MIRA Ultra Deca

THE WORLD'S FIRST TRULY COMPACT, 10 Hz HIGH ACCURACY GREENHOUSE GAS ANALYZER

Real-Time Continuous Ambient and Source Monitoring

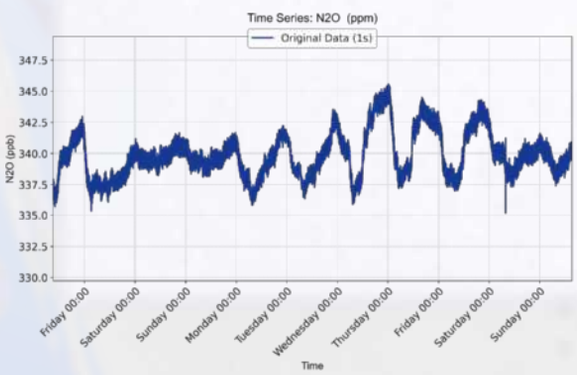
- *N_2O: <300 ppt, CO_2: <250 ppb, CH_4 <1.2 ppb*
- *Ultra-high stability and accuracy*
- *Operation from 1 to 10 Hz*
- *GPS-enabled for the ideal time stamp reference*
- *Built-in WiFi, RS232, and optional analog out*
- *Low power consumption: <200 W at steady-state*
- *Low maintenance sensor due to robust optics and user-serviceable filters*

Introducing **MIRA Ultra Deca**, the world's first compact, rapid, and highly precise, fast trace gas analyzer. Leveraging Aeris' groundbreaking miniature laser-based sensor technology, the Ultra Deca series provides outstanding sensitivity and accuracy within seconds. Engineered for high-flow operation with minimal maintenance requirements, it incorporates a robust optical core that ensures low-drift performance. Versatile for both fixed and mobile applications, the Ultra Deca operates in the mid-infrared (MIR) spectrum, delivering unparalleled specificity and sensitivity in a lightweight, energy-efficient design. In addition to measuring traditional greenhouse gases, the Aeris Ultra Deca is capable of detecting ethane (C_2H_6) and carbon monoxide (CO) at a 10 Hz frequency, making it an invaluable tool for quantifying thermogenic emissions at a very fast rate.

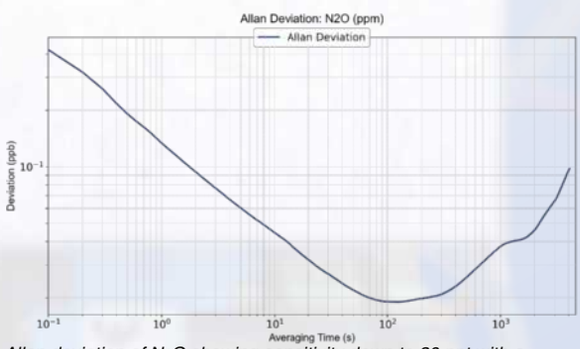
The **MIRA Ultra Deca**, utilizing an absorption-based methodology, delivers exceptional linearity across an extraordinarily broad concentration range, typically encompassing several. In contrast to conventional 10 Hz open-path systems, which often encounter challenges in obtaining accurate measurements during precipitation events such as fog or rain, Aeris' closed-path cell, characterized by low optical reflectivity, effectively mitigates these issues. Furthermore, this design contributes significantly to the system's longevity and durability, eliminating the need for routine mirror cleaning or even mirror replacements.

Aeris Technologies offers 10 Hz Deca measurement in the following combinations:

- N_2O/CO_2
- CH_4
- CH_4/C_2H_6



A typical time series of the MIRA Ultra Deca N_2O/CO_2 analyzer collecting at 10Hz in ambient air showing remarkable stability for N_2O.



Allan deviation of N_2O showing sensitivity down to 20 ppt with a 1-minute average.

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Industry-leading
sub ppb accuracy and sensitivity

Metric	Specification
Measurement Method	Mid-Infrared Direct Laser Absorption Spectroscopy
Sensitivity (σ) at 10 Hz	N_2O: <300 ppt / CO_2: <250 ppb
	CH_4: <1.2 ppb
	CH_4: <3 ppb / C_2H_6: <1 ppb
Temperature / Humidity	10-35° C, 10 to 95% RH (non-condensing)
Measurement Range*	N_2O: 2 ppb - 500 ppm / CO_2: 10 ppm - 10,000 ppm
	CH_4: 10 ppb - 6,000 ppm
	CH_4: 10 ppb - 6,00 ppm / C_2H_6: 1 ppb - 1,000 ppm
Response time / Flow Rate	95 mSec (1/e refresh rate), >9.0 L/min (volumetric)
Size	48.3 cm W (19.0") x 19.7 cm H (7.77") x 31.0 cm D (12.2")
Weight	9 kg (19.8 lbs), external pump: 2.8 kg (6.16 lbs) 50 L/min or 7.5 kg 16.5 lbs) 100 L/min
Voltage / Max Current	Analyzer: 100-240 VAC 0.5 A (50-60 Hz) 22 W at steady state, 47 W at startup Pump: 150 W (2A) 50-50 Hz Pump: 200 W (2.5 A) 50-60 Hz
Interface / Outputs	Wi-Fi, USB-A, DB9 RS232, Ethernet (optional analog out)
Memory	32 GB (expandable)
Data Update Rate	1 Hz, 5 Hz, 10 Hz (selectable)

***Linear measurement range. Operational range configurable for specific applications.**

Included:	
Rugged Shipping Case	Tablet
10 Hz GPS	110/240V Power Plug

Optional Accessories:	
Anemometer	
External pump	

MIRA Ultra Rackmount systems ensure stable, low-drift performance with a temperature- and pressure-controlled sensor core, delivering exceptional accuracy and reproducibility for simultaneous gas measurements. This stability extends calibration intervals and, in some cases, eliminates the need for calibration. The system features two programmable sampling ports for calibration, re-zeroing, or differential measurements, supporting a wide variety of applications.

Core Sensor Technology

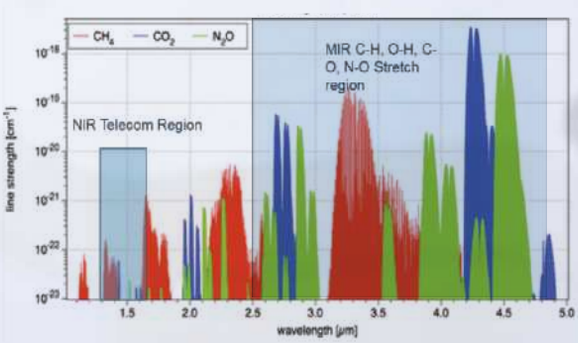
MIRA series analyzers combine Aeris' patented multipass cell technology with mid-IR solid-state lasers and custom electronics to achieve superior sensitivity and accuracy in an extremely robust and compact platform. The proprietary sensor engine used in every MIRA analyzer uniquely achieves a long absorption path length in an extremely small volume resulting in a fast response time with reduced pumping and power requirements.

MIRA's compact optical core achieves a 13 meter path length in a 60 cc volume.

The Power of Mid-infrared

Spanning wavelengths from 2.5 to 5 micrometers (μm), the Aeris mid-IR technology achieves the same or superior short-term sensitivity as fragile NIR cavity-based techniques. The robust design of the mid-IR core is well suited for a wide range of applications including airborne analysis and environmental monitoring.

Mid-infrared vs near-infrared absorption line strength



Absorption spectrum of greenhouse gases across the IR. Absorption line strength is orders of magnitude stronger in the Mid-IR than NIR.

Aeris Technologies, Inc. provides ultrasensitive gas analyzers for trace gas monitoring applications. Aeris is redefining the state of the art in laser-based gas analysis systems, reaching unparalleled size, weight, power, and cost milestones.

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