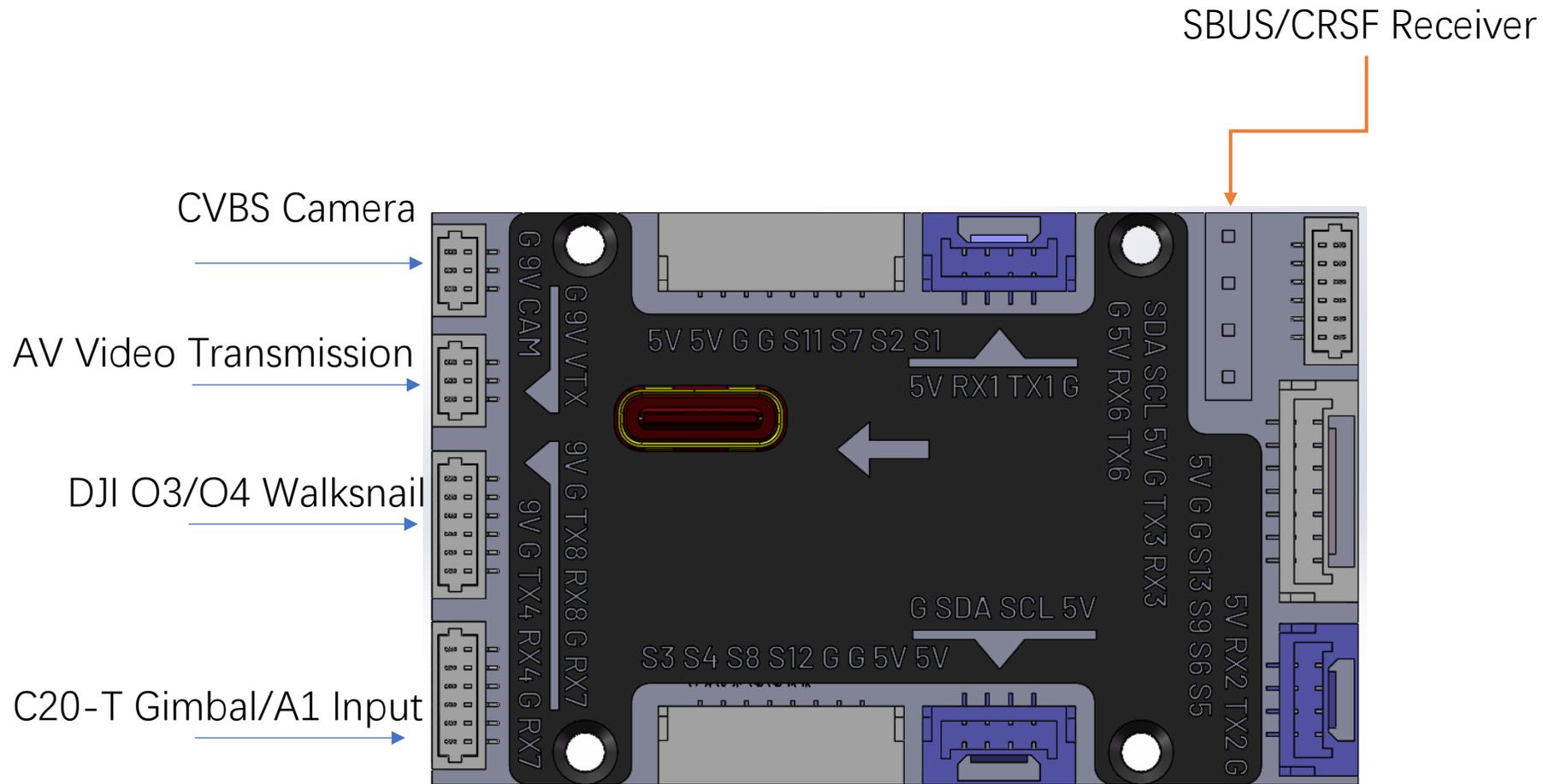




TECHNOLOGY

ROC WING PNP MANUAL



The flight controller is ready to use with no setup required.

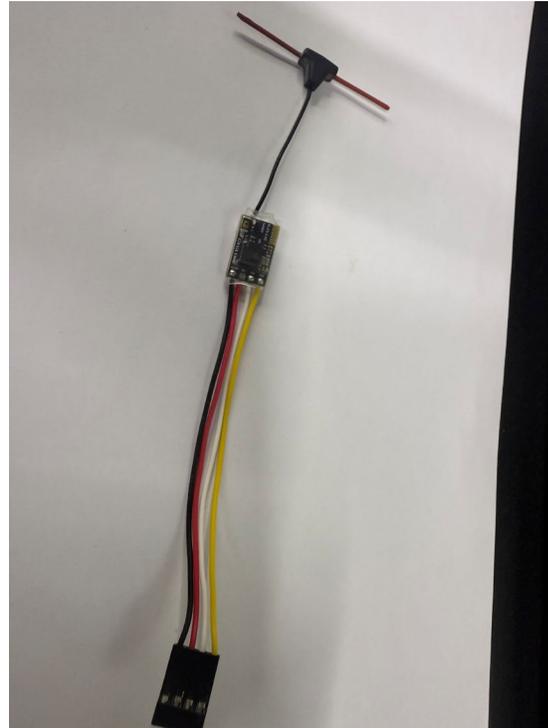
Do not use fixed-wing manual (MANUAL) mode.

For the power battery, please use a 6S pouch Li-Po battery. Do not use 18650 cells.

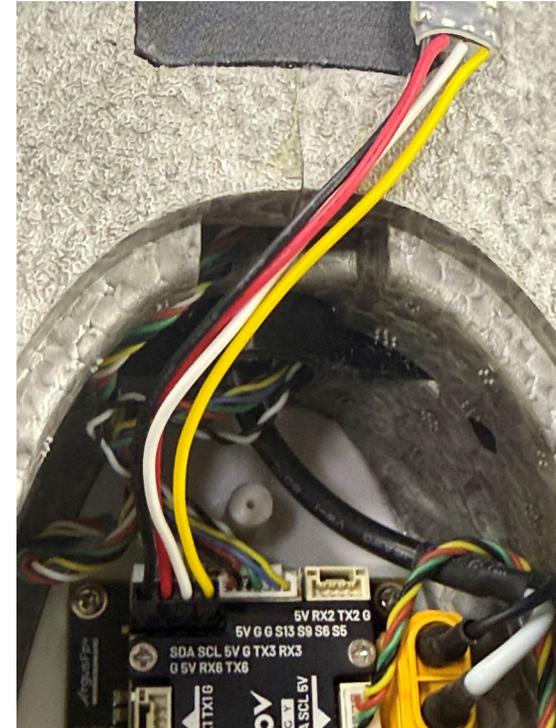
ELRS Receiver Connection Method



Take out the included ELRS connection cable.



Solder it to your ELRS receiver according to the diagram above.



Connect the cable to the flight controller's RX6 and TX6 interfaces as shown in the diagram above.

Note:

Black wire corresponds to Receiver G (Ground)

Red wire corresponds to Receiver V (Voltage)

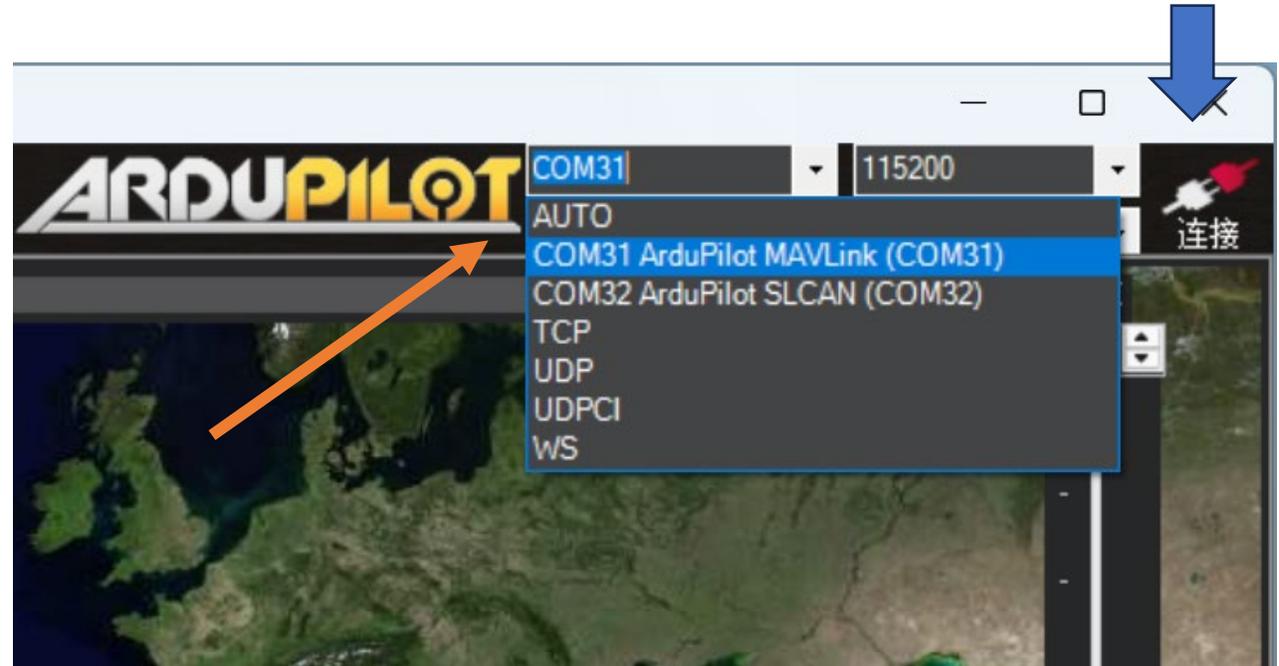
White wire corresponds to Receiver TX

Yellow wire corresponds to Receiver RX

Please visit <https://firmware.ardupilot.org/Tools/MissionPlanner/> to download the Mission Planner software.



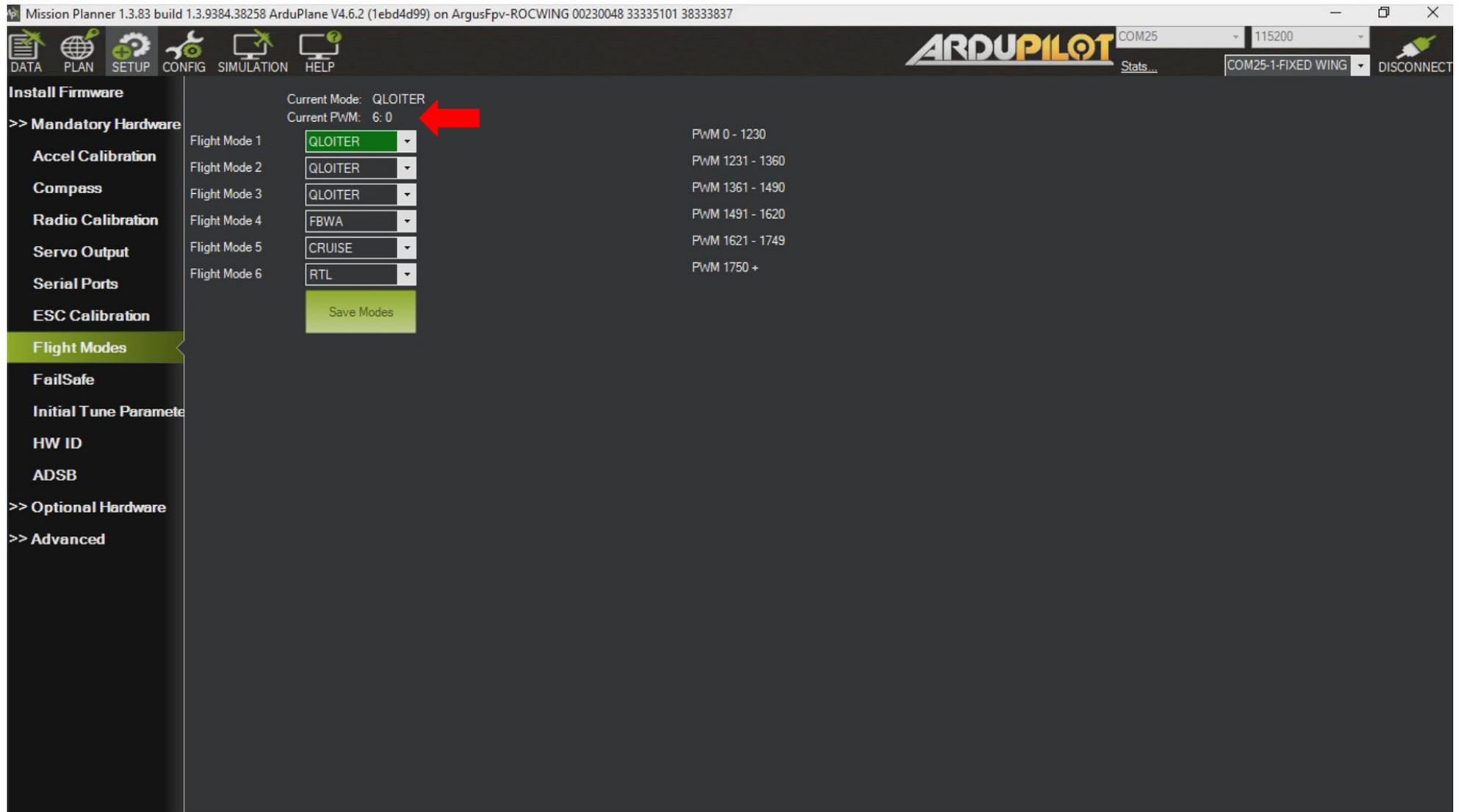
Connect to the computer using a Type-C cable.



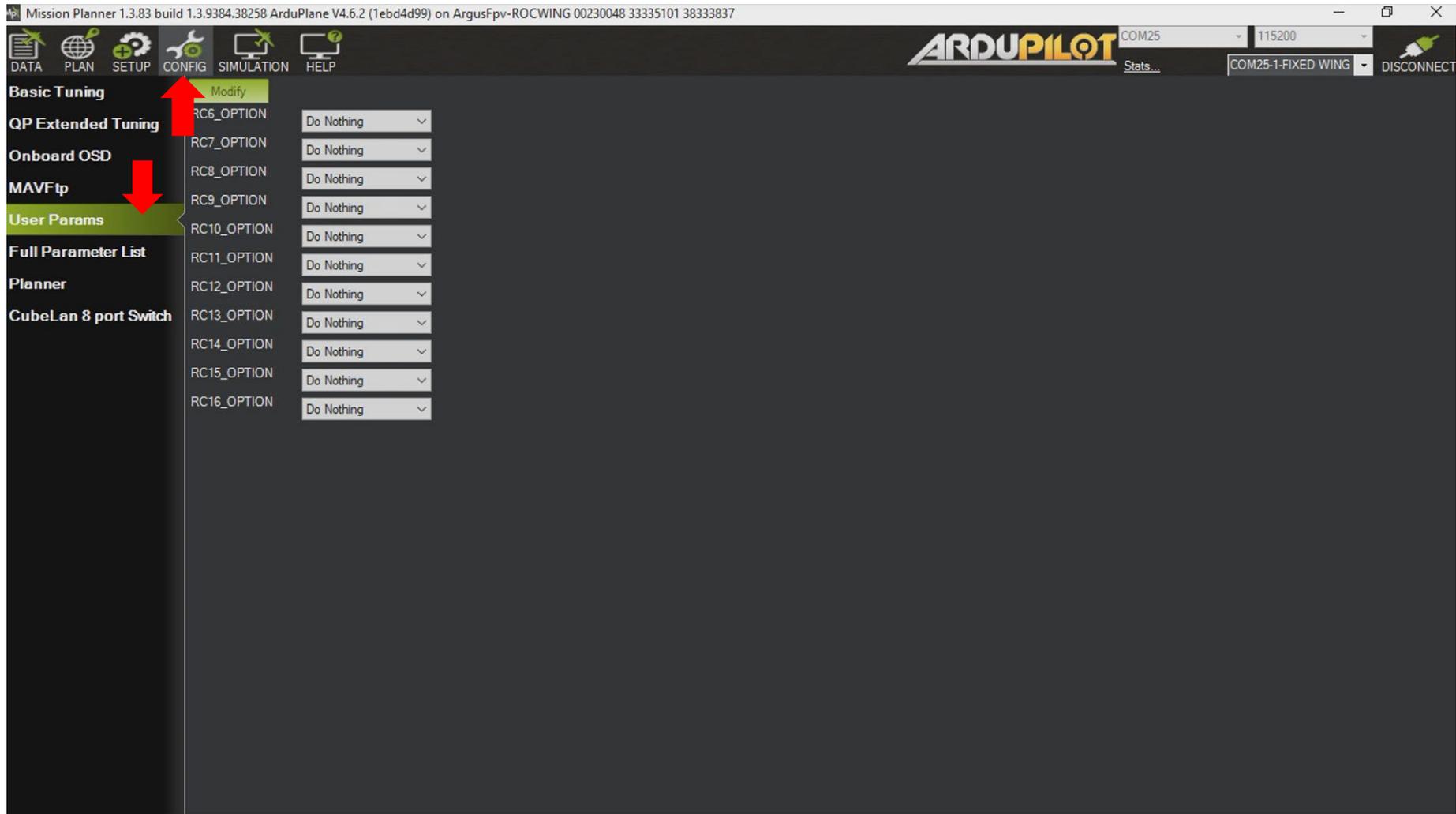
Select the MAVLINK serial port and click "Connect".



Follow the prompts in Mission Planner to complete the calibration process for the remote controller.



The default flight mode is assigned to Channel 6. The flight controller's default flight mode is QLOITER. We recommend using the three-position switch on the remote control for adapting flight mode settings, specifically for the QLOITER, CRUISE, and RTL modes.



You can configure settings for other channels and set the corresponding flight modes in this interface. However, please note that Channel 6 should not be configured.

Mission Planner 1.3.83 build 1.3.9384.38258 ArduPlane V4.6.2 (1ebd4d99) on ArgusFpv-ROCWING 00230048 33335101 38333837

ARDUPILOT COM25 115200
Stats... COM25-1-FIXED WING DISCONNECT

DATA PLAN **SETUP** CONFIG SIMULATION HELP

Install Firmware

- >> **Mandatory Hardware**
 - Accel Calibration
 - Compass
 - Radio Calibration
 - Servo Output
 - Serial Ports
 - ESC Calibration
 - Flight Modes
 - FailSafe
 - Initial Tune Param
 - HW ID
 - ADSB
- >> **Optional Hardware**
 - RTK/GPS Inject
 - CubeID Update
 - Sik Radio
 - CAN GPS Over
 - Battery Monitor**
 - Battery Monitor 2
 - DroneCAN/UAVCAN
 - Joystick
 - Compass/Motor Cal

Monitor: Analog Voltage and Current Battery Capacity: 6000 mAh

Sensor: 0: Other MP Alert on Low Battery

HW Ver: 5: VR Brain 4.5 - 5

Calibration

1. Measured battery voltage:	0.00203110755
2. Battery voltage (Calced):	0.00223405163
3. Voltage divider (Calced):	21
4. Measured current:	
5. Current (Calced):	1.13999993569
6. Amperes per volt:	66.7

Enter the corresponding value according to the battery's actual capacity.

Mission Planner 1.3.83 build 1.3.9384.38258 ArduPlane V4.6.2 (1ebd4d99) on ArgusFpv-ROCWING 00230048 33335101 38333837

DATA PLAN **SETUP** CONFIG SIMULATION HELP

ARDUPILOT COM25 115200 Stats... COM25-1-FIXED WING DISCONNECT

Install Firmware

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 - Serial Ports**
 - ESC Calibration
 - Flight Modes
 - FailSafe
 - Initial Tune Parameters
 - HW ID
 - ADSB
- >> **Optional Hardware**
- >> **Advanced**

Port Name	Speed	Protocol	Options
SERIAL PORT 1 UART7 (RTS/CTS Auto)	57600	MAVLink2	Set Bitmask
SERIAL PORT 2 UART1	115200	MAVLink2	Set Bitmask
SERIAL PORT 3 UART2	115200	MAVLink2	Set Bitmask
SERIAL PORT 4 UART3	230400	GPS	Set Bitmask
SERIAL PORT 5 UART8	115200	DisplayPort	Set Bitmask
SERIAL PORT 6 UART4	115200	MAVLink2	Set Bitmask
SERIAL PORT 7 UART6	115200	RCIN	Set Bitmask
SERIAL PORT 8 OTG2		MAVLink2	Set Bitmask

Note: Changes to the serial port settings will not take effect until the board is rebooted.

Please note that the 'x' in TX x / RX x on the flight controller corresponds to the UART number.

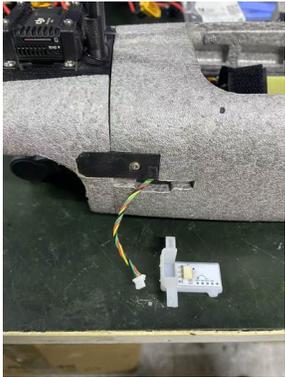
Balance Point



The indentation on the wing-mounted plastic part is allowed a maximum deviation of 1 cm toward the nose.

When using the HD gimbal nose cover, you need to relocate the airspeed sensor to the top of the nose cover and adjust the airspeed scaling setting.

Remove the airspeed sensor.



Remove the nose cover.



Route the airspeed sensor cable through the nose cover before reconnecting it to the sensor.



Install the airspeed sensor mounting bracket.



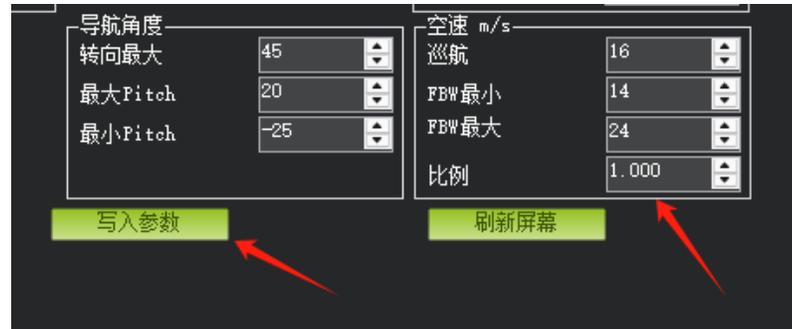
Connect the flight controller to Mission Planner via USB and navigate to the basic parameter tuning page.



Configure the settings as shown in the figure below.

Set **Airspeed Scaling** to **1.0**.

Write the parameters to the flight controller.



If you prefer not to relocate the airspeed sensor, you may disable it as illustrated in the figure below. Disabling the airspeed sensor will not affect flight performance.



Note: The above setup applies only when using the HD gimbal nose cover. The default nose cover included with the product does not require any configuration and should remain with its factory settings.

After connecting to power, do not move the aircraft. Wait for the flight controller to initialize.

While the flight controller is warming up, the tail light will illuminate orange. Please wait patiently.



After approximately one minute, when the tail light turns green, preheating is complete and the aircraft can be disarmed.



Unlocking Procedure:

1.Power On: Activate the aircraft using the remote controller and allow the flight controller to initialize. Wait for the preheating sequence to complete (indicated when the tail light changes from orange to green).

2.Mode Verification: Ensure the remote controller switch is set to the default flight mode: QLOITER.

3.Control Input:

Move the Channel 3 (THR Throttle) stick to the lowest position.

Simultaneously move the Channel 4 (RUD Direction) stick to the far right position and hold for approximately 5 seconds.

4 Confirmation & Action: Once the propellers begin to spin, immediately return the Channel 4 (RUD Direction) stick to the center position.

5.Status Indication: A flashing white light will be visible on the wings/tail section.

Locking Procedure:

1.Post-Landing: After the aircraft has landed on the ground,

2.Control Input:

Move the Channel 3 (THR Throttle) stick to the lowest position.

Simultaneously move the Channel 4 (RUD Direction) stick to the far left position and hold for approximately 5 seconds.

3 Confirmation & Action: Once the propellers stop spinning, immediately return the Channel 4 (RUD Direction) stick to the center position.

4.Status Indication: The flashing white light on the wings/tail section will cease.

Arm and Disarm



Flight Mode Descriptions

QLOITER Mode (VTOL)

QLOITER mode automatically maintains the vehicle's current position, heading, and altitude. In this mode, pilots operate the aircraft similarly to a quadcopter. Upon releasing the control sticks, the vehicle decelerates to a stop and maintains its position.

CRUISE Mode (Fixed-Wing)

CRUISE mode functions similarly to Fly-By-Wire-B (FBWB) but incorporates heading lock. This mode is ideal for long-range FPV (First-Person View) flights, enabling precise tracking of distant objects while automatically managing altitude, airspeed, and heading.

WARNING:

CRUISE mode is not recommended for low-altitude flight. Its altitude control time constant (derived from TECS) responds too slowly for terrain avoidance. This mode lacks the pitch control responsiveness required for safe ground proximity operations.

FBWA Mode (Fly By Wire A)

As the most widely used assisted flight mode in Plane and the optimal choice for novice pilots, FBWA maintains the roll and pitch angles specified by the control sticks. For example:

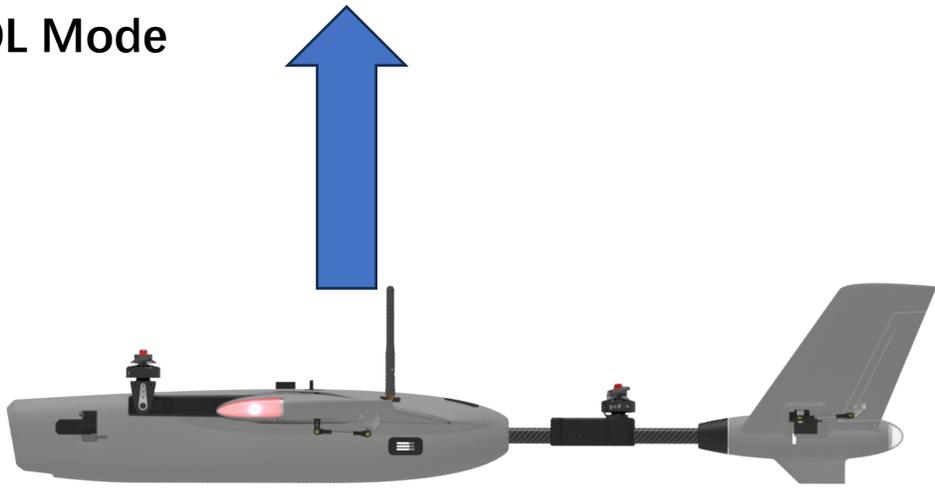
Full right aileron input holds a fixed 45-degree right bank angle (within system limits).

Pitch angles are constrained to ± 25 degrees.

Note: Level pitch does not guarantee altitude hold. Climb/descent rate at a given pitch angle depends on airspeed, primarily controlled by throttle. To gain altitude, increase throttle; to descend, reduce throttle. For automatic altitude maintenance, consider Fly-By-Wire B (FBWB) mode.

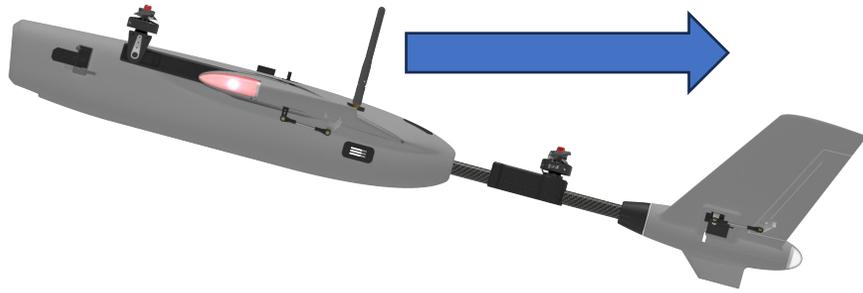
In FBWA, throttle is manually controlled. Rudder operation can be either manual or automated through configurable roll-rudder mixing, enabling ground steering while maintaining coordinated turns during flight.

VTOL Mode

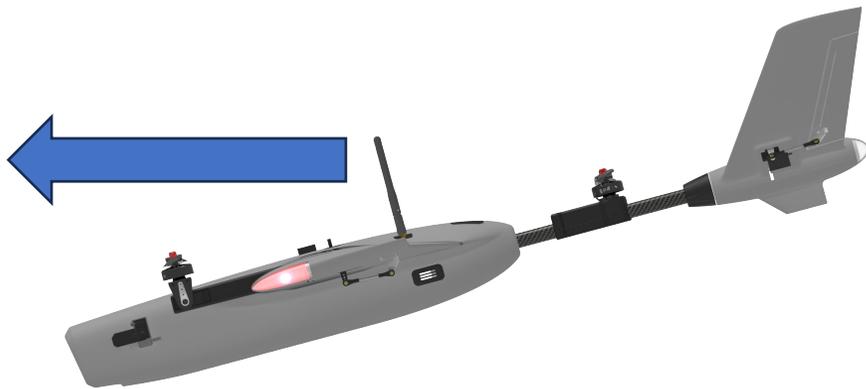


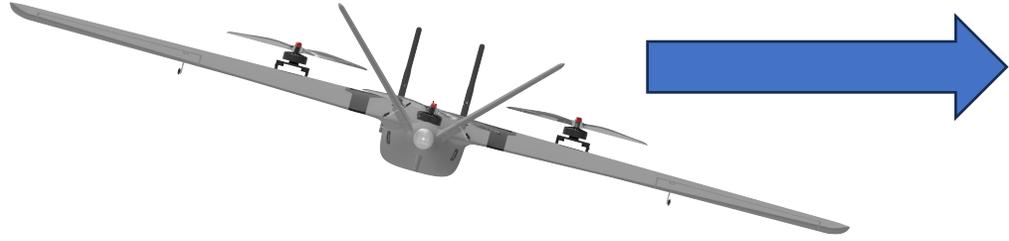
VTOL Mode (QLOITER)
The Channel 3 throttle channel manages aircraft ascending and descending.



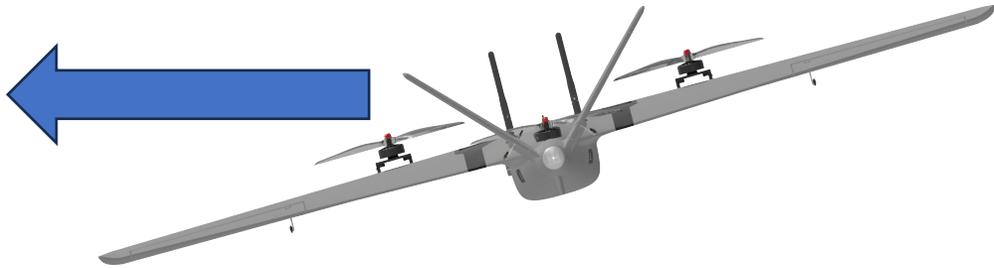


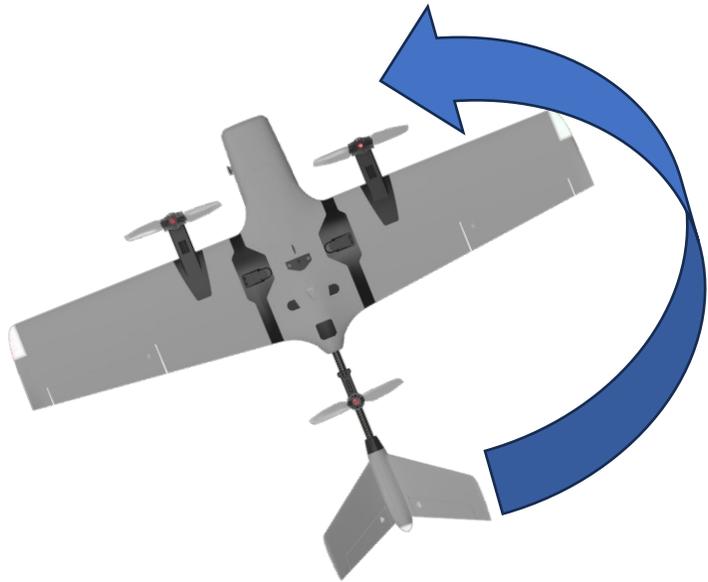
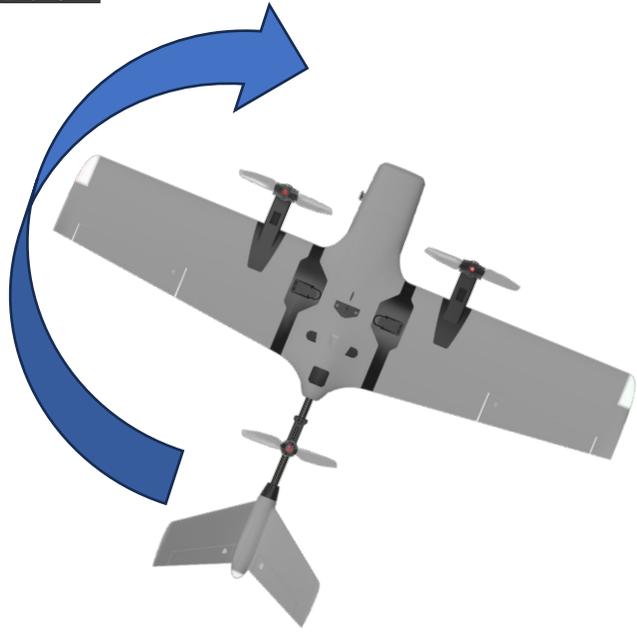
CH2 controls the aircraft's pitch, enabling forward and backward movement during VTOL mode.





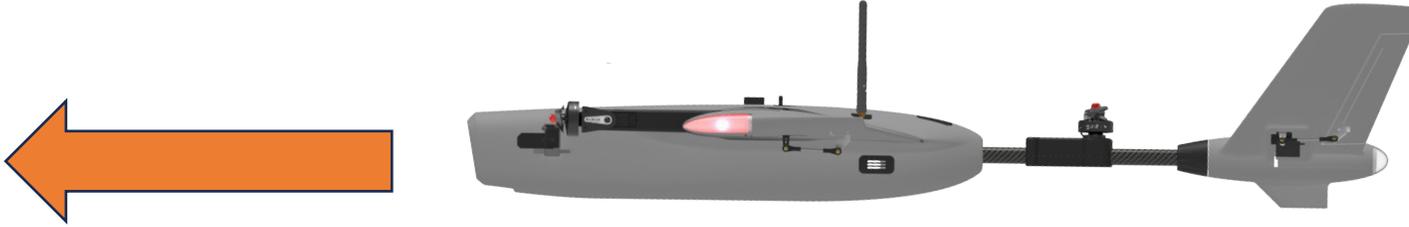
CH1 controls the aircraft's left and right roll, enabling it to bank and move laterally.





CH4: Horizontal Rotation Control (Left/Right)

Fixed-Wing Mode: CRUISE Mode or FBWA Mode



Aircraft airspeed is controlled by CH3.

CRUISE Mode: The airspeed indicator actively manages throttle control.

Mid-throttle position: 16 m/s

Maximum throttle position: 24 m/s

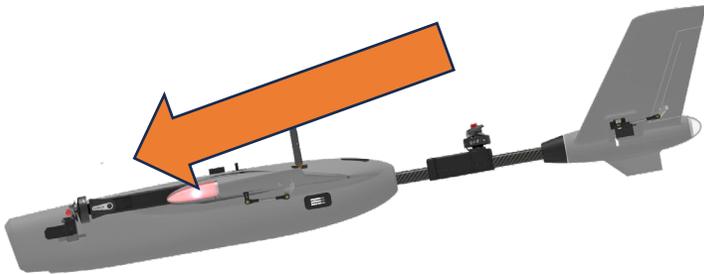
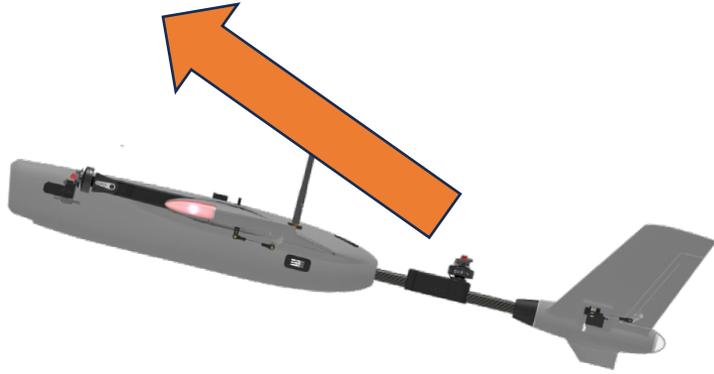
Minimum throttle position: 14 m/s

FBWA Mode: Throttle is manually controlled by the pilot, enabling airspeeds from 0 to 44 m/s.

Below 12 m/s, the flight controller automatically engages VTOL (Vertical Take-Off and Landing) assistance.

Maintaining mid-throttle delivers an optimal, economical cruising speed of approximately 16-20 m/s.





CH2: Controls Aircraft Pitch

Pull back on the stick: Raises the nose for climb.

Push forward on the stick: Lowers the nose for descent/dive.

CRUISE Mode:

The flight controller will restrict climb/sink rates to **2 m/s** when pitching up or down.

Throttle will automatically adjust to maintain airspeed within the **commanded range set by CH3**.

FBWA Mode:

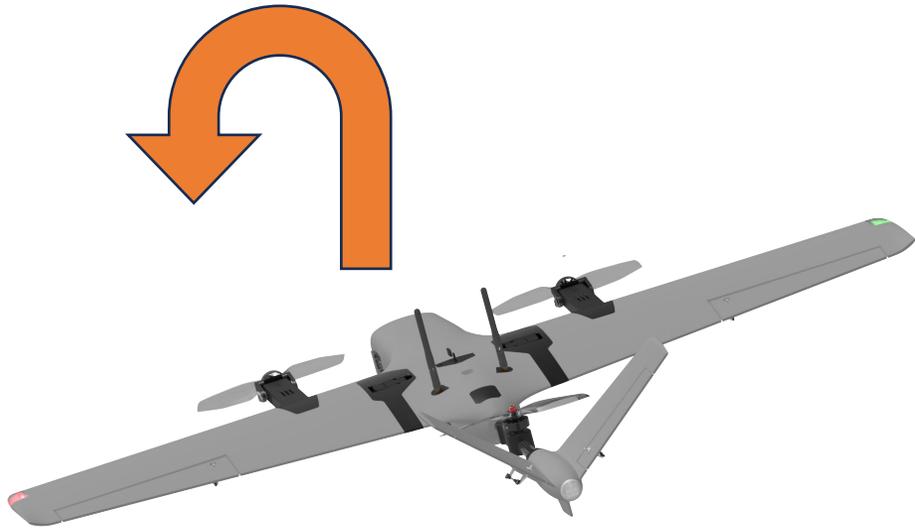
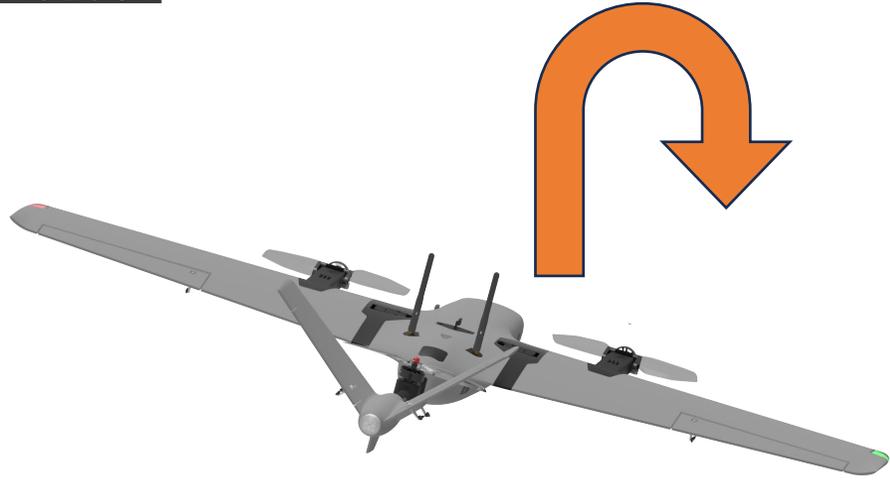
The flight controller limits pitch angle to **±20 degrees** when pitching up or down.

CAUTION

The CRUISE flight mode is not suitable for terrain-hugging flight. During CRUISE mode operation, altitude is controlled at a rate of 2 meters per second. When flying close to the ground, CRUISE mode **does not provide** the pitch control flexibility required to prevent ground impact.

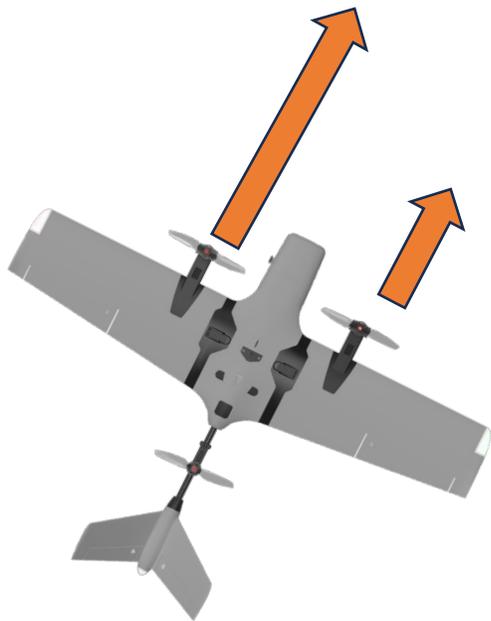
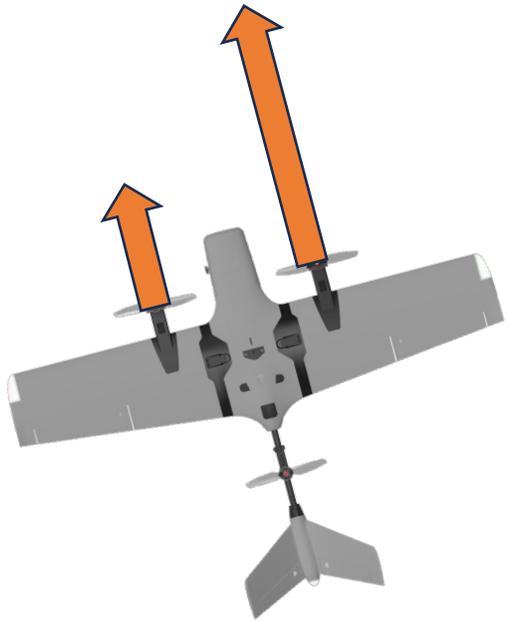
Benefits of CRUISE Mode:

- Maintains optimal airspeed via the airspeed sensor
- Conserves battery power through automatic throttle control
- Enables stable, hands-off cruising by continuously maintaining altitude



Chapter 1: Roll Control

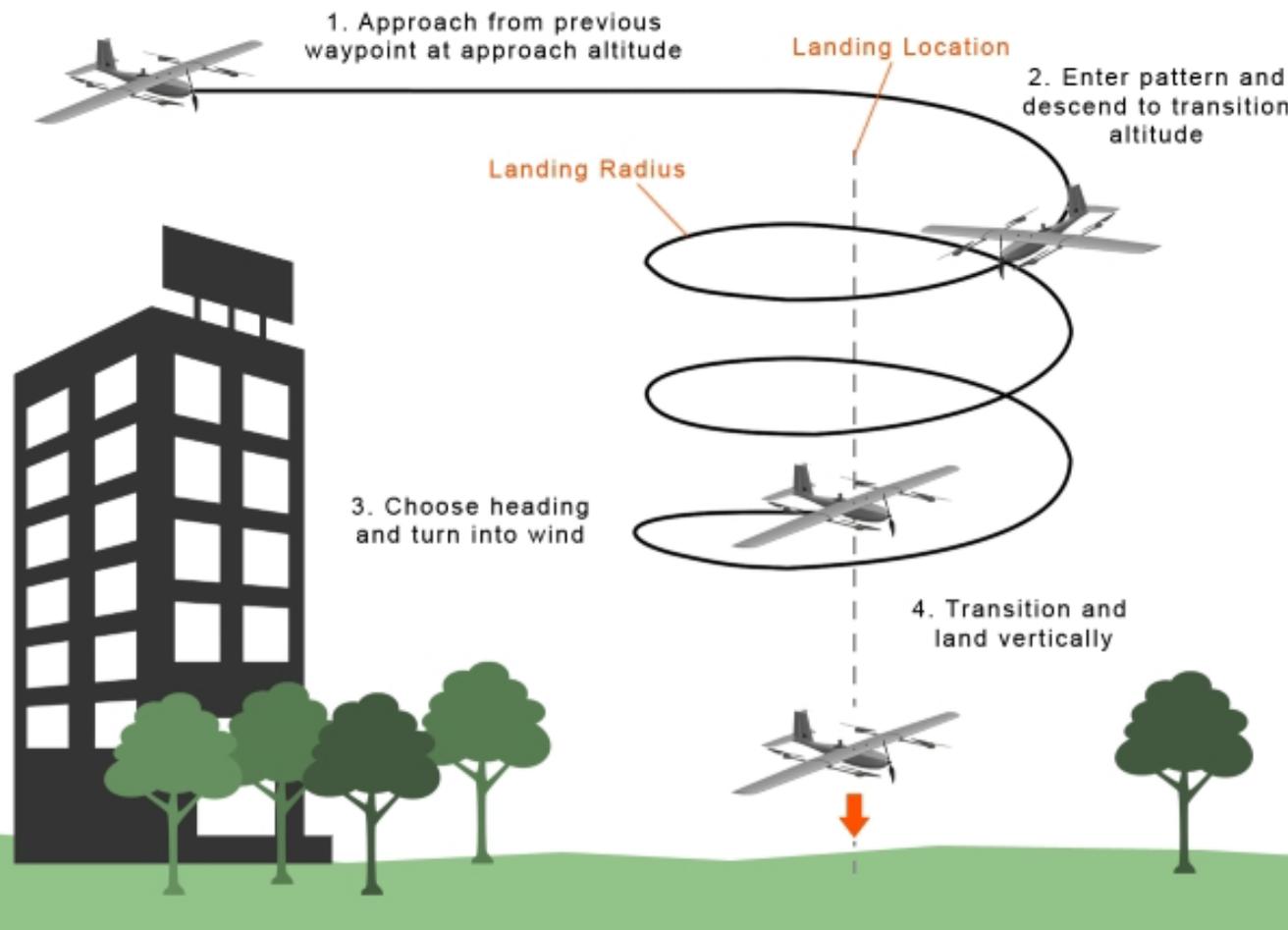
Controls the aircraft's roll along its longitudinal axis. The aircraft rolls and initiates turns in proportion to the deflection angle input via the remote control stick.



CH4 (Channel 4) controls the yaw axis (aircraft nose direction). Movement is initiated based on the pilot's joystick inputs. The aircraft achieves horizontal rotation (yaw) by generating a differential thrust between its left and right propellers.

Note: In practical operation, yaw responsiveness can be significantly reduced due to wind resistance and aerodynamic effects.

Therefore, using CH1 (Channel 1) for directional control during flight is strongly recommended.



RTL mode (Return To Land)

Aircraft Return-to-Land (RTL) Procedures:

1. Exceeding 75m from Home Point:

When the aircraft exceeds a **75-meter radius** from the takeoff point, it will activate **fixed-wing mode**.

It will maintain an altitude of **100 meters** while returning to the home point.

Upon approaching within a **50-meter radius** of the home point, the aircraft will initiate a circling descent to **30 meters**.

At 30 meters, it will **switch into VTOL (Vertical Take-Off and Landing) mode** facing into the wind and land.

2. Within 75m of Home Point in VTOL Mode:

If the aircraft is **within a 75-meter radius** of the home point and operating in **VTOL mode**:

At an altitude **above 30 meters**, it will gradually descend to **30 meters** during its return to the home point before landing.

At an altitude **below 30 meters**, the aircraft will first **climb vertically to 30 meters** at its current position. It will then proceed to the home point and land.

3. Manual Control During VTOL Landing:

During the final **VTOL landing phase**, the pilot **can manually control** the aircraft using the control sticks to adjust its precise landing position.

Control is exercised **according to standard VTOL mode operation**. **Activating manual control will pause the automatic landing sequence**.

The aircraft will move **slowly in the direction commanded by the control sticks**, allowing positioning to the desired landing point. Automatic landing will resume when manual control inputs are released.

1.C20-T Gimbal Cable: This dedicated cable allows the gimbal to receive remote control channel input signals via the MAVLink protocol through the flight controller's serial port.

2.Head Track Device: The corresponding channel for connecting to the remote controller can be configured using the Training port.

3.Flight Controller

Compatibility: The flight controller comes pre-configured for this functionality.

4.Gimbal Channel Setup: Please refer to the Gimbal User Manual for instructions on setting the gimbal channels.



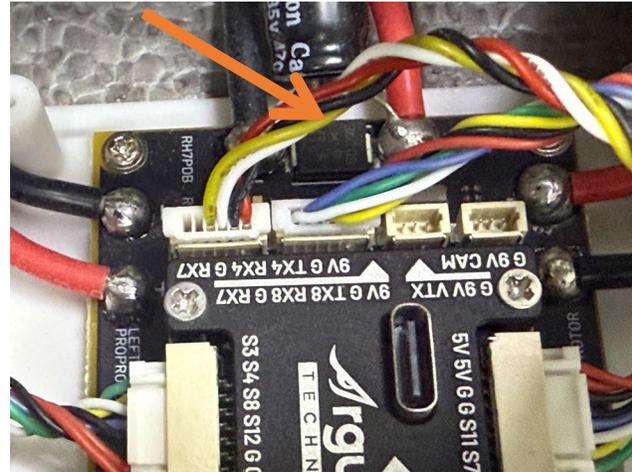
Dedicated plug-and-play connection cable for O3/O4 and similar digital video transmission systems. OSD position and parameter display requires manual configuration.

HD FPV System Connection Guide

Take out the included HD FPV transmission cable.



Insert the cable into the middle port of the flight controller as shown below.



Route the cable along the wire channel on the right side of the fuselage.



Connect the other end of the cable to the HD video transmitter.

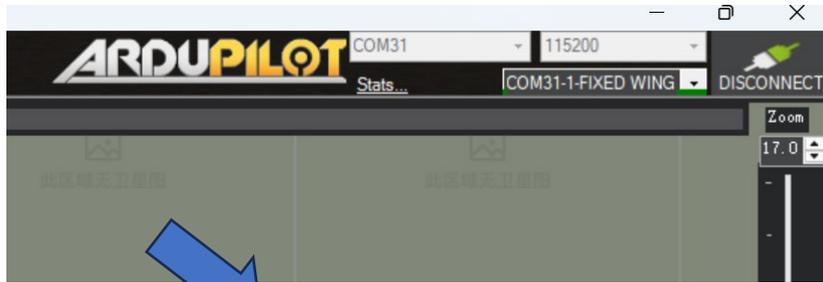


Remove the wire channel cover.

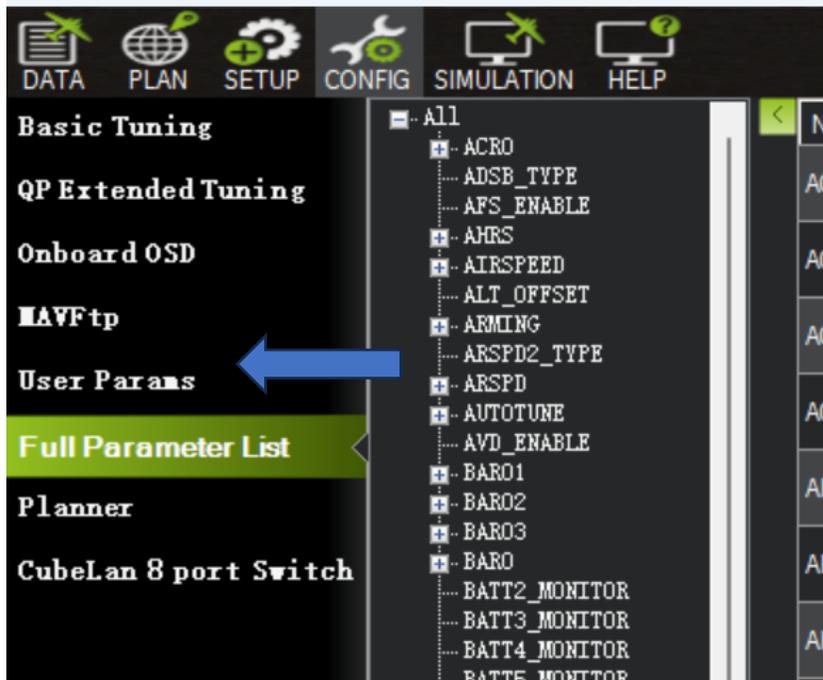


Snap the cover into the wire channel as illustrated below.

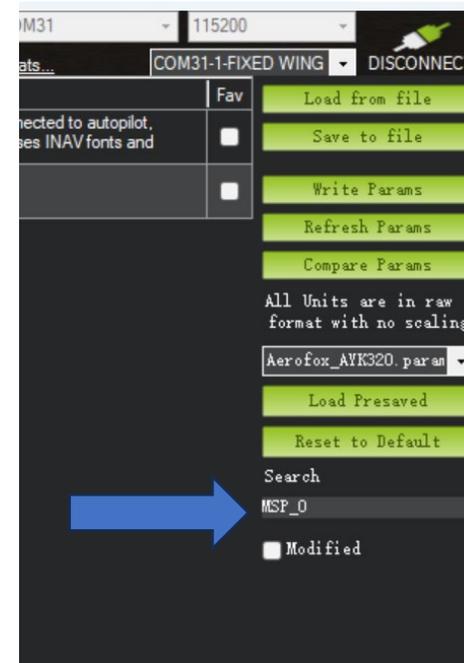




Mp Mission Planner 1.3.83 build 1.3.9384.38258 ArduPlane V4.6.3 (92b0cc)



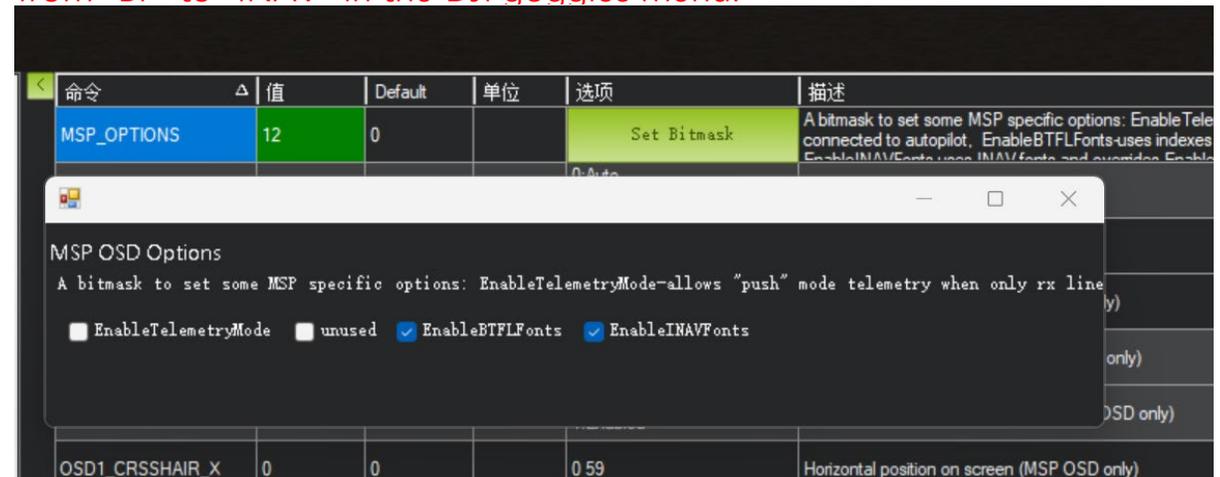
Access All Parameter Pages



Quickly Locate Parameters

To use the DJI HD FPV system, set the MSP_OPTIONS parameter to 4 or 12 to ensure proper OSD character display.

Note: For firmware versions beyond 4.6.3, change the flight controller type from "BF" to "INAV" in the DJI goggles menu.



Gimbal Connection Method

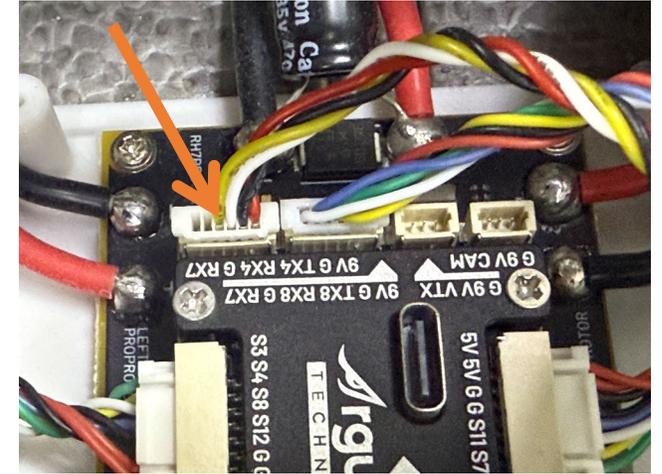
Take out the C20T connection cable.



Insert the 8P connector into the 8P port on the gimbal.



Insert the other end into the port on the left side of the flight controller.



Route the cable along the cable channel on the right side of the fuselage.



Take out the cable channel cover.



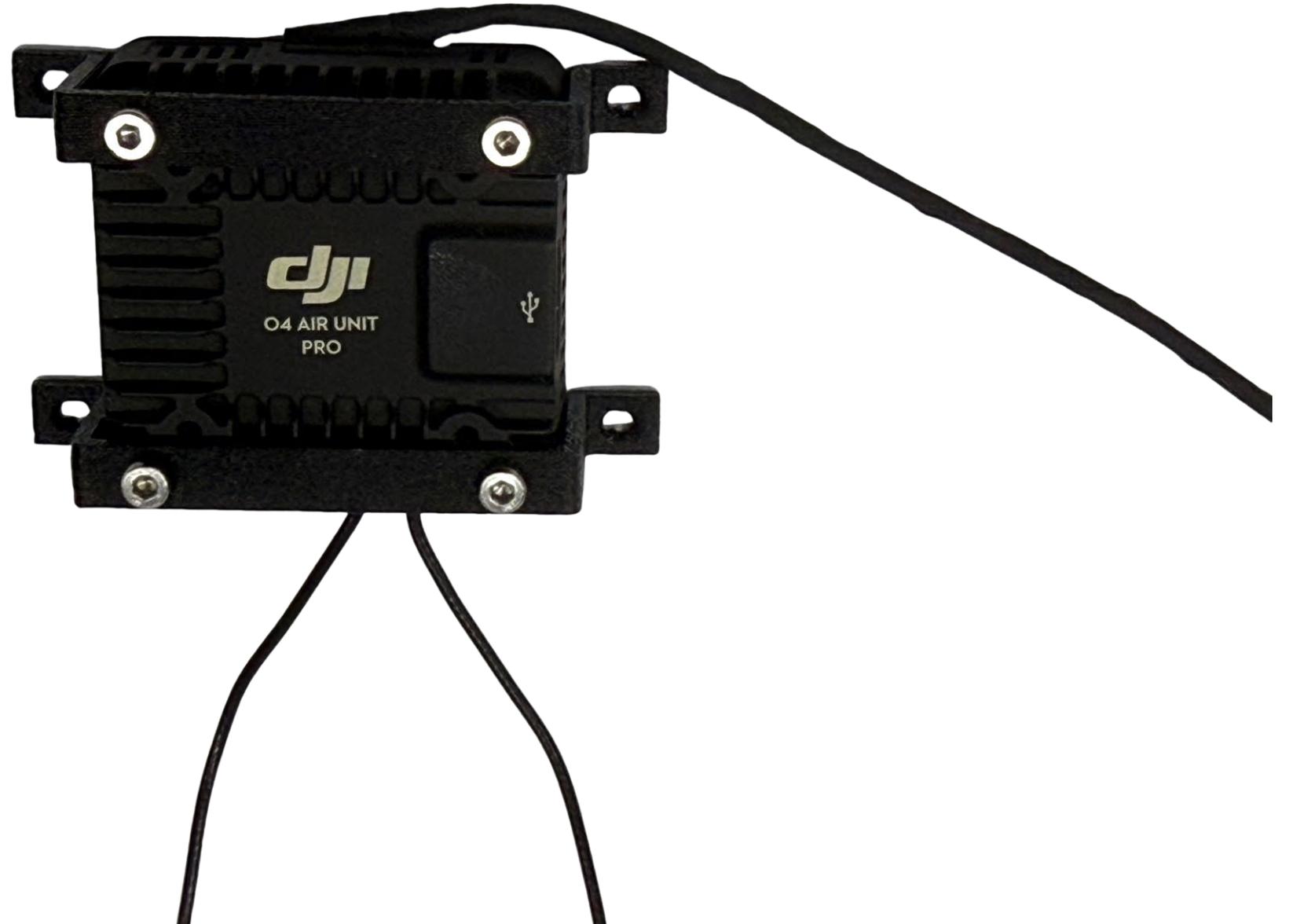
Snap the cover into the cable channel, as shown in the figure.



Install Digital Video Transmission

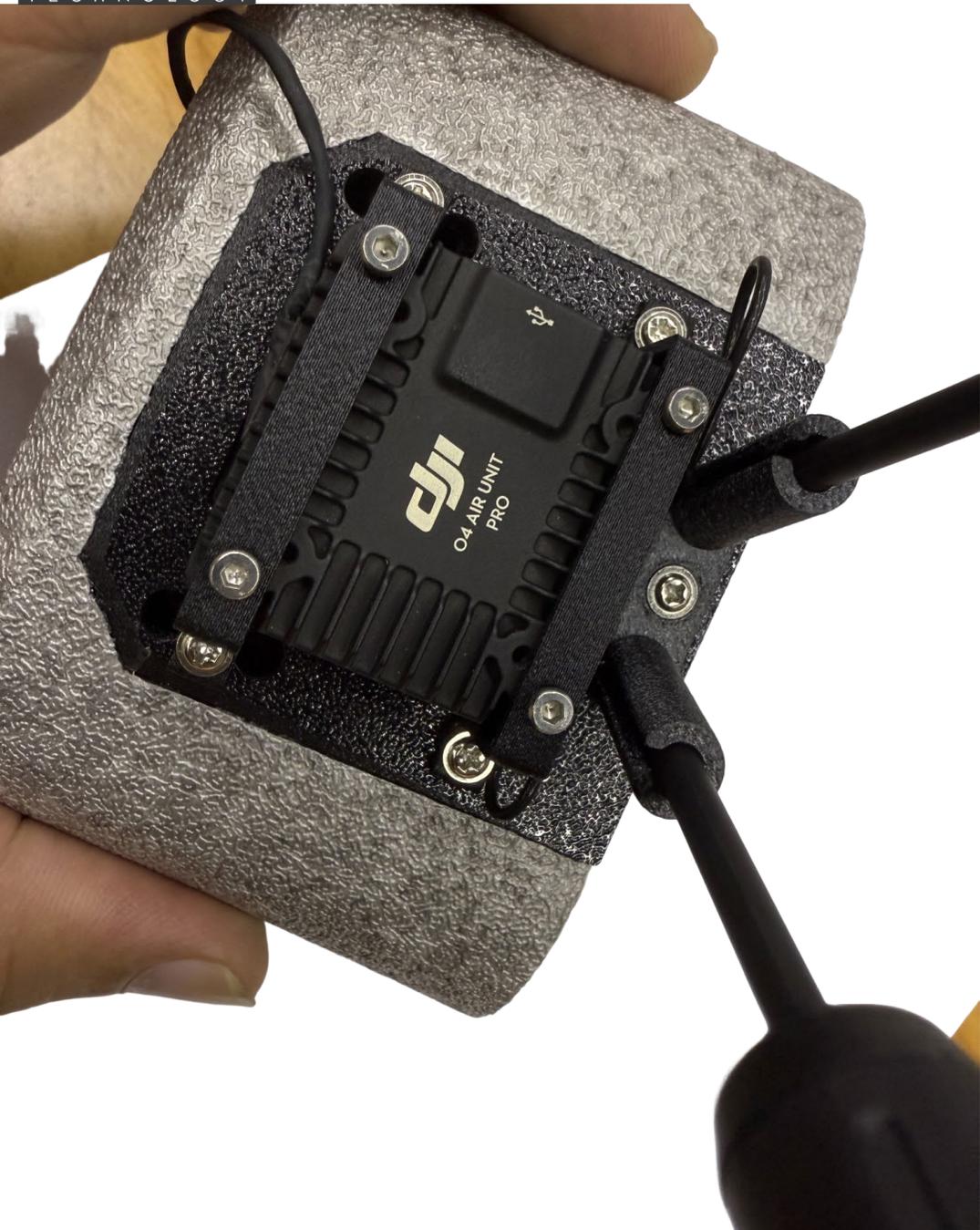
The aircraft nose kit is compatible with most video transmission hardware currently on the market, including DJI O3/O4, Snail, and others; it also supports the XF Robot C20-T gimbal.













After removing the lens mounting bracket, the XF Robot C20-T gimbal mount can be installed.



Install a Heat Sink on the DJI O4 Module

