OPTOSKY Spectroscopy Solutions

Datasheet

Methane Remote Sensor GF100

Features

- Utilizes tunable diode laser absorption spectroscopy technology & non-contact measurement.
- Supports long-distance active monitoring with a maximum range of up to 200 meters.
- Provides early warnings.
- Selective for methane only, unaffected by other gases, water vapor, or dust.
- Sensitivity of 5 ppm·m.
- Response time ： ≤ 0.1 seconds.
- Detection range ： 0-50,000 ppm·m.
- Working temperature: -20°C to +55°C.
- Working humidity: <95% RH (non-condensing).
- Lightweight design, suitable for various applications.

Description

The GF100 is engineered for hazardous environments with gas and dust, making it perfect for challenging conditions. Thanks to its single-mode laser wavelength, it effectively avoids cross-interference from other gas components. This key feature of laser spectroscopy enhances its gas fingerprinting capability, significantly reducing false alarms and simplifying safety management. Ideal for critical applications in the petroleum industry, petrochemical sector, natural gas, chemical industry, mining operations, and power plant facilities, the GF100 supports unmanned real-time gas monitoring, boosting operational safety and efficiency. With its innovative methane remote sensing technology and exclusive high-precision gas detection, the GF100 sets a new standard in industrial gas monitoring. Elevate your safety measures and operational performance with this leading-edge gas leak detection module.

Product data information is current as of publication data. Products conform to specifications per the terms of Optosky Standard warranty.

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Application

- Portable Laser Methane Remote Sensor

A lithium battery-powered portable device with high detection accuracy and fast response speed. Compact and lightweight, it is easy to carry.

- Pan-Tilt Laser Methane Remote Sensor

A pan-tilt laser methane remote sensor designed for hazardous environments with gas and dust. It offers excellent fingerprinting capability, effectively eliminating false alarms. It is suitable for critical applications in petroleum, petrochemical, natural gas, chemical industries, mining, and power plants, enabling unmanned, real-time monitoring.

- Robot Inspection

The laser methane remote sensing module can be mounted on intelligent inspection robots to automatically survey high-risk areas. This enhances worker and equipment safety, reduces operational costs, and significantly mitigates safety risks at facilities.

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- Vehicle-Mounted Laser Methane Remote Sensor

Ideal for pipeline monitoring in urban gas networks and gas distribution lines, as well as for long-distance high-pressure pipeline inspections.

- Drone-Mounted

Equipped on DJI's advanced professional drone platforms, this sensor uses cutting-edge laser gas detection technology. It features high sensitivity, rapid response, good selectivity, and low detection limits. It ensures comprehensive safety for urban gas and pipeline networks. Capable of performing automated mid-to-long-distance pipeline inspections, it allows real-time monitoring of drone status, sensor status, and measurement results. In the event of a leak, the system automatically alerts and records data (time, coordinates, leak concentration, and on-site photos) to generate inspection reports.

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1. Parameter

Model	GF100-30	GF100-100	GF100-150/200	GF100-X
Detection Target	CH4			
Detection Principle	TDLAS			
Sensitivity	5ppm·m			
Measurement Range	0-50000ppm·m			
Response Time	0.01s (adjustable)			
Output Data	Methane concentration, light intensity			
Workinging Temperature	-20°C to +55°C			
Working Humidity	<95% RH, no condensation			
Telemetry Distance	Up to 30m	Up to 100m	Up to 200m	Up to 100m
Compatible Drone	None	None	None	DJI M300 RTK, DJI M350 RTK
Interface	RS485	RS485	None	Payload SDK
Power Supply Voltage	3.3-5V	5V	12V	13.6V
Instrument Weight	150g	300g	1000g	640g
Dimensions	68mm×*41mm*×26mm	100mm×*75mm*×90mm	100mm×*75mm*×140mm	160mm×*130mm*×170mm
Android Software	None			Intelligent Flight Control Software
Basic Functions	Flexible settings for drone, gimbal, and laser methane telemetry parameters; Real-time display of methane detection concentration and alarm data; Supports path inspection and automatic cruise; One-click export of test reports after the task ends			

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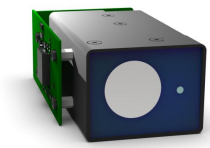
2. Accessories List

No.	Model	Quantity	Option/Standard
1	Laser Methane Telemetry Device	1	Standard
2	Product Manual	1	Standard
3	Packaging Box	1	Standard

No.	Model	Quantity	Option/Standard
1	Laser Methane Telemetry Device	1	Standard
2	DJI X-port Gimbal	1	Standard
3	Handheld Flight Control Software	1	Standard
4	**Product Manual**	**1**	**Standard**
5	Packaging Box	1	Standard

3. Product Appearance

GF100-30



GF100-100

GF100-150/200

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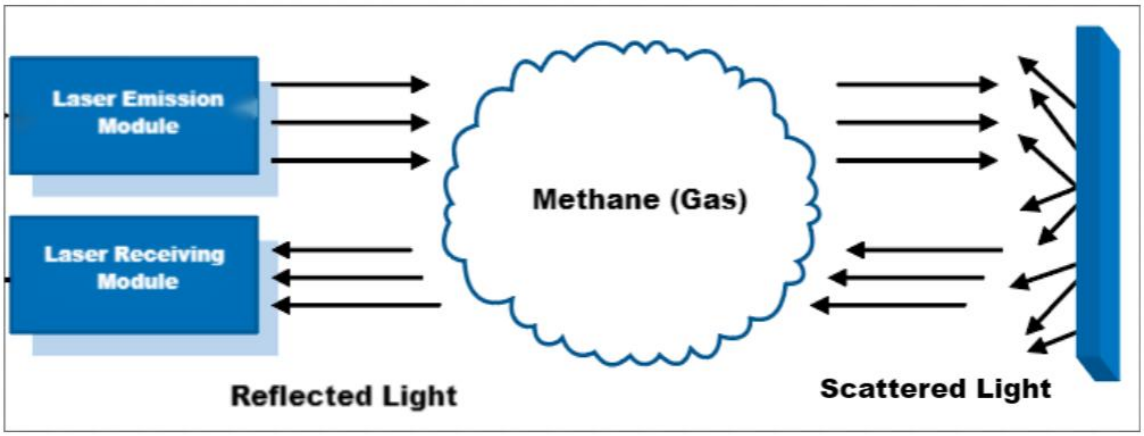
GF100-X

4. Working Principle

When the instrument operates, it emits a detection laser with a specific wavelength range (varying with the gas being measured). This laser encounters reflective surfaces (such as the ground, valves, pipelines, walls) and undergoes diffuse reflection, with some laser returning to the instrument's detection unit. If there is a gas cloud formed by the leaked gas in the beam path, it will absorb the detection laser. The ratio of unabsorbed to absorbed light correlates with the concentration of the gas cloud, and this ratio is calculated to determine the concentration of the gas cloud.



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Measurement results are expressed as gas column concentration (ppm·m): gas concentration (ppm) × gas cloud thickness (m).

Notes:

① Unit Concentration (ppm·m): The detected value of this product represents the overall concentration of the measured gas in the beam path, measured in ppm·m, which is the product of gas concentration (ppm) and gas cloud size (m).
② Choosing Appropriate Reflective Surfaces: The reflective capability of the target surface directly affects measurement distance and accuracy. If the target is dark-colored, highly inclined, porous, mirror-like, or strongly reflective, adjust the angle and position to achieve optimal detection results.

- Poor reflective targets: Black foam, direct glass, steeply angled ground, stainless steel metal grilles, etc.
- Good reflective backgrounds: Plaster walls, cement surfaces, continuous foliage, land, or sand.

③ High Reflectivity Surfaces: When aimed at high reflectivity surfaces (e.g., glass, smooth tiles, water surfaces, smooth stainless steel railings), the direct reflection of laser light can overload the detector, causing false alarms. Additionally, high reflectivity surfaces may lead to directional reflection of the detection beam, resulting in a lack of returning light and weak signal errors.
④ Penetration of Transparent Objects: Lasers can detect methane through transparent objects, but the measurement value may be lower due to reflections from transparent objects. The more transparent objects the laser passes through, the greater the loss.
⑤ Long-Distance Monitoring: The laser beam is not a strict straight line but diverges and weakens with distance, forming a conical beam. At 100 meters, the beam spot diameter is approximately 1 meter. As distance increases, the detection area may become too small, leading to the potential issue of some laser light not reflecting back through the gas, resulting in measurement values that may be lower than the actual values or ineffective detection.

- When measuring tall buildings, a large measurement angle can cause elliptical beam spots to cover multiple floors, leading to reduced detection values.
- In long-distance detection and adverse weather conditions (such as wind, sand, rain, or fog), laser scattering can result in weak returning light, causing measurement values to be lower or signal errors.

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