EmiCo. *lite*

Monitoring Nitrous Oxide & Methane

Product Brochure

VARIOLYTICS

Making the invisible visible.

EmiCo. lite | Monitoring Nitrous Oxide & Methane

Overview

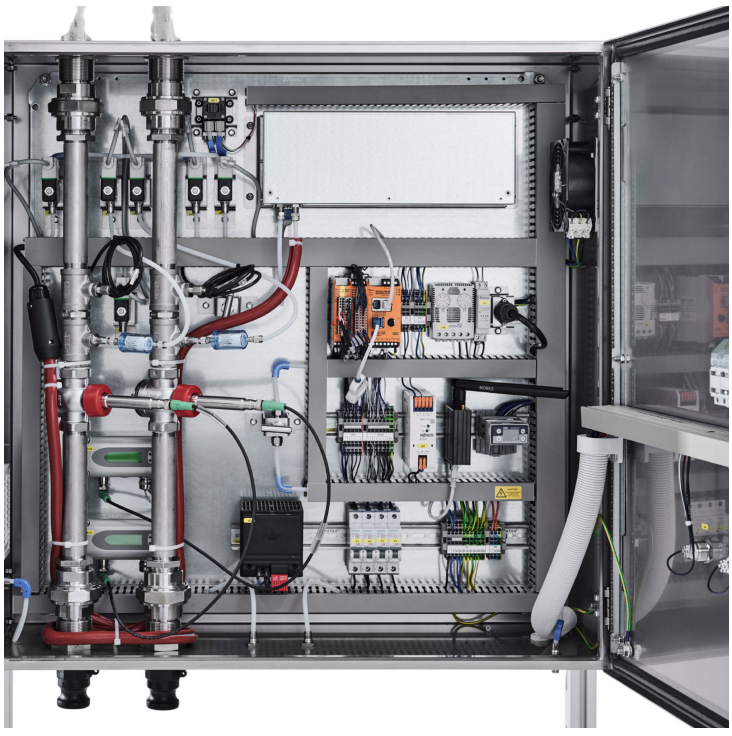
EmiCo lite is designed to meet new regulations on monitoring greenhouse gas emissions, providing operators with new insights into their treatment processes. It offers smart real-time monitoring of nitrous oxide (N_2O) and methane (CH_4) in the biological step of wastewater treatment plants. The cloud architecture enables fast and seamless implementation ensuring reliability, security and data integrity.

What is EmiCo. lite?

The Emission Control (EmiCo) lite is a low-cost analyser specifically designed for operation in wastewater treatment plants, to monitor greenhouse gas emissions that stem from the biological step. The analyzer comes in a climate-controlled housing and can analyse probes from 2 measuring spots.
The probe lines are 10 meters long and enable measurements 20 meters apart. With its integrated eSIM, the data can be accessed online in real-time from any location.

EmiCo. lite consists of the following modules:

- NDIR Analyzer
- CPU with eSIM
- 2 measuring hoods
- Flow meter
- O_2 Sensor
- 20-meter probe line
- Climate controlled housing
- Gas delivery pump



Application & Benefits

What is EmiCo. lite used for?

The wastewater treatment industry is on its path to net-zero, decarbonizing its operations. Currently, nitrous oxide and methane are responsible for >70% of the total carbon footprint of a treatment plant. This can be avoided through improved process control by mitigating the formation of these emissions in the biological step. EmiCo lite provides the tools to do this, detecting direct emissions when they occur and providing the necessary insights to adapt control strategies.

What are the benefits?

The benefits for wastewater utilities are:

1	Precise, real-time emission monitoring of N_2O & CH_4
2	New insights for improved control strategies
3	Compliance with regulatory standards
4	Accurate reporting of direct emissions

Technology

How does the technology work?

The measurements from Emico lite are carried out using Non-Dispersive Infrared (NDIR) technology. Infrared light source emits light that passes through a sample of air in a measurement chamber. The specific wavelengths absorbed by the gases in the sample are then detected by an infrared detector. The amount of light absorbed at these specific wavelengths is measured, and this measurement is used to determine the concentration of the gases in the sample.

Your Path to Net-Zero

What can be measured?

EmiCo lite provides multi-parameter measurements in real-time from the exhaust gas collected under a 1 m^2 hood. The analyzer is calibrated to measure the following parameters, in relevant concentrations every 5 minutes:

- **Nitrous oxide (N_2O)**
- **Methane (CH_4)**
- **Oxygen (O_2)**
- **Carbon dioxide (CO_2)**

Additionally, flow rate and temperature values are measured to calculate:

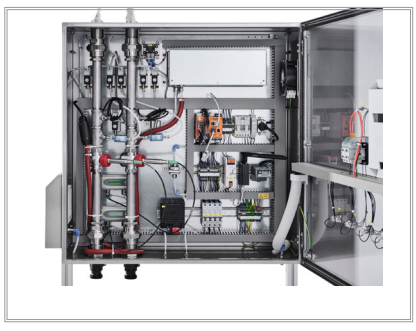
» Emission rates

Unique Selling Proposition

Why choose EmiCo. lite?

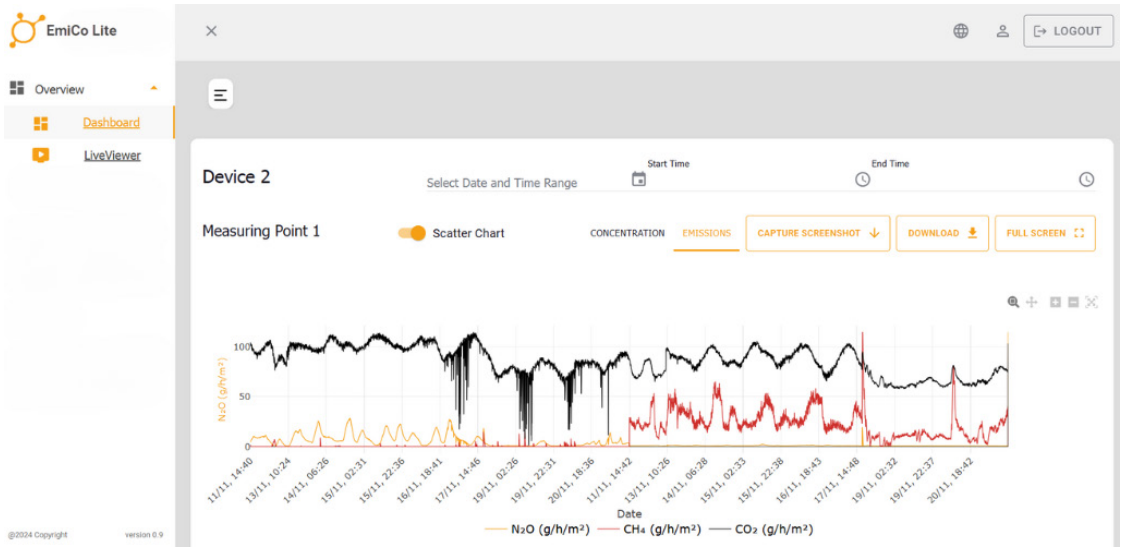
EmiCo lite is designed to be a comprehensive and user-friendly tool for wastewater treatment plants striving to meet and exceed environmental standards. The system is your gateway to advanced emisson control, providing accurate monitoring of greenhouse gases and ensuring compliance with regulatory requirements.

1	Low-cost system providing important insights on emissions
2	Multiple parameters with one analyser (N_2O, CH_4, O_2 & CO_2)
3	Monitor emission rates and not just concentrations
4	Fast implementation and low maintenance costs



Understanding emission rates

EmiCo lite is not just about monitoring concentrations; it goes a step further by providing precise emission rate measurements. This capability offers a deeper insight into your greenhouse gas emissions, enabling more effective control strategies and regulatory compliance.



How emission rates are measured

Our advanced system calculates emission rates by combining gas concentration data with flow rate measurements. This dual-parameter approach ensures that you receive a comprehensive and accurate assessment of your emissions.
Here is how it works:

1. Gas concentration measurement: Using Non-Dispersive Infrared (NDIR) technology, EmiCo lite measures the concentration of gases such as nitrous oxide (N_2O), methane (CH_4), oxygen (O_2), and carbon dioxide (CO_2) in the exhaust gas.

2. Flow rate measurement: The system simultaneously measures the flow rate of the gas. This is crucial for determining the actual volume of emissions over time.

3. Emission rate calculation: By integrating the concentration data with the flow rate, EmiCo lite accurately calculates the emission rates, providing a clear picture of the quantity of each gas being emitted.

EmiCo OS

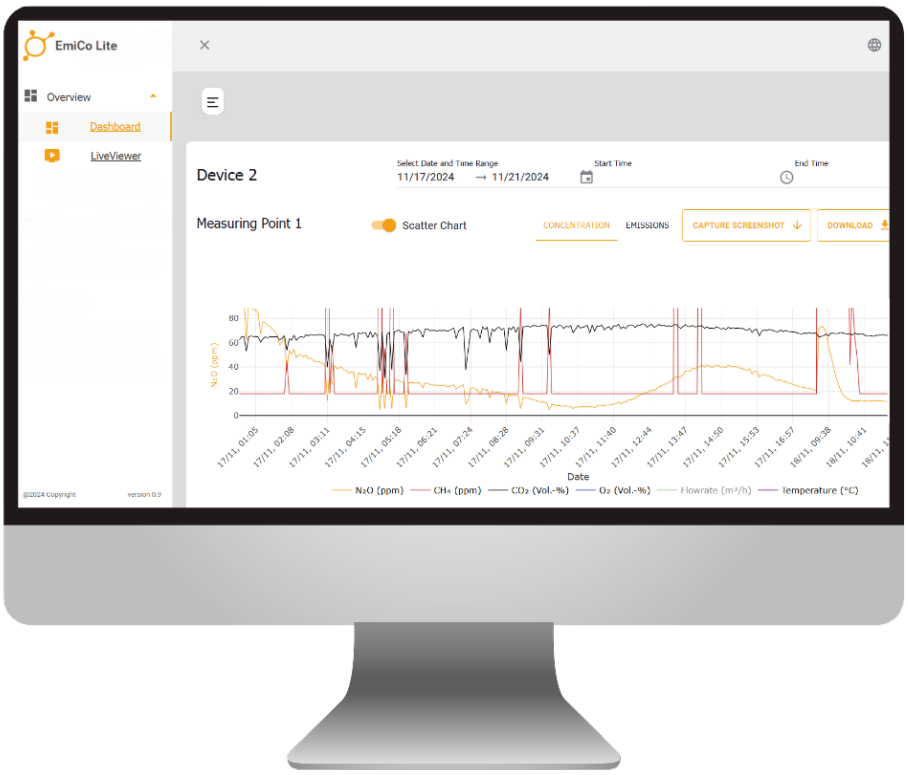
EmiCo OS is an integral part of the EmiCo lite system, designed to enhance your emission monitoring and data analysis capabilities. The software provides a comprehensive and user-friendly interface to manage, visualize, and interpret your emission data effectively.

Key features

• **Intuitive dashboard**: EmiCo OS offers an easy-to-navigate dashboard that presents your data in a clear and organized manner.

• **Real-time data visualization**: Access real-time data on N_2O, CH_4, O_2, and CO_2 emissions. Monitor gas concentrations, flow rates, and temperatures as they happen, enabling immediate insights and action.

• **EmiCo Assistant:** Identifies good and bad process states to uncover optimization potential. Gain tailored recommendations to improve efficiency, reduce emissions, and enhance overall process stability.



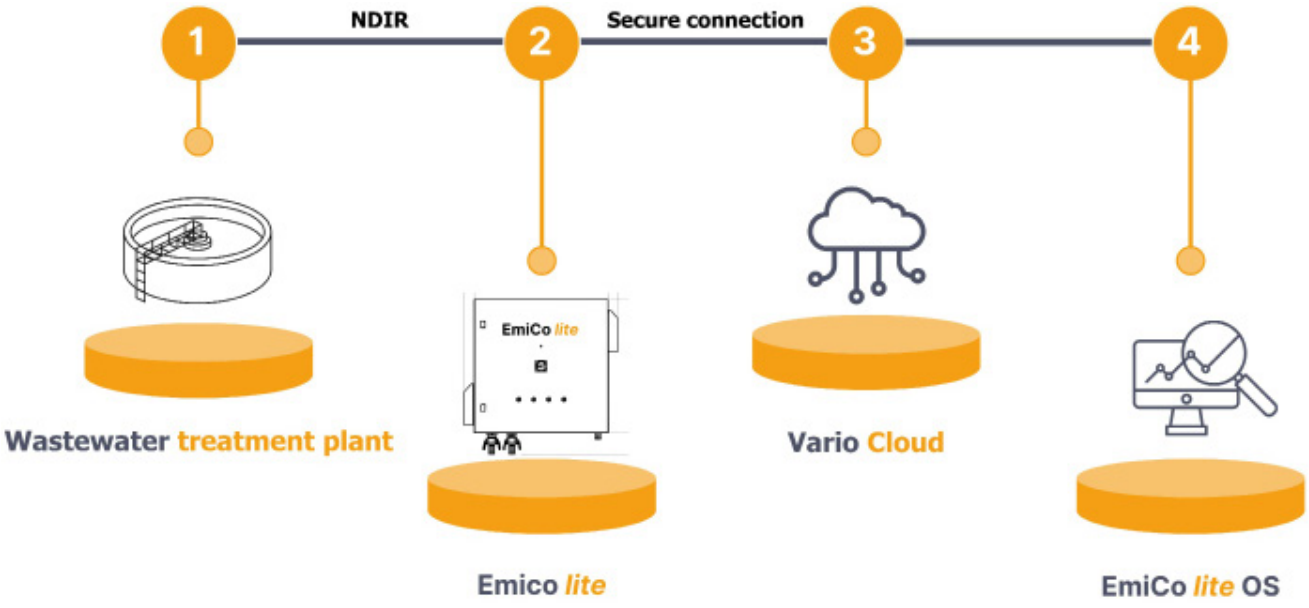
Your path to effective monitoring

Why cloud?

Guaranteed Data Integrity: Your data is always backed up, securely stored, and protected against any form of loss or corruption. Our algorithms inspect the data and verify that measurements are reliable.

Instant Support: Real-time, remote troubleshooting and updates by our dedicated support team. Faster resolution of issues and seamless system updates, minimizing downtime, without the need for onsite interventions.

Rapid Deployment: Implementation is swift and straightforward, bypassing the complex setup required for traditional systems. EmiCo lite only requires a power supply, and delivers data to your cloud account, without the need for costly LAN infrastructure



Calibration & Maintenance

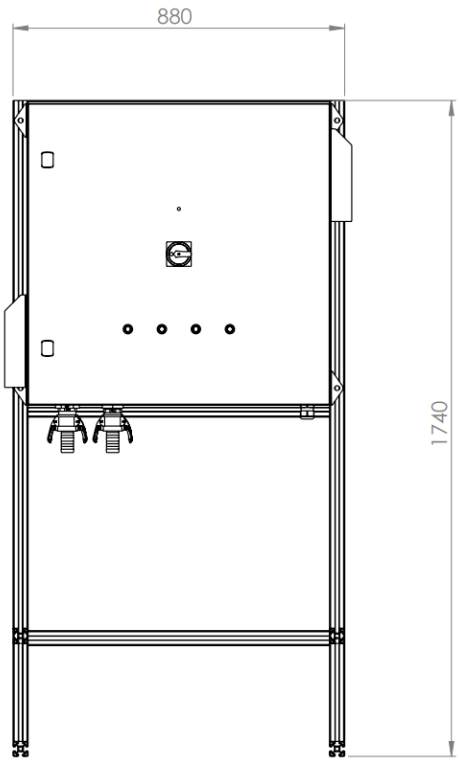
Zero Point: To provide precise measurements, EmiCo lite determines the 0 point of components. On a weekly basis the system performs an automatic zero-point calibration with pure nitrogen. For this reason, a nitrogen bottle needs to be connected to the system when longer measuring campaigns are planned.

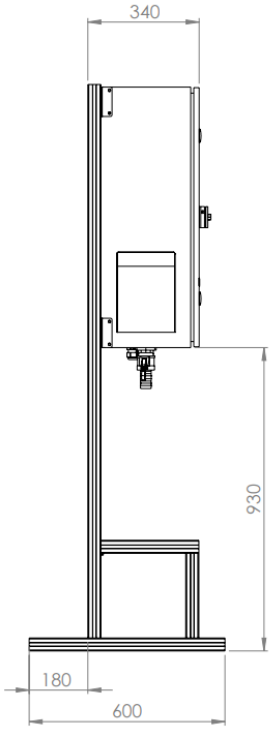
6 Months: To avoid drifts, the EmiCo system requires a bi-annual calibration. The calibration is performed by connecting gas bottles with predetermined N_2O, CH_4 and CO_2 concentrations to the system.

Maintenance: It is recommended that the system is serviced within 24 months.

Technical Representations

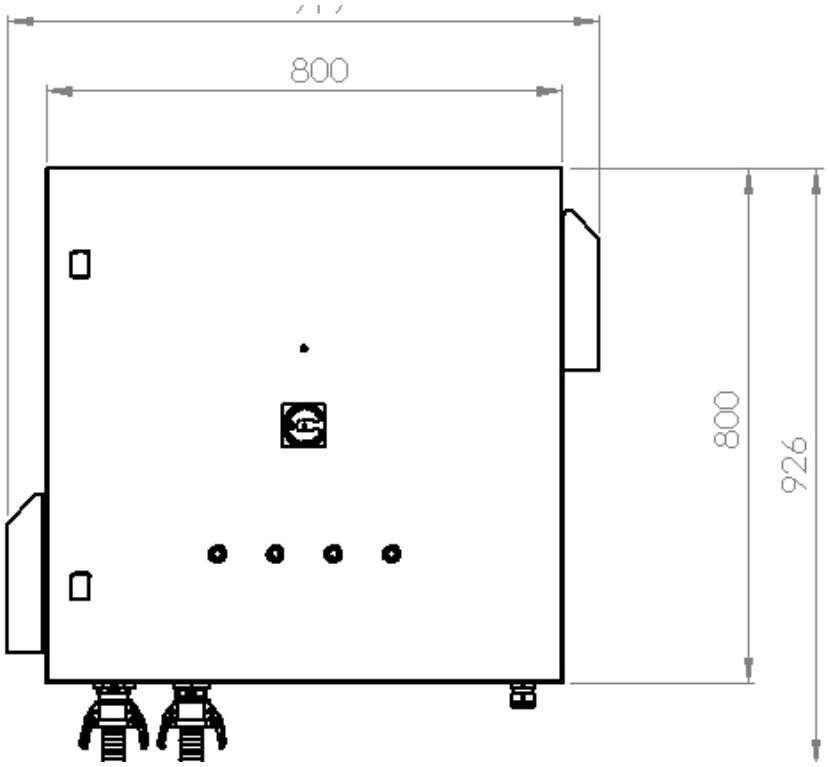
EmiCo. lite with mount

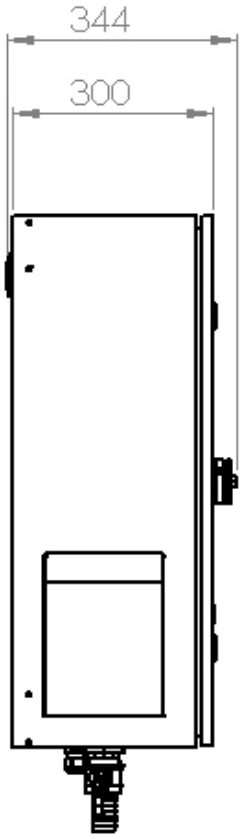




Technical Representations

EmiCo. lite without mount





Technical Specifications	
Hardware Specifications - Analyzer	
Dimensions	800 x 800 x 300 mm
Weight	~30 kg
IP protection class	IP67
Ambient temperature	-20 bis +40 °C
Storage temperature	-20 bis +60 °C
Power supply	100-240 VAC / 50 - 60 Hz
Max. Measuring Points	2
Power connection	Fixed connection 230V/16A
Power consumption	max 300 W
Digital connection	1x Ethernet RJ45/1x 5G-Cloudbased
Hardware Specifications - Hood	
1. Gas collecting hood	
Material	Plastic (UV-resistant)
Dimensions	Ø 1175mm x H 457mm
Weight	~13Kg
2. Accessories gas collecting hood	
Retaining rod	Aluminium 35x2,0
Wall mount	Stainless Steel 1.4571
Fastening hood	4 x ropes per Hood
Probe line	2 x hose (NS=32mm) (L=10m)
Measurement Technology	
Technology	NDIR
Sample	Gas
Exhaust air measurement	0 - 20 m^3/h
Measuring Range	
N_2O	0 - 1000 ppm
CH_4	0 - 1000 ppm
CO_2	2...4 Vol.-%
O_2	0...25 Vol.-%
Detection Limit	
N_2O	<0,3 ppm
CH_4	<2 ppm
CO_2	<10 ppm
O_2	<1%

About Variolytics

Variolytics is a provider of environmental analytics and AI software based in Stuttgart, Germany. Variolytics‘ mission is to be a catalyst for change with our technologies. With our EmiCo system, we support wastewater treatment plants in decarbonising their operations.
The company was founded in 2020 as a spin-off of the Fraunhofer Institute for the Development of Applied Research in Germany. The major investors of Variolytics include the High-Tech Gründerfonds and the Fraunhofer Technologie-Transfer Fonds. Since 2023, Variolytics has also been supported by the EIC Fund for companies with groundbreaking innovations.

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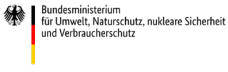

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