

Map interface description

Click to switch the map thumbnail to the map interface.



27. Map style switching

Click to change the map display style between normal map and satellite map.

28. Orientation lock

Click to lock the mobile device map orientation. After locking, the orientation on the map is always facing north.

29. Toolbox

Click to use distance/area measurement functions.

30. Positioning

Click to see the current position of the aircraft.

31. Camera interface switching

Click to switch to the camera interface.

32. Point marking and positioning

Click to mark a point on the map center.

b) Point marking on the map interface: Click to mark a point on the map center. After selection, the interface will display the point position name and number, aircraft altitude (namely, the aircraft altitude while recording the point), relative altitude, altitude, and latitude and longitude.

The selected point can be edited as follows:

1. Set the point as HOME point. 2. Edit the point position, including its name, latitude and longitude, altitude, and marked color. 3. The point can be deleted.

After entering the editing status, the point position can be changed by dragging it on the map

- The App interface language must be the same as the mobile device's system language. To change the interface language, please change the mobile device's system language first.
- The interface shown varies slightly depending on the payloads.
- The App interface and function will be updated continuously. Please refer to the latest version.

Advanced networking mode


Introduction

The S400E supports an advanced networking mode which is suitable for controlling one aircraft using multiple remote control terminals and controlling several aircraft with one remote control terminal. Based on the equal weight design principle (in other words, the roles of multiple remote controllers are not distinguished), after pairing is finished, all remote controllers can establish flight control over the UAV. During operation, the pilot can assign flight control over the aircraft and view display control as required to allow the user to be more focused and efficient during operation. There are two types of control operation parameters: Flight control and view display control. When a remote controller has the flight control assigned to it, it can control the flight; when the remote controller has the view display control assigned to it, it can display the real-time view of the current aircraft.

Setting of the advanced networking mode

Before using the advanced networking mode, it is necessary to set the pairing of the remote controller and UAV respectively. Refer to the steps below:

Build a network in networking mode:

1. Select one set of one-to-one-paired aircraft and remote controller (if the aircraft is not paired with the remote controller, please pair it based on the one-to-one pairing mode);
2. Run the GDU Flight II App and click “” to enter the “Settings” interface and “Remote Controller Settings” interface;
3. Enter the Level 2 page in Advanced Networking mode. In the “Networking Mode” drop-down list, select the required Networking Mode (default: 1-to-1 mode);
4. After switching the Networking Mode interface, an empty gray node icon will appear on the App networking interface. Operate other nodes (remote controller or aircraft) to be added to the network; enter the pairing status and click the empty node on the App networking interface; a prompt stating “Paired sent successfully” will appear on the App networking interface;



5. When the network receives the addition of an empty node, the original remote controller will be temporarily disconnected. When the empty node is added, check the topology icon of the Advanced Networking mode interface in the App. If it is green, this indicates that the network connection was successful and the device is online.




Advanced networking description

1. Ensure that the first remote controller has been paired and connected to the aircraft. By default, the remote controller connected first has the control right over all devices (flight control right, view display control right), and the remote controller connected later can be repaired after the remote controller connected first assigns an unpaired node position.
2. When the remote controller has authorization to control devices (aircraft, gimbal camera, view display), it can control the device using the control stick, dial, shortcut key, UI icon, and other functions. The usage method is the same as using the remote controller alone.
3. The user can click to select the aircraft to be controlled and obtain the flight control permissions and view display control right over this aircraft. They can press and hold the aircraft to be controlled to only obtain the flight control right. Only a remote controller with flight control right can enable the function to return or cancel the return.
4. By default, the Advanced Network icon on the Flight Control interface is in the Networking Mode (namely, one remote controller controls one aircraft). In addition, this icon is not displayed. This icon is displayed in the non-default Networking mode to obtain the number of specified aircraft in the current Networking mode (including online, offline, and unpaired statuses).
5. In multi-control operation scenarios, when one remote controller loses communication with the aircraft, a message notification will be triggered. The user can manually select whether to take over the flight control rights. When the online remote controller opts not to take over the flight control rights, the aircraft will execute the lost communication solution. When the online remote controller fails to make a decision within specified time, the aircraft will also execute the lost communication solution.
6. During flight operation, when a remote controller that has lost communication is connected to the aircraft again, it is defaulted to have control over all devices.
7. All remote controllers can set the operation of devices related to flight, including flight control software, sensing system, battery, and video transmission settings provided that the flight control permission has been granted.
8. When no operation mission is being executed, the node can be removed by pressing and holding the paired node on the "Networking Mode Settings" page. After the node is removed, the node position will be adjusted to be unpaired, and the device's networking status will be reset. To pair the device again, a paired remote controller is required to specify an unpaired node position and connect the node to the network again after pairing.
9. When no operation mission is being executed, the networking mode can be set on the "Networking Mode Settings" page. When the number of devices in setting mode decreases, and this type of node has been connected to all corresponding device, it is required to manually remove excessive node devices to finish the mode switch; when the number of devices in setting mode increases, the total number of devices is restricted to 2-3, including the aircraft and remote controller.
10. The node type, node number, and node sequence in the Networking Mode cannot be changed.
11. When all nodes in the Networking Mode are paired, the device cannot be connected before specifying an unpaired node; however, the remote controller in the first node can be replaced for connecting through the default remote controller pairing mode. This is Applicable to initial pairing, a lost remote controller, and other scenarios.

Description of video transmission

The S400E aircraft adopts the professional video transmission technology developed by GDU that supports dual-channel 1080p video transmission and the operation of a single remote controller or multiple remote controllers

 • The video transmission resolution is limited by the output capacity of different payloads. Please refer to the actual display.

Advanced network connection function

Operation interface description:



By default, there is no control right, and only the images can be viewed.



Double click to gain/cancel the control right (with a small green remote controller icon appeared) so as to control the selected aircraft. By default, there is no control right, and only the images can be viewed.



Press and hold to lock/unlock the control right (with a small golden lock appeared), so as to lock the control right. Then, the remaining remote controllers cannot be obtained.

Mission flight

On the home page of the APP,entering the route mission list by clicking Mission Flight, you can view the created missions, or create new route flight, 2D flight, 3D flight and waypoint flight missions. All four route missions can be directly planned and generated through the APP. The mission flight function is illustrated by taking the route flight mission as an example.







Waypoint flight

Click waypoint flight to select the track mission in the mission list so as to execute the track mission; or create a new flight route mission.



Click the map to add waypoints, then set the flight route and waypoints.

1. **Clear flight route**
 : Click to clear the added flight route.
2. **Delete waypoints**
 : Click to delete the currently selected waypoint.
3. **Expanding / closing**
 : Click to expand / close the taskbar.
4. **Edit mission**
 Click to edit the flight route name (the aircraft is displayed as GDU-S400E) and set the payload selection and altitude mode.
5. **Flight route editing**
 Edit the entire flight route including speed, altitude, aircraft's course angle, gimbal control, completed mission action, shielding control stick, return type, out-of-control action and estimated takeoff point.
6. **Waypoint editing**
 Select the waypoint to be edited, and set a single waypoint. Waypoint settings include speed, relative takeoff point altitude, aircraft course, waypoint type, gimbal pitch angle, waypoint action and longitude / latitude.
7. **Flight route information**
 Displays the flight route length, estimated time, number of waypoints and number of estimated photos.
8. **Flight**
 Click to access the UAV status inspection list in App and check the parameters and flight status. Click "Start flight" to execute the current flight route mission.
9. **Mission saving**
 : Click to save the current parameters and create a flight route.


Aircraft point position collection

Click "Flight Route Flight" - "Aircraft Point Collection" to enter waypoint editing.

When the aircraft's takeoff altitude is above 10 m, click the Point Collection icon to record the aircraft's current latitude, longitude, and altitude as the waypoint. The App will calculate the flight route length and estimated flight time based on the number of waypoints.

Enter mission flight and select a flight route to import in the top right corner.

1. Generate files in XML, KML or KMZ format through the platform, and import the files into the mobile device file folder.
2. Select the required file and import it into the mission list to enter offline waypoint editing.

-  • When the user selects to respond to lost communication, please enter Flight Settings to set lost communication.
- When the user selects not to respond to the lost communication settings, if the aircraft and the remote controller cannot communicate normally, the flight track mission can continue.
 - Complete the execution.
 - During the aircraft point collection, the aircraft altitude is above 10 m.
 - When the aircraft is in "A" mode, it is unable to automatically return or land; if the aircraft enters "A" mode during auto return or auto landing, it will automatically exit auto return or auto landing.

Flight

This chapter introduces flight precautions, flight restricted areas and aircraft precautions

Flight

Before a normal flight, please ask the professionals to conduct flight training and guidance training. During flight, please choose an appropriate flight environment to ensure the flight safety. Before a flight, be sure to read the Disclaimer and Safety Guidelines to learn safety precautions.

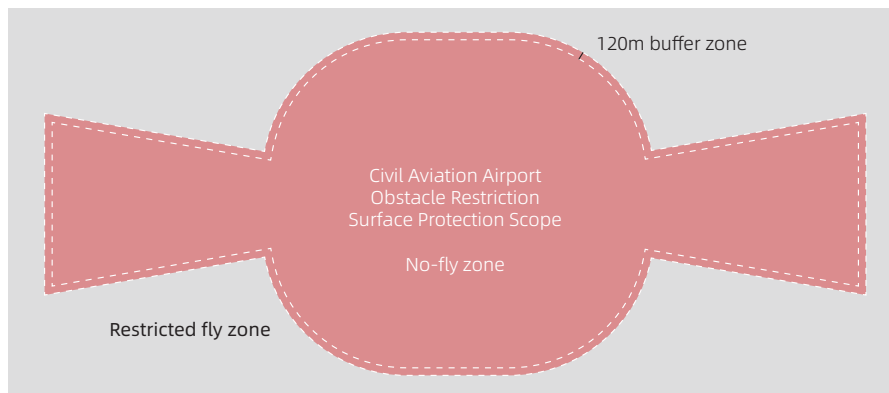
Flight restriction functions

No-fly zone

The no-fly zone is based on the 12 coordinate points of the restriction surface and tolerance buffer zone of civil airport obstacles published by the Civil Aviation Administration. The aircraft cannot take off in a no-fly zone. When approaching from an external area to the buffer zone at the no-fly zone boundary, the aircraft will automatically decelerate and hover.

When the aircraft enters a no-fly zone due to special reasons, the forced landing function will be triggered. At this point, the aircraft will be forced to land. During descending, the aircraft can move in the horizontal direction, but the control stick cannot be pushed upwards.

The altitude limit zone is a rectangle area of roughly 20km wide and 40km long by extending the midpoints at both ends of the runway outward for 20km, and extending for 10km along the two sides of the runway (the non-intersect part with the no-fly zone). In the altitude limit zone, the aircraft's flight altitude is restricted to 120m.



Flight environment requirements

1. No flight is allowed in severe weather conditions, such as heavy winds (with wind speed $> 12\text{m/s}$). When flying in the rain, be sure to follow the IP rating requirements. Please read details of IP45 rating description.
2. Select an open area without tall buildings around as the flight site. Buildings with a large amount of reinforcing steel bars will affect the compass usage, and block GNSS signals, resulting in a poor effect or even failure of aircraft positioning. Please fly as prompted in the App.
3. During flight, please use the aircraft only within your own visual range, and avoid any obstacles, people, water, etc.
4. DO NOT use the product in close proximity to high-voltage cables when RTK mode is not enabled.
5. DO NOT use the product in proximity to communications base stations or towers, as they are prone to interfere with communication signals.
6. In high altitude areas, environmental factors may result in aircraft battery and propulsion system performance impairment, thus affecting the flight performance. Please fly with caution.
7. In the antarctic circle and arctic circle, the aircraft cannot fly in P mode. Please fly with caution.

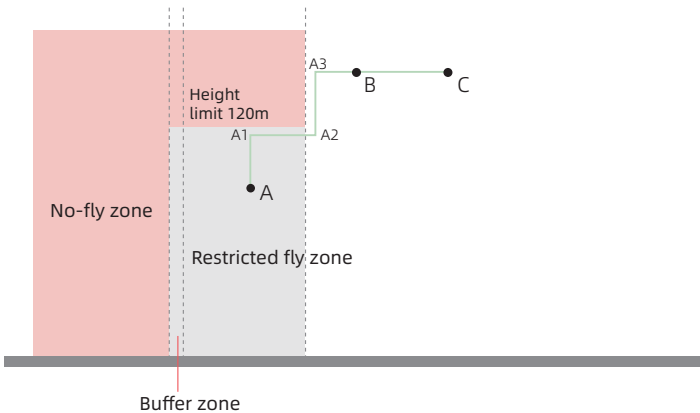
Buffer zone

The buffer zone is the zone by extending the no-fly zone outwards by 120m.

1. When the aircraft approaches to the buffer zone, the App starts to prompt the user that the aircraft is approaching the no-fly zone. Please note the flight direction.
2. When the aircraft enters the buffer zone, the same will start automatic braking until hovering. Within the buffer zone, pushing the control stick towards the no-fly zone direction will not work. However, the control stick can be pushed in other directions within the altitude limit range.

Mission flight

1. When the mission flight route is within the no-fly zone, the aircraft cannot take off and cannot execute the mission.
2. In the restricted zone, when the point height of the flight route mission does not exceed the 120m altitude limit, the mission can be executed normally; and when the set altitude is higher than the 120 m altitude limit, the aircraft will hover at 120m.
3. When the waypoint A in the flight route is within the restricted zone, and waypoint B is outside the restricted zone and above the altitude limit, the aircraft will first fly to the altitude limit A1 and move horizontally out of the restricted zone to A2 position. Then, it will adjust the altitude to B point altitude and reach the A3 position to execute the mission. As shown in the figure below:



Pre-flight check

- Carefully check whether all parts of the aircraft are in good condition. If there are any cracks or damage, please stop flying.
- Check whether the battery, remote controller, and mobile device have sufficient battery level.
- Ensure that the arms as well as the landing gear are unfolded and make sure the propellers are installed firmly.
- Ensure that the remote controller is properly connected to the aircraft.
- Check whether all firmware versions are the latest and whether the app is properly connected to the remote controller.
- Ensure that "Normal flight" is displayed on the app camera interface.
- Check whether the motor and gimbal are functioning after the aircraft is powered on.

Compass Calibration





If you are using the aircraft for the first time or if the flight area changes significantly, please calibrate the sensor.




Calibration method: When the green light is solid on, open the App, enter "Flight Settings" - "Sensor Status" - "Compass", enter the interface and click "Calibrate" to enter calibration mode. The aircraft indicator light is yellow and solid on.


- 1) Rotate the aircraft clockwise in the horizontal direction, the App prompts "horizontal calibration successful", the indicator light flashes white, vertical calibration can be performed.
- 2) Rotate the aircraft clockwise in the vertical direction, and wait for the app to prompt "vertical calibration successful", the indicator light is green and solid on, means calibration completed.



Takeoff/landing

Takeoff: Click “One-button take-off ”, in the app. The aircraft will take off and ascend to 1.5m for hovering; or push the control stick to the inner corner to unlock the aircraft   motor startup. Push the throttle stick upwards .

Landing: Press or click the “one-button return ” / “vertical landing ”; on the remote controller; Or, push the throttle stick downward until the aircraft lands , After maintaining this status for 2 seconds, the motor will stop. After flight, please power off the aircraft and remote controller in succession.

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-  • Before takeoff, the user should face the tail and keep an appropriate safety distance from the place where the aircraft is located.
- Do not unlock and launch the aircraft from a slope that is at a substantial incline.
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Appendix

Technical specifications

S400E technical indexes

Entire machine	
Dimension	Folded (including propellers): 347×367×424mm (L×W×H) Unfolded (including propellers): 950×995×424mm (L×W×H) Unfolded (excluding propellers): 549×592×424mm (L×W×H)
Maximum flight time	No load: 49min
Symmetrical motor diagonal distance	≤ 725mm
Weight	4kg Left and right (excluding batteries)
Maximum takeoff weight	7kg
Maximum payload	3kg (Under the maximum payload, the maximum safe flight speed is only 15m/s)
Noise	≤ 58dB@5m position
Propeller	1866 folded propellers
Flight control software performance index	
Hovering accuracy (GNSS)	Horizontal: ±1.5m (with GNSS positioning) Vertical: ±0.5m (with GNSS positioning)
Hovering accuracy (with vision positioning)	Horizontal: ±0.3m (with GNSS positioning) Vertical: ±0.3m (with GNSS positioning)
Hovering accuracy (RTK)	Horizontal: ±0.1m (with RTK positioning) Vertical: ±0.1m (with RTK positioning)
RTK position accuracy	When RTK is fixed: 1cm+1ppm (horizontal) 1.5cm+1ppm (vertical)
Maximum angular velocity	Pitch axis: 200°/s Yaw axis: 100°/s
Maximum pitch angle	30° (45° during emergent braking and startup)
Maximum ascent speed	S mode: 5 m/s P mode: 4 m/s
Maximum descent speed	S mode: 4 m/s P mode: 3 m/s
Maximum wind resistance	12 m/s (Level VII) The maximum wind resistance is 12m/s during taking off and landing.
Maximum flight speed	S mode: 23 m/s P mode: 15 m/s
GNSS satellite search time	Cold-startup satellite search time: ≤3.5 minutes Hot-startup satellite search time: ≤50 seconds
IP rating	IP45
Operating temperature	-20°C~55°C
Maximum takeoff altitude	5000m

Visual system	
Obstacle sensing range (Buildings, trees, telegraph poles, and pylons above 10 m)	Front: 0.7 m ~ 40 m (the maximum detection distance is 60 m for large-size metal objects) Left and right: 0.6 m ~30 m (For large-size metal objects, the maximum detection distance is 40 m) Up, down, and rear: 0.6 m ~ 25 m
Operating environment	Surfaces with clear patterns and adequate lighting (> 15 lux, normal lighting environment under fluorescent lamps indoor)
Compatible gimbal	
Gimbal types	PVL-8K gimbal camera, PDL-300 thermal & visible dual gimbal camera, PDL-1K dual-lens gimbal camera, PQL01 quad-sensor gimbal camera
Gimbal mechanical interface	Gimbal payload standard interface
Data interface	Second-generation extension interfaces
Video transmission	
Video transmission distance	15 km (maximum distance in a line-of-sight and unobstructed environment)
Remote controller	
General	
Display	7.02-inch touch LCD display with a resolution of 1920 × 1200 and a highest brightest of 1000 cb/m ²
Dimensions (folded antenna)	268x139x103 mm (LxWxH)
Weight	Approximately 1 kg (excluding the external battery) Approximate 1.25 kg (including external battery)
Internal battery	Li-ion: 7000mAh@7.2V
External battery	Li-ion: 7000mAh@7.2V
Maximum battery life	Built-in battery: 3 hours Internal battery + external battery: 6 hours
IP rating	IP54
Professional Generation 2 video transmission	
Operating frequency	2.400-2.4835GHz; 5.725-5.850GHz;
Maximum signal effective distance (free of interference and obstacles)	15 km (FCC); 8 km (CE / SRRC / MIC)
Equivalent omnidirectional radiated power (EIRP)	2.4GHz; < 28dBm (FCC) ; < 20dBm (CE/SRRC/MIC) 5.8GHz; < 25dBm (FCC) ; < 14dBm (CE) ; < 23dBm (SRRC)

WiFi	
Protocol	802.11 / a / b / g / n / ac
Operating frequency	2.400-2.4835GHz; 5.725-5.850GHz;
Equivalent omnidirectional radiated power (EIRP)	2.4GHZ: < 14dBm (FCC) ; < 12dBm (CE/SRRC/MIC) 5.8GHZ: < 12dBm (FCC/SRRC) ; < 12dBm (CE)
Bluetooth	
Protocol	Bluetooth 4.2
Operating frequency	2.400-2.4835 GHz;
Equivalent omnidirectional radiated power (EIRP)	< 8dBm
Battery	
Battery capacity	14000mAh
Voltage	23.1V
Battery type	Li ion 6S
Energy	323.5Wh
Overall battery weight	About 1.5kg
Operating ambient temperature	-20°C~55°C
Ideal storage temperature	22°C~30°C
Charging environment temperature	5°C~45°C (charging at low temperature will reduce the battery life)
Charging time	It takes about 110 minutes to fully charge using the standard charger
Charger	
Ports	3 ports for smart battery, remote controller, and other mobile devices respectively.
Voltage and current	26.4V / 15A (smart battery) 12V / 3A (remote controller) 5V / 2A (other mobile devices)
Operating temperature	5°C to 40°C


Firmware update

Remote controller upgrading steps

S400E remote controller firmware upgrade

Use the remote controller's parameter adjustment tool for performing upgrades:

1. Visit the official website to download the remote controller's firmware upgrade package and the remote controller's parameter adjustment tool.
2. When the remote controller is powered off, use the Micro USB cable to connect the Micro USB interface on the bottom of the remote controller to the computer.
3. Launch the remote controller parameter adjustment tool and power on the remote controller.
4. Click "Start Connection" and check whether the remote controller's connection status is normal.
5. Click "Firmware Upgrade." Select the downloaded remote controller's firmware upgrade package and open the file to start the upgrade.
6. Wait until the remote controller upgrade is completed. After upgrading, the remote controller will power off automatically.
7. Manually restart the remote controller. Click "Start Connection" to check the new remote controller's firmware version number.

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-  • When upgrading, ensure that remote controller's battery level is above 20%.
• Do not plug or unplug the USB cable while upgrading.
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Aircraft upgrading steps

1. Launch the GDU Flight II App to automatically enter the firmware testing status.
2. If there are different versions, a prompt to upgrade will appear on the interface. Click "upgrade immediately" to begin downloading the firmware installation package.
3. After downloading, the firmware installation package will be installed automatically.
4. After upgrading, please restart the device.

S400E payload compatibility table

S400E supports a single downward gimbal. For compatible payloads, refer to the table below.

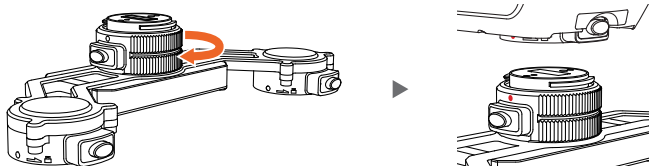
Number	Product name	Model
1	8K camera	PVL-8K
2	Thermal & visible dual camera	PDL-300
3	1K infrared thermal & visible dual camera	PDL-1K
4	Quad-sensor camera	PQL01

Use the multi-payload module

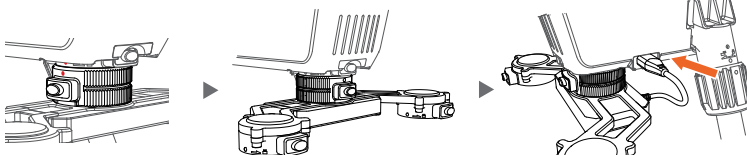
The multi-payload module is used to mount the gimbal camera to the bottom of the S400E aircraft.

Installation steps of dual-payload module:

1. Press the rotating ring button on the dual-payload module and rotate it clockwise to the left.
2. Align the dual-payload module and the red point on the UAV payload interface.

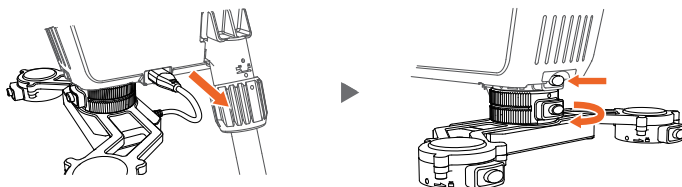


3. Rotate the rotating ring by 90° based on the direction shown in the figure to lock it tightly. After locking, the support will be fixed and unable to rotate.
4. After the multi-payload module is attached firmly, connect the power connection cable with the external power supply port. Then, the multi-payload module can be used.

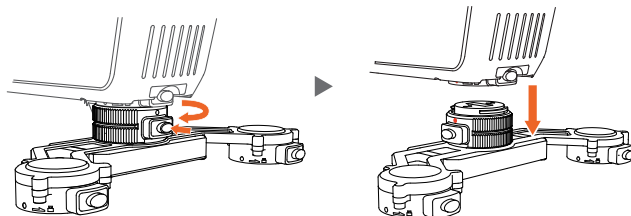


Removal steps for the dual-payload module:

1. Remove the power connection cable from the external power port of the aircraft.
2. Press the upper payload interface button and rotate the multi-payload module clockwise to make it disengage from the center position.



3. Press the lower multi-payload module rotating ring button and rotate the rotating ring of multi-payload module by 90° based on the direction shown in the figure until it is aligned with the red point on the UAV payload interface. Then, remove the multi-payload module downward.



⚠ • During installation and removal, rotate the support of the multi-payload module to help increase the speed of installation and removal

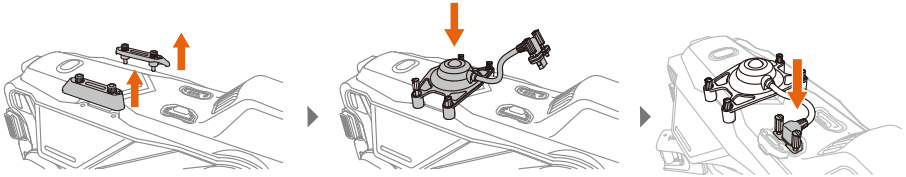
Using the night navigation light component

The night navigation light is installed on the top of the aircraft to facilitate lighting at night or poorly-lit environments. Turning the night navigation on/off and causing it to blink can be controlled through the app.

Installation

Please follow the steps below to install the kit in the aircraft.

1. Remove the fuselage's decorative cover first.
2. Fix the night navigation light on the top of the aircraft and tighten the screws.
3. Insert the power cable into the top interface of the aircraft.



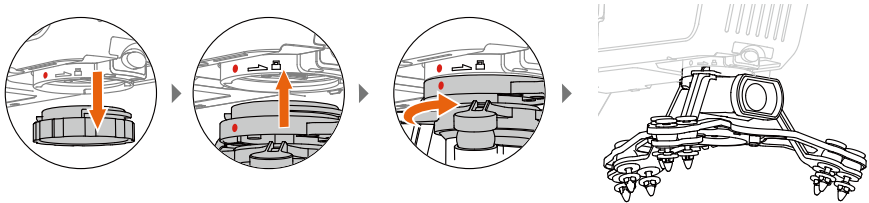
Using the FPV component

The FPV component is a camera device installed at the bottom of the S400E aircraft for fixing the direction. It can also be used with another payload.

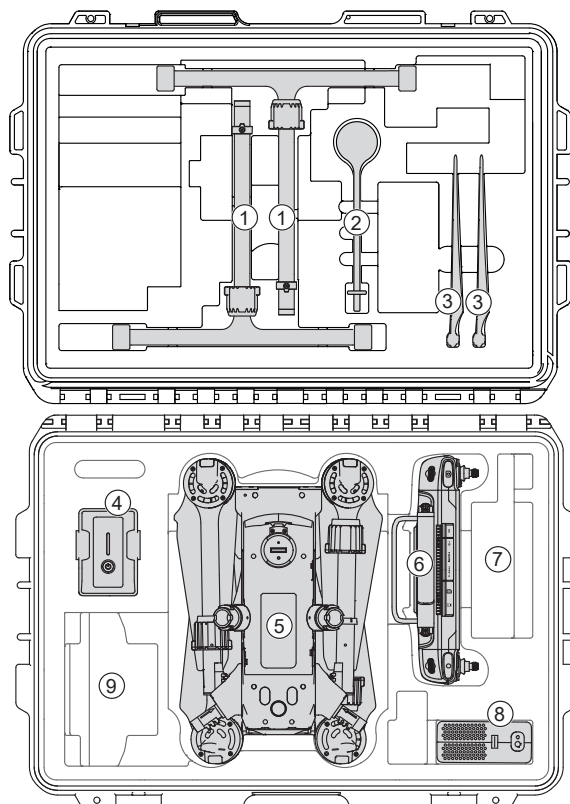
Installation

Please follow the steps below to install the kit in the aircraft.

1. Press the payload unlocking button to remove the protective cover.
2. Align the red point on the payload interface and insert the gimbal into the installation position.
3. Rotate it by 90° based on the direction shown on the casing to lock it.



Transportation box description



- 1 Landing gear
- 2 RTK
- 3 Backup propellers
- 4 Aircraft battery
- 5 Aircraft
- 6 Remote controller
- 7 Paper documents
- 8 Charger
- 9 Screwdriver set

FCC compliance statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Important: Changes or modifications to this product not authorized by GDU-Tech Co., Ltd. could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, televisions, and other electronic devices.

SAR Statement:

This Remote control meets the government's requirements for exposure to radio waves. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health.

FCC RF Exposure Information and Statement the SAR limit of USA (FCC) is 1.6 W/kg averaged over one gram of tissue.

Device types: GDU RC SEE (FCC ID: 2A8WC-S400-0102) has also been tested against this SAR limit. This device was tested for typical body-worn operations with the back of the handset kept 0mm from away the body. To maintain compliance with FCC RF exposure requirements, use accessories that maintain a 0mm separation distance between the user's body and the back of the handset. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided.

Body-worn Operation This device was tested for typical body-worn operations. To comply with RF exposure requirements, a minimum separation distance of 0mm must be maintained between the user's body and the handset, including the antenna.

Third-party belt-clips, holsters, and similar accessories used by this device should not contain any metallic components.

Body-worn accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided. Use only the supplied or an approved antenna.