

VOC Drone-borne gas leak detector

GF900

Features

- With 0.01S response time
- Effectively monitor methane leakage air mass in low-altitude areas below 100m;
- Ppm level high precision, more than 5ppm.m
- Single target gas, only sensitive to methane;
- Highly integrated flight control and methane leak inspection functions
- Highly automated
- Highly open
- Super long flight time
- Real-time data display
- Data wireless transmission function

Application

- Natural Gas Pipeline Inspection
- Building inspection
- Station Inspection
- Emergency response

Description

GF900 UAV-borne laser methane telemetry system is a new generation of intelligent inspection equipment for methane leaks launched by Optosky. It consists of a high-performance laser methane telemeter, a four-rotor high-stability UAV, a high-stability pan-tilt, a large-capacity storage system, a wireless image system, and a ground control system, which can provide a new perspective for pipeline network inspection.

GF900 uses 3AXIS three-axis stabilized gimbal, the gyroscope detects the inclination angle of the drone, and the attitude processor controls the three motion axes of the gimbal to balance the flight attitude, so that the telemetry sensor always points in the same direction no matter how the aircraft shakes. It is the basis for effective detection of machine detection system.

The GF900 solution can provide intelligent, accurate and reliable inspection solutions for complex and dangerous environments such as factories, pipelines, residential buildings, urban complexes, and mountains. Fully guarantee the safety of personnel and equipment. The intelligent application software on the ground side receives real-time feedback images and detection data, and immediately reports to the police when leaks are found. At the same time, it records inspection tracks and alarm events, and automatically generates inspection reports. The system supports planned flight and manual flight control.



1. parameter

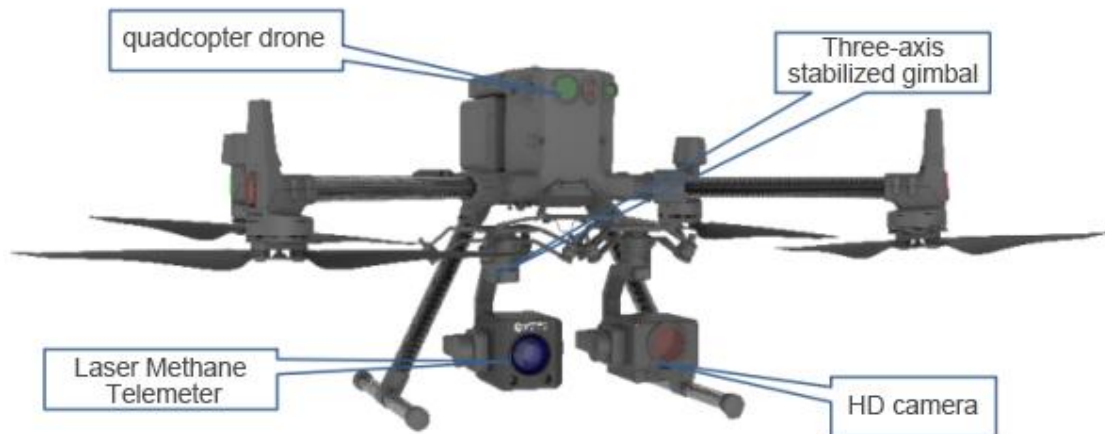
Laser Methane Telemeter (S350-W2)	
Detection object	CH4
Detection principle	TDLAS
sensitivity	5ppm.m
Measuring range (CH4)	0-10000ppm.m
responding speed	0.01s
telemetry distance	100m
supply voltage	5V
Output Data	Methane concentration value, light intensity, sensor internal temperature
Working temperature	-10°C~ + 55°C
Working humidity	< 95%RH, non-condensing
Enclosure protection class	IP54
Instrument weight	300g(removable shell)
size	66mm*57mm*94mm
Camera (DJI Zenmuse H20)	
Angular jitter	±0.01°
Function	Zoom+Wide Angle+Laser Ranging
Controllable rotation range	pitch: -120°-30° translate: ±320°
installation method	detachable
Maximum zoom factor	200× (DFOV: 0.5°, equivalent focal length: 4800mm)
Eye Safety Level	Class 1M (IEC 60825-1:2014)
Working temperature	-20°C-50°C
degree of protection	IP44
Size	150×114×151 mm
Weight	678±5°
Gimbal (DJI X-Port)	
Features	High-precision three-axis gimbal Integrate all functions of PSDK2.2 PTZ parameters can be customized Remote control custom button mapping Can be directly controlled by DJI PILOT/ MSDK/ OSDK
Maximum load	450g
Android software	
Basic functions	It is possible to flexibly set the relevant parameters of drones, gimbals, and laser methane telemeters Real-time display of methane detection concentration value and output alarm

	<p>point data information</p> <p>Support path inspection and automatic cruise</p> <p>The test report can be exported with one click after the task is completed</p>
UAV platform parameters	
size	<p>Dimensions (expanded, excluding paddles): 810×670×430 mm (length×width×height)</p> <p>Dimensions (folded, including paddles): 430×420×430 mm (length×width×height)</p>
Symmetrical motor wheelbase	895mm
Weight (including the bottom single gimbal support)	<p>Empty weight (without batteries): 3.6 kg</p> <p>Empty weight (with dual batteries): 6.3 kg</p>
The maximum weight of the weight-reducing ball for single gimbal	930g
maximum take-off weight	9kg
Hover Accuracy (P-GPS)	<p>vertical:</p> <p>±0.1 m (when vision positioning works normally)</p> <p>±0.5 m (when GPS is working normally)</p> <p>±0.1 m (when RTK positioning is working normally)</p> <p>level:</p> <p>±0.3 m (when vision positioning works normally)</p> <p>±1.5 m (when GPS is working normally)</p> <p>±0.1 m (when RTK positioning is working normally)</p>
Maximum flight altitude	5000m
maximum wind speed	15m/s (Seven wind speed)
Maximum flight time	55min
degree of protection	IP45
GNSS	GPS+GLONASS+BeiDou+Galileo
Working temperature	-20°C-50°C
Maximum working distance of ground station	15km 1080 (Pimage transmission)

2.Parts List

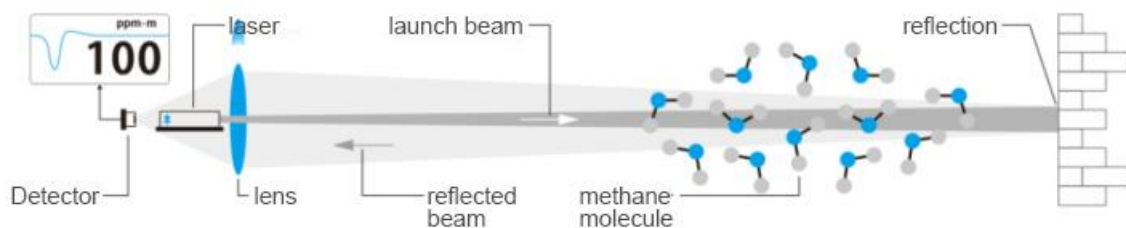
NO.	Parts	Quantity	Optional/Standard
1	Laser Methane Telemeter	1	Standard
2	DJI Matrice M300RTK UAV	1	Standard
3	DJI X-Port Standard Duty Gimbal	1	Standard
4	Zenmuse H20 Camera	1	Standard

3.Appearance



4. Working principle of GF900

The working principle of this product is: When the instrument is working, it emits detection laser in a specific wavelength range (different gases to be measured have different central wavelengths). The detection laser encounters reflective objects (such as the ground, valves, pipes, walls, etc.) , diffuse reflection occurs, and part of the laser light returns to the detection unit of the instrument. In the beam path, if there is an air mass formed by the leakage of the gas to be measured, the air mass will absorb the detection laser light, and the ratio of the amount of unabsorbed light to the amount of absorbed light is proportional to the concentration of the air mass. By calculating the ratio, it can be deduced The concentration of the air mass.



The measurement results are expressed in gas column concentration (ppm.m): gas concentration (ppm) \times air mass thickness (m). As shown in the figure below, the gas concentration value is 300ppm, and the thickness of the cluster is 1m, so the gas column concentration = 300ppm \times 1m = 300ppm.m.

Notice:

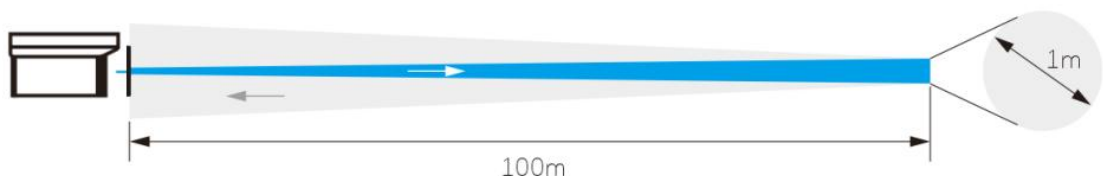
- ①**Unit concentration (ppm.m):** The detection value of this product is the overall concentration of the measured gas within the beam path, and the unit is ppm \cdot m, which is the product of the gas concentration (ppm) and the air mass size (m);
- ②**Choose a suitable reflective surface:** The reflective ability of the target to the laser will directly affect the distance and effect of the measurement. If the target is dark, inclined at a large angle, porous, mirror or highly reflective surface, please adjust the angle and position to achieve the best detection effect. For example, black foam, facing glass, large-angle exposure to the ground, stainless steel metal grids, etc. are bad reflection targets; plaster walls, cement planes, continuous foliage vegetation, land or sand are excellent reflection backgrounds;

③ **Highly reflective surface:** The equipment is facing a surface with high reflectivity (glass, smooth tiles, water surface, smooth stainless steel railings). Since the mirror reflected light is directly reflected into the detector, the detector will be overloaded instantly, resulting in false alarms. In addition, highly reflective surfaces may also cause a directional reflection of the detection beam, no return light, and an error of too low light intensity.

④ **Penetration of transparent objects:** Laser can detect methane through transparent objects, but during the penetration process, the approximate measurement value will be low due to the reflection of transparent objects. The more transparent objects that penetrate, the greater the loss.



⑤ **Long-distance monitoring situation:** The beam emitted by the laser collimation is not a strict straight line, but will continue to diverge and weaken as the distance increases; forming a conical divergent beam. The spot size of the detection beam at a distance of 100 meters is about a circle with a diameter of 1 meter, so when the distance increases, the area of the gas detection is too small, which may cause a part of the laser light to not pass through the gas and reflect back to the instrument, resulting in a measured value that is higher than the actual value. Issues that are too small to detect effectively.



When detecting high-rise residential buildings, when the measurement elevation angle is too large, the oval spot will cover multiple layers, and the detection target cannot be filled with the spot, resulting in a small detection value.

In the case of long-distance detection, the laser itself will scatter, and the situation will be even worse in windy, sandy, rainy and foggy weather, resulting in too low light intensity reflected back to the device, resulting in small detection values or too weak light intensity errors.