ADTi 210S User Manual

V1.01   2023.07.01
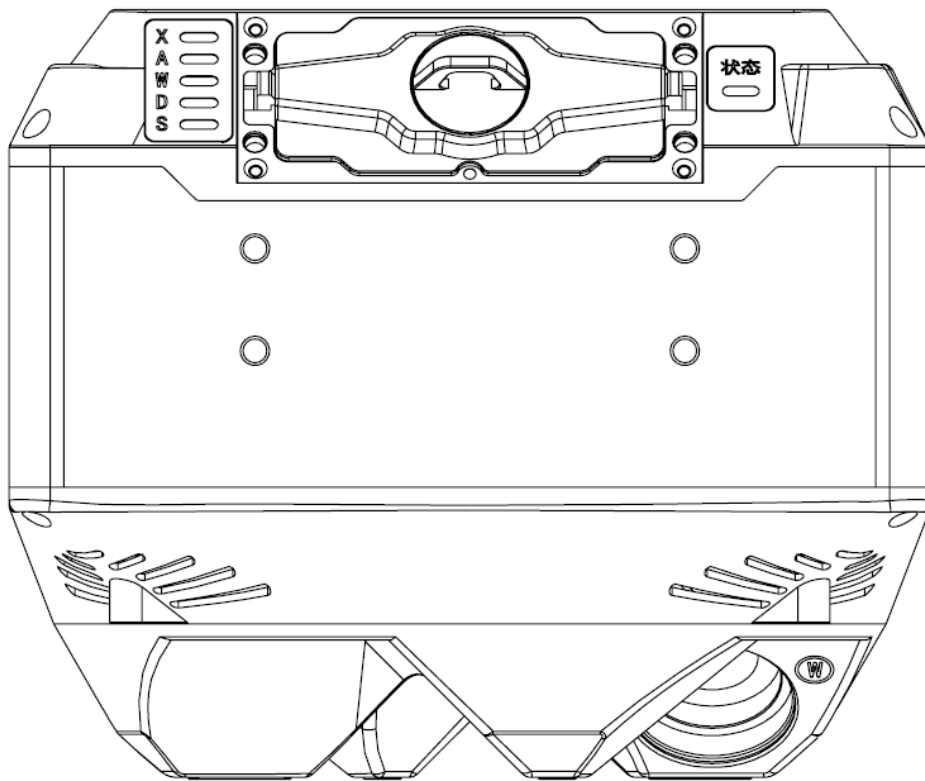
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Product description

product description

ADTi 210S full frame oblique camera is a new generation of 210-megapixel oblique photogrammetric multi-camera 210S. It adopts brand-new technology and process to create a new generation of full-frame oblique camera.
The new generation inter-mirror shutter lens module achieves faster shutter speed and longer shutter life than original Sony curtain shutter has; the 210S is integrated with centralized SD cards hub module that can storage all five sensors image data and transfer them to PC via USB 3.0 cable.

210S has data preprocessing software called Freetop FT-PreData, it can inspect all the field data, assist internal engineering import.

ADTI 210S can be integrated with a three-axis The brushless self-stabilizing gimbal, while achieving a more stable acquisition attitude, the custom angle configuration truly realizes three-axis acquisition without dead angles.

The new generation of 210S is only 135*135*112mm in size and 950g in weight, so that middle size multicopter such as DJI M300 can carry the 210S full-frame cameras.
The 210S, which consists of FIVE 4200-pixel full-frame SONY CMOS sensors, ONE 40MM Nadir-facing lens and FOUR 55MM focal length 45-degree lenses.

item list

Camera body*1
Data storage module*1 (one standard configuration, additional purchase)
TF card*1
Data reader and accessories*1
Data reading interface dust cover*1
Skyport adapter box (optional)*1
Universal intelligent control box (optional) *1
Three‑axis brushless gimbal and accessories (optional)*1
Cleaning kit*1

The main parameters

- CCD (sensor) quantity: 5 sets

- Power supply: DC12-28V, 50W

- Minimum exposure interval: 0.8S

- Camera switch: unified switch

- Exposure mode: signal trigger/protocol trigger

- Parameter setting: One-key setting scene automatic parameter adjustment

- Operating temperature: -10°C to 40°C

- Default focal length: 40mm*1, 55mm*4

- Pixels: 42 million*5

- Image format: 7952×5304

- Pixel size: 4.5μ

- CCD size: 35.9×24mm

- Tilt camera angle: 45°

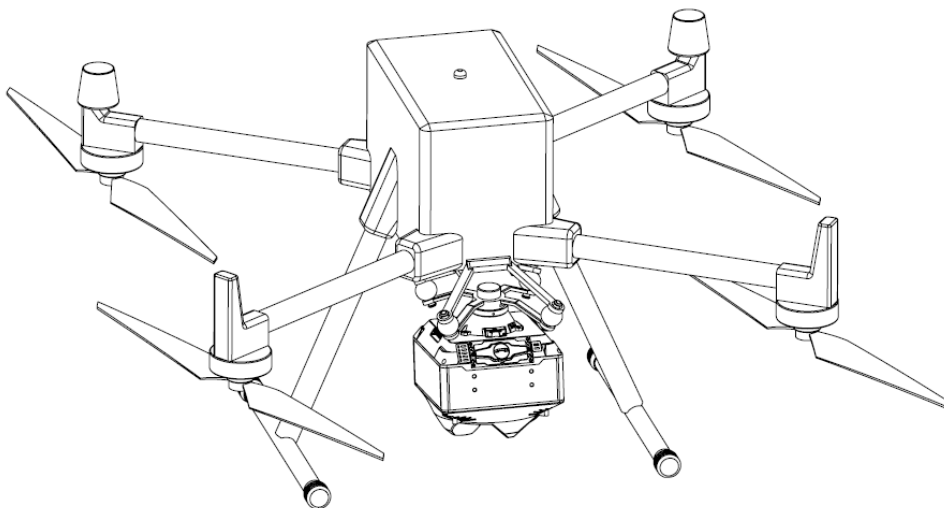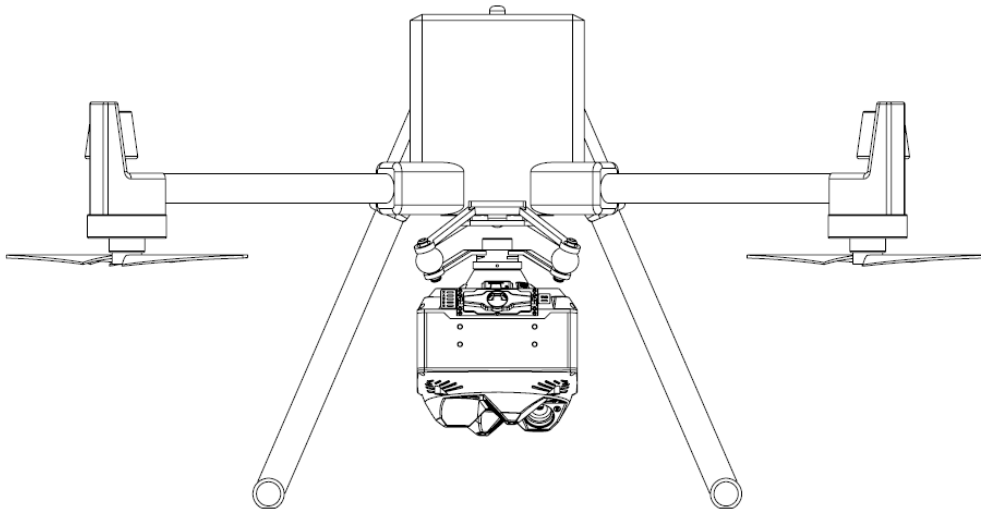- Dimensions: 135×135×112mm

- Total weight: 950g

Installation and use

1. Camera system detail list

Mounting of M300 three-axis self-stabilizing gimbal:
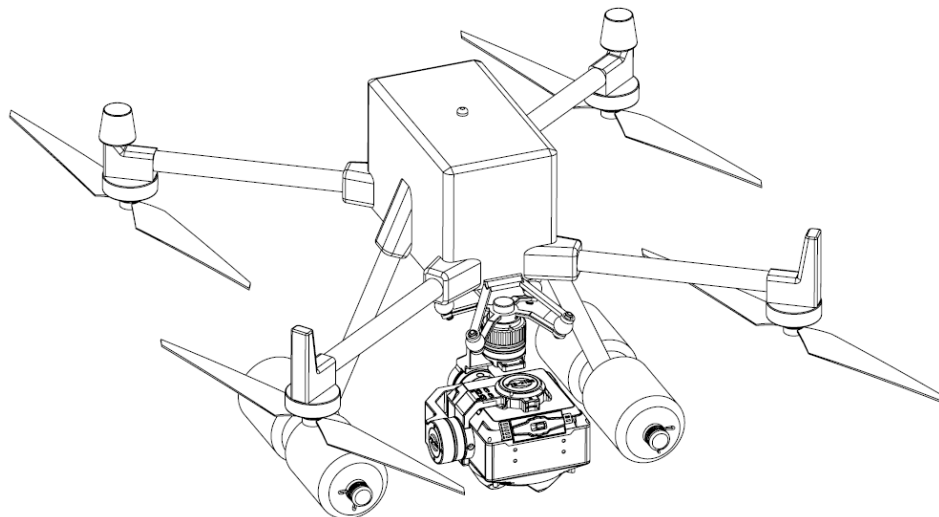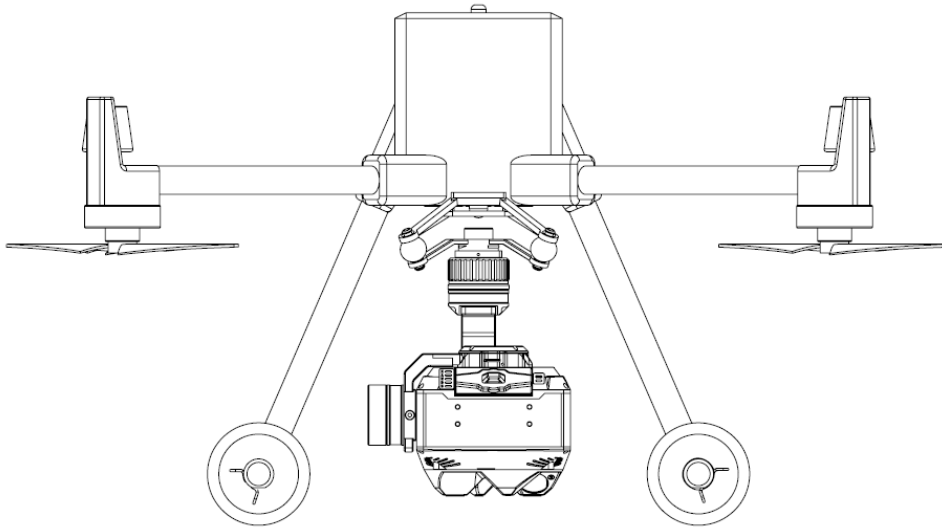
2. M300 SKYPORT adapter mount:

3. Fixed-wing mission storage load:
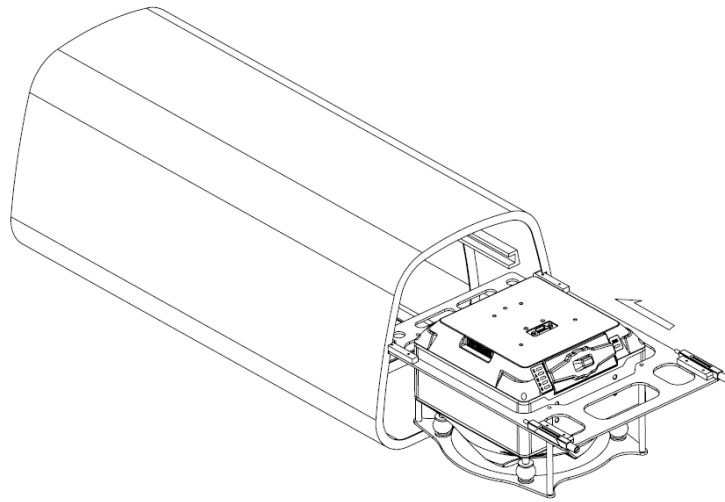
Camera Preparation and Accessories Instructions

Cameras and Accessories

camera body
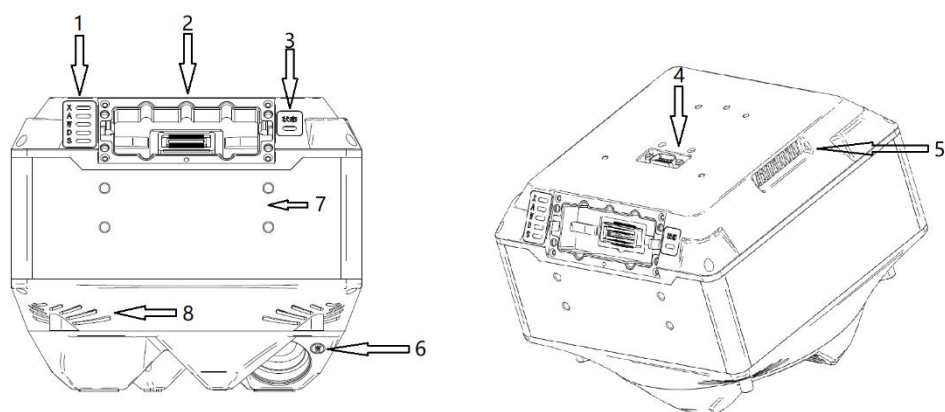
1. Storage indicator light, when the light flashes, it means that the camera is reading and writing the memory card;
2. Storage module installation slot;
3. Camera system status indicator light;
4. camera system socket;
5. cooling vents;
6. sub-camera ID;
7. Dust cover storage;
8. Cooling air intake.

data storage module
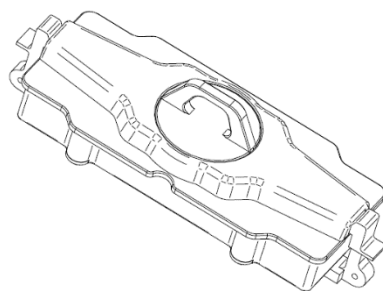
1. This part is an independent functional module, which can be replaced. According to different requirements, there are different specifications of 128G*5 and 256G*5 for

selection;

2. When the module is installed, insert it according to the guide rail, and there will be a popping sound feedback when it is installed in place;
3. When picking it up, turn the knob in the direction indicated by the arrow in the picture below, and the module will pop up automatically, then just pull it out.
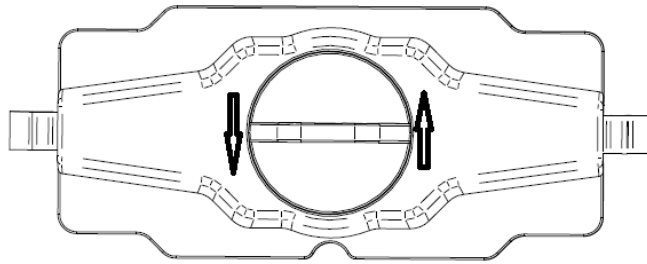
data dump
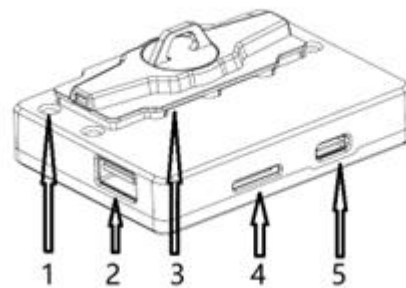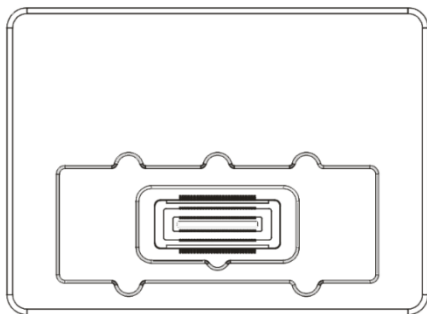
1. The suction point of the dust cover, after removing the storage module, cover the dust cover in time to prevent foreign objects from falling into it;

2. Extended USB 3.2 interface, which is only used to connect downstream devices, such as mouse, keyboard, mobile hard disk, etc., and cannot be connected to PC;
3. Storage module slot, please check that there is no foreign matter in the connector before accessing the storage module;
4. Camera log TF card slot;
5. Connect to the USB TUPE-C port of the PC, which is used to dump data and clean up

the storage module.

Universal voice intelligent control box
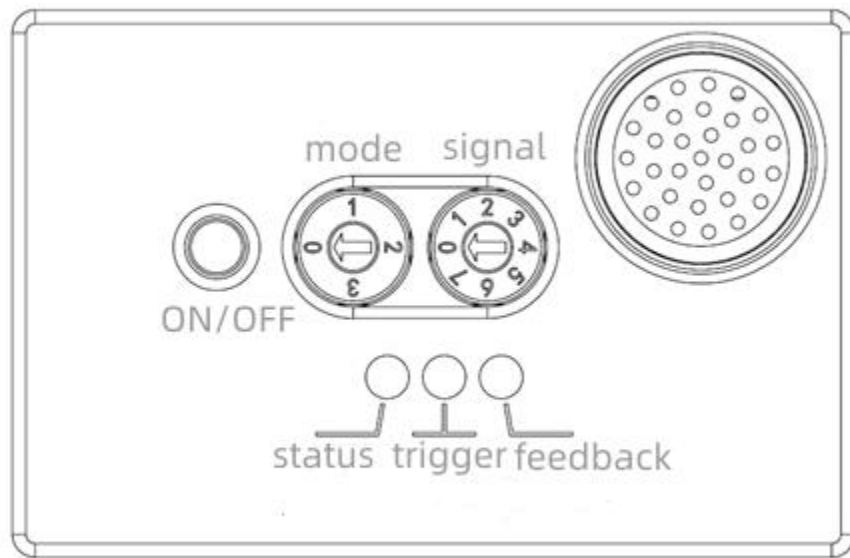
Skyport adapter box
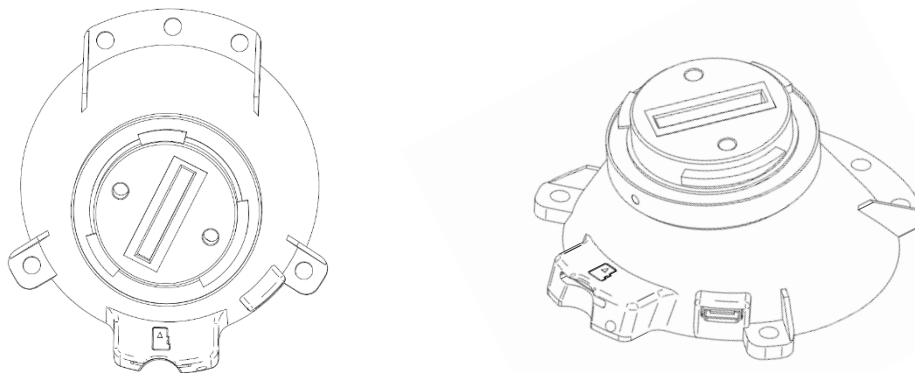
1. Used to mount 210S camera on M300 aircraft;
2. Compatible with conversion of DJI PSDK control p
3. The camera operation log is recorded in the TF car..

Three-axis brushless gimbal
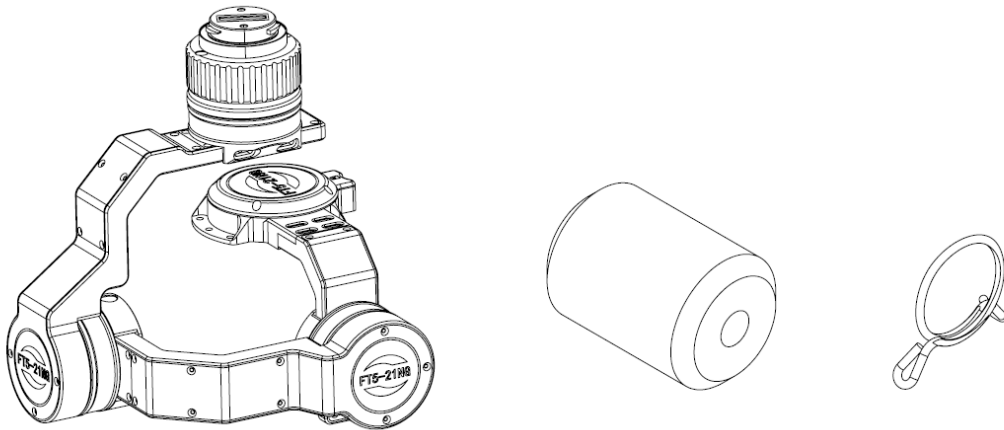
1. The kit includes 1 set of three-axis brushless gimbal main body, 4 heightening foam shafts, and 4 heightening shaft anti-drop clamps;
2. Before installing the gimbal, be sure to install the heightening shaft on the aircraft stand to avoid damage to the camera lens when it touches the ground.

dust cover
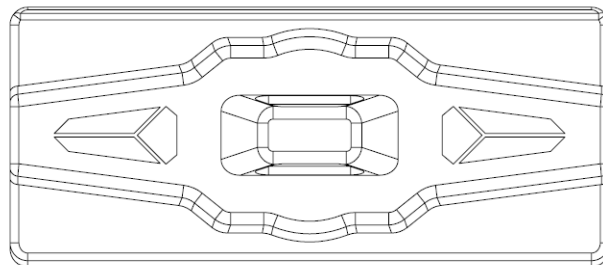
1. The dust cover is used to cover the slots of the camera and the data storage module, to avoid direct exposure of falling foreign objects and damage to the equipment;
2. Magnetic design, the camera and the data transfer device are common, and can be directly snapped and removed:
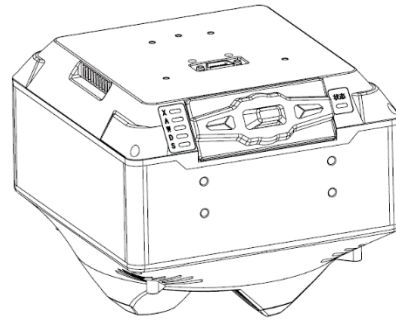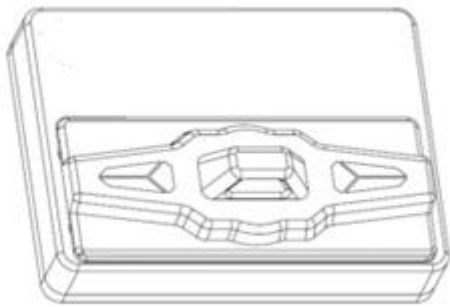
Preparation

1. Use the data transfer device, install the data storage module and log TF card, and clear the data card through 210S-PREDATA software;
2. Press the memory module into the camera according to the limit hole for use.

Use of the wild card version

device installation

1. Make the adapter frame according to the expansion diagram in the attachment or directly open the window on the belly of the cabin. Make sure that the window and screw holes match the size in the figure. For the expansion diagram, see the attachment:
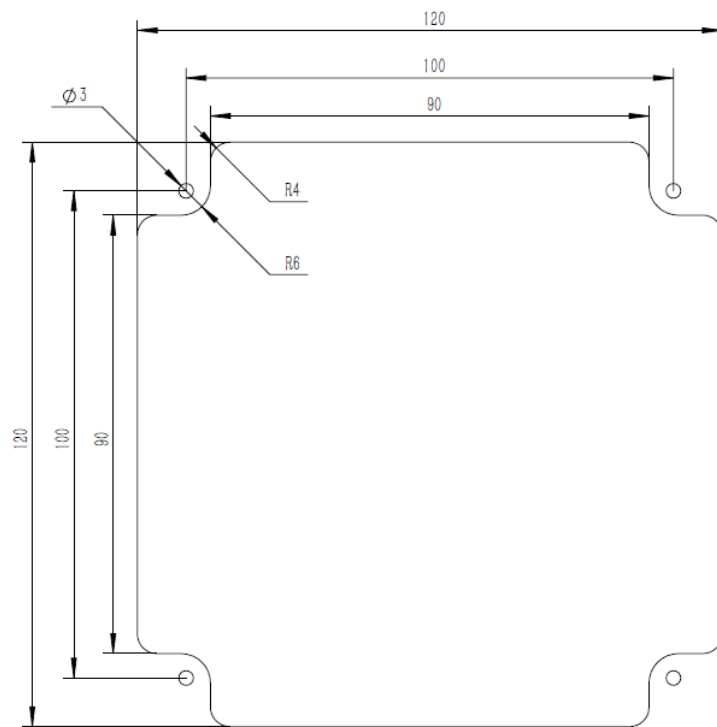
2. Install with the corresponding structural parts of the aircraft through the bottom shock‑absorbing mounting bracket;
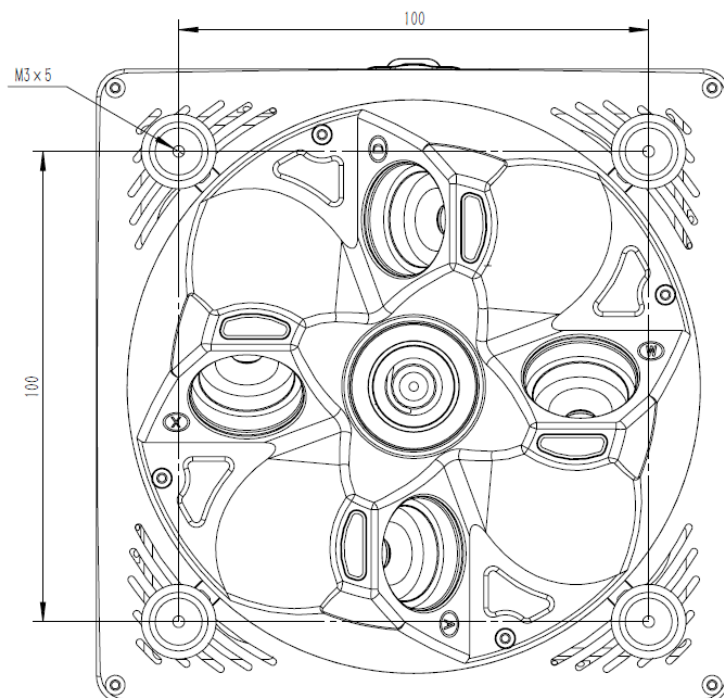
3. Installation example (fixed wing camera mount box installation):
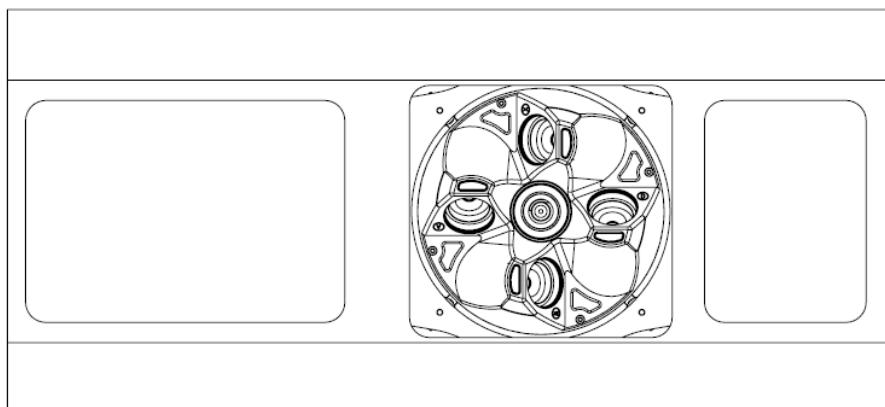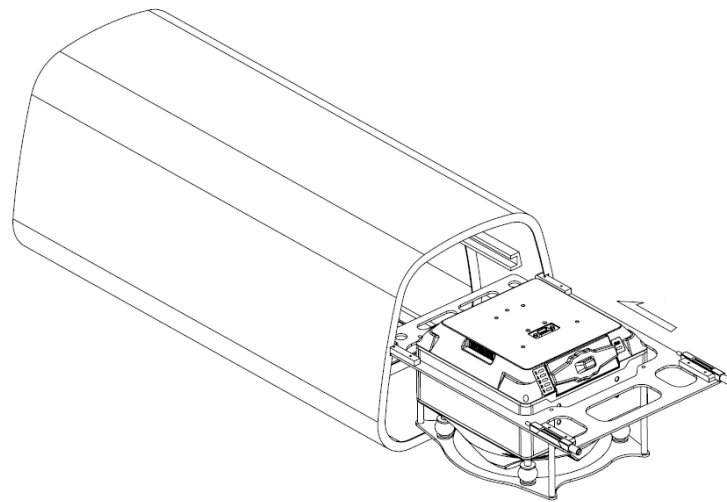
line connection

1. Integrate the aircraft with the camera through the control module;
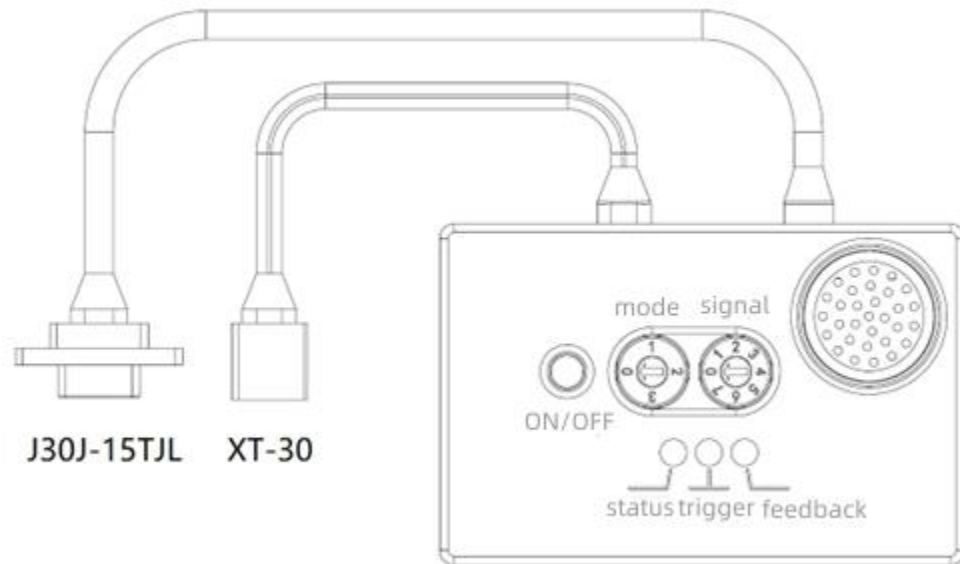
2. Connect the J30-15 plug in the above picture to the corresponding plug on the top of the camera, and fasten the screws, and plug and unplug the interface strictly when the power is on;
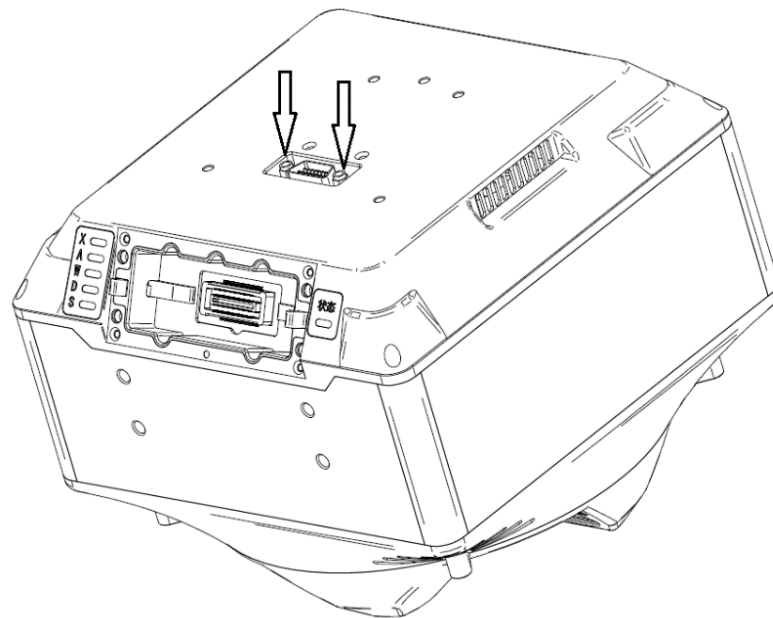
3. XT30 is the power inlet, connected to DC 12-28V power supply, the power supply capacity is not less than 50W;
4. Format the TF into FAT format, and insert the contact point upwards into the module to record the camera work log, as shown in the figure below:
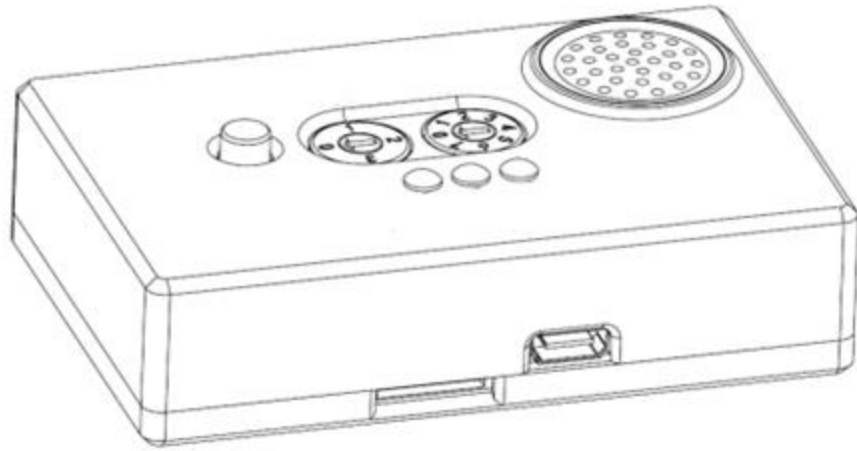
5. Equipped with platform electrical connection port:
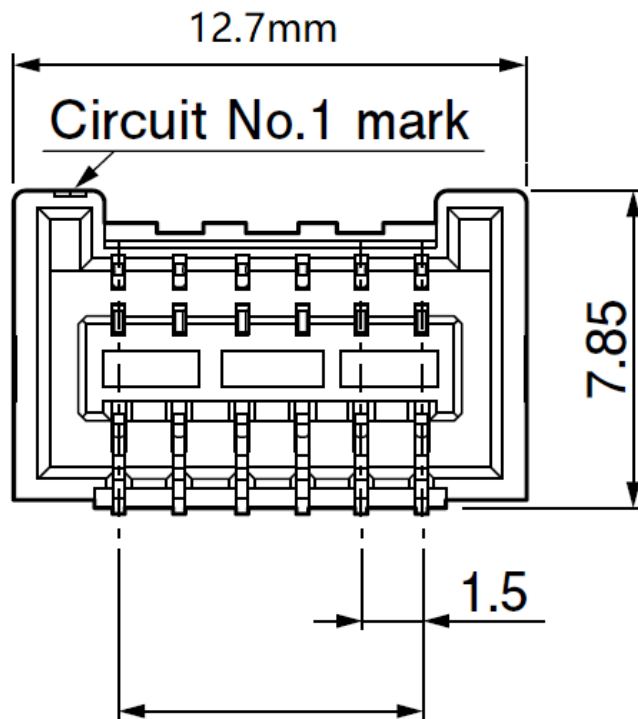
Terminal number table

1	3	5	7	9	11
USART_TX	USART_RX	FB	GND_EX	FB4	FB2
2	4	6	8	10	12
CAN_L	CAN_H	THREE	FB5	FB3	FB1

Signal Description

network	thread color	illustrate	
FB1		A camera independent feedback	Normal high level 3.3V, feedback falling pulse after taking pictures, width 10ms
FB2		X camera independent feedback	
FB3		S camera independent feedback	
FB4		W camera independent feedback	
FB5		D camera independent feedback	
GND_EX	black	ground wire	
THREE	white	trigger signal	3.3V logic voltage
FB	red	Feedback signal	
CAN_H		CAN bus H	3.3V logic voltage
CAN_L		CAN bus L	
USART_RX		Reserved serial port R	3.3V logic voltage
USART_TX		Reserved serial port T	

This port is used to connect the electronic signals of the carrying platform, including trigger (TRI), system feedback (FB), sub-machine independent feedback and communication protocol. The default transfer for regular shipments is MR30 (1-GND, 2-
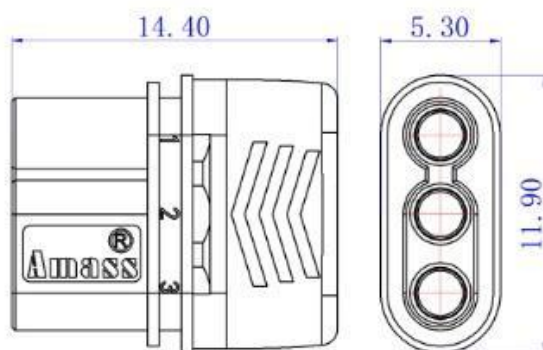
FB, 3-TRI).

MR30(1-GND,2-FB,3-TRI)

If you need other hardware interfaces, signals, and protocol adaptations, please contact our tech services

Use and operation

Control box operation and use

     This version is integrated, and the operation and control of the camera are all done through the smart camera control box. The camera control box controls the camera, configures the camera, obtains the camera status, records the working day of the camera, broadcasts the current status of the camera, and can observe part of the working status of the camera on the camera.

Operation panel description:
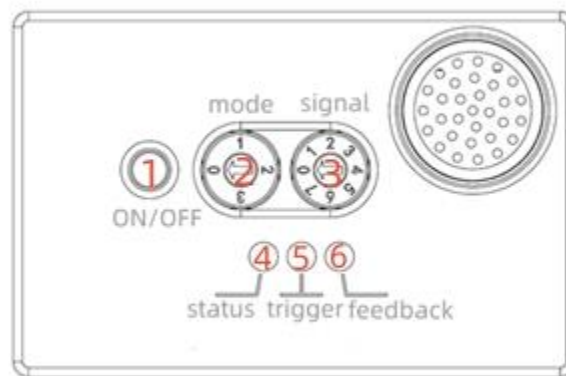
1. Switch button (ON/OFF)
2. Mode selection Knob
3. Trigger mode (SIGNAL) selection Knob
4. Status light

status	Camera Function
always on	Off
Often off	boot status
1 second flashes 1 time	booting
1s blinks 2 times	shutting down

5. The system trigger light, with a trigger signal, flashes once
6. Feedback light, after the camera takes pictures, it will flash once

MODE Knob tuning default parameters

serial number	camera mode	Format	Sensitivity	Shutter speed	Instructions for use
0	MODE M	JPEG	100-800	1000	Fixed wing preferred Use when the light intensity is high on sunny days

1	MODE 1	JPEG	100-800	800	Multi-rotor low-speed flight, that is, it is used when the ground speed is <=12m/s It is recommended to use when the light is low, cloudy, early morning and evening when there is not enough light
2	MODE 2	JPEG	100-800	1250	It is used when the light intensity is high on sunny days and when flying at high speed
3	custom				Customer custom required Contact tech service before purchasing

Trigger (SIGNAL) mode knob function code

serial number	trigger mode	system feedback	Remark
0	High level trigger	High level 10ms	The rising edge is valid, and the high level is kept for 100-200ms
1	Low level trigger	High level 10ms	The falling edge is valid, and the low level is kept for 100-200ms
2	PWM trigger	High level 10ms	Normal 1ms pulse width, trigger state 2ms pulse width maintain 200ms
3	Reserve (custom)		Customer custom required Contact tech service before purchasing
4	High level trigger	Low level 10ms	The rising edge is valid, and the high level is kept for 100-200ms
5	Low level trigger	Low level 10ms	The falling edge is valid, and the low level is kept for 100-200ms
6	PWM trigger	Low level 10ms	Normal 1ms pulse width, trigger state 2ms pulse width maintain 200ms
7	Reserve (custom)		Customer custom required Contact tech service before purchasing

switch machine

boot:

a. After the camera is powered on, the cooling fan turns off after self-test, the buzzer beeps three times "beep, beep, beep", the status light flashes off at the same time, the voice broadcasts the current status, and when the status light is

always on, it enters the standby state one after another, and the camera panel can be operated;

b. Press the button once, "Da" with a long sound of the bee tweet, and the state lights are extinguished at the same time. At this time, the switch is unlocked; press the voice prompt, and press the power button again within 5 seconds. Long press and press the bee twice "Da, Da" to lift the button. The SD card lights flickered, waiting for about 30s until the camera self -inspection was taken to take pictures, the state lights were extinguished, the voice broadcast was turned on, and the camera was in a working state;

c. If the ON button is pressed once, the buzzer beeps once, and the button is not pressed again after lifting it up. After 5 seconds, the button power-on function becomes invalid, the status light turns on, and the camera returns to the standby state.

Note: Do not perform other operations on the camera before the camera completes the self-test and takes pictures, please wait patiently.

shutdown:

a. The camera is in the power-on state, the camera can respond to take pictures, and the status light is off;

b. Press the ON button once, the buzzer beeps once, and the status light flashes once and then turns off. At this time, the switch is unlocked, and the camera no longer responds to the camera command; lift the button, pause for more than 1 second, and within 5 seconds, press the power button again, and press and hold until the buzzer beeps twice, then lift the button, the status light flashes, enter the shutdown process and wait for about 10 seconds. In the machine state, the power supply can be removed at this time.

M300 adaptation version solution use

Skyport installation and connection

1. Insert the PSDK adapter module into the connector on the top of the camera, as shown below:
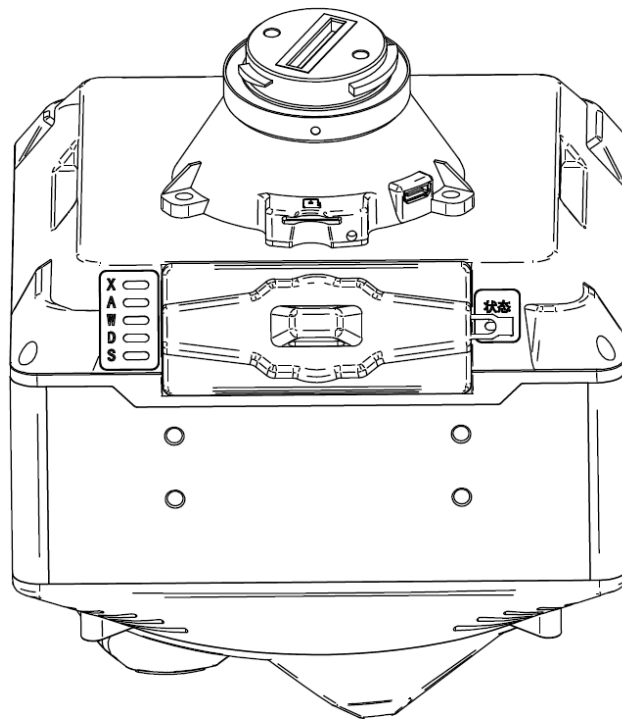
2. Tighten the five mounting screws, as shown in the figure below, the positions are circled by the white silkscreen:

M3 × 6!
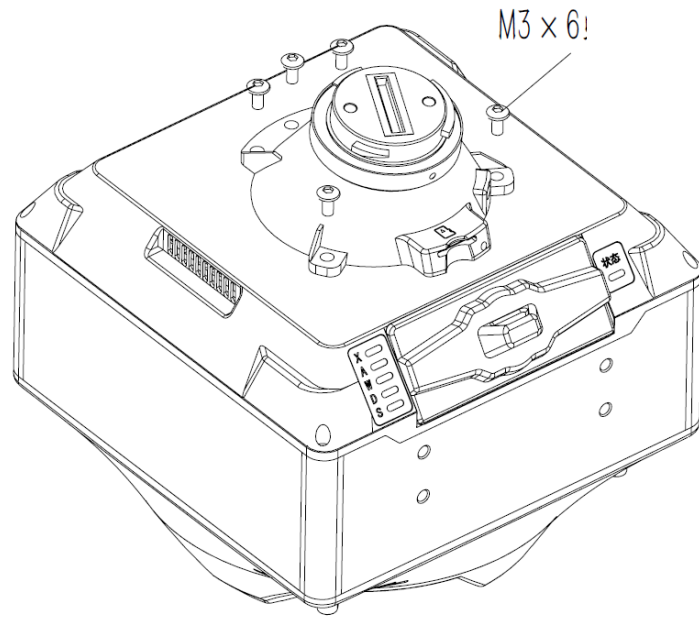
3. If mounted via a three-axis gimbal:

5 PCS M3*6 to hold camera with gimbal
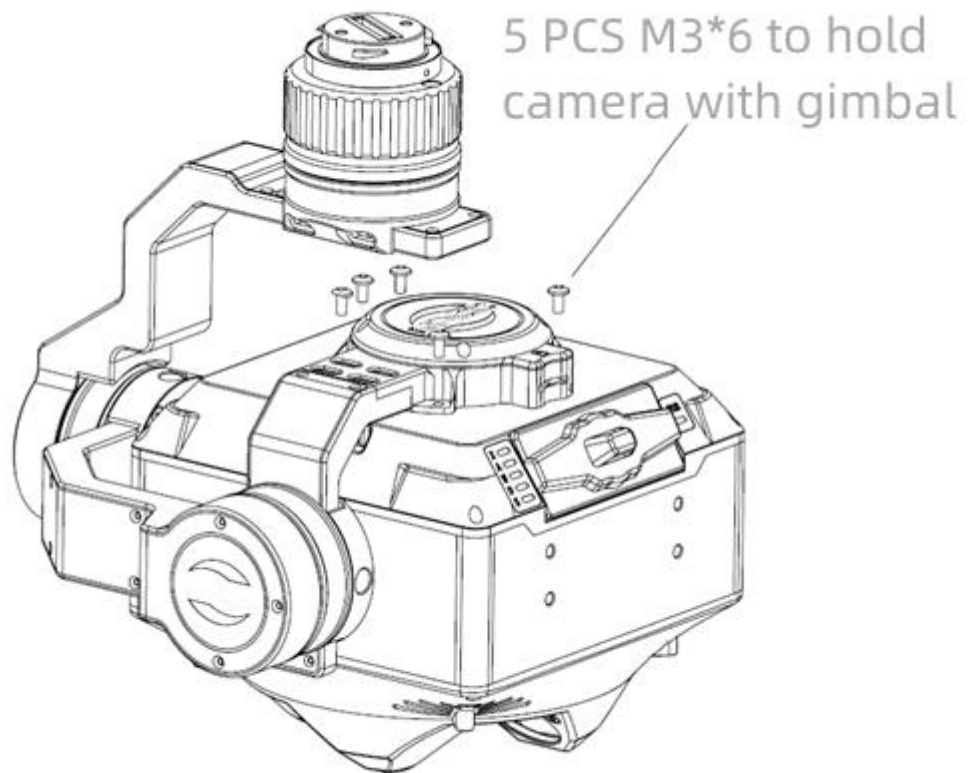
4. Installation of landing gear heightening accessories:
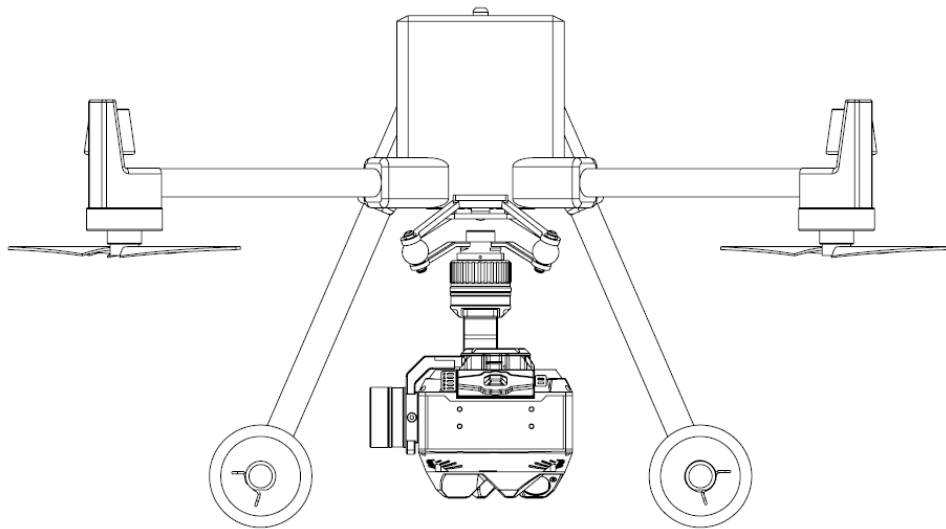
5. Format the TF card into FAT format, insert it into the card slot of the adapter seat in the PSDK adapter box/gimbal camera, and insert the card according to the screen printing on the front of the card slot;
6. Install the load on the aircraft load hanger through the DJI SKYPORT adapter ring;
7. If you are using the aircraft for the first time, you need to use DJI Assistant 2 For Matrice to connect to the M300 and upgrade the firmware of the aircraft. For details, please refer to "M300_RTK_User_Manual"
8. Turn on the M300 remote control, open the PILOT software, and observe whether there is a word FT5 in the lower left corner. If there is, it means that the connection is successful, as shown in the figure below

Use and operation of M300 payload camera

camera configuration

1. Enter the M300 flight route

2. On the new camera page of the aerial map, manually output the resolution, sensor, and focal length information, as shown in the figure below;

3. Enter the flight control interface, open the menu PAYLOAD setting page, as shown below:

4. After the display of real-time data is turned on, the main interface of the remote control will have a floating window displaying camera status information, which will display the switch status, parameter configuration gear, trigger number, number of shots taken by each sub-camera at the time of startup, and gimbal yaw angle YAW (this item will not be displayed if the gimbal is not used);
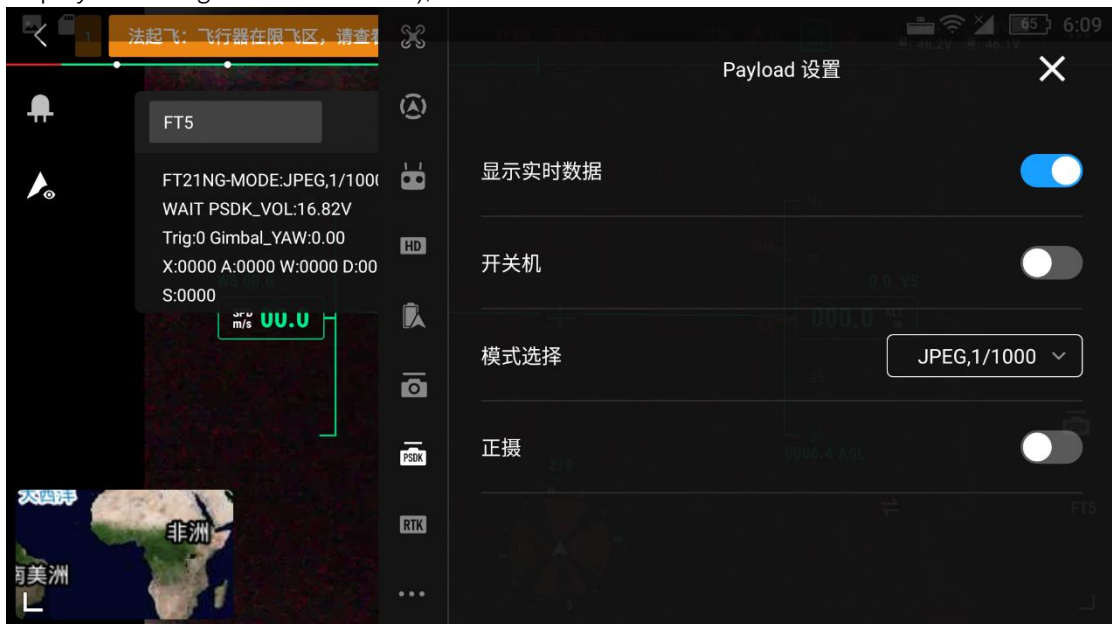
5. Turn on and off the switch item on the PAYLOAD setting page, wait for about 30 seconds after turning on the machine, and the camera will start self-test and take pictures;

6. The camera mode corresponds to different parameter configurations;
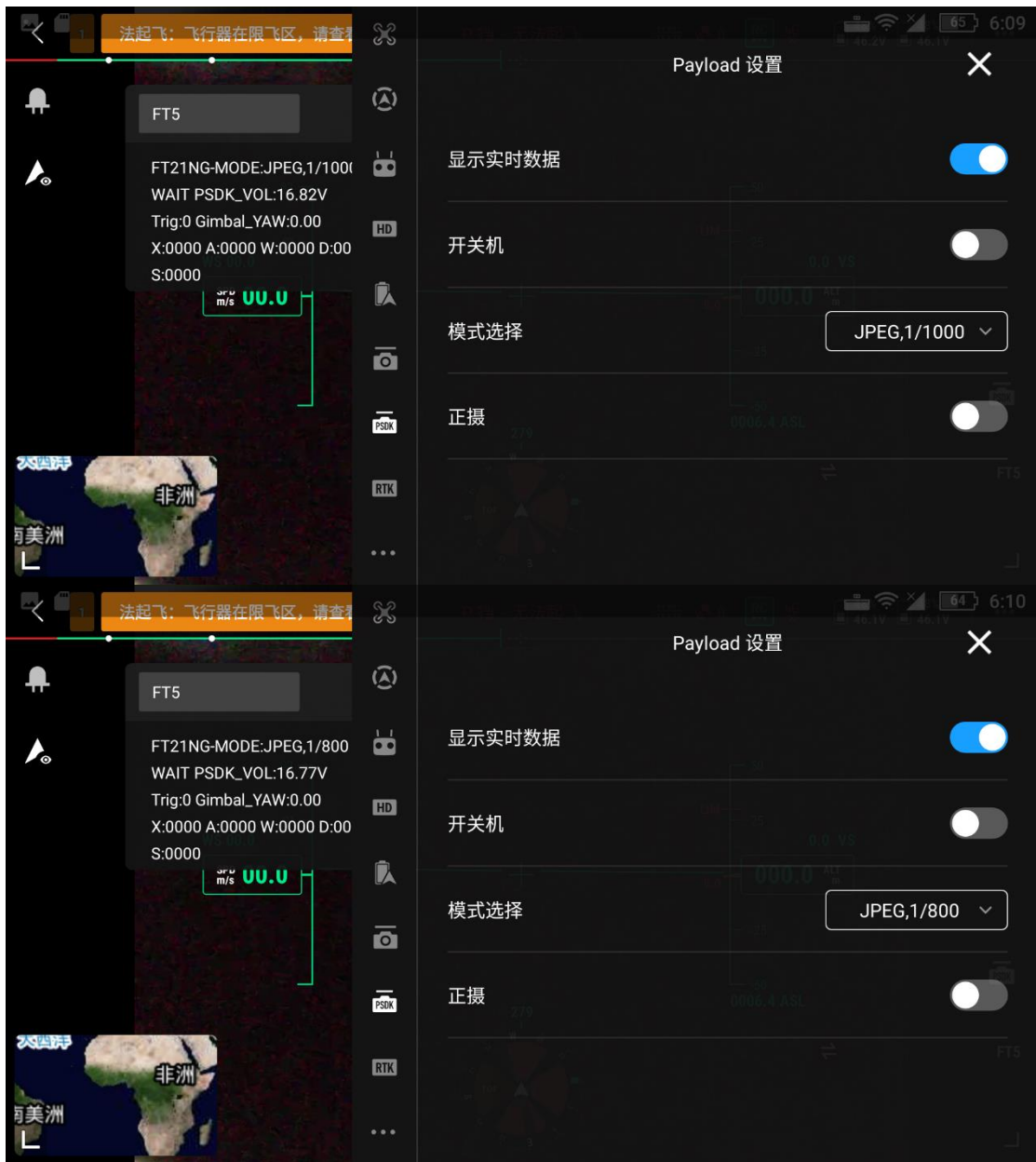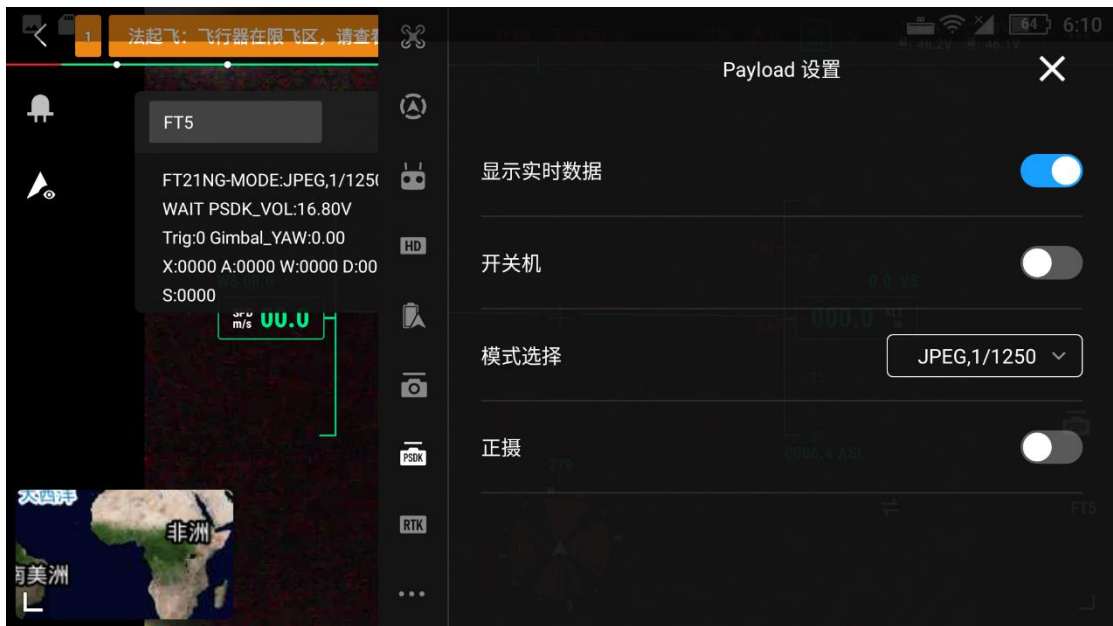
serial number	camera mode	Format	Sensitivity	Shutter speed	Instructions for use
0	M	JPEG	100-800	1000	
1	1	JPEG	100-1600	800	
2	2	JPEG	100-800	1250	

After starting up, you must select the required operating parameters in the PAYLOAD setting page - mode selection column according to the operating conditions.

7. Front camera switch, when the front camera is turned on, only the downward-looking (S) camera will take pictures.

Three-axis gimbal use

1. After the M300 recognizes the gimbal, the gimbal setting menu is as follows:

2. Control the gimbal through the thumbwheels on the left and right shoulders of the remote control:

控制云台

使用左右拨轮可分别控制云台俯仰和平移方向的角度。

	左拨轮用于控制云台俯仰角度。顺时针拨动拨轮，云台向上转动。逆时针拨动拨轮，云台向下转动。
	右拨轮用于控制云台平移角度。顺时针拨动拨轮，云台顺时针转动。逆时针拨动拨轮，云台逆时针转动。

3. Use the compass on the remote control display as a reference, point the aircraft head to the north, and the heading angle displays "000", then adjust the gimbal to the neutral position through the dial, click "Reset gimbal parameters" in the gimbal setting menu, and the gimbal position is accurate:
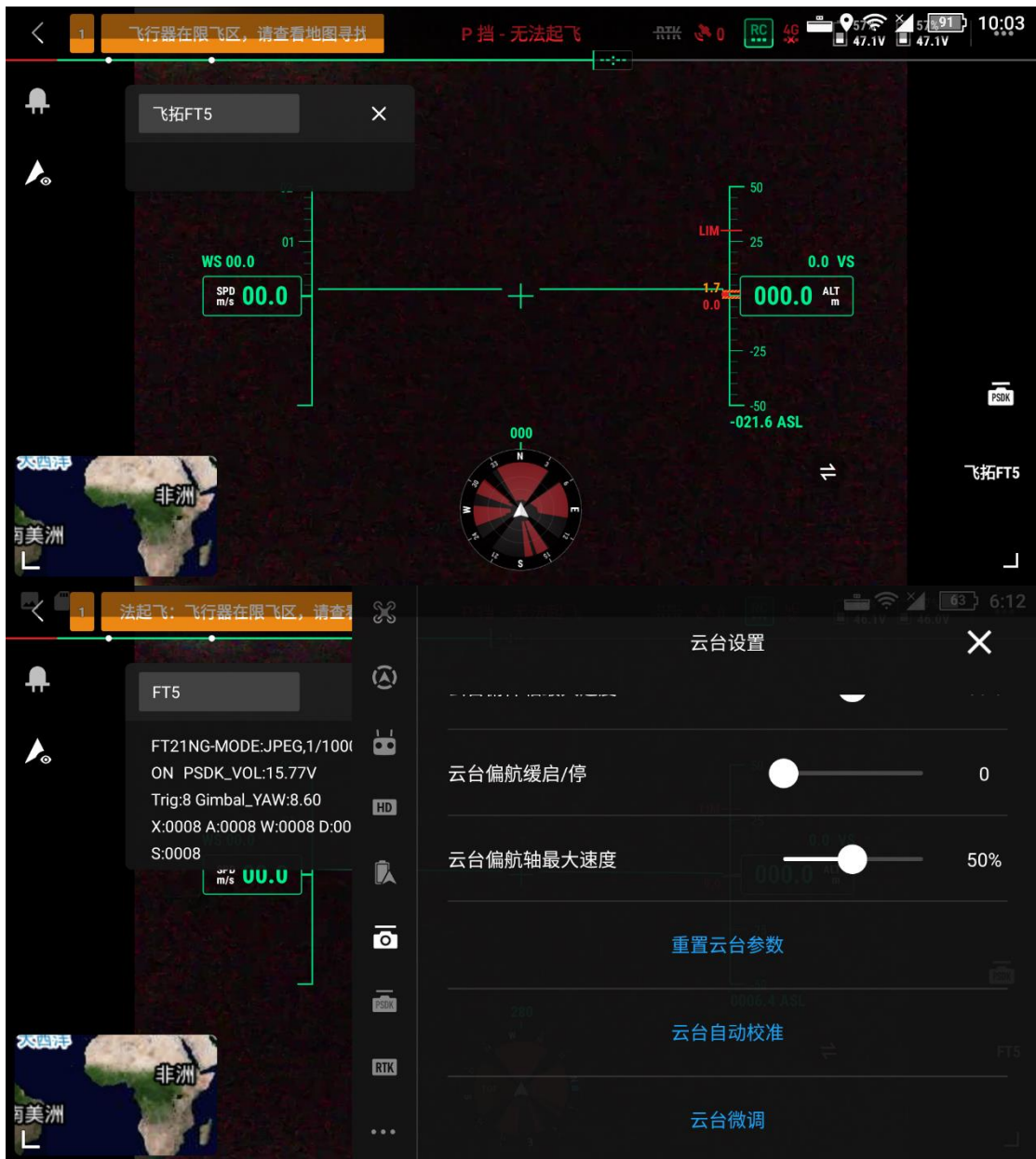
4. Use the dial to adjust the gimbal to the desired angle, change the gimbal mode to follow mode, and you can fly:

5. In case of special circumstances, when the route task cannot set the photo point, it can automatically take pictures at regular intervals, as shown in the interface shown below;

a. Single shot: After sending the camera command, the camera takes a single photo;

b. Continuous shooting: This function has no use scene, so it is closed and no operation is required;

c. Timed photo taking: When a photo taking command is issued, the camera will take a specified number of photos according to the specified time interval. Currently supports 1/3/5/7/10/15/20/30 second intervals;

d. When the collection starts, the remote control manually triggers the timing photo. After the collection is completed, manually turn off the timing photo.

Post-flight operations and data collation

rollover preparation
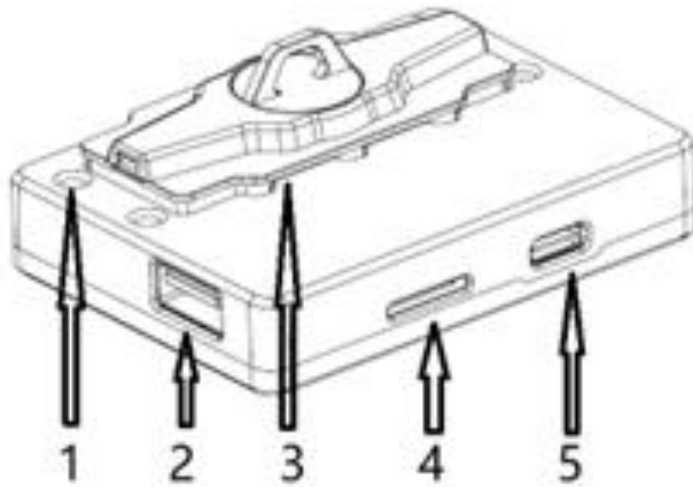
1. Insert the data storage module (marked 3 in the above picture) and log TF card (marked 4 in the above picture) into the corresponding positions of the data transfer device, and connect the TYPE-C (marked 5 in the above picture) to the computer through the USB cable:
2. If there is no other memory module installed in the camera, please cover the dust cover on the camera memory module slot to prevent foreign matter from entering:
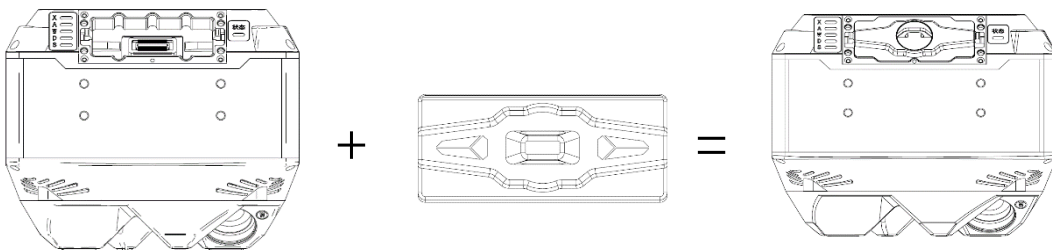
3. The HUB USB3.0 port (marked 2 in the above figure) can be used to connect extended USB devices such as mouse, keyboard, and USB storage device, but it cannot be connected to the USB port of a PC/MAC computer.

Operations related to data dump

See "ADTI 210S User Mnual" for details.

log lookup

1. After the flight is over, pull out the TF card from the module (wild card, PSDK), and check the csv file named by date and time in the LOG folder through the card reader;
2. Description of the main information of the log content:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	number	trig	fb	time	latitude	longitude	altitude	relativeHe	pitch	roll	yaw	heading	temp_sys	volt_sys
2	0	1	1f	2022-09-1	39.9265	115.8256	631.9393	0.04364	0	0	-75	194	32.60℃	16.92V
3	1	2	1f	2022-09-1	39.92247	115.8259	1126.114	494.2105	-1	-1	72	340	37.60℃	16.93V
4	2	3	1f	2022-09-1	39.92252	115.8261	1120.057	483.3558	-11	-2	73	343	37.60℃	16.98V
5	3	4	1f	2022-09-1	39.92261	115.8265	1108.834	473.6099	0	-1	73	344	37.60℃	16.93V
6	4	5	1f	2022-09-1	39.92268	115.8268	1099.756	463.711	-3	0	72	343	37.60℃	16.91V
7	5	6	1f	2022-09-1	39.92275	115.8271	1090.73	453.8812	-3	-1	72	342	37.60℃	16.96V
8	6	7	1f	2022-09-1	39.92285	115.8275	1078.725	443.7396	-5	-1	73	342	37.60℃	16.89V
9	7	8	1f	2022-09-1	39.92292	115.8278	1069.769	433.8282	-4	-1	73	343	37.60℃	16.82V
10	8	9	1f	2022-09-1	39.92294	115.8279	1066.8	429.2401	-1	0	73	343	37.60℃	16.93V
11	1	10	1f	2022-09-1	39.9233	115.8266	1045.836	413.9573	-1	1	-107	163	39.30℃	16.91V
12	2	11	1f	2022-09-1	39.92325	115.8264	1049.043	418.8294	-12	0	-106	163	39.30℃	16.82V
13	3	12	1f	2022-09-1	39.92317	115.8261	1052.89	423.3614	-8	0	-106	162	39.30℃	16.96V
14	4	13	1f	2022-09-1	39.92309	115.8257	1057.156	427.4476	7	0	-107	162	39.30℃	16.81V
15	5	14	1f	2022-09-1	39.92302	115.8254	1060.836	428.9661	-10	16	-72	188	39.30℃	16.94V
16	6	15	1f	2022-09-1	39.92319	115.8252	1057.077	423.1246	-11	0	-35	234	39.40℃	16.95V
17	7	16	1f	2022-09-1	39.92339	115.825	1052.359	417.9979	14	1	-34	235	39.40℃	16.96V
18	8	17	1f	2022-09-1	39.92354	115.8249	1048.888	415.7535	1	23	19	270	39.40℃	16.81V
19	9	18	1f	2022-09-1	39.92363	115.8251	1043.589	409.7366	-13	2	72	342	39.30℃	16.94V
20	10	19	1f	2022-09-1	39.9237	115.8254	1038.667	404.0274	-6	2	73	343	39.30℃	16.81V
21	11	20	1f	2022-09-1	39.92378	115.8258	1033.201	398.4495	-7	1	73	343	39.30℃	16.90V
22	12	21	1f	2022-09-1	39.92386	115.8261	1027.754	392.8497	-8	1	72	342	39.30℃	16.96V
23	13	22	1f	2022-09-1	39.92394	115.8265	1022.369	387.0831	-7	1	72	343	39.30℃	16.88V
24	14	23		2022-09-1	39.92401	115.8268	1016.981	381.5401	-6	1	73	343	39.30℃	16.96V

Header	name	illustrate
number	LOG count	Each trigger records 1 record, the ground test shot number is 0, and starts to accumulate from 1 after takeoff
trig	trigger count	When the task triggers counting, the counting starts from 1, and the ups and downs occur in the middle without interruption, and the counting remains continuous
Fb	feedback sign	This count is in hexadecimal, converted into binary, the lower five digits represent the shooting situation of each camera that is triggered at the time, 11111 corresponds to SDWAX from high to low, 1 means taking pictures, 0 means not taking pictures when triggering
Time	date time	1. The universal version module does not have the internal clock of the system 2. PSDK version for aircraft GPS time
Latitude	latitude	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file 2. PSDK writes directly after reading from the aircraft
longitude	longitude	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file

		2. PSDK writes directly after reading from the aircraft
altitude	GPS altitude	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file 2. PSDK writes directly after reading from the aircraft
Relativeheigh	Height to ground	in meters
Pitch	pitch	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file 2. PSDK writes directly after reading from the aircraft
Roll	to roll	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file 2. PSDK writes directly after reading from the aircraft
Yall	yaw angle	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file 2. PSDK writes directly after reading from the aircraft
Heading	Heading	1. The content of the wild card version is empty and needs to be obtained from the aircraft POS file 2. PSDK writes directly after reading from the aircraft
Temp_sys	system temperature	The camera system board reads the temperature
Volt_sys	System input voltage	Camera Input Power Voltage

3. If the wild card version is placed for a long time, the clock must be checked;
4. In the PSDK version, when the aircraft fails to search for satellites successfully, there are deviations in time and GPS information, but it is normal after searching for satellites.

Attachment 1: 1:1 Rubbing Map of Field of View

Window and Positioning Hole

*Note: You can print this page on A4 paper at a ratio of 1:1, rubbing and opening holes. Before opening, please measure and check whether the expansion space is consistent with the mark. If not, please check the printing settings. The original file "FT5-21NG fixed wing opening plate.pdf"