MULTICOMPOUND GAS ANALYZER

MGA Overview

High-precision all-in-one gas analyzers to combat climate change and air pollution

Innovation with Integrity

Highlights

- Measures 10 gases simultaneously selectable from: **CH_4, CO, CO_2, SO_2, NH_3, N_2O, NO, NO_2, H_2O, O_3, OCS, HCHO** and **HONO**
- Direct measurement of all compounds (incl. NO_2)
- High precision for ambient air quality and greenhouse gas monitoring at low concentrations
- High time resolution (1 Hz or up to 10 Hz)
- Suitable for laboratory applications, field deployable, eddy covariance and mobile measurements (aircraft, vehicle, marine, ground-based stations)

The MIRO MGA[10]-GP has revolutionized and simplified the monitoring of greenhouse gases and air pollutants by enabling simultaneous online measurements of 10 gases at high measurement rates, while offering excellent stability and precision. Different gas combination options are below:

Configurations		GHG					Trace Gases and Air Pollutants						
		H_2O	CO	CO_2*	N_2O	CH_4	NO or HCHO**	O_3	NH_3	NO_2	OCS	SO_2	HONO
MGA[10] - GP	C1	✓	✓	I	✓	✓	✓	✓	✓	✓		✓	
	C2	✓	✓	II/III	✓	✓	✓	✓	✓	✓	✓		
	C3	✓	✓	II/III	✓		✓	✓	✓	✓	✓		✓
	C4	✓	✓	II/III		✓	✓	✓	✓	✓	✓	✓	
MGA[5] - GHG		✓	✓	II/III	✓	✓							
MGA[3] - GHG	C1	✓			✓	✓							
	C2	✓		II/III							✓		

* I: standard precision, ideal for agriculture and emission measurements; II: high-precision, ideal for atmospheric science and air quality monitoring; III: GAW compatibility compliant best CO_2 performance but without CO.
** Either NO or HCHO can be chosen.

MIRO's MGA[10]-GP analyzers directly measure concentrations of all compounds using mid-infrared laser absorption spectroscopy with **Quantum Cascade Lasers**. This allows for highly specific and accurate gas detection along with maximum measurement sensitivity.

Our analyzers are typically free of measurement interferences from other gas species. The intuitive touch display enables fast and easy control. The analyzer is suitable for various applications from air monitoring to eddy covariance flux measurements.

MIRO's products are made in Switzerland and undergo strict quality control before shipping.

Applications

MGA is a general purpose multicompound gas analyzer suitable for a wide range of applications.

Atmospheric Science

- Direct & precise
- Continuous measurements of most of the regulated/observed atmospheric gases
- Almost no maintenance required

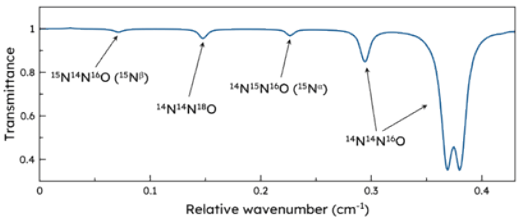
Biosphere

- Field deployable
- Low gas flows possible
- No interference from other gases

Other Products and Accessories

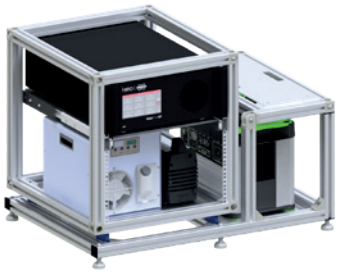
· MGA^{i}-N_2O

Simplifies monitoring of N_2O isotopic composition by enabling simultaneous online measurements of up to 5 main isotopologues at high rate and with excellent stability and precision.



· MIRO Mobile Kit

Shock-proofed rack including a battery to run the system up to 10 h without external power supply. Ideal for airborne, zeppelin-, ship- or car-based mobile measurements.

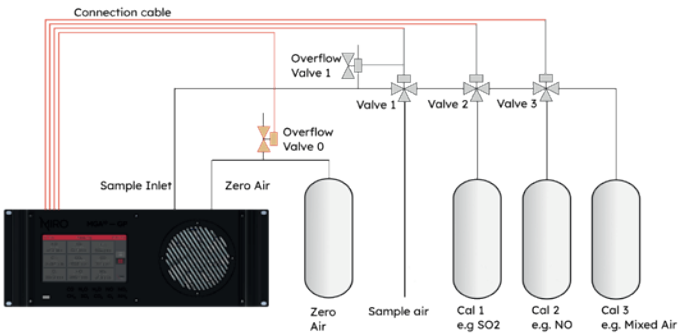


· MIRO Field Enclosure

Protects the instrument with rugged casing and provides a temperature controlled environment for stable measurements.

· Valve Sequencer + Selector Valve Option

Adjustable automatic valve sequencer controlling an external selector valve or up to three 3-way valves. Ideal for advanced sampling and calibration settings.



Eddy Covariance

- Field deployable
- High time resolution (10 Hz)
- High time accuracy (NTP-based timestap synchronization)
- Option to trigger anemometer measurements to better time synchronization

Mobile Measurements

- Compact & robust
- Shock-proofed
- Lower power consumption
- All-in-one lab

General Technical Specifications

Parameters	1 Hz	10 Hz
Ambient Temperature	15 – 30°C	
Ambient Humidity	< 90% RH, non-condensing	
Sample Pressure	700 – 1050 mbar	
Sample Flow Rate	0.1 to 1.5 slpm	15 slpm
Sample/Zero-air Inlet Fittings	6/6 mm - Swagelok	12/6 mm - Swagelok
Dimensions	48 w x 18 h x 70 d (cm)	
Accessories required	Chiller unit, Vacuum pump	
Weight	25 kg (Analyzer), 11 kg (Chiller unit), 9 kg (Vacuum pump)	25 kg (Analyzer), 11 kg (Chiller unit), 24 kg (Vacuum pump)
Average/max. Power (depends on environmental conditions)	110–220 VAC / 50–60 Hz; <120/210 W Analyzer, <230/580 W (Pump + Chiller unit)	110–220 VAC / 50–60 Hz; <120/210 W Analyzer, <610/1130 W (Pump + Chiller unit)
Installation	19" Rack mountable or benchtop	
Time Synchronization	Internet or GPS based time synchronization based on the Network Time Protocol (NTP)	
Digital Ports	RS232 (for data output), USB, Ethernet	
Connectivity	The instrument provides remote access and control of its main functionalities. It contains a PC which is running the instrument software. If a network access is provided, the instrument's full functionality can be accessed via a remote control software.	
Electrical and Laser Safety	CE/CB (EN IEC 61326-1: 2021, EN IEC 61000-3-2: 2019, EN 61000-3-3:2013/ A2:2021, EN 61010-1:2010/ AI:2019/AC:2019, EN 60825-1:2014/ AII:2021/AC:2022, EN IEC 63000:2018)	
Service Interval	The instrument is suitable for operation without on-site interventions for a period of at least three weeks.	

Specifications

	MGA¹⁰ - GP	MGA⁵ - GHG	MGA³ - GHG			
Species	Precision (1σ) @ 1s / <200s	Precision (1σ) @ 1s / <200s	Precision (1σ) @ 1s / <200s	Max. Drift* (24 hours)	Specification Range	Measurement Range (ppm)
CH_4 (ppb)	0.7 (0.1)	0.4 (0.04)	0.4 (0.04)	5	1´000 – 3´000	0 – 150
CO (ppb)	0.4 (0.05)	0.4 (0.05)		1	0 – 1´000	0 – 20
CO_2 (ppm)	I/II/III**	I/II/III**	0.2 (0.02)	1	300 – 500	0 – 8´000
SO_2 (ppb)	2 (0.2)			5	0 – 300	0 – 150
NH_3 (ppb)	0.2 (0.02)			1	0 – 300	0 – 15
N_2O (ppb)	0.3 (0.02)	0.2 (0.02)	0.2 (0.02)	2	300 – 400	0 – 40
NO (ppb)	0.4 (0.04)			2	0 – 400	0 – 100
NO_2 (ppb)	0.4 (0.04)			1	0 – 200	0 – 40
H_2O (ppm)	5 (1)	20 (2)	6 (1.5)***	120	0 – 30´000	0 – 40´000
O_3 (ppb)	2 (0.2)			10	0 – 300	0 – 300
OCS (ppb)	0.02 (0.005)		0.02 (0.005)	2	0 – 100	0 – 10
HONO (ppb)	2 (0.4)			10	0 – 300	0 – 300
HCHO (ppb)	2 (0.4)			2	0 – 300	0 – 100

* Maximum pk-to-pk difference of 1-hour averaged data over 24 hours. Drift can be greatly improved by activating MIRO's automatic zero-air correction using scrubbed, clean air or nitrogen. ** precision @1s and best @100-200s are: standard configuration **I: 1.5 ppm and 150 ppb**; high-precision **II: 500 ppb and 80 ppb**; GAW compatibility compliant, best CO_2 performance but without CO **III: 200 ppb and 20 ppb**.*** Depending on the configuration the values may differ.

Bruker Optics is continually improving their products and reserves the right to change specifications without notice.
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