



FT-IR GAS ANALYZER

OMEGA 5

The All-in-One Solution for Gas Analysis.

Innovation with Integrity

Gas Analysis.

Real-Time. Quantitative. Calibration-Free.

OMEGA 5 is a compact FT-IR gas analysis system in a 19 inch rack-mount box equipped with a 5 m multi-reflection gas cell for the measurement of industrial gases. It is designed for automated, high-precision and real-time monitoring of gas concentrations in many different applications. This includes for example:

ANALYSIS OF INDUSTRIAL GASES AND PROCESS CONTROL

OMEGA 5 is suited for industrial applications due to the easy-to-use software OPUS GA and operational simplicity. Continuous data acquisition is enabled through detector types that do not require liquid nitrogen. Retrieved analysis results can be transferred and it is possible to control the gas analysis software OPUS GA via various interfaces.



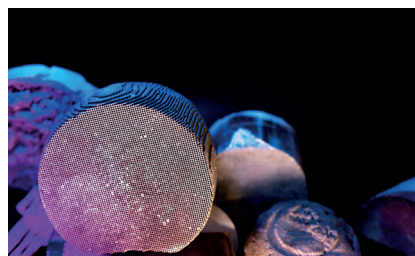
EMISSION MONITORING AND QUANTIFICATION OF GREENHOUSE GASES

The spectral resolution of 1.0 cm^{-1} makes unambiguous identification of gas species even in complex gas mixtures possible, for instance when monitoring exhaust gas emissions (e.g., analysis of NO_x in H_2O) or when investigating gas mixtures with highly potent greenhouse gases such as SF_6 .



SCIENTIFIC RESEARCH

OMEGA 5 is perfectly suited for the analysis of varying gas compositions, i.e., in scientific research or for the investigation of catalytic reactions, since no calibration measurements are required to define quantification methods. If an additional compound needs to be analyzed, the corresponding quantification method is added by a few clicks in OPUS GA.



TRACE GAS ANALYSIS AND PURITY CONTROL

Reference spectra of excellent quality, high wavenumber accuracy, outstanding sensitivity, gas cells with high optical throughput, and efficient consideration of spectral interference, allow the analysis of trace gases and purity control even of IR-active matrix gases.



ANALYSIS OF BATTERY GASES

The analysis of battery gases is achieved through high-quality reference spectra, the flexible gas analysis software OPUS GA and the spectral resolution of 1.0 cm^{-1} .



OMEGA 5

The All-in-One Solution for Gas Analysis.

WHAT YOU GET.

The OMEGA 5 is designed for automated, high-precision, and real-time monitoring of gas concentrations across various applications. Enclosed in a 19" rackmount housing, it features a 5-meter multi-reflection gas cell that can be heated to 191 °C. The system is equipped with a TE-MCT detector for low detection limits and continuous measurements as liquid nitrogen is not required.

HIGH SPECTRAL RESOLUTION.

The high-resolution option provides the capability to measure with a spectral resolution of better than 1 cm⁻¹ (standard: better than 2 cm⁻¹). This enhanced spectral resolution proves invaluable in numerous applications, enabling the identification and quantification of gas compounds, even within complex gas mixtures with a significant degree of overlapping infrared signals.

HIGH PRESSURE.

The high-pressure option provides the capability to conduct gas measurements at pressures of up to 15 bar absolute (standard: up to 2 bar absolute) for temperatures up to 30 °C. This option is particularly well-suited for the detection of extremely low gas concentrations, such as impurities, as well as for performing industrial online measurements of gases under elevated pressure conditions.

CALIBRATION-FREE QUANTIFICATION.

The OMEGA 5 is operated by the gas analysis software OPUS GA. This software enables the quantification of over 350 compounds without the need for calibration measurements. For an accurate quantification, the pressure and temperature of the gas are constantly recorded throughout the analysis process and taken into account.

STABILIZED H₂O AND CO₂ BACKGROUND.

The attainable quantification limits for H₂O and CO₂ are primarily contingent upon the stability of the background concentrations of these gases. The well-sealed and purgeable optics compartment effectively mitigates fluctuations in the background levels of H₂O and CO₂, resulting in low quantification limits, such as 10 ppm for H₂O.

NO NEED FOR EXTERNAL PURGE GAS.

The optional DryPath™ feature even eliminates the need for an external purge gas, making the OMEGA 5 also suitable for mobile applications.

ROBUSTNESS.

The permanently aligned RockSolid™ interferometer is resistant to vibrations and the prolonged lifetime of the CenterGlow™ IR source ensures data acquisition over many years without maintenance.



OPUS GA

Gas Analysis as Easy as can be.

The comprehensive Gas Analysis software OPUS GA allows the continuous and fully automated quantification of gas compounds without the need for calibration measurements or expert knowledge.



EASY-TO-USE.

OPUS GA establishes an easy-to-use graphical user interface to control OMEGA 5. The user can conduct a fast, continuous and fully automated identification and quantification of gas compositions with minimum training effort. Expert knowledge in spectroscopy is not required.



OPUS GA user interface: The time series window (top) displays the concentration of selected gas compounds as a function of time. In the Spectral Analysis window (bottom), the measured spectra can be investigated in detail. The measured spectrum (blue), the fit (orange) and the contribution of the target gas N₂O (green) to the overall spectrum are shown in a selected spectral region. An excellent agreement between measured spectrum and fit is obtained.

ACCURATE.

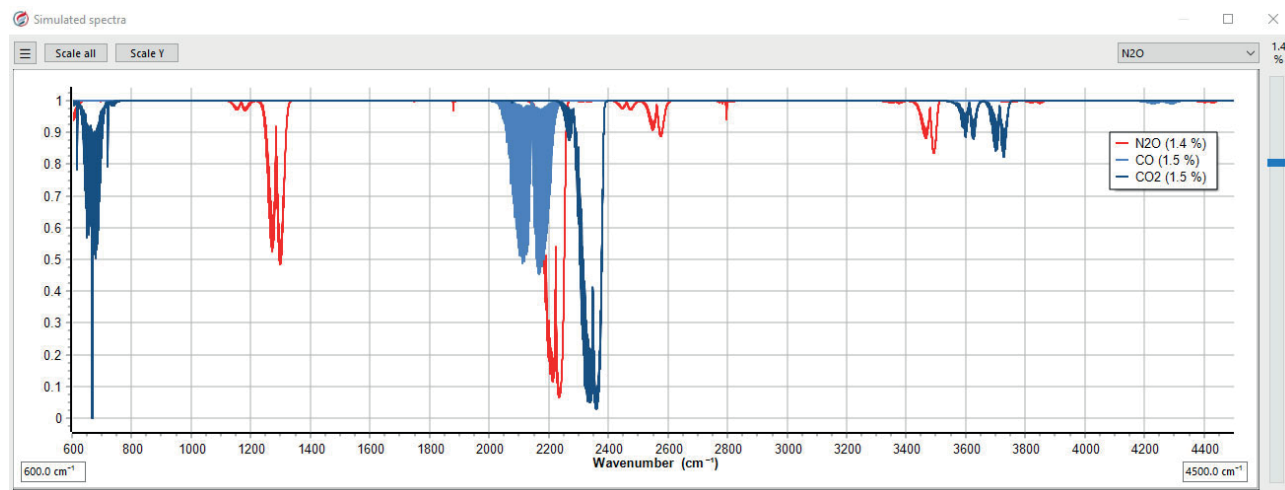
The quantification of gas compounds is based on a unique non-linear fitting algorithm which fits a reference spectrum of the target compound to the measured spectrum. The algorithm allows for an accurate detection and quantification of compounds even in the presence of high concentrations of interfering gas compounds, which are also considered in the fitting procedure. The influence of varying gas temperature and pressure is considered by the analysis routine.

FLEXIBLE.

With the available quantitative gas library, OPUS GA allows for the identification and quantification of more than 350 gas compounds without the need for calibration measurements. Adding a new quantification method for an additional compound just takes a few clicks in OPUS GA. Beyond that, individual reference spectra can be measured and added to the existing library. At any time, existing measurements can be re-analyzed based on an updated library or modified quantification methods without rerunning the measurement.

PREDICTIVE.

The sophisticated simulation tool within the OPUS GA software allows detailed simulations of the resulting spectra of gas mixtures considering variable gas concentrations. The spectra are simulated under real environmental conditions, by taking into account temperature, pressure, and the spectral resolution. Quantification methods can easily be defined through these simulations as the spectra of the analyte and of the interfering compounds are shown. As the quantification is based on a non-linear fitting algorithm, possible unexpected gas species are directly visible in the evaluated spectra.



The simulation tool can be used to visualize IR spectra of gas mixtures in order to define or modify quantification methods. The spectra of all compounds that are part of the spectral database (more than 350) can be simulated considering concentration, temperature, pressure and spectral resolution.

INTEGRATABLE.

OPUS GA can be integrated into a process control system by means of the Modbus TCP/RTU module. Additionally, analog output and a web interface for the transmission of analysis results and the measurement status can be offered. Data from external devices, such as O₂ or H₂ sensors, can be displayed in OPUS GA via analog inputs.

Specifications

Performance

Spectral range	4500 – 800 cm ⁻¹
Spectral resolution	Better than 2 cm ⁻¹ , option: better than 1 cm ⁻¹

Optical System

Detector	TE-cooled detector
IR source	CenterGlow™ IR source, guaranteeing a constantly high emission
Interferometer	RockSolid™, permanently aligned

Specification of the Gas Cell

Type	Multi-reflection cell
Optical path length	5 m
Max. gas cell temperature	191 °C
Gas cell pressure range	Up to 2 bar (absolute, optional: 0-15 bar)
Body	Aluminium, Nickel-coated
Windows	Zinc selenide (other materials optional)
Mirrors	Gold-coated
Connections	Swagelok for 6 mm outer diameter tubing

Physical Parameters

Dimensions	Approx. 740 x 485 x 222 mm (D x W x H) (19 inch rack with 5U height and 15U depth)
Mass	Approx. 28 kg, depending on configuration

System/Integration

Interface	Ethernet
Data Output	MODBUS TCP/RTU, 4-20 mA analog, integrated webserver available
Software	Gas Analysis Software OPUS GA, OPUS
Spectral database	Spectral library with more than 350 compounds available

Electronics

Data Acquisition	24 bit A/D converter
Power Supply	110 V ±10%; 50/60 Hz or 230 V ±10%; 50/60 Hz
Sensors	Integrated temperature and pressure sensors

Bring the Team Together

Whatever the application, we have got the solution.

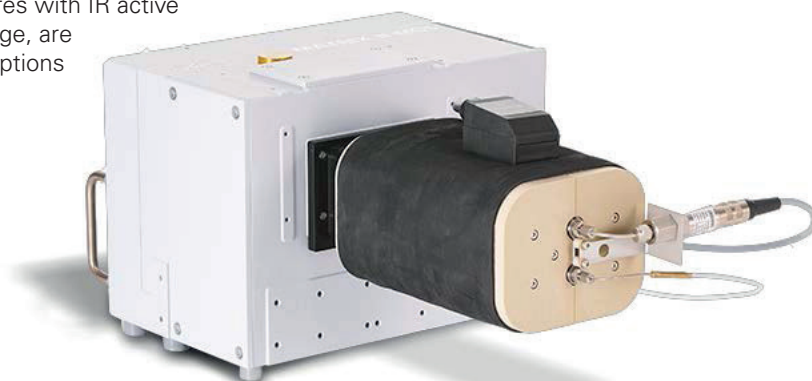
For dedicated applications which require e.g. a very short gas cell, even higher spectral resolution or detection in the ppt-range, please have a look at our further gas analyzers.

MATRIX II-MG SERIES

Configurable High Performance for FT-IR Gas Analysis.

Gas cells with different optical path lengths, ranging from 10 cm to 26 m, are available to accurately determine mixing ratios across a wide concentration range, from percentage levels down to parts per billion (ppb). The selection of the optimal optical path length involves a careful balance between minimizing noise levels and optimizing the transmission of infrared light. This approach ensures that oversaturated infrared spectra, even when dealing with gas mixtures with IR active compounds in concentrations in the percentage range, are circumvented. A large variety of different detector options allow you to configure the system for your needs.

Want to know more?



MGA SERIES

Powerful laser-based Gas Analyzers with ppb to ppt precision for monitoring of greenhouse gases and air pollutants.

MIRO's MGA10-GP has revolutionized and simplified the monitoring of greenhouse gases and air pollutants by establishing simultaneous online measurements of up to 10 gases at high measurement rates while offering excellent stability and ppt precision.





Environmental, Social and Governance

As a forward-thinking, innovative company, Bruker has a rich legacy of protecting the environment, treating others with dignity and respect, and following the highest standards of ethical compliance and governance. These principles more recently characterized as Environmental, Social and Governance (ESG), have been an integral part of our DNA for over 60 years.

Bruker's innovative technologies and solution support scientists and businesses around the world to explore, understand, and improve the world in which we live. Our innovative spirit drives solutions intended to address environmental challenges, improve recycling, advance research discovery, identify hazardous and harmful materials in the environment, and keep our foods and environment safe. We are proud to support a more sustainable future.

As a global innovation leader in developing and marketing advanced analytical technologies and solutions, our scientists and engineers support businesses and scientists around the world to better understand environmental hazards, protect our essential food supply, research clean, sustainable energy, and search for new ways to improve the quality of life. We are especially proud to collaborate closely with many of our customers on ways to ensure a more sustainable future.

Laser class 1 product.

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**Bruker Optics is ISO 9001, ISO 13485,
ISO 14001 and ISO 50001 certified.**

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