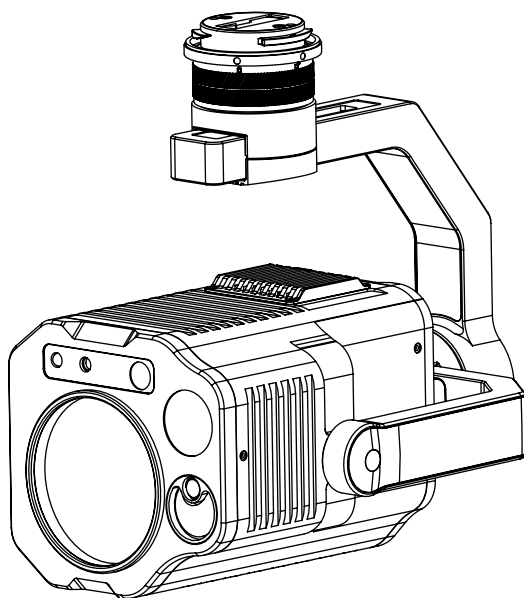


# 禾启智能 PURWAY-CH-4 无人机激光甲烷遥测仪 HEQ PURWAY-CH-4 UAV Laser Methane Leak Detector

## 快速入门指南和免责声明 Quick Start Guide and Disclaimer

V1.1 2024.06



## 免责声明与警告

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如有更新，恕不另行通知。请访问 [www.hequavtech.com](http://www.hequavtech.com) 官方网站以获得最新的产品信息。

## 请勿自行调整云台结构

HEQ PURWAY-CH-4 无人机激光甲烷遥测仪出厂前已根据其所搭载的相机和镜头完成调试。请不要自行调整云台或者改变其机械结构，也不要为相机增加其他外设（如滤镜、遮光罩）。

云台结构精密，请勿自行对 HEQ PURWAY-CH-4 无人机激光甲烷遥测仪作任何拆装，否则将会导致云台设备工作异常。

## 务必安装 HEQ PURWAY-CH-4 无人机激光甲烷遥测仪至指定飞行器

HEQ PURWAY-CH-4 无人机激光甲烷遥测仪目前适配 Matrice 300/Matrice 350 飞行器，并且后续将会陆续更新其它支持的类型。请配合巡检 APP HEQ Captain 使用相应功能。

## 使用安全

请确保正确安全地使用您的遥测仪。请仔细阅读用户手册与观看教学视频，以便正确地安装遥测仪至飞行器。请遵循航模爱好协会的安全指引使用飞行器。一旦使用本产品，即视为您已经仔细阅读免责声明与警告，理解、认可和接受本声明全部条款和内容。您承诺对使用本产品以及可能带来的后果负全部责任。您承诺仅出于正当目的使用本产品，并且同意本条款以及 HEQ™ 制定的任何相关条例、政策和指引。

HEQ™ 对于直接或间接使用本产品而造成的损坏、伤害以及任何法律责任不予负责。用户应遵循包括但不限于本文提及的所有安全指引。

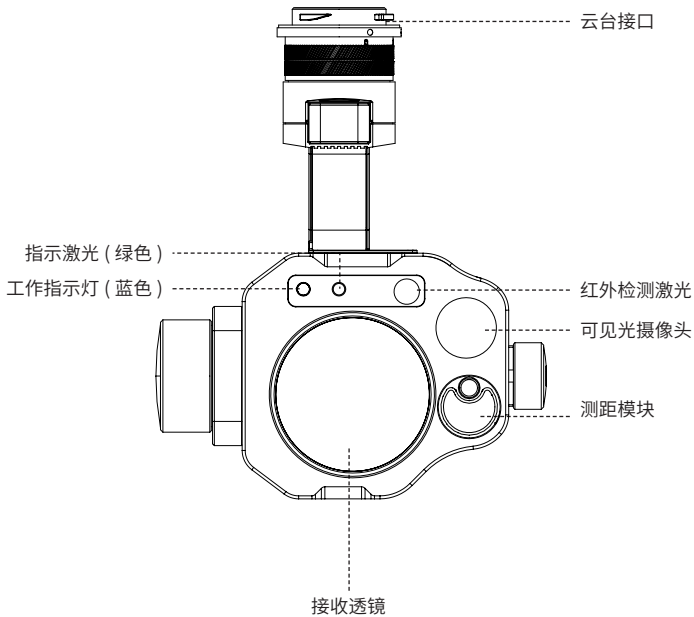
## HEQ PURWAY-CH-4 无人机激光甲烷遥测仪

HEQ PURWAY-CH-4 激光甲烷遥测仪是一款小型化轻量化的无人机负载，具有灵敏度高、遥测距离远、响应速度快等特点。基于激光吸收光谱技术，可快速发现空气中的微量甲烷气体，最远检验距离达 300 米。

该设备将检测激光与可见光传感器进行标定结合，运用了调谐二极管激光吸收光谱（TDLAS）技术，可实时数据分析，同时与无人机系统集成，使检测设备远离泄漏点。是天然气巡检作业的得力工具，有助于提高安全性，减小环境影响，并提高作业效率，实现精准可视化巡检。配合云台智能增稳控制、激光测距等技术，能迅速为用户提供泄露点关键信息，帮助用户掌握先机，将感知能力与作业效率提升至全新高度。

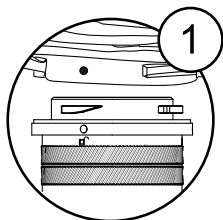
设备配合 HEQ Captain 地面站，用户只需轻点屏幕就能轻松规划复杂航线任务，实现全自动航点飞行作业。

## HEQ PURWAY-CH-4 无人机激光甲烷遥测仪

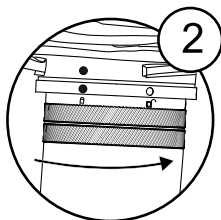


## 安装 HEQ PURWAY-CH-4 无人机激光甲烷遥测仪

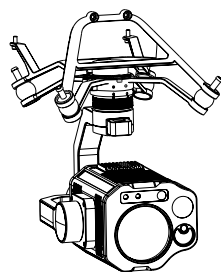
将 HEQ PURWAY-CH-4 无人机激光甲烷遥测仪云台接口调整至解锁位置，嵌入 Matrice 300/Matrice 350 云台安装位置最后旋转云台锁扣至锁定位置以固定云台。



1  
对齐遥测仪上的白点与接口红点，并嵌入安装位置



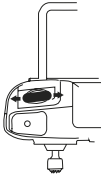
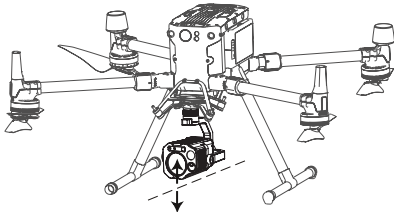

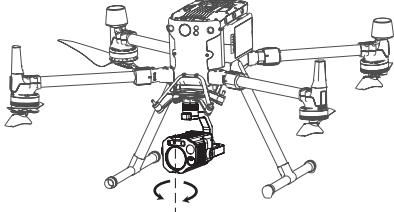
2  
旋转遥测仪快拆接口使红点与接口红点对齐，以固定遥测仪



云台接口结构设计紧凑，安装或取下时请用手固定安装平台的同时用力旋转。

## 云台功能

左拨轮可以控制云台上下角度；右拨轮可调整相机拍摄的平移角度。  
C1 按键用于前回中；C2 按键用于下回中。

		左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。

# 进入 HEQ Captain APP

在 Matrice 300/Matrice 350 遥控器上安装 HEQ Captain APP, 开启 Matrice 300/Matrice 350 飞行器 and 遥控器, Matrice 300/Matrice 350 飞行器与遥控器连接成功后, 点击“进入飞行界面”进入 APP。

注意, 首次安装软件需要连接网络注册 SDK

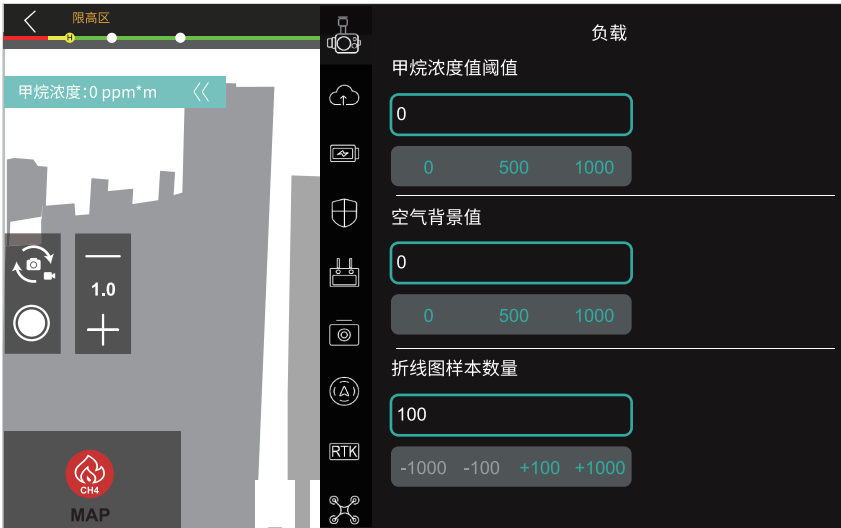


# HEQ Captain APP 界面说明

APP 界面的参数与信息可以通过”设置”调整与关闭

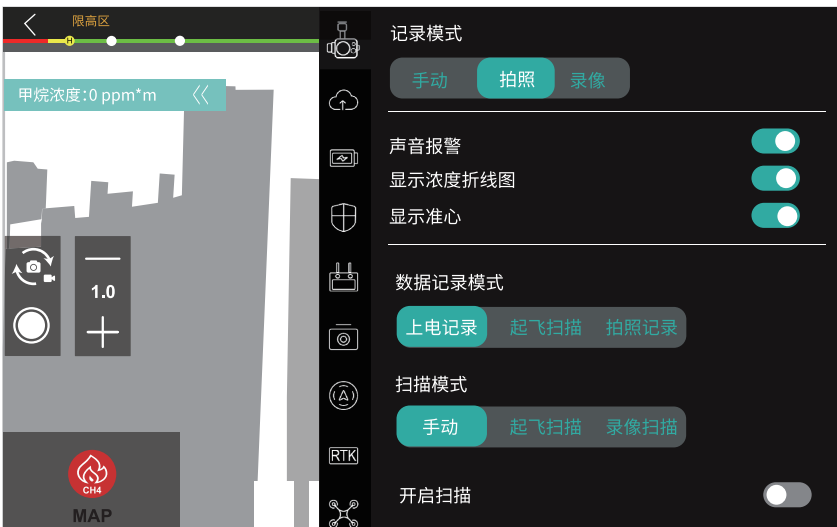


## 负载参数设置



**甲烷浓度值阈值：**检测到超过设置的阈值，软件会报警提示

**空气背景值：**设置空气中非甲烷泄露的情况下存在甲烷分子的浓度值



## 记录模式

手动：改为手动模式时，当检测到甲烷不会自动记录，可以手动拍照 / 录像；手动录像开启后在飞行过程检测到甲烷，录像出来的视频左上角会有甲烷浓度值水印拍照：检测到甲烷自动以照片的形式记录  
拍照：改为自动拍照模式时，当检测到甲烷自动以照片的形式记录，照片会存在文件根目录  
录像：改为自动录像模式时，当检测到甲烷自动以录像的形式记录，录像会存在文件根目录

## 数据记录模式

上电记录：1. 飞机上电会自动记录（没有记录文件请查看选择的记录模式是哪一种）

起飞记录：1. 手动起飞，会记录文件  
2. 飞行航线起飞，会记录文件

拍照记录：1. 记录模式改为手动，然后按拍照按钮，会记录文件  
2. 飞行航线添加拍照航点动作，记录模式需要改为手动才能触发航点动作，然后当航线飞行至设定的航点动作会记录文件

## 扫描模式

手动扫描：1. 手动点击开启扫描按钮

起飞扫描：1. 手动起飞，触发扫描功能  
2. 飞行航线起飞，触发扫描功能

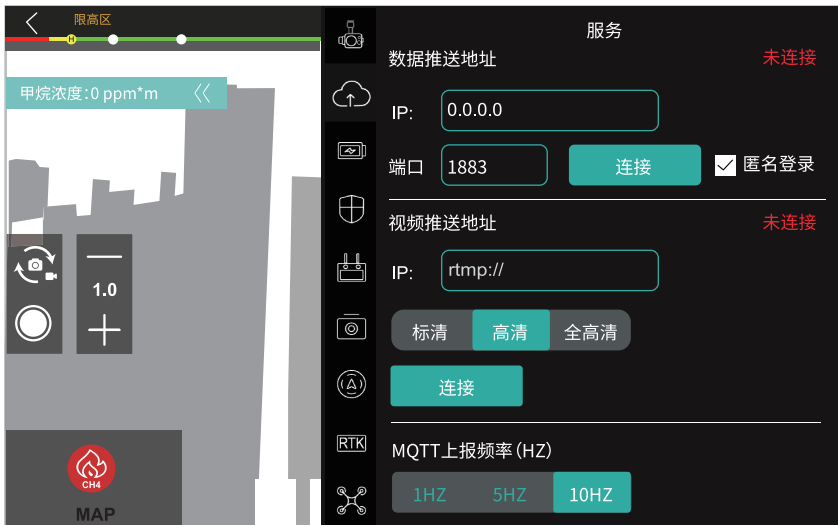
录像扫描：1. 记录模式改为手动录像，然后按录像按钮，触发扫描功能  
2. 飞行航线添加录像航点动作，记录模式需要改为手动才能触发航点动作，然后当航线飞行至设定的航点动作会触发扫描功能



**进入配置模式：**修改设备防误报等级、设备响应速度



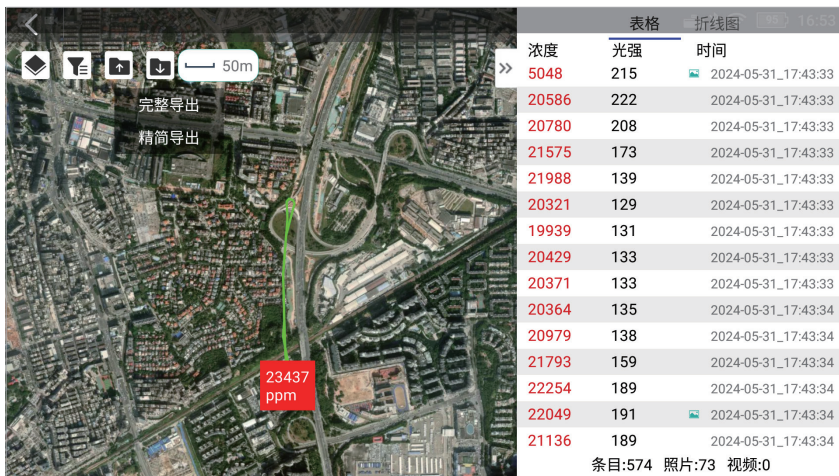
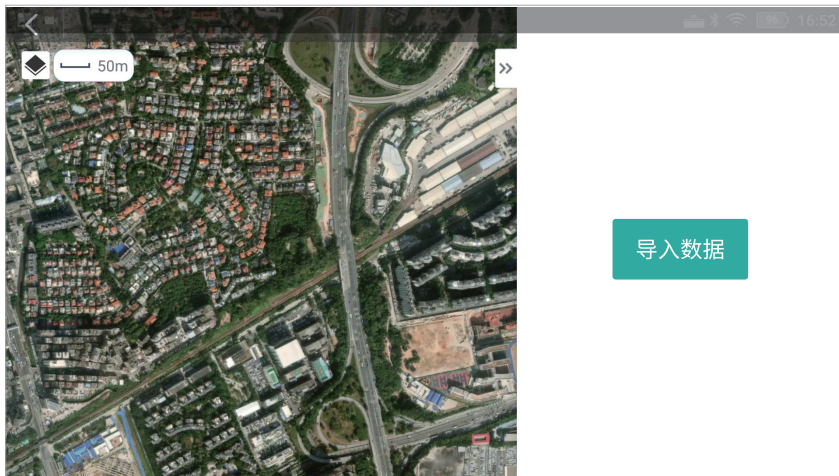
**时区设置:** 根据自己所在的国家或者地区来设置对应的时区。



**云服务:** 通过 MQTT 和 RTMP 协议将数据和视频传输到客户自己的服务器, 使客户能拓展更多云端功能。

## HEQ Captain 信息分析

巡检数据存储及设备相机 SD 卡，揭开设备后部的硅胶盖取出 SD 卡；使用读取器直接插入遥控器 / 把 SD 卡的记录文件移动到遥控器本地；打开 HEQ Captain APP 首页进入“导出报告”。



用户可自行选择报告是完整导出或者精简导出。

# 无人机激光甲烷遥测仪数据报告 (精简版本)

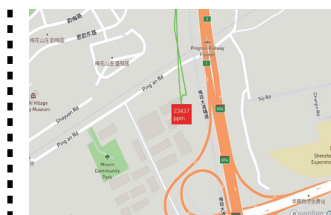
## 无人机激光甲烷遥测仪数据报告

生成时间:2024/05/31 18:03:41

报警点数:1  
作业时长:00:07:50  
作业航程:1.573KM  
开始时间:  
2024/05/31 17:43:05  
结束时间:  
2024/05/31 17:50:55  
巡检员:  
禾启智能  
巡检地点:  
龙华区1970



序号: 1  
23437 PPM  
纬度:  
22.6227236  
经度:  
114.0423201  
时间:  
2024/05/31 17:43:33



# 无人机激光甲烷遥测仪数据报告（完整版本）

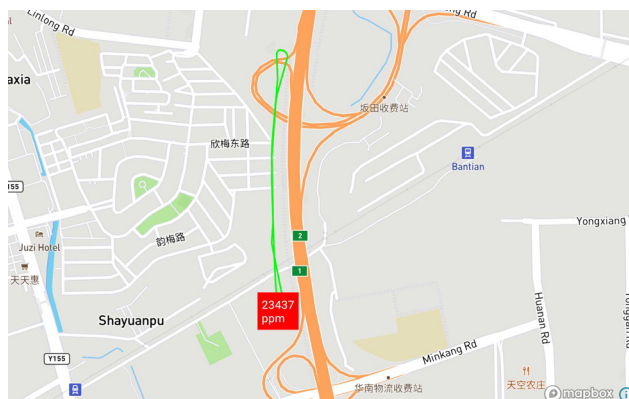
## 1、巡检概览

巡检地点	XXXXX				
巡检员	XXXXX	巡检时间		XXXXX	
报警点数	XX	作业时长	XXXXX	作业距离	XXXXX

## 2、浓度曲线



## 3、轨迹地图





遥测仪参数	
检测对象	甲烷及含甲烷成分气体
云台增稳	YAW+PITCH+ROLL
对准摄像头	1080 P
视频清晰度	FHD 1920*1080 (30p)
灵敏度	5ppm*m
浓度范围	0~99999 ppm*m
测量精度	±10% (100~50000 ppm*m)
响应速度	5ms、10ms、100ms(可配置)
遥测距离	300m
激光测距	实时坐标功能
仪器重量	770g
防护等级	IP54
工作温度	-20 °C 至 50 °C
额定电流	< 1 A 典型值8V供电情况下电流0.3 A
转动范围	俯仰: +30°至-90°; 平移: ±135°
航线功能	航线规划、KMZ/KML导入
支持机型	标准接口, 支持定制
红外检测激光	Class 3R, 避免激光直射眼睛
波长	1.65 μm, <25 mW
绿色指示激光	Class 3R, 避免激光直射眼睛
波长	520 nm, < 5 mW

本文档如有更新，恕不另行通知。

您可以在 HEQUAV 官方网站查询最新版本  
<https://store.hequavtech.com>

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## **Please Do Not Adjust the Gimbal Structure Yourself**

The HEQ PURWAY-CH-4 dronelaser methane detector has been calibrated according to the camera and lens it is equipped with before leaving the factory. Please refrain from adjusting the gimbal yourself or altering its mechanical structure. Additionally, do not attach any external accessories to the camera, such as filters or lens hoods.

The gimbal structure is precision-engineered, and any disassembly or modification of the HEQ PURWAY-CH-4 dronelaser methane detector by yourself may result in abnormal operation of the gimbal equipment.

## **Ensure the installation of the HEQ PURWAY-CH-4 drone laser methane detector on the designated aircraft**

HEQ PURWAY-CH-4 drone laser methane detector is currently compatible with Matrice 300/Matrice 350 aircraft, and additional supported types will be updated in the future. Please use the HEQ PURWAY-CH-4 Captain APP for inspection purposes, utilizing the corresponding features accordingly.

## **Safety in Use**

Please ensure the correct and safe use of your drone. Carefully read the user manual and watch instructional videos available on the Purway Innovation official website to properly install the gimbal on the drone. Follow the safety guidelines provided by the Aero Modeling Hobbyist Association for drone usage. By using this product, you acknowledge that you have read and understood the disclaimer and warnings, and you accept all the terms and conditions therein. You commit to taking full responsibility for the use of this product and any potential consequences. You agree to use this product only for lawful purposes and abide by these terms as well as any related regulations, policies, and guidelines set forth by Purway Innovation.

Purway Innovation is not liable for any direct or indirect damages, injuries, or legal liabilities resulting from the use of this product. Users should adhere to all safety guidelines mentioned in this document, among others.

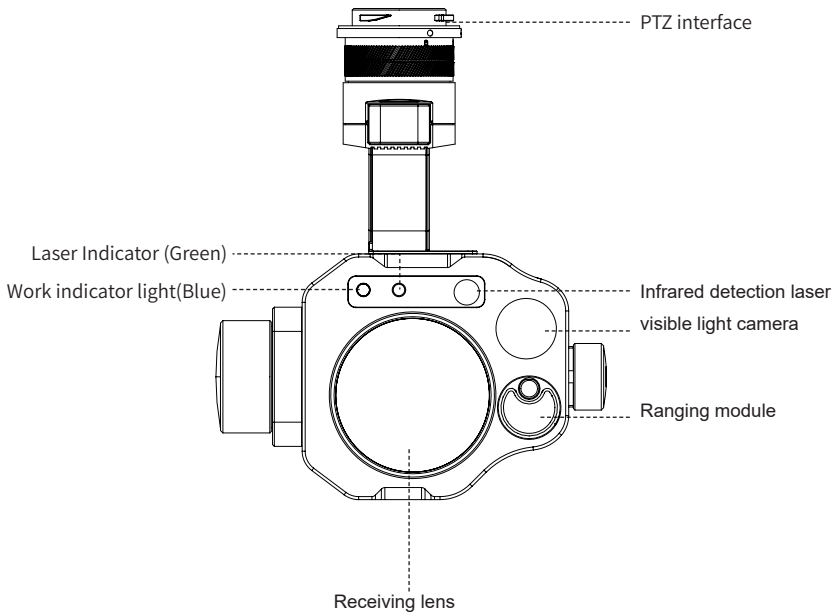
## HEQ PURWAY-CH-4 Laser Methane Detector

HEQ PURWAY-CH-4 Laser Methane Detector is a compact and lightweight drone payload known for its high sensitivity, long-range remote sensing capability, and rapid response. It utilizes laser absorption spectroscopy technology to swiftly detect trace amounts of methane gas in the air, with a maximum inspection distance of up to 300 meters.

This device combines laser detection with visible light sensors, employing Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology for real-time data analysis. It integrates with drone systems, keeping the detection equipment away from potential leak sources. It is a powerful tool for natural gas inspection operations, helping to improve safety, reduce environmental impact, improve operating efficiency, and achieve accurate visual inspection. Coupled with gimbal intelligent stabilization control, laser rangefinding, and other technologies, it can quickly provide users with key information on leak points, help users seize the opportunity, and improve perception capabilities and operating efficiency to a new level.

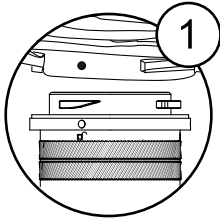
Combined with the HEQ PURWAY-CH-4 Captain ground station, users can easily plan complex route tasks with just a tap of the screen and realize fully automatic waypoint flight operations.

## HEQ PURWAY-CH-4 Laser Methane Detector

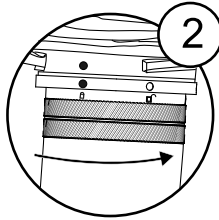


## Install The HEQ PURWAY-CH-4 Laser Methane Detector

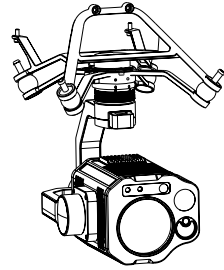
Using Matrice 300/Matrice 350 aircraft as an example for installation: Adjust the HEQ PURWAY-CH-4 DroneLaser Methane Detector gimbal interface to the unlocked position. Insert it into the gimbal mounting location of the Matrice 300/Matrice 350. Rotate the gimbal lock lever to the locked position to secure the gimbal in place.



Align the white dot on the telemeter with the red dot on the interface and embed it into the installation location



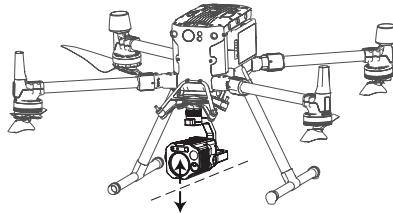
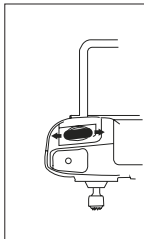
Rotate the quick-release interface of the telemeter so that the red dots are aligned with the red dots of the interface to secure the telemeter.



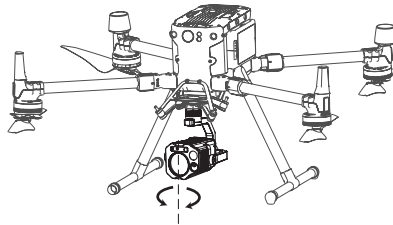
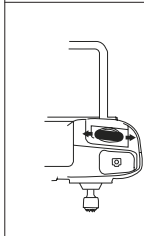
The gimbal interface is designed with a compact structure. When installing or removing it, please firmly hold the mounting platform with one hand while applying rotational force.

## Camera Controls

The left dial can control the gimbal's pitch angle, while the right dial can adjust the camera's pan angle. The C1 button is used for the previous selection, while the C2 button is used for the next selection.



The left dial is used to control the gimbal's pitch angle. Turn the dial clockwise to tilt the gimbal upward, and counterclockwise to tilt the gimbal downward.

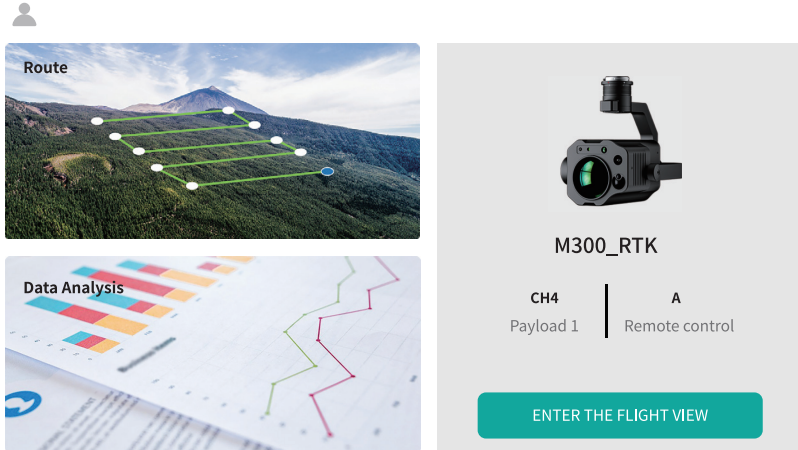


The right dial is used to control the gimbal's pan angle. Turn the dial clockwise to rotate the gimbal clockwise, and counterclockwise to rotate the gimbal counterclockwise.

## Enter HEQ PURWAY-CH-4 Captain APP

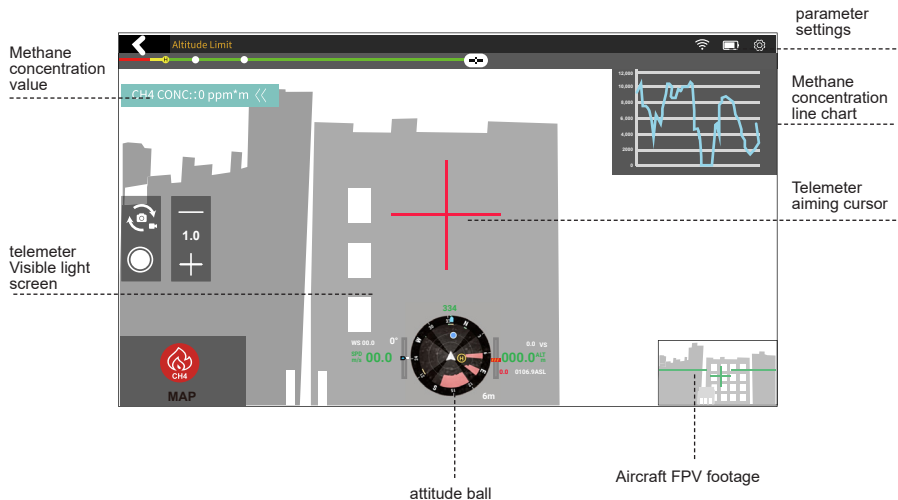
1. Install the HEQ PURWAY-CH-4 Captain APP on the Matrice 300/Matrice 350 remote controller.
2. Power on both the Matrice 300/Matrice 350 aircraft and the remote controller.
3. Once the communication between the Matrice 300/Matrice 350 aircraft and the remote controller is established, click on "Enter Flight Interface" to access the APP.

**Note:** The software requires an internet connection to register the SDK during the initial installation

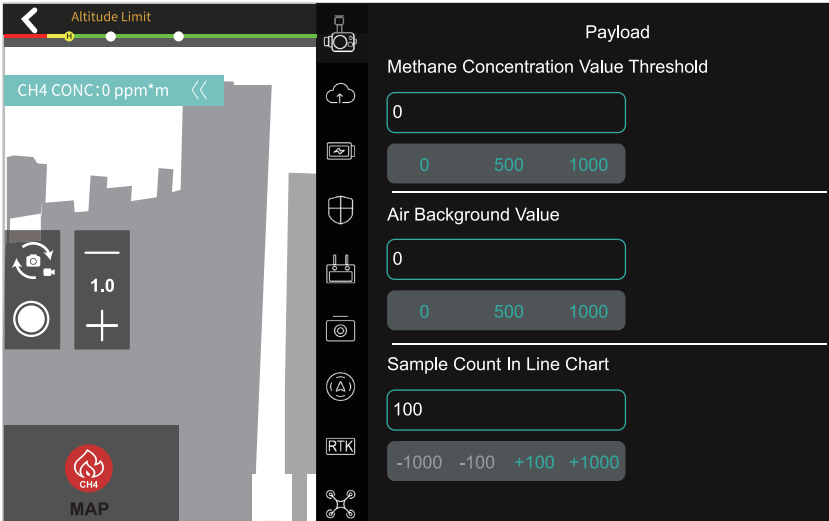


## Captain APP Interface Explanation

The parameters and information on the APP interface can be adjusted and turned off through the "Settings."

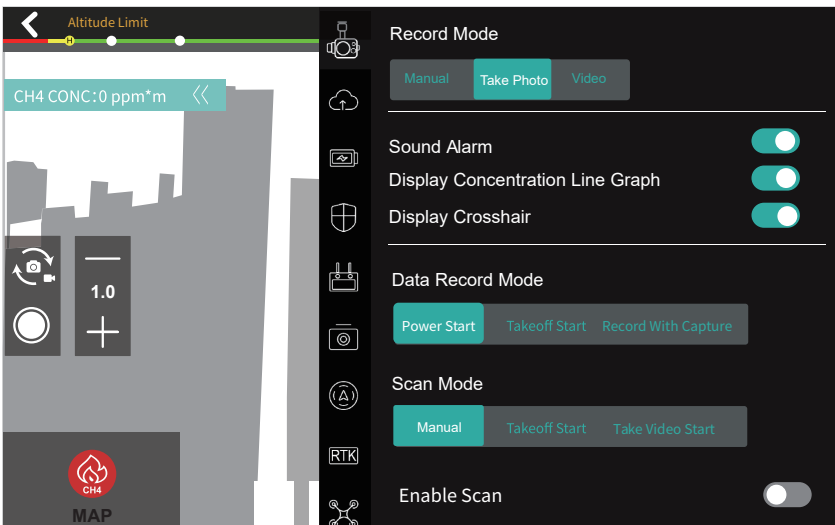


# Payload Parameter Settings



**Methane Concentration Threshold:** When the detected value exceeds the set threshold, the software will issue an alert.

**Air Background Value:** Set the concentration of methane molecules present in the air in the absence of non-methane leaks.



## Recording Mode

**Manual:** When switched to manual mode, methane detection won't be automatically recorded. You can manually take photos/videos. During manual video recording, if methane is detected, the video will have a methane concentration watermark in the top left corner. When methane is detected, it will be automatically recorded as a photo.

**Take photo:** When switched to automatic photo mode, methane detection will automatically be recorded as a photo, which will be saved in the root directory.

**Video:** When switched to automatic video mode, methane detection will automatically be recorded as a video, which will be saved in the root directory.

## Data Record Mode

**Power start:** 1. Automatically records when the aircraft is powered on (if there are no recorded files, check the selected recording mode).

**Takeoff start:**

1. Manually take off to record files.
2. The flight route takes off and will record files.

**Record with capture:**

1. Switch the recording mode to manual, then press the photo button to record files.
2. Add a photo waypoint action to the flight route. The recording mode needs to be switched to manual to trigger the waypoint action. When the flight route reaches the setting waypoint action, the file will be recorded.

## Scan Mode

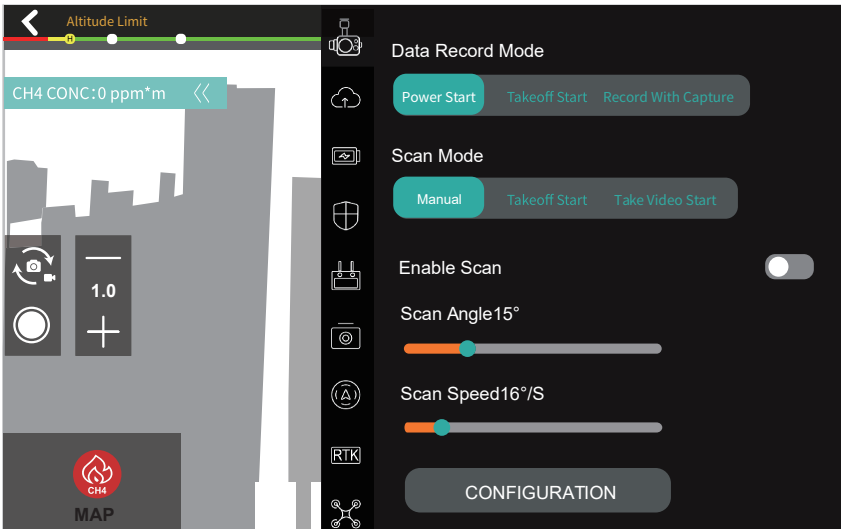
**Manual :** Manually click the start Scan button.

**Takeoff start:**

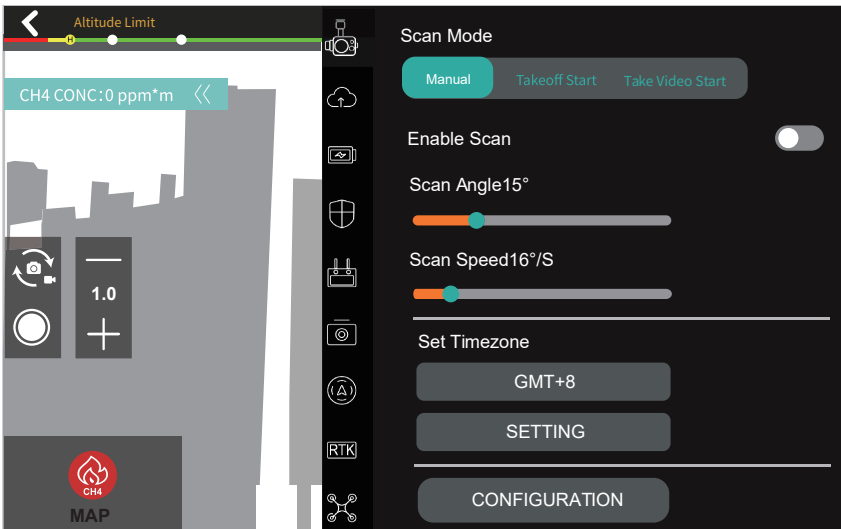
1. Manually take off to trigger the scanning function.
2. The flight route takes off, triggering the scanning function.

**Take Video start:**

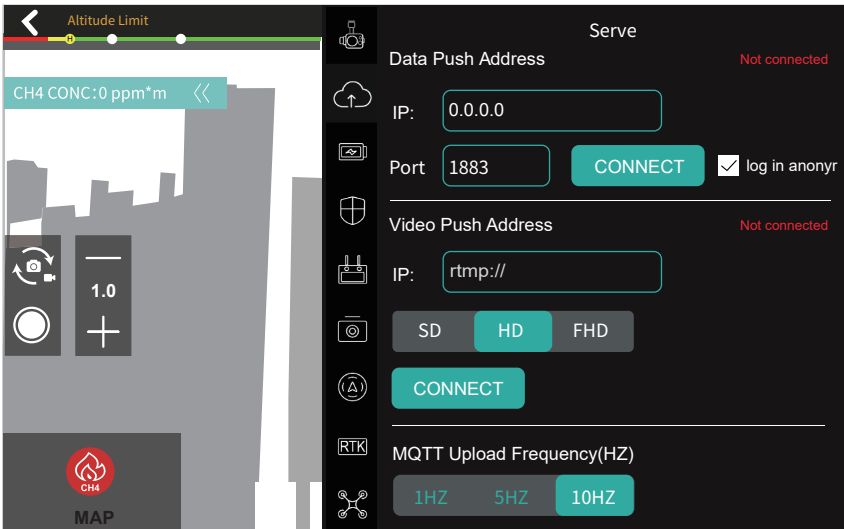
1. Switch the recording mode to manual recording, then press the record button to trigger the scanning function.
2. Add a video waypoint action to the flight route. The recording mode needs to be switched to manual to trigger the waypoint action. When the flight route reaches the designated waypoint action, the scanning function will be triggered.



**Entering Configuration Mode:** Adjusting the device's false alarm prevention level and response speed.



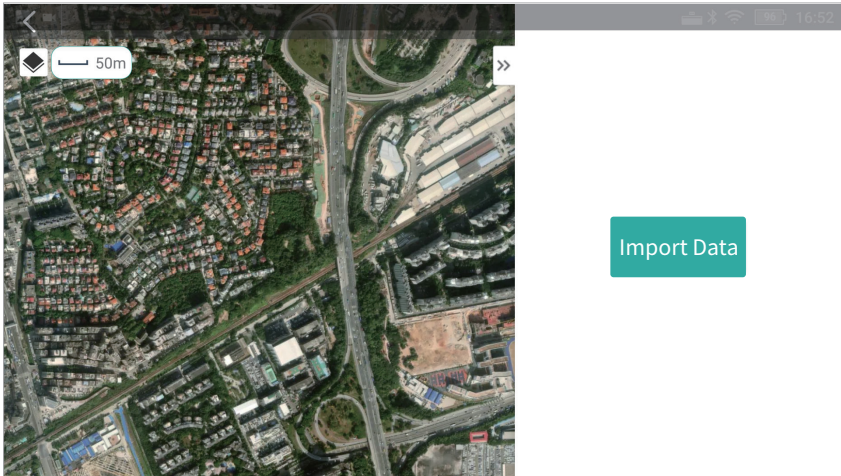
**Time Zone Setting:** Set the corresponding time zone based on your country or region.



**Cloud services:** Transmit data and video to the customer's own server via MQTT and RTMP protocols, enabling the customer to expand more cloud functions.

## HEQ PURWAY-CH-4 Captain Data Analysis

Inspection data is stored on the device's camera SD card. To access it, remove the silicone cover at the rear of the device and take out the SD card. You can use a card reader to directly insert the SD card into the remote controller or move the recording files from the SD card to the local storage of the remote controller. Then, open the HEQ PURWAY-CH-4Innovation Captain APP's homepage and go to 'Export Reports'.



The screenshot shows the app's interface with an aerial satellite view. A green line is drawn on the road, and a red box indicates a concentration of 23437 ppm. The interface includes options for 'Full' and 'Simple' report views. To the right, there is a table with columns for 'Concentration', 'Luminous', and 'Time'.

Concentration	Luminous	Time
5048	215	2024-05-31_17:43:33
20586	222	2024-05-31_17:43:33
20780	208	2024-05-31_17:43:33
21575	173	2024-05-31_17:43:33
21988	139	2024-05-31_17:43:33
20321	129	2024-05-31_17:43:33
19939	131	2024-05-31_17:43:33
20429	133	2024-05-31_17:43:33
20371	133	2024-05-31_17:43:33
20364	135	2024-05-31_17:43:34
20979	138	2024-05-31_17:43:34
21793	159	2024-05-31_17:43:34
22254	189	2024-05-31_17:43:34
22049	191	2024-05-31_17:43:34
21136	189	2024-05-31_17:43:34
21576	188	2024-05-31_17:43:34

Item:576 Photo:73 Video:0

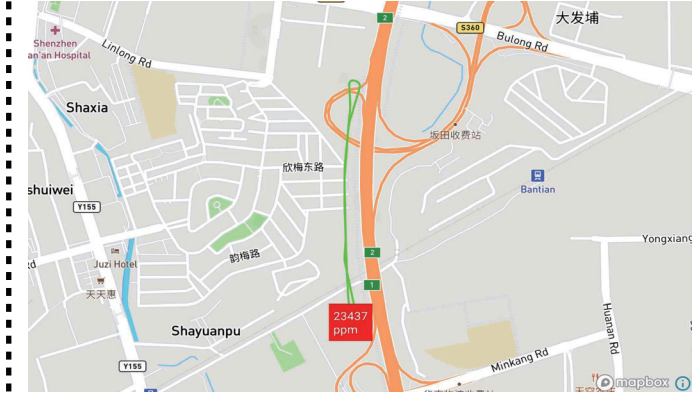
Users can choose to export the report either in full or in a simplified version.

# UAV Laser Methane Detector Data Report (Simple Version)

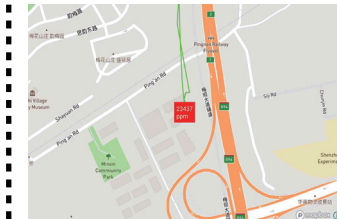
## Laser Methane Telemeter Data Report

Generation Time:2024/05/31 18:09:48

Warning:1  
Duration:00:07:50  
Voyage:1.573KM  
Start Time:  
2024/05/31 17:43:05  
Stop Time:  
2024/05/31 17:50:55  
Staff:  
HEQ  
Address:  
1970



Index: 1  
23437 PPM  
latitude:  
22.6227236  
longitude:  
114.0423201  
Time:  
2024/05/31 17:43:33

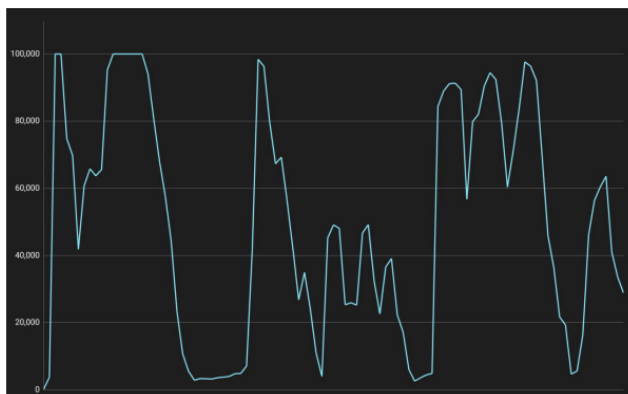


# UAV Laser Methane Detector Report (Complete Version)

## 1、Inspection Overview

Location	XXXXX				
Inspector	XXXXX		Inspection Time	XXXXX	
Alarm Points	XX	Operation Duration	XXXXX	Operation Distance	XXXXX

## 2、Concentration Curve



## 3、Inspection Trajectory



## 4、Concentration Sheet

Name : XXX

Location: XXXXX

Time:XX:XX:XX

No	Longitude	Latitude	Concentration	Luminous	Site Photo
1	83.70xxxxxx	40.75xxxxxx	10506	555	photo
2	83.70xxxxxx	40.75xxxxxx	10006	399	photo

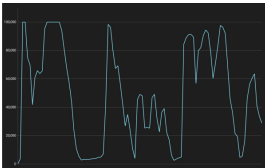
## Report display

### UAV Laser Methane Detector Report


1. Inspection Overview

Location	XXXXX				
Inspector	XXXXX	Inspection Time	XXXXX		
Alarm Points	XX	Operation Duration	XXXXX	Operation Distance	XXXXX

2. Concentration Curve



3. Inspection Trajectory



4. Concentration Sheet

Name : XXX      Location: XXXXX      Time:XX:XX:XX

No	Longitude	Latitude	Concentration	Luminous	Site Photo
1	83.70xxxxxx	40.75xxxxxx	10506	555	photo
2	83.70xxxxxx	40.75xxxxxx	10006	399	photo

<b>Detector parameters</b>	
Detection Object	Methane and methane-containing gases
Gimbal Stabilization	YAW+PITCH+ROLL
Aim Camera	1080 P
Video Definition	FHD 1920 * 1080(30P)
Sensitivity	5ppm*m
Concentration range	0~99999 ppm*m
Measurement Accuracy	±10% (100~50000 ppm*m)
Response Speed	5ms、10ms、100ms(configurable)
Telemetry Distance	300m
Laser Ranging	real-time coordinate function
Instrument Weight	770g
Protection Level	IP54
Operating Temperature	-20°C to 50°C
Rated Current	< 1A Typical value 8V power supply,current 0.3A
Rotation Range	Pitch: +30° to -90°; Pan: ±135°
Route Function	Route planning, KMZ/KML import
Supported Models	Standard interface, Custom support
Infrared Detection Laser	Class 3R, avoid direct laser exposure to eyes
Wavelength	1.65 μm, <25 mW
Green Indicating Laser	class 3R, avoid direct laser exposure to eyes
Wavelength	520 nm, < 5 mW

This document will not be notified of updates separately.

You can check for the latest version on the website:

**[www.purway-innovate.com](http://www.purway-innovate.com)**

If you have any questions or suggestions regarding the manual, please contact us via the following email: [support@purway-innovate.com](mailto:support@purway-innovate.com)