

Portable UAV detection &
direction finding equipment

Instructions



V1.0

Please read the operating instructions carefully before use

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Disclaimers

Any user is advised to read the operating instructions and this statement carefully before using the product. By using the product, is deemed to acknowledge and accept all the contents of this statement. Disassembly of this product is strictly prohibited. Some details of this document are subject to change without notice as the software version of the product is upgraded.

Precautions

- Portable UAV detection & direction finding equipment with low battery alarm function, in the use of low battery alarm state should be charged in a timely manner to extend the battery life.
- Avoid strong collisions and drops when in use and place in protective box when not in use.
- Push buttons, control knobs and housings can easily become dirty after prolonged use of the equipment, please clean the housing with neutral detergent and damp cloth. Never use chemicals such as degreasers, alcohol, aerosols or petroleum-based preparations that may cause damage to the equipment to clean.
- Keep the equipment away from Fire sources and ensure that the contact environment is dry. Do not let the battery contact water, otherwise there is a risk of short-circuiting.
- Ensure that the SMA connector (i. e. the antenna connection connector) is tightened to prevent any impact on reception performance when installing the directional antenna.

- Keep the battery with a certain charge (i. e. charge it once in a while) to avoid damage due to over-discharge when the equipment is not in use for a long period of time.

1- Product profile

Portable UAV detection & direction finding equipment is used for drones detection and direction finding. Based on spectrum sensing and artificial intelligence technology, it identifies and classifies the UAV's image transmission links. Equipment features include: detection of the full range of UAV frequency bands and a wide variety of species; upgradeable feature library; small size and light weight; with lights, sound and other multiple alarm alert functions, with optional warning methods and adjustable warning frequency; with direction finding of UAVs and obtaining the UAV orientation.

Function description

- Direction finding: the equipment is equipped with direction finding mode, which allows the equipment to find the direction of the UAV target after the equipment is equipped with a directional antenna.
- Real-time detection: the equipment can display in real time the sorties, brands, models and operating frequencies of detected drones.
- Sensitivity adjustment: the equipment supports the adjustment of signal recognition thresholds by adjusting the detection sensitivity option.
- Low battery alert: the equipment is equipped with a multi-level battery indicator, which alerts when the battery is too low.
- Alarm mode configuration: the equipment supports a variety of alarm modes such as light and sound, and the degree of urgency of the alarm bell is adjustable.

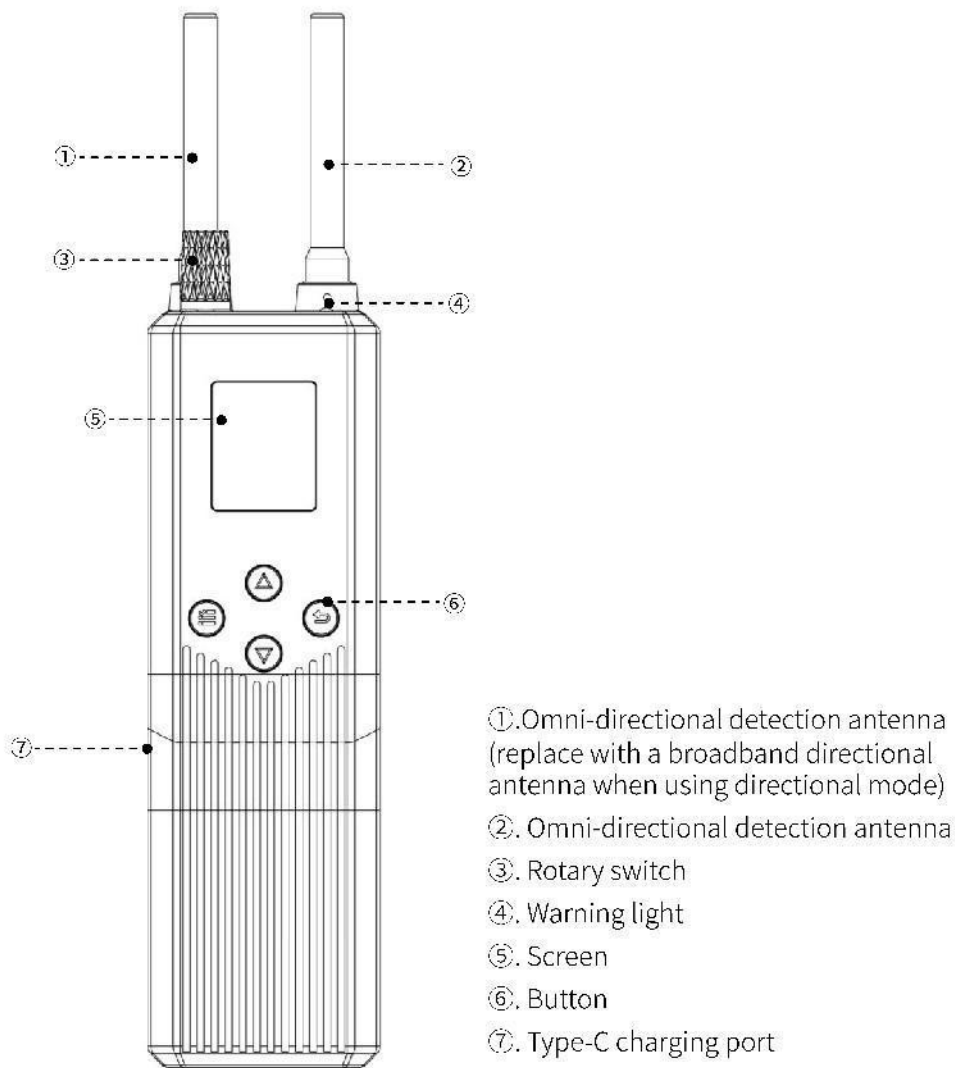
2 – Product configuration



| Serial number | Name | Number | Unit | Remarks |
|---------------|-------------------------------|--------|-------|--|
| 1 | Detection mainframe | 1 | Piece | Self-contained omnidirectional detection antenna |
| 2 | Broadband Directional Antenna | 1 | Piece | |
| 3 | Antenna grip | 1 | Piece | |
| 4 | RF connection cables | 1 | Piece | |
| 5 | Portable battery | 1 | Piece | |
| 6 | Charger | 1 | set | Connectors |
| 7 | Power cord | 1 | Piece | USB to Type-c |
| 8 | SMA non-slip handwheel | 1 | Piece | |

3 – Equipment composition & operating instructions

■ Description of equipment composition and antenna interface



■ Boot up

Turn the knob switch clockwise to the “on” position to enter the power-on interface and wait for nearly 20 seconds to enter the main detection interface, which includes detection information display bar (brand, model and operating centre frequency of the drone) and device status bar (alarm mode, drone sorties found, device power).

■ Detection & Identification

The detection equipment can monitor the surrounding drone signals in real time, and when a suspicious signal is captured, it will perform feature extraction and model matching, and display the brand, model and operating frequency of the Illegal flying drones and other link characteristics in the detection information column.

Due to the limitation of the screen display, a maximum of 4 drones can be displayed on a single page at the same time. When more than 4 drones are detected, the user has to press the "up" and "down" buttons to turn the page manually.

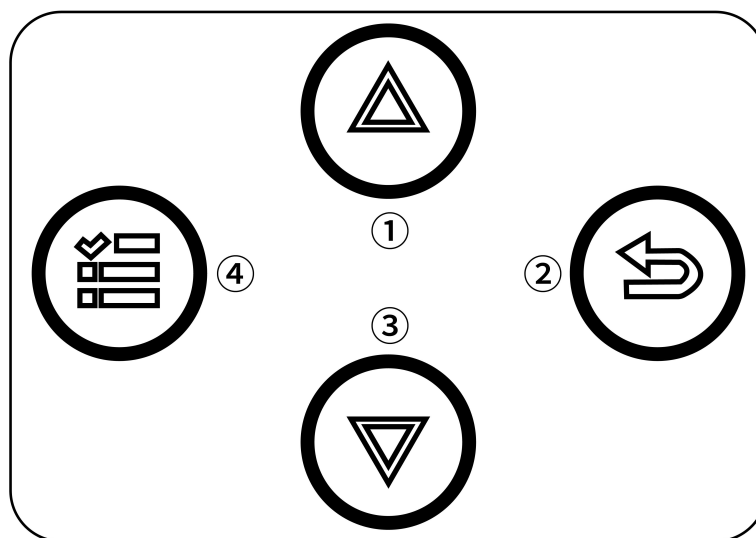


■ Control buttons

The control buttons include "Set and OK", "Back" and the up/down toggle button.

Clicking on the button "Set and OK" will take you to the settings page, which contains settings for alarm mode, alarm frequency, recognition sensitivity, etc (see section "Setting content" for details). If you need to jump to the content adjustment column on the right, press the button "Set and OK " again, then press the buttons "Up" or "Down" to switch the content, and finally press the button "Set and OK " again to

complete the content switch.



①.Up ②.Back ③.Down ④.“Set and OK”

Precautions

- ① Stay in the setting screen for 10 seconds (without any operation), the system will automatically jump to the main detection screen.
- ② Be sure to press the button “Set and OK ” again to complete the settings after making adjustments to the content. Pressing the directly or staying in the settings screen for 10s will not complete the update.
- ③ To enter the “Direction finding mode” , click on the button “Back” to select the drone to be direction found first, then click on the button “Set and OK” to enter the direction finding mode.

■ Setting content

Alarm methods

The alarm modes include three options: "Sound", "Light" and "Sound and light", which can be selected and switched according to the user's preference.

Alarm frequency

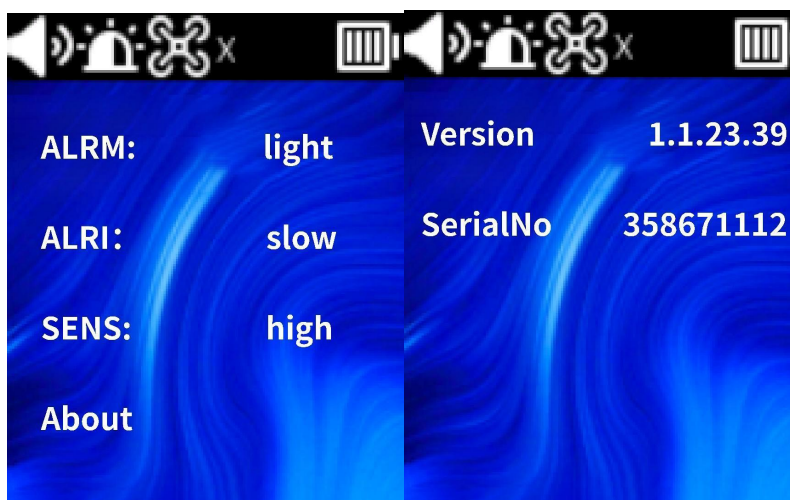
The alarm frequency include two options: "Slow" and "Fast", which can also be selected and switched by the user's preference.

Detection sensitivity

The detection sensitivity includes four options: "High", "Medium", "Low" and "Micro", which can be selected and switched by the user according to their actual needs. In general, the higher the recognition sensitivity, the further the distance the drone can be detected and recognised.

About the equipment

Allows viewing of the software version and serial number of the equipment.



4 – Direction finding mode

■ Antenna installation

- Step 1: Install the SMA non-slip handwheel on the SMA connector at either end of the RF line (or you can choose not to install the antenna ratchet, just make sure the feeder line is tightened in step 2).



- Step 2: Connect the broadband directional antenna using the SMA connector of the RF line fitted with the SMA non-slip handwheel end.



- Step 3: Connect the SMA connector on the other end of the RF line to the RF connector on the equipment side.



- Step 4: Assemble the antenna grip to the directional antenna.



■ Antenna usage

It is recommended to ensure that the antenna is vertically polarised when using the configured broadband directional antenna for UAV detection,

The actual use diagram is shown below.



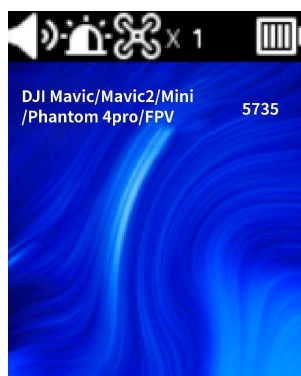
■ Operation method

The equipment is ready for direction finding once the broadband directional antenna has been installed (note: the direction finding mode can only be entered when a drone is detected) as follows.

- Step 1: Open the equipment and enter the main interface for the detection.



- Step 2: The interface starts to display information when the equipment detects the drone.



- Step 3: Click on the button "Back" to select the drone that needs direction finding. When more than one drone is detected at the same time, click on the button "Up" or "Down" to select the drone to be direction-finding.



- Step 4: Click on the button "Set and OK" to enter the direction finding mode, the information displayed on the direction finding mode interface from top to bottom are the drone model, drone frequency and signal strength (this value is used to determine the location of the drone).

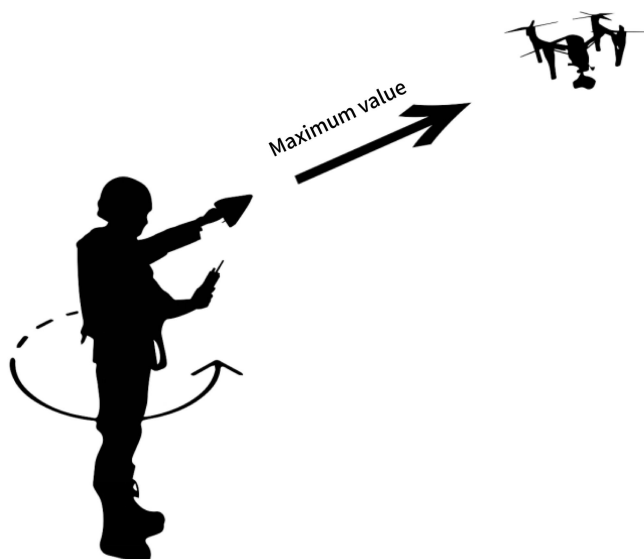


- Step 5: Scan the surrounding electromagnetic environment according to the antenna holding pattern described in the "Antenna Usage", there are two ways to determine the drone's position, as follows.

◆ **Maximum value discrimination method**

The method is to read the maximum value of the signal strength displayed by the equipment, the bearing to which the maximum value points is the position of the UAV.

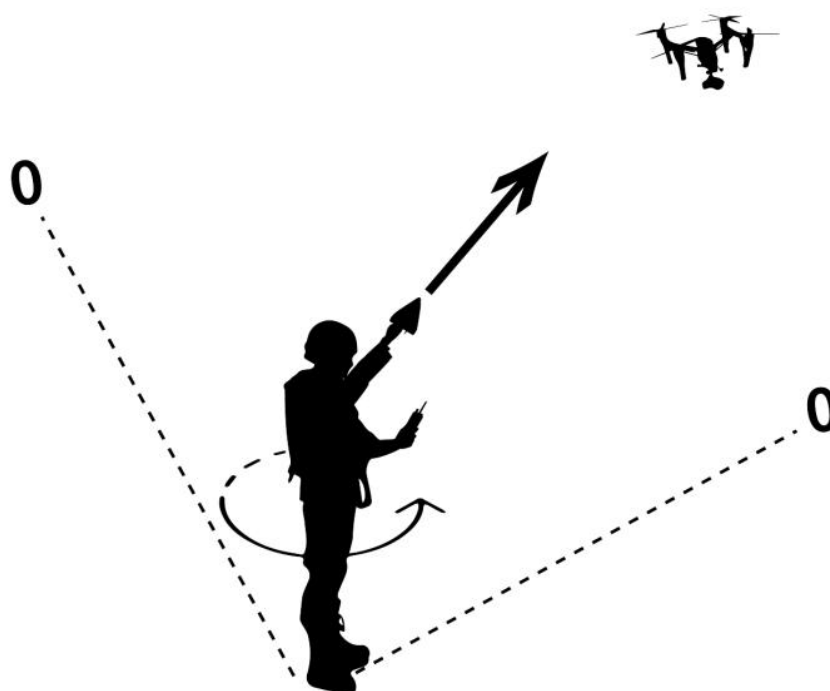
Diagram is shown below.



◆ Zero-value centre discrimination method

The method is to record the bearings at the two ends of the non-zero value when the equipment scans the airspace during the scanning process, and the centre of the two bearings is the orientation of the drone.

Diagram is shown below.



■ Precautions

- In the direction finding mode, if the signal strength value is 0 for 60 seconds, click on the button "back" to exit the direction finding mode and re-enter the direction finding mode after the drone is detected again.
- In the direction finding mode, it is not possible to find the direction of a UAV in a frequency hopping state.
- There are cases where the equipment detects UAVs that are unable to perform direction finding. The following table provides a list of models for which the equipment can perform direction finding.
- The angle of orientation of the equipment to the UAV is influenced by the relative distance of the UAV relative to the equipment, when

the UAV is too close to the equipment ($\leq 200\text{m}$), the UAV cannot be oriented.

List of orientable models

| Brands | Model |
|--------|--------------------|
| DJI | Dji Mavic 3 |
| | Dji Air2s |
| | Dji Air2 |
| | Dji mini2 |
| | Dji FPV |
| | Phantom 4 Pro V2.0 |
| | Phantom 4 Pro |
| EVO | EVO II |
| | EVO II pro |

5 – Product parameters

■ General indicator parameters

| Serial No. | Projects | Technical parameters |
|------------|-----------------------------|---|
| 1 | Identification time | $\leq 2\text{s}$ |
| 2 | False alarm rate | ≤ 1 time/day |
| 3 | Identification capabilities | Number of drones that can be detected and identified simultaneously ≥ 10 (5 manufacturers) |
| 4 | Alarm methods | "Sound", "Light" and "Sound and light", etc. |
| 5 | Size | L*W*H: 240mm*66mm*48mm (main unit) |
| 6 | Operating temperature | $-20^{\circ}\text{C}\sim 55^{\circ}\text{C}$ |
| 7 | Duration | 3 h |
| 8 | Charging port | Type-C |

■ Antenna usage

| Serial No. | Projects | Technical specifications |
|------------|--------------------------|---|
| 1 | Working mode | Omnidirectional passive detection |
| 2 | Action objects | DJI series drones, DJI FPV Drone Combo, YUNEEC drones, PowerVision drones, Tello drones and some image transmission modules, etc. |
| 3 | Operating frequency band | 1.1GHz, 1.2GHz, 1.4GHz, 2.4GHz, 5.8GHz and other common frequency bands for drones |
| 4 | Detection distance | 800m (Suburban environment, tested with DJI AIR2 as the target drone situation) |
| 5 | Detection position | 0° ~360° |
| 6 | Weight | ≤800g |

■ Direction finding mode

| Serial No. | Projects | Technical specifications |
|------------|--------------------------|--|
| 1 | Working mode | Directional passive detection |
| 2 | Action objects | DJI Mavic series drones, DJI Phantom series drones, EVO drones and Hubsan drones |
| 3 | Operating frequency band | 2.4GHz and 5.8GHz |
| 4 | Detection distance | 1500m (urban environment, tested with DJI AIR2 as the target drone situation) |
| 5 | Detection accuracy | Azimuth error ≤15° (no change in frequency of the UAV during the locked direction finding mode and at a distance of 1 km from the equipment) |
| 6 | Weight | ≤1100g (without feeder line and handle) |

Technical Support

Service Hotline:

Address:

Email:

Postcode:

For more information, please visit: <https://anti-drones.com.mx/>