FluX Methane

High-performance methane measurement

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Description

Tuneable Diode Laser Absorption Spectroscopy (TDLS) is a technology used in gas detection systems, including methane leak detectors. TDLS detectors operate by emitting a laser beam with a tuneable wavelength that is absorbed by the target gas molecules. The amount of absorption is then analysed to determine the concentration of the gas in the surrounding environment.

Features

- Fast response, high accuracy, long life span
- High Sensitivity and Selectivity for Methane
- Measurement range: 0-1000 ppm, lower available on request
- Low power consumption
- Integrated ambient sampling system
- Real-time monitoring
- Self-Calibration Capabilities

Working Principle

Tuneable Diode Laser Spectroscopy (TDLS) is a technique used for the precise and selective measurement of trace gas concentrations in various environments. TDLS uses a tuneable diode laser as the light source. Diode lasers are advantageous because they can be tuned to emit light at specific wavelengths. The gas sample under investigation is placed in a measurement cell. The gas molecules in the sample absorb light at specific wavelengths that are characteristic of the molecular structure.

The diode laser's wavelength is tuned to a range that corresponds to the absorption lines of the target gas. This tuning allows for selective measurement of the absorption characteristics of the specific gas of interest. The tuneable diode laser beam passes through the gas sample. If the wavelength matches the absorption lines of the gas molecules, the light is absorbed, and the intensity of the transmitted light decreases. The transmitted light is detected by a photodetector, and the signal is processed to determine the amount of absorption. The concentration of the target gas can be calculated based on the measured absorption.

Advantages of TDLS:

- High sensitivity and selectivity for specific gas measurements.
- Non-intrusive technique.
- Fast response time.
- Minimal drift, self-calibrating

Applications

The FluX Methane (M) unit is developed with ***stationary greenhouse gas monitoring*** applications in mind. It can be used for a variety of use cases in industrial, energy and livestock monitoring.

The FluX Methane can also be provided with a customized configuration for ***vehicle-mounted and aerial inspection applications*** using drones and unmanned aircraft. The FluX Methane S is compact in size, and provides quick reaction times (T90) of ca. 2 seconds.

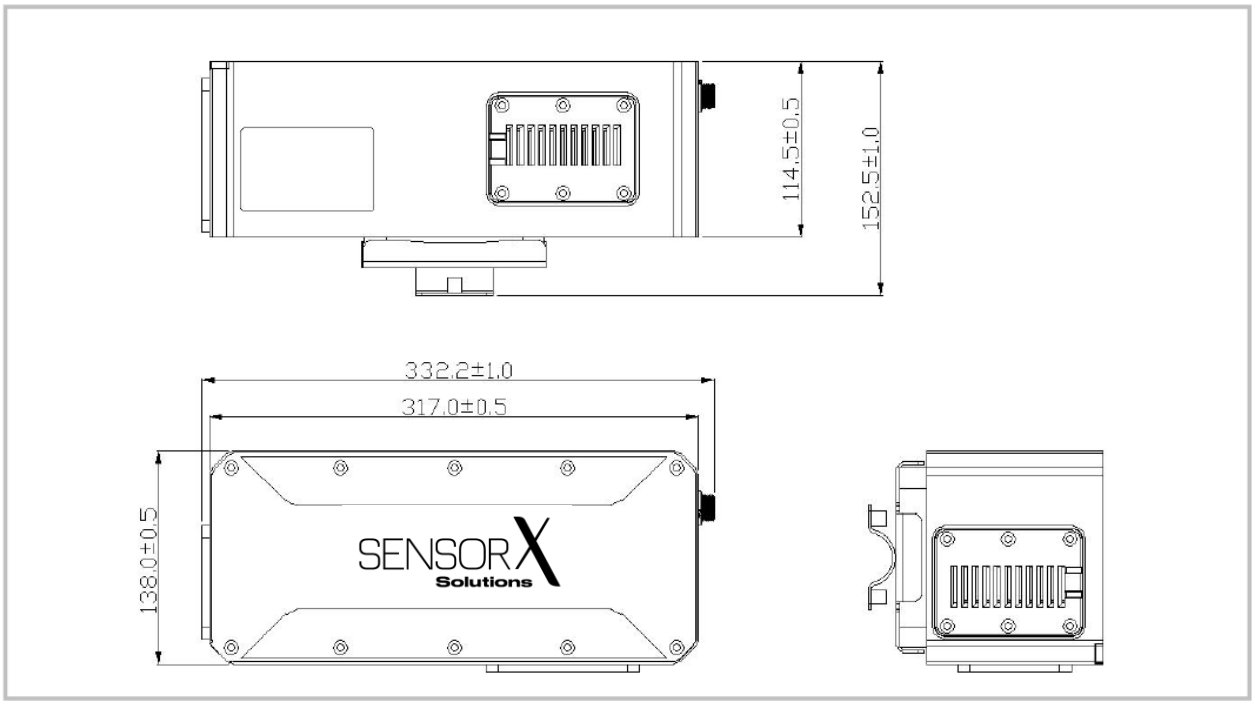
1. Specifications

FluX Methane (M) Specification	
Target Gas	Methane (CH4)
Working Principle	Tuneable Diode Laser Absorption Spectroscopy (TDLAS)
Measurement Range	0~1000 ppm
Accuracy [1)]	+/-(5 ppm + 2%reading)
Resolution	0.1 ppm
Detection Limit	1 ppm
Response Time	T90 < 20s
Refresh Rate	1s - 1h, can be configured
Dimension	138mm x 152mm x 332mm
Gross Weight	3,560 g
Communication Mode	RS485 @12V System UART-TTL @5V System
Design Lifetime	10 years
IP Grade	IP66
Certification	UL Class I Div 2
Working Temperature	-20 ~ 60℃
Working Humidity	0~100%RH (including condensing)
Working Pressure	0.86 – 1.06 bara / 86kPa - 106kPa
Working Place	Outdoor
Power Supply	DC 5V/12V
Average Power Consumption	≤1W

Detection Limit is defined as 3 times the standard deviation.

Specifications are subject to change without notice.

2. Product Dimensions



Dimensions unit: mm

IoT capability with cloud integration (X-Cloud)

The FluX Methane unit is available with IoT-enabled interfaces such as LoRaWAN on request. Additionally, a full IoT integration with the SensorX cloud-based reporting system (X-Cloud) can be provided.

The X-Cloud integration provides:

- Complete access to sensor data
- Availability of methane leak quantification algorithms
- Customized reporting dashboards

Precautions

While using a Tuneable Diode Laser Absorption Spectroscopy (TDLS) sensor, it's essential to follow certain precautions to ensure safety, accuracy, and optimal performance. Here are some general precautions:

1. Operational Environment:

Ensure that the TDLS sensor is operated within its specified environmental conditions, including temperature and humidity ranges.

2. Gas Compatibility:

Verify that the sensor is suitable for the specific gases you intend to measure. Some sensors are designed for specific gases and using them with incompatible gases can lead to inaccurate readings.

3. Calibration:

Regularly calibrate the TDLS sensor according to the manufacturer's guidelines. Calibration is crucial for maintaining accuracy in gas concentration measurements.

4. Maintenance Schedule:

Adhere to the recommended maintenance schedule provided by the manufacturer. Regular maintenance helps prevent sensor drift and ensures long-term reliability.

5. Cleaning Procedures:

Follow proper cleaning procedures to remove any contaminants from the optical components of the sensor. Contaminants can affect the accuracy of measurements.

6. Avoid Physical Damage:

Handle the TDLS sensor with care to prevent physical damage. Avoid impacts, excessive vibrations, and rough handling, which can affect the alignment of optical components.

7. Alignment Verification:

Periodically verify the alignment of the optical components to ensure that the laser beam is correctly directed through the gas sample and the photodetector receives accurate signals.

8. Ventilation:

If the sensor is used in confined spaces, ensure adequate ventilation to prevent the buildup of gases and maintain a safe working environment.

9. Power Supply:

Connect the TDLS sensor to a stable and reliable power supply to prevent fluctuations that could affect the performance of the laser source and other electronic components.

10. Safety Training:

Provide appropriate training to personnel operating the TDLS sensor, emphasizing safety protocols, proper handling procedures, and emergency response measures.

11. Emergency Procedures:

Have clear emergency procedures in place in case of sensor malfunctions, gas leaks, or other unexpected events. Ensure that personnel know how to respond promptly and safely.

12. Compliance with Regulations:

Ensure that the use of the TDLS sensor complies with relevant safety and environmental regulations in your industry or region.

13. Record Keeping:

Maintain detailed records of calibration, maintenance, and any troubleshooting or repairs performed on the TDLS sensor. This documentation is valuable for quality control and audits.

Always refer to the specific guidelines provided by the manufacturer of the TDLS sensor, as they may have unique recommendations and precautions for their particular model.

About SensorX Solutions

SensorX Solutions is leveraging the power of IIoT sensors, by combining it with technologies such as Blockchain, AI and Cloud Computing. We serve GHG monitoring markets with integrated IIoT and software solutions to fight climate change. We are proud to partner with cutting-edge sensor manufacturers worldwide, while providing our solutions to global markets.

Visit www.sensorXsolutions.com for more information.