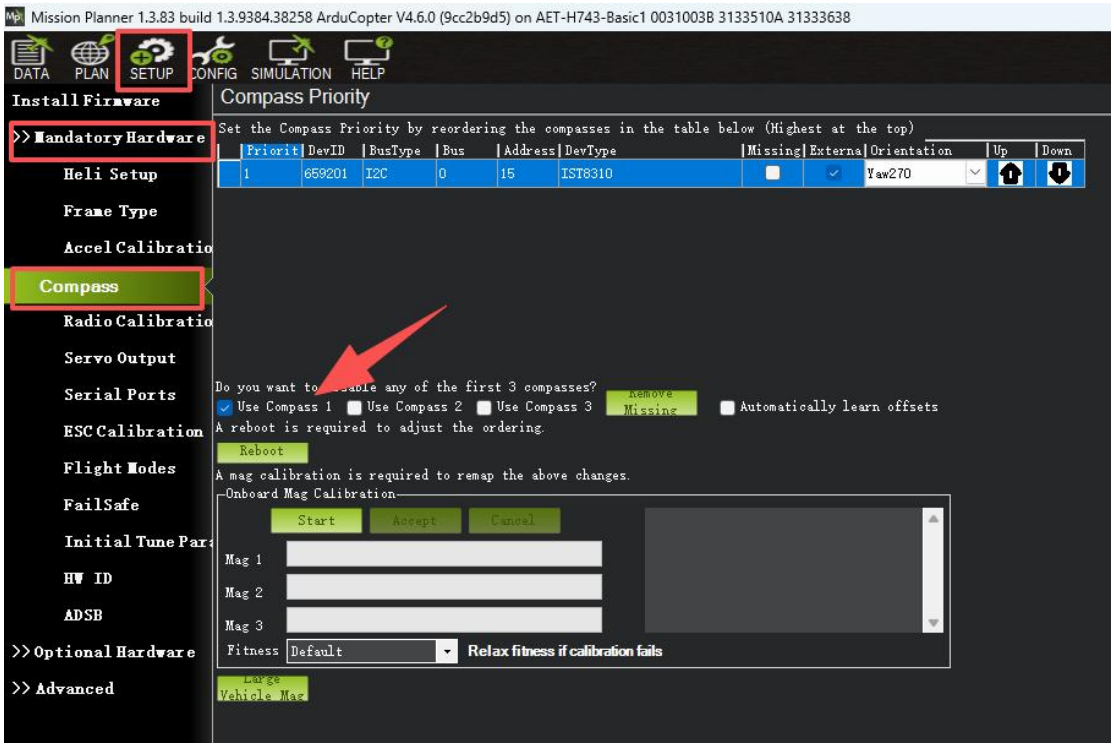


Dual GPS mode: The installation orientation of the L7 flight controller and GPS module is as shown in the figure.

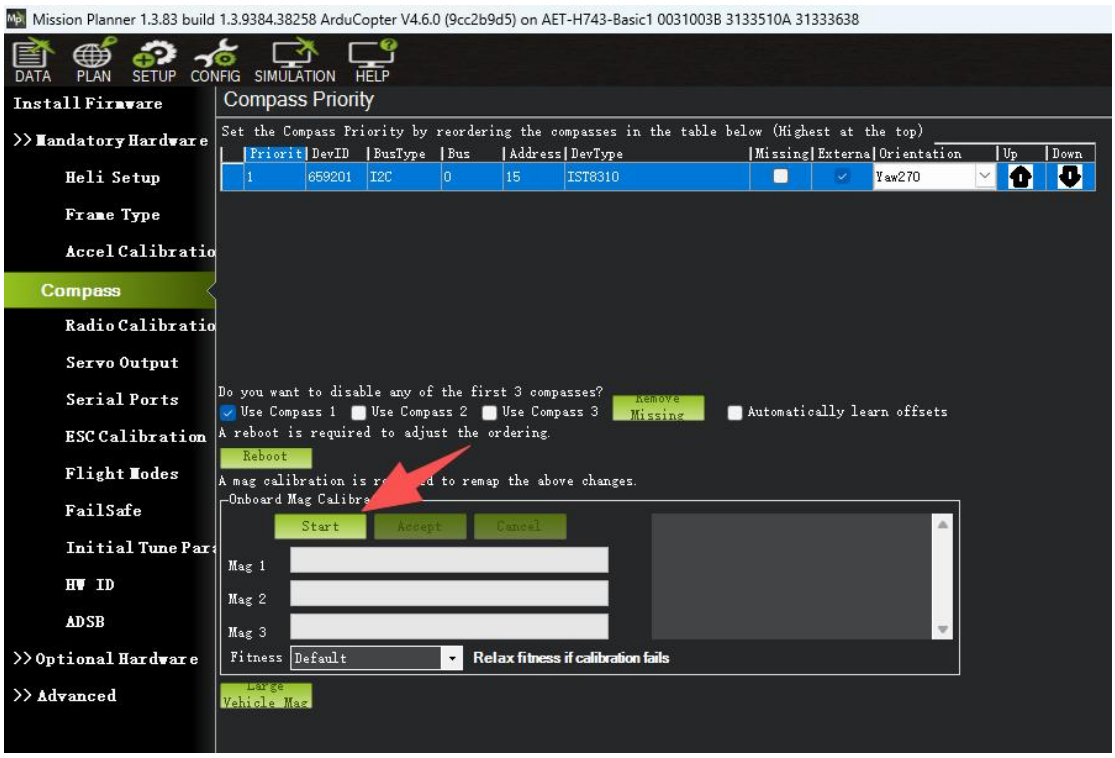


(1)As shown in the figure, this is the compass calibration status for single GPS mode.

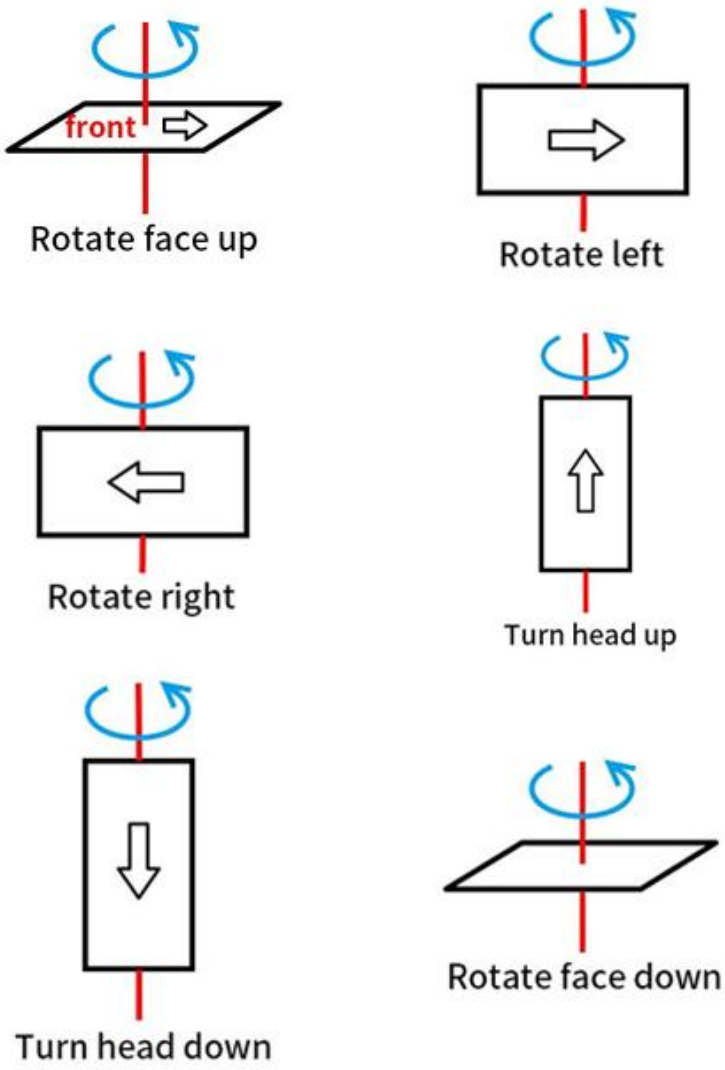
please tick "Use Compass 1"



As shown in the figure, click "Start"



Calibrate the helicopter compass as these steps below，as shown in the figure below.



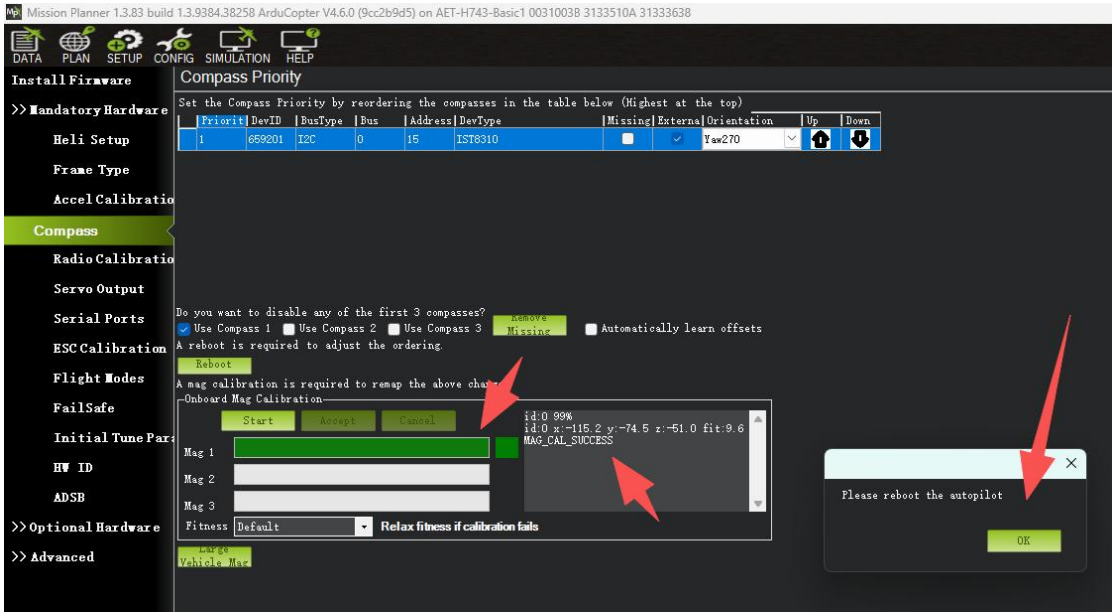
The mission planner will keep recording the data that collected by the compass sensor and the progress barand the percentage will keep change when you calibrate the compass, if the percentage have not changed,please check if the compass is connect success.The mission planner will remind you when the compass has calibrated success.Mag 1 to the end and comes out the MAG_CAL_SUCCESS marked words，as shown in the figure below.Then click "OK,"

disconnect the helicopter power and USB connection, and then power it on again.compass calibrate success after restart the L7 flight controller.

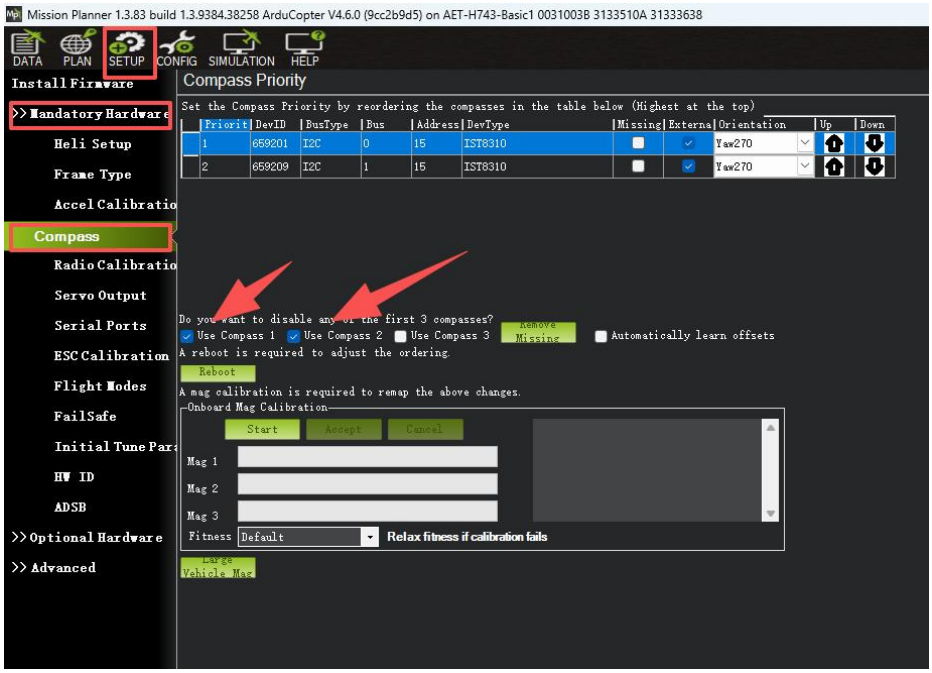
Attention:

When the progress bar moves to 100 and then restart from 0, it may because of the wrong calibrate action orinterference. You can have a try to calibrate again till compass calibrate success, or setup the Fitness is

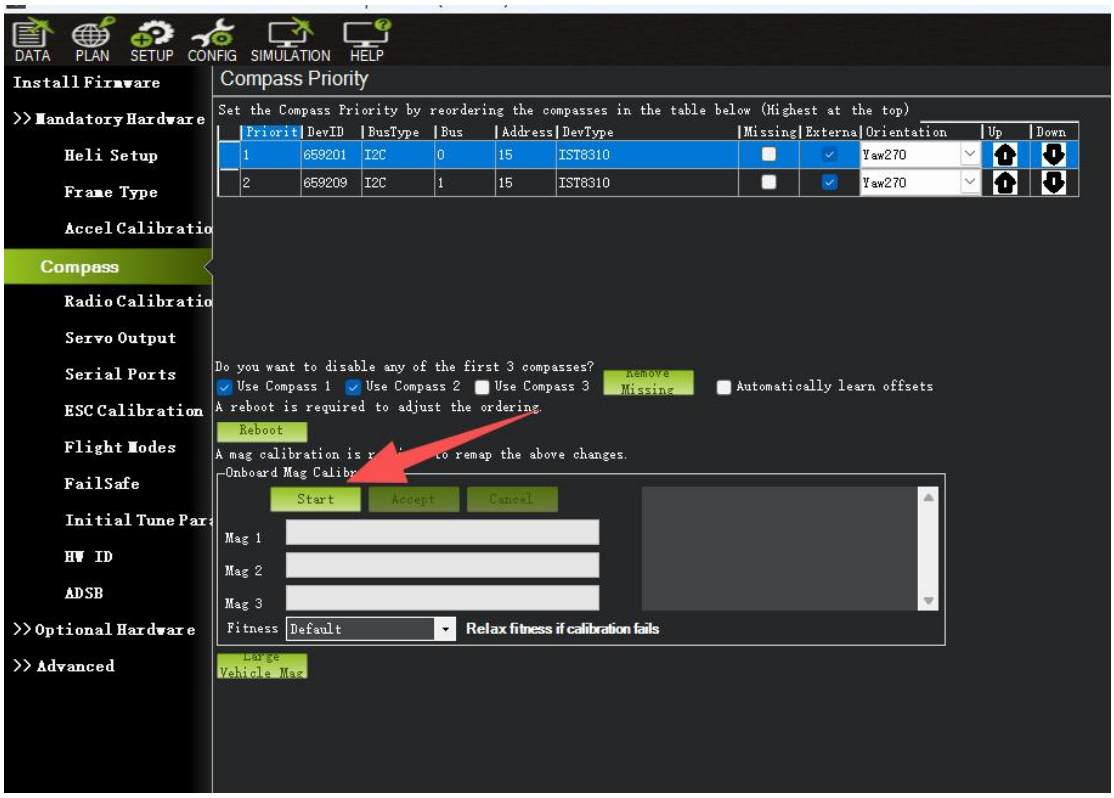
Relaxed and recalibrate



(2)As shown in the figure, this is the compass calibration status for dual GPS mode. Before calibrating the compass, please tick "Use Compass 1" and "Use Compass 2". This means using both compasses in the two GPS modules.

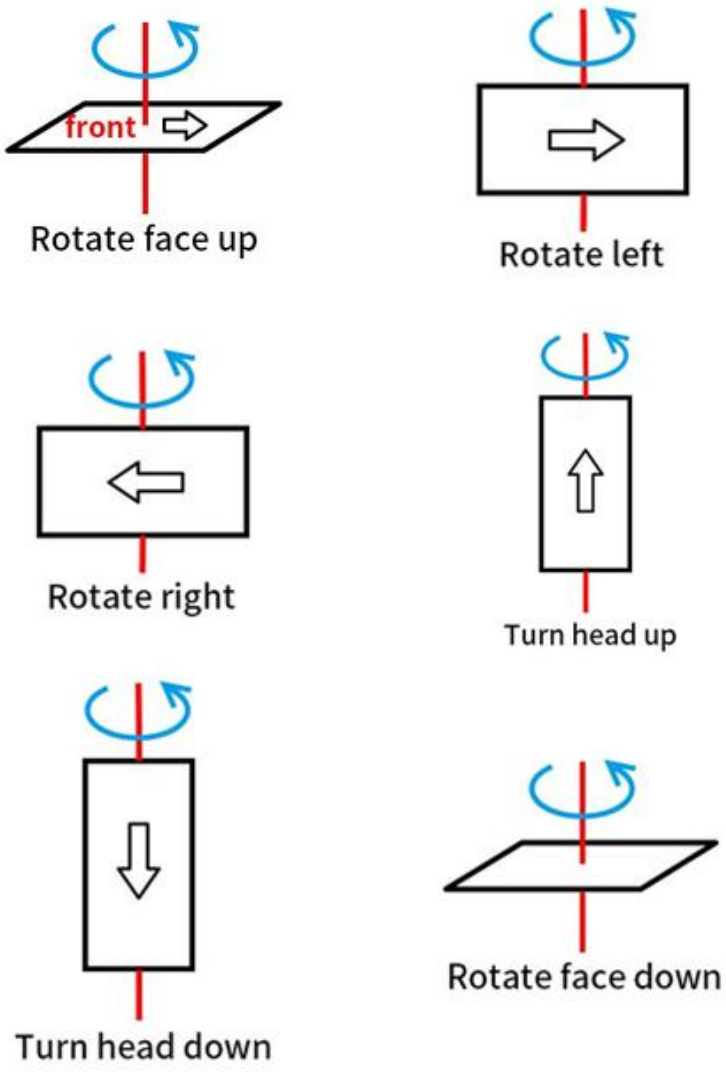


As shown in the figure, click "Start"



Calibrate the helicopter compass as these steps below, as shown in the figure below..Then click "OK," disconnect the helicopter power and USB connection, and

then power it on again.



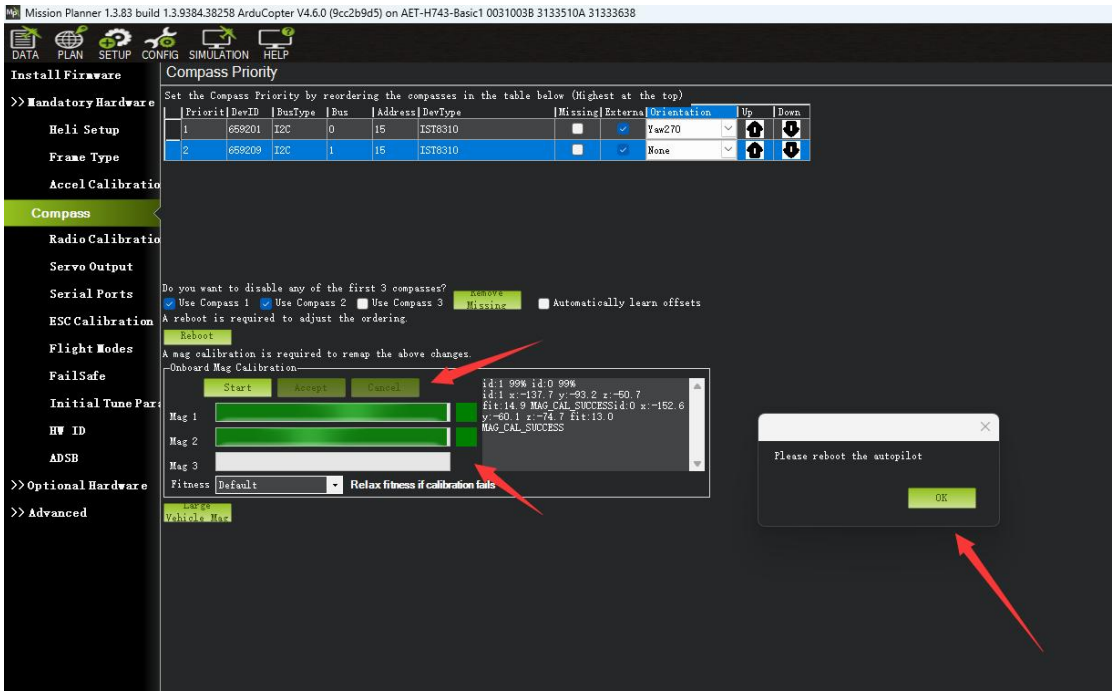
The mission planner will keep recording the data that collected by the compass sensor and the progress barand the percentage will keep change when you calibrate the compass, if the percentage have not changed,please check if the compass is connect success.The mission planner will remind you when the

compass has calibrated success.Mag 1 to the end and comes out the MAG_CAL_SUCCESS marked words，as shown in the figure below.Then click "OK," disconnect the helicopter power and USB connection, and then power it on again.compass calibrate success after restart the L7 flight controller.

Attention:

When the progress bar moves to 100 and then restart from O, it may because of the wrong calibrate action orinterference. You can have a try to calibrate again till compass calibrate success, or setup the Fitness is

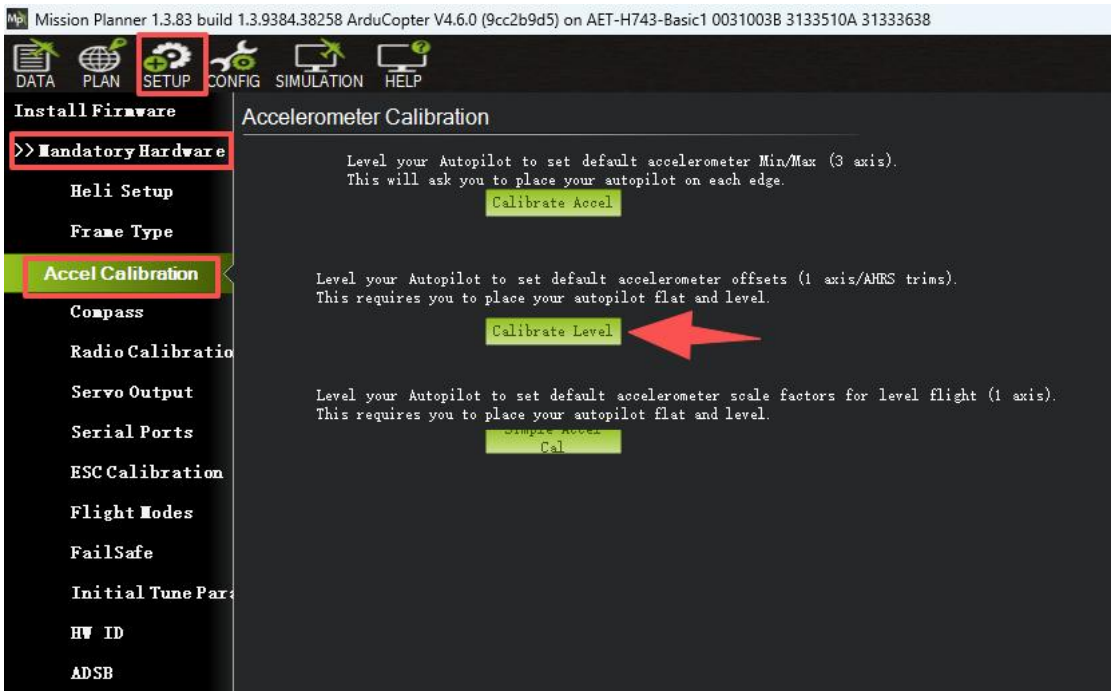
Relaxed and recalibrate



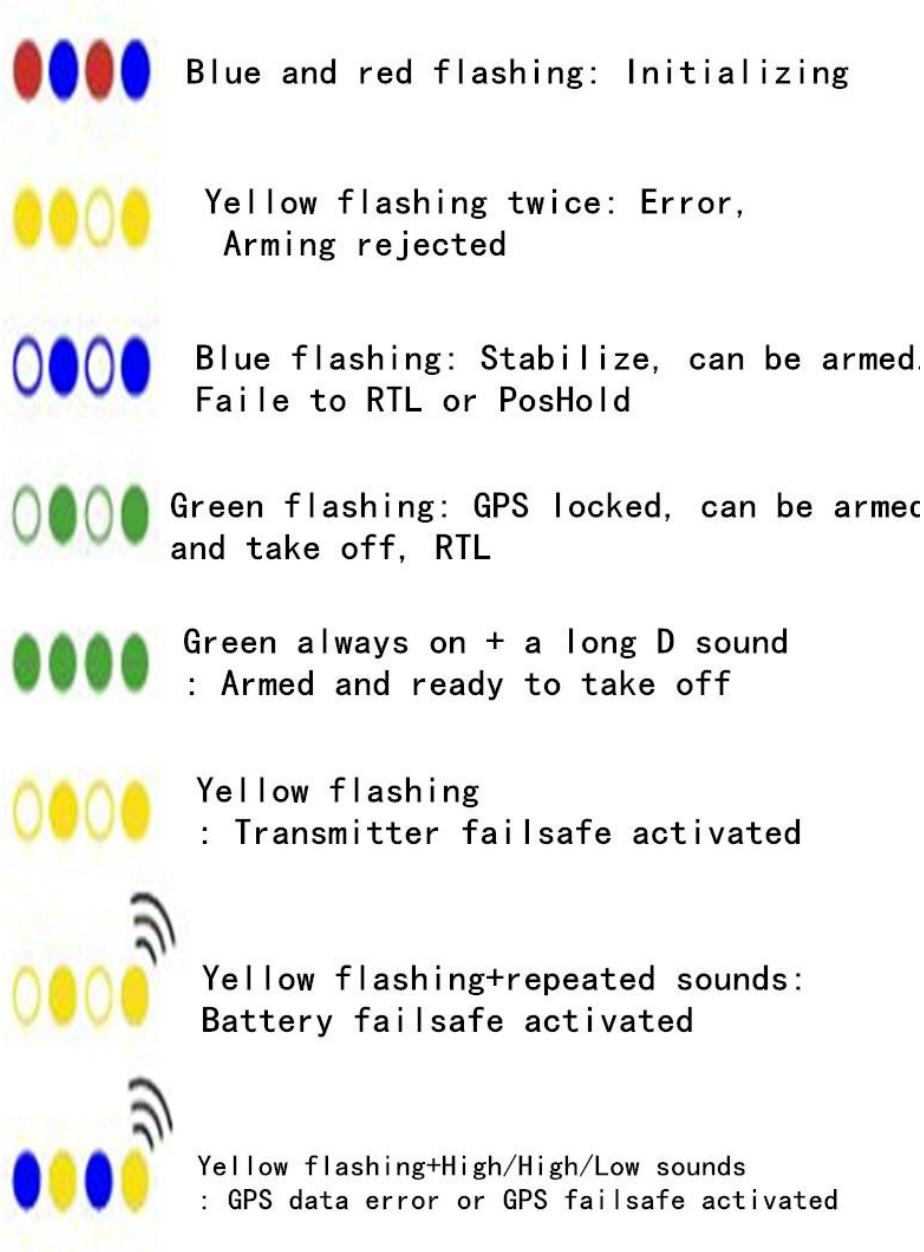
9.Level Calibration（直升机的水平校准）

After you have finished assembling the helicopter,if the Mission Planner shows the drone not level when you put it horizontal as this picture, You can setup as below to solve the problem.

Under Initial Setup-Mandatory Hardware--select Accel Calibration from the leff-side menu--Click Calibrate Level to start the calibration.


Mission Planner 1.3.83 build 1.3.9384.38258 ArduCopter V4.6.0 (9cc2b9d5) on AET-H743-Basic1 0031003B 3133510A 31333638
DATA
PLAN
SETUP
CONFIG
SIMULATION
HELP
Install Firmware
>> Mandatory Hardware
Heli Setup
Frame Type
Accel Calibration
Compass
Radio Calibratio
Servo Output
Serial Ports
ESC Calibration
Flight Modes
FailSafe
Initial Tune Para
HW ID
ADSB
Accelerometer Calibration
Level your Autopilot to set default accelerometer Min/Max (3 axis).
This will ask you to place your autopilot on each edge.
Calibrate Accel
Level your Autopilot to set default accelerometer offsets (1 axis/AHRS trims).
This requires you to place your autopilot flat and level.
Calibrate Level
Level your Autopilot to set default accelerometer scale factors for level flight (1 axis).
This requires you to place your autopilot flat and level.
Cal

10.L7 flight controller external LED Indicator(外置 led 说明思)



（8）Arming and Disarming

Connect all the accessories. When you have completed transmitter calibration, acceleration calibration andcompass calibration, you can try to arm it.When the LED of the flight controller is blue or green, it can be armed. You can only arm or disarm inStabilize, ACRO, AltHold, Loiter, and PosHold modes. You cannot arm your copter in AUTO mode.

Arm action:

1. Arm the motors by holding the throttle down, and rudder right for 5 seconds.

2. When you hear the buzzer beeping for a long time and the flight controller indicator light is always on, thearming is successful

3. Toggle the 8-channel switch to the maximum value, and wait for the motor to rotate to a constant speed.

Note 1: When it is not stick mode 2, please perform the arm action as the lowest for channel 3, and thehighest for channel

Note 2: When the arming action is performed, but there is a beep from the buzzer, which means that itcannot be armed at this time, and there is a fault. Please connect the flight controller to the Mission Plannerto check the disarm prompt, and solve the fault according to the fault description below.

Note 3: Once the unlocking is successful, the helicopter will lock the current flight mode, and the flight mode will not be allowed to change until the helicopter takes off.

Disarm

action:1. Toggle the 8-channel switch to the minimum value and wait for the motor to stop rotating2. The left joystick executes the action shown in the picture below and holds for 5 seconds. When the flightcontroller indicator flashes and the motor stops, the disarm is done.

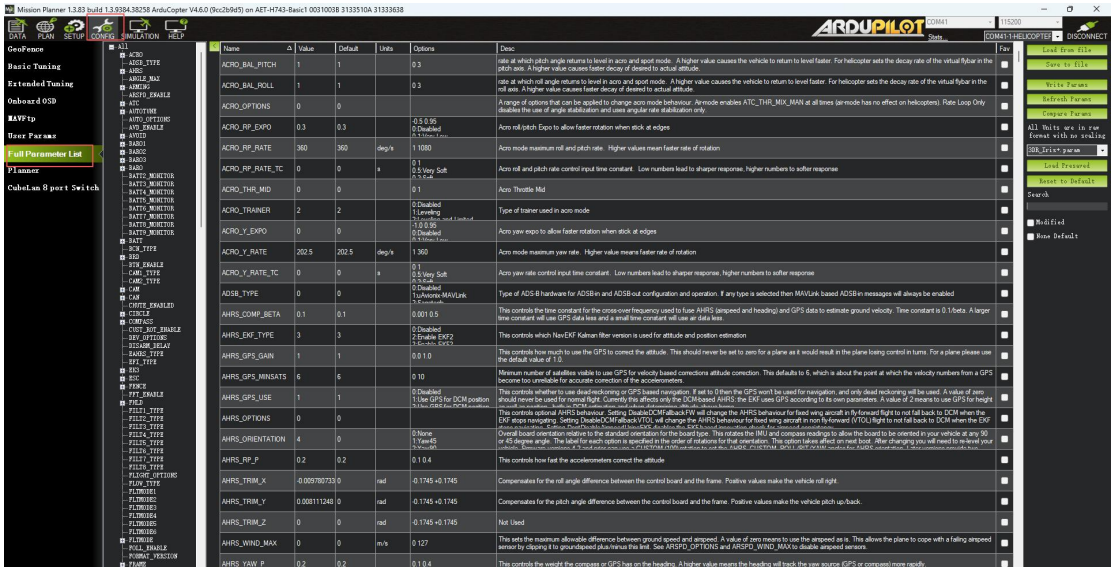
Note: 1. When it is not stick mode 2, please execute the lowest for channel 3 and the lowest for channel 4 todisarm

2. After landing, please wait for the propeller speed to decrease before performing the disarm action,otherwise it may cause the possibility of the aircraft turning over

10.Parameters Setting

(1)Parameter Introduction

All of the parameters of CrossFlight can setup in Mission Planner, please do not change theparameters during the flight.



Left column:Basic Tuning: Provide simple parameter adjustment, such as climbing response rateExtended Tuning: provide adjustment of PID, function of channel 7 and 8 channelStandard Params: Provide some basic settings to unlock detection items, logs, enable additionalfunctions, channel functions, etc.

Advanced Params: Provide some advanced function settings such as PIDFull Parameter List: All parameter list display, parameter name, parameter value, value unit, value rangeand value options, parameter function introduction etc.Full Parameter Tree: Related function parameters are similarly displayed.After a function is expanded,the function-related parameters are displayed

Right column:

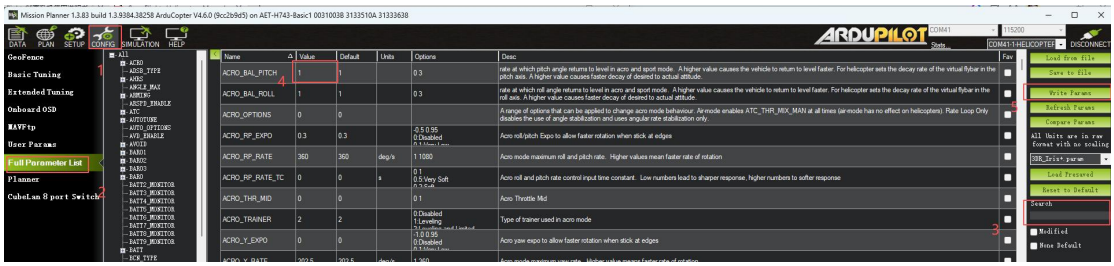
Load from file: load the files with the parameters have setup already.Save to file:

save the file with the parameters to your computer.Write Params: write the parameters that have modified to L7t.Refresh Params: exhibit the newest parameters which have modified no the Mission Planner.Compare Params: compare the current and the previous parameters.Load Presaved: load the parameters that Radiolink upgrade the files which design for 210-250 frameracing drone to L7

(2) Parameter Modification

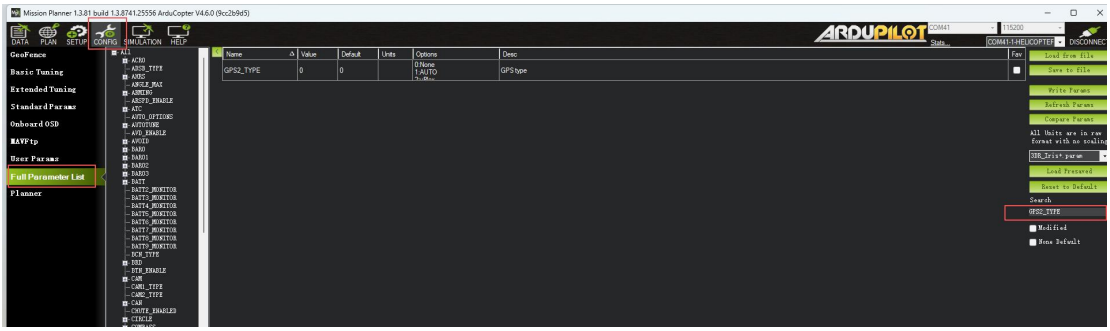
All the parameters of L7 can be adjusted. You can modify it according to the following steps;.

1. Enter the parameter name you want to modify in the search box
2. Wait for the refresh and the searched parameters is displayed
3. After clicking in the parameter value box, enter the value you want to modify
4. Click Write Params on the right to save the parameter

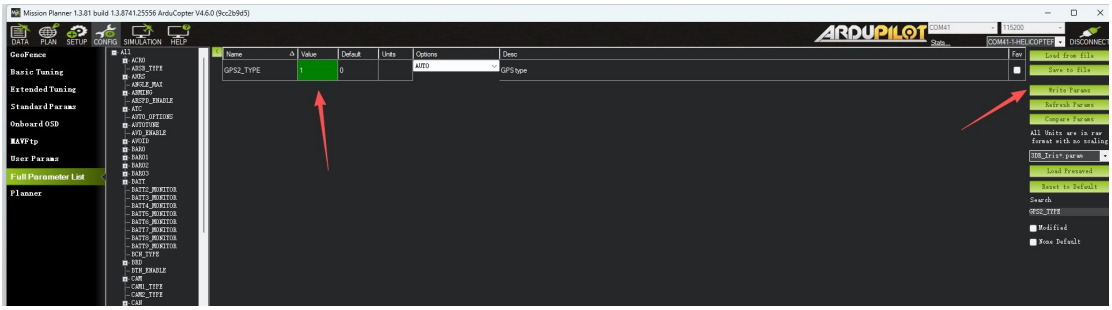


11.Method for Activating Dual GPS Mode（双 GPS 模块激活方式）

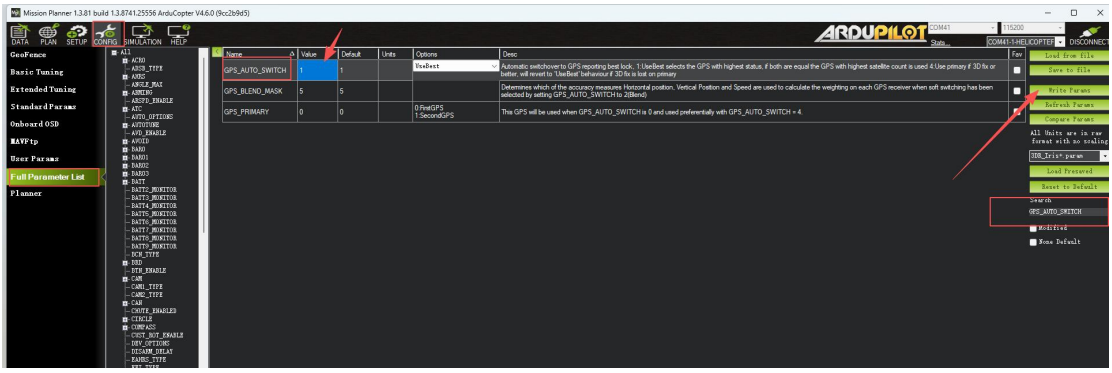
Click on CONFIGGPS》Full Parameter List》Search，and then enter“GPS2_TYPE”



Change the "GPS2_TYPE" Value to 1, then click Write Params to save the parameters to the L7 flight controller. This activates dual GPS mode.

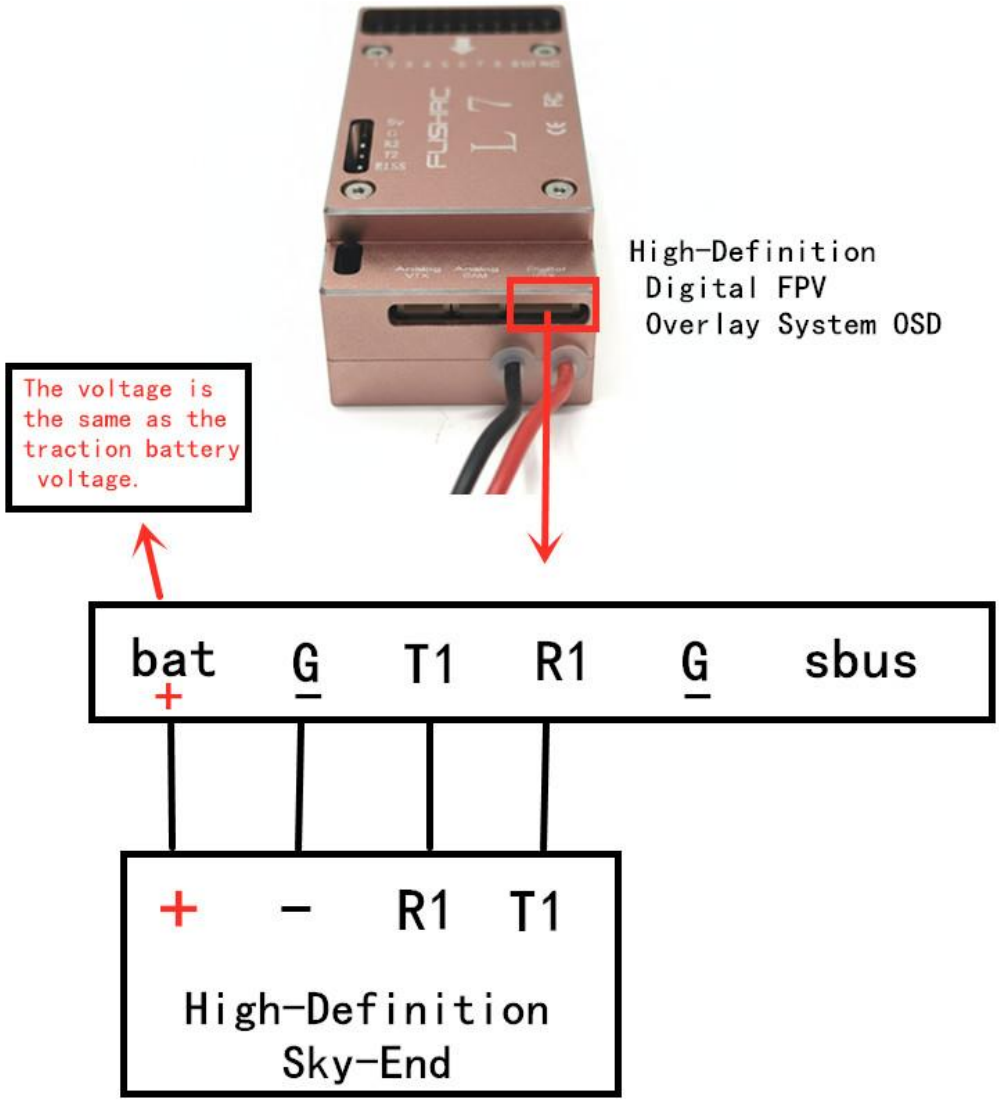


Click on CONFIGGPS 》 Full Parameter List 》 Search ， and then enter “GPS_AUTO_SWITCH”，Change the "GPS_AUTO_SWITCH" Value to 1, then click Write Params to save the parameters to the L7 flight controller.



12. OSD

Wiring Diagram



Digital Video Transmission Sky-End Serial Port Settings and Auxiliary Parameters(High-Definition Video Transmission Does Not Require SBUS or the Adjacent Ground Connection)

The digital video transmission sky-end connects to the flight controller with 4 wires. The wiring on the L7 flight controller port is as follows: BAT (+), GND (-), TX, and RX. Note that BAT has the same voltage as the traction battery. Pay attention to the voltage range of the sky-end to prevent damage. Connect BAT and GND to the positive and negative terminals of the digital video transmission sky-end respectively. Connect the sky-end's TX to the flight controller's RX1, and the sky-end's RX to the flight controller's TX1. Then configure the port parameters for Serial1 corresponding to UART1.

Use DJI G2, G3, or N3 goggles to pair with Vista, O3, O4 Lite, or O4 Pro sky-ends.

For the Caddx Snail high-definition digital sky-end, the latest OpenIPC firmware supports MSP. Configure as follows:

SERIAL1_BAUD 115

SERIAL1_OPTIONS 0

SERIAL1_PROTOCOL 42

Next, set several auxiliary parameters to ensure the OSD is displayed

completely and correctly:

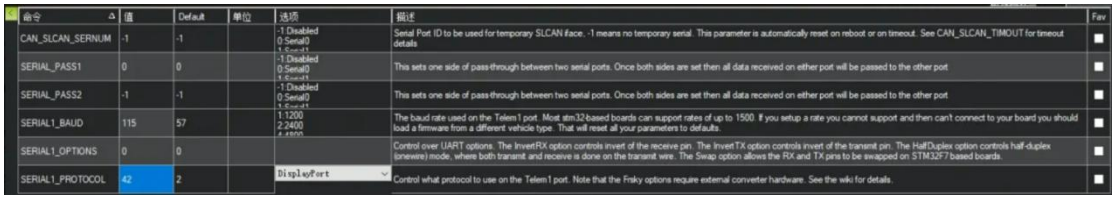
OSD_TYPE 5

OSD_OPTIONS 32 (This setting is not required when using the Caddx Snail digital sky-end; when using the OpenIPC open-source digital sky-end, this parameter should be set to 42.)

MSP_OPTIONS 4 (This setting is not required when using the Caddx Snail digital sky-end.)

OSD1_TXT_RES 1

As shown in the figure, configure the settings.



If using DJI V1 or V2 goggles to pair with Vista and original sky-ends, the serial port parameters are:

SERIAL1_BAUD 115
SERIAL1_OPTIONS 0
SERIAL1_PROTOCOL 33
OSD_TYPE 3

When pairing DJI V2 goggles with the O3 sky-end, refer to the settings for G2, G3, and N3 goggles mentioned above.

13. ELRS Receiver Setup

L7 Flight Controller and ELRS Wiring

Receiver TX pin → Flight controller UART RX pin

Receiver RX pin → Flight controller UART TX pin

Receiver 5V and GND → Flight controller corresponding power pins

| ELRS Receiver | Flight Controller (ArduPilot) |

| TX | → UART_RX (e.g., UART2_RX) |

| RX | → UART_TX (e.g., UART2_TX) |

| GND | → GND |

| 5V | → 5V |

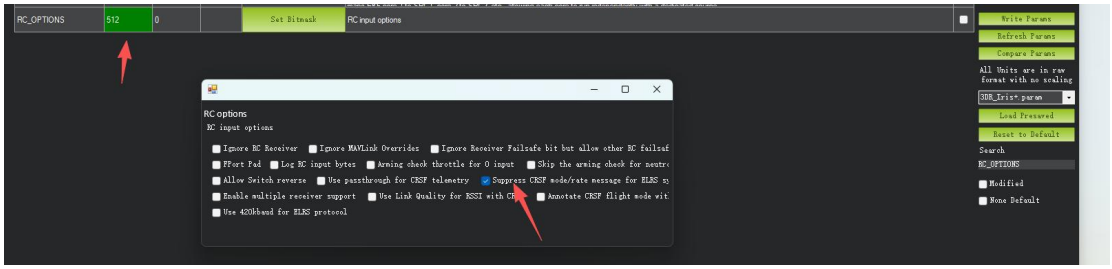
SERIAL2_PROTOCOL = 23 (if set to 1, it is auto-detected)

SERIAL2_BAUD = 115

RC_OPTIONS = 768

RC_OPTIONS	Feature Combination	Application Scenario
512	ELRS only (inhibition)	Minimize communication overhead, telemetry not required
768	ELRS inhibition + Telemetry	Standard ELRS, no throttle check
800	ELRS inhibition + Telemetry + Throttle check	Recommended full configuration

288	Telemetry + Throttle check (no ELRS inhibition)	Legacy ELRS or Crossfire



RSSI Setup

Parameter	Value	Description
RSSI_TYPE	3	Highly recommended. Tells the flight controller to use ELRS link quality as the signal source, which is more accurate and reliable than traditional RSSI.
RSSI_CHANNEL	15	When RSSI_TYPE = 3, this parameter should be set to 15, as ELRS transmits link quality information via channel 15 by default.