

EMGA Series

Oxygen/Nitrogen/Hydrogen Analyzers



Redefining material analysis

The EMGA Series brings "measurement speed", "accuracy", and "usability" to any material analysis

EMGA Series

Oxygen/Nitrogen/Hydrogen Analyzers

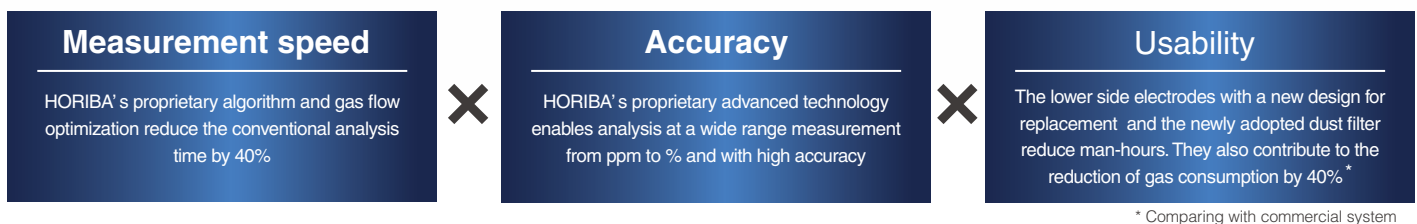
Enhanced “measurement speed”, “accuracy”, and “usability”.

The characteristics and performance of metal and solid materials, including steel, various other metals, ceramics, and electronic materials, are determined by the amount of oxygen, nitrogen, and hydrogen they contain. Analyzing elements in such materials at high accuracy and with a small amount of sample has become increasingly important in the study and performance analysis of materials. The EMGA Series Oxygen/Nitrogen/Hydrogen Analyzers significantly reduces analysis time and costs while enhancing analysis accuracy and functionality. The EMGA Series also strongly supports improved efficiency in material research and development and quality control.

The EMGA Series provides the following two models.

- EMGA-Pro: Standard model featuring both high-speed analysis and usability.
- EMGA-Expert: High-End model for even higher accuracy and wider range analysis applications.

Features



Equipped with various navigation functions

HORIBA provides our users with full support, from analysis and maintenance to troubleshooting and recovering from problems by leveraging our know-how developed through many years of experience. Smooth operation of the analyzers contributes to reducing working hours.

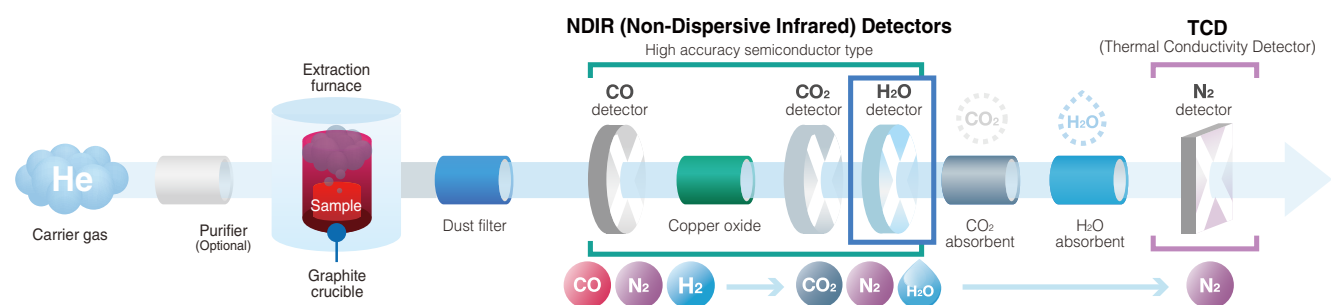
Rich lineup of options

In addition to the auto sampler, auto-cleaner and automation systems for supplying crucibles that were developed to reflect the needs of users, the fully automated analysis option reduces labor for analysis and realizes stable analysis. We also offer optional units to accommodate various samples, including a halogen trap unit.

Measurement Principle

Inert Gas Analysis (IGA) measures gas-forming elements (O, N and H) present in solid materials from ppm to tens of percentage levels. A high temperature furnace is used to rapidly heat the sample and thereby convert certain elements into volatile forms in order to separate, detect and measure them.

The inert gas fusion and infrared absorbing method/thermal conductivity methods are used as the measurement principle. The sample put in a crucible is melted by electric heat to gasify the elements contained in the sample, which are then transported to detectors using helium (He), which is an inert gas, as the carrier gas.

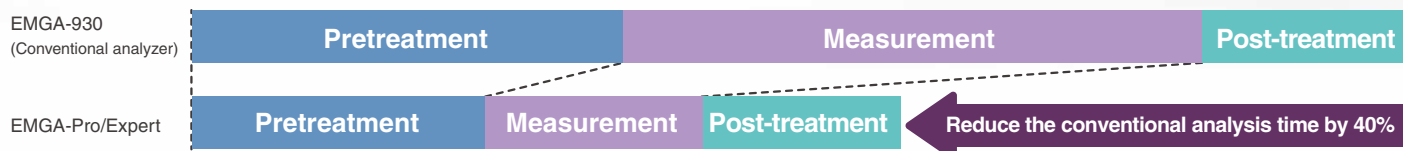
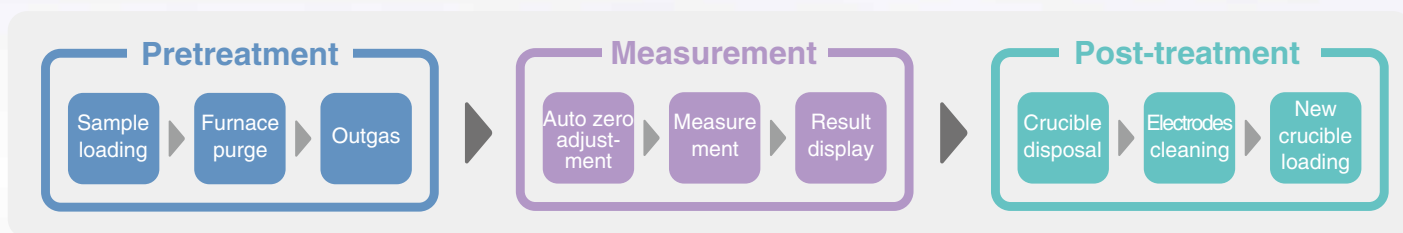


* Ar carrier gas also available as optional

Fast measurement

HORIBA's proprietary sequence algorithm reduces the analysis cycle time*

* Patent Pending



* EMGA-Expert (30E) with the auto-cleaner option, measured under the conditions recommended by HORIBA

Ultratrace, high accuracy, high reproducibility

HORIBA's proprietary detectors

The EMGA Series has NDIR gas detectors developed, designed, and manufactured by HORIBA. Based on detailed design and sophisticated production technology, these detectors are manufactured with close attention to all processes, from the polishing and assembly of components to adjustment and confirmation of stable operation. Our thorough quality control provides stable and highly reliable measurement for an extended period with the EMGA Series. In addition, we have also developed the TCD detector in-house to ensure these analyzers demonstrate the best performance.



		EMGA-Pro(20P)	EMGA-Expert (20E)	EMGA-Expert (30E)
O	Measurement range	0.1 ppm - 0.3% (Low-concentration specification) 0.1% - 5% (High-concentration specification)	0.04 ppm - 5%	0.04 ppm - 5%
	Precision repeatability	$\sigma_{n-1} \leq 0.05$ ppm or $RSD \leq 0.5\%$ (GAS) (Low-concentration specification) $RSD \leq 0.5\%$ (GAS) (High-concentration specification)	$\sigma_{n-1} \leq 0.02$ ppm or $RSD \leq 0.5\%$ (GAS)	$\sigma_{n-1} \leq 0.02$ ppm or $RSD \leq 0.5\%$ (GAS)
N	Measurement range	0.1 ppm - 0.3% (Low-concentration specification) 0.1% - 3% (High-concentration specification)	0.04 ppm - 3%	0.04 ppm - 3%
	Precision repeatability	$\sigma_{n-1} \leq 0.05$ ppm or $RSD \leq 0.5\%$ (GAS) (Low-concentration specification) $RSD \leq 0.5\%$ (GAS) (High-concentration specification)	$\sigma_{n-1} \leq 0.02$ ppm or $RSD \leq 0.5\%$ (GAS)	$\sigma_{n-1} \leq 0.02$ ppm or $RSD \leq 0.5\%$ (GAS)
H	Measurement range	-	-	0.08 ppm - 2500 ppm
	Precision repeatability	-	-	$\sigma_{n-1} \leq 0.04$ ppm or $RSD \leq 2.0\%$ (GAS)

Reduced maintenance work hours and frequency

Use of a new mechanism for replacing consumables

Easy replacement of lower side electrodes*

* Patent Pending

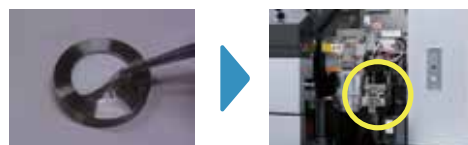
With the new design for replacing the chip, all you have to do is remove the lower side electrode cap to replace the chip. This mechanism reduces the amount of time it takes.



Dust filter*

* Patent Pending

With the new mechanism for replacing the dust filter you only need to replace the thin filter inside the filter holder. This has also reduced the filter replacement frequency to from 100 to 500 analysis.



Significantly reduced carrier gas consumption*

* Patent Pending

The number of measurements that can be performed with one gas cylinder has significantly increased from about 1,400 times to 2,300 times.

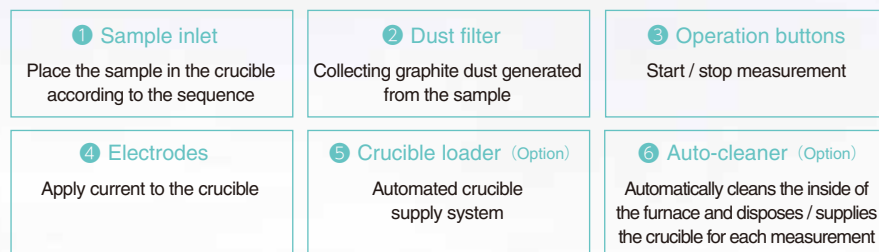
Users feedback

"We can now perform maintenance without any special tools and in a short time!"

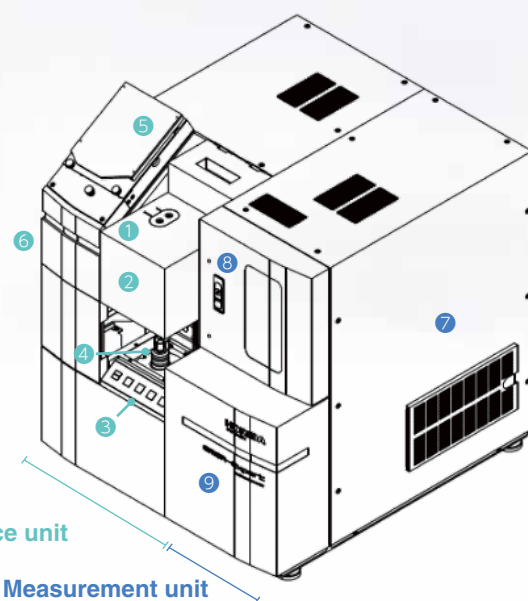
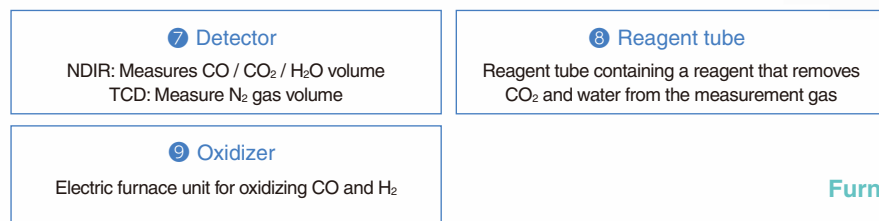
"Our consumption of helium, which is difficult to obtain, has reduced, leading to reduced costs."

Equipment design with excellent work efficiency and operability

Furnace unit : Sample setting, melting and obtaining gas from the sample.



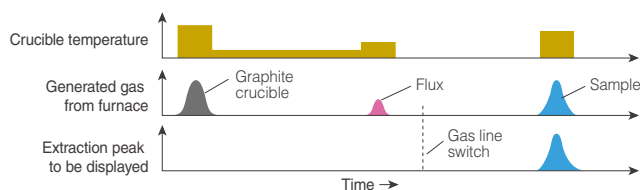
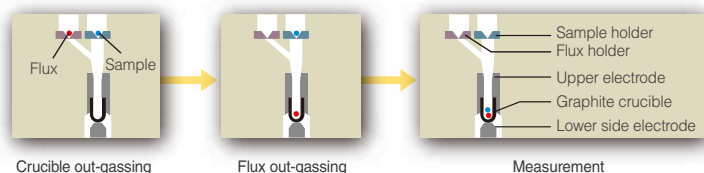
Measurement unit : A unit that measures the gas obtained from the sample.



Sample/Flux dual loading mechanism

HORIBA's originally developed flux dual loading mechanism has independent sample loading slots, which allows flux to be fed in advance, and degassing to be performed at low temperatures.

This mechanism prevents excessive scattering of flux and erosion of crucibles and allows degassing of flux to be performed at the optimal temperature, contributing to high accuracy analysis that fully utilizes the effects of flux without affecting the blank.

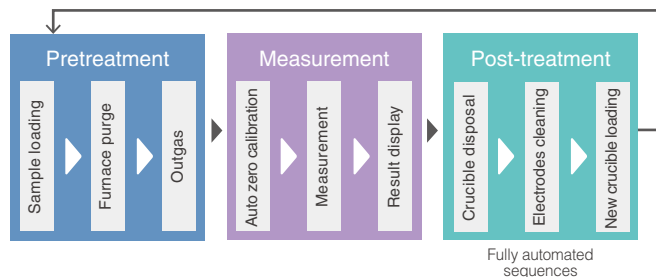


Accelerated labor-saving through automated analysis

Rich customization options

The EMGA Series features a number of functions required for the automation of measurement, saving labor for measurement work and ensuring safety.

With a “crucible loader” for automatically supplying crucibles, an “auto-cleaner” for automatically cleaning electrodes and disposing of crucibles, an “auto sampler” for automatic loading of samples and the “automated analysis system”, the analyzers achieve a clean and safe measurement environment that will not dirty the measurement operator’s hands. In addition, the optimized automation sequence simplifies operation down to just loading the sample, and pressing the start button after entering the preset (measurement conditions and sample name).



Crucible loader unit (Automated crucible supply system)*

* Patent numbers : US8172072, EP2138849, CN105510614, JP05086918, JP05068702



Precise capture and positioning of crucibles by rotary mechanism.
 Maximum stock: 100 pcs.
 Compatible with standard/long type crucibles.

Auto-cleaner*

* Patent numbers : JP05198947, JP05155751



Two rotating brushes clean the upper and lower side electrodes after each measurement. The vacuum cleaner prevents contamination by removing dust.

Auto sampler



Samples and fluxes are automatically loaded. Up to 22 samples and fluxes can be set.

Full automation analysis system

* Patent number : JP05043802



This system supports full automation of analysis work. It has a complete safety mechanism and also supports communication with an online host system. The system can be customized according to the measurement conditions and communication specifications of users.
(Example: From weighing to completion of the analysis)

* The specification of the options shown in the photos may be different from those of actual options.

Accessories

FP-30 : Capsule press unit

* Patent number : JP05363245



Sealing of capsules containing powder samples can be easily performed for improved reproducibility of data.

HT-03 : Halogen trap unit



Some samples included halogen elements, and halogen elements in sample gas damage the detector, and can decrease sensitivity. This unit collects fluorine in the sample gas.

Transfer vessel unit

* Patent number : JP06560491



It is required to avoid atmospheric exposure with sample
(Example: cathode for LiB).
Using this unit, it is simply drop sample into the unit without efficiency of atmospheric exposure.

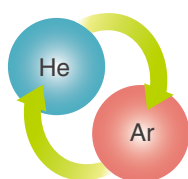
C-50 : Gas Conversion unit

* Related patent : JP04618613



When melting the sample, gas is generated as O_2 during rising temperature analysis.
This unit converts $O_2 \Rightarrow CO$.
This unit is also able to be used for other types of gas.

Carrier gas switching function



This function enables to switching the helium carrier gas to the argon carrier gas easily.
It contributes to cost reduction.

* When using Ar carrier gas for Nitrogen analysis, accuracy guarantee is change.

Additional interlock cover



The safety cover unit with interlock function ensures operator safety.

Other accessories

- Gas purifier unit: Removes impurities in the carrier gas.
- Gas doser unit: Makes a calibration curve with standard gas.

Consumables

Standard crucibles



Various Fluxes



Sn/Ni pellets



Ni capsule



Sn capsule

Various reagents

- CO_2 absorbent
- Copper oxide
- Dehydration agent
- Dust filter

* We also offer various reagents.

User-friendly software

By taking advantage of know-how developed alongside users, we provide support for the use of analyzers, measurement condition setting, maintenance, and resolving problems that are critical in maintaining high analysis accuracy. By suggesting analysis conditions for unknown samples and helping users to efficiently perform maintenance and recover from problems, our support will reduce total time for analysis.



Screen tab
Measurement, maintenance, and other operations can be performed on a single window

Result display
Values obtained by analysis of Oxygen/Nitrogen/Hydrogen are displayed in real time

Navigation function
Analysis navigation, maintenance navigation, and troubleshooting navigation are displayed

Operation displays are consolidated
Measurement steps, from preparation for sample measurement to starting measurement, are shown from the first step to the last step.

Touch screen compatible (option)

Extraction curve display
Oxygen/Nitrogen/Hydrogen extraction graphs/curves and power level are displayed in real time

The screen display of the software can be customized. Users can hide unnecessary items for measurement.



▲ Customization example:
Only analysis values are displayed

Users can recognize the measurement result at once!



Various navigation functions that fully assist analysis

The EMGA Series' unique software includes HORIBA's analysis know-how, "Analysis Navigation" that assists in proposing optimal measurement conditions and operating procedures according to the measurement sample, and maintenance work that can be done by checking the maintenance procedure in a video. "Maintenance Navigation" and "Troubleshooting Navigation" that navigates from the alarm display to the recovery of the device are installed.

1. Analysis Navigation



Easy to understand even for beginners, we support operation procedures and conditions one by one.

Analysis method

The points to be noted in the analysis and the know-how for deriving the optimum measurement conditions are displayed.

Operation flow

By analyzing along the flow, we support highly accurate analysis.

Analysis conditions

It is also possible to propose measurement conditions according to the measurement sample and register the referenced conditions.

Glossary

Explains the technical terms and names of device parts with illustrations.

2. Maintenance Navigation

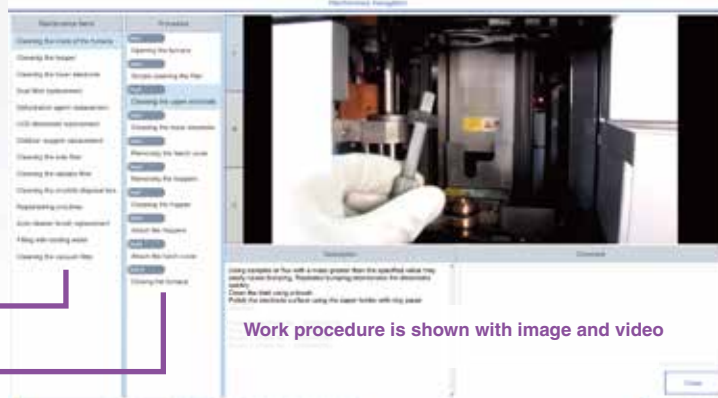
Users are led through maintenance work items, procedure, and method.

They can watch the videos which shows of actual maintenance work, ensuring safety and thorough work, and reducing differences in the maintenance work processes performed by individuals.

Daily maintenance item

Flow of work procedure

Maintenance Navigation Screen



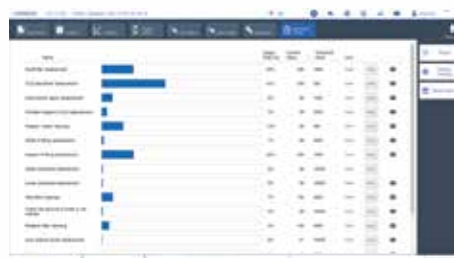
Maintenance Screen

Users can perform operations, including solenoid valve operation and leak checks, that are necessary for maintenance work.



Maintenance Counter Screen

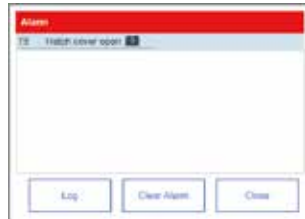
The current value and threshold for each maintenance item are shown. If the set threshold is reached, you can display an alarm about the need for maintenance.



3. Troubleshooting Navigation

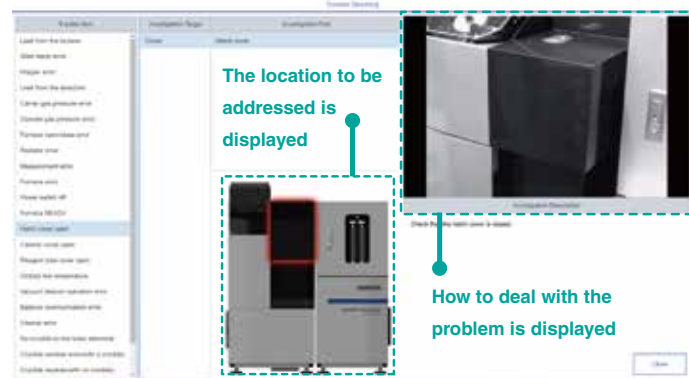
Users are led to the best recovery method from the alarm being displayed screen that explains recovery with images and videos. Suggestions on troubleshooting steps that can be applied on site will lead to reduced down time of instrument.

Alarm has occurred



Access from the alarm dialog box to the troubleshooting navigation!

Troubleshooting Navigation Screen



The EMGA' s ultratrace, high accuracy, oxygen/nitrogen/hydrogen analysis performance that is helpful for research and development and quality control of a wide range of materials



Steel

Steel sheet for automobiles
Tool steel
Building materials



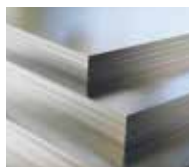
Chemistry

Catalyst
Rubber
Carbon
Ceramics
Silicon



Electrical Material

Solder
MLCC
(Multilayer Ceramic Capacitor)



Non-ferrous Alloy

Copper
Aluminum



Rare Metal

Lithium
Cobalt
Nickel
Tungsten



New Energy

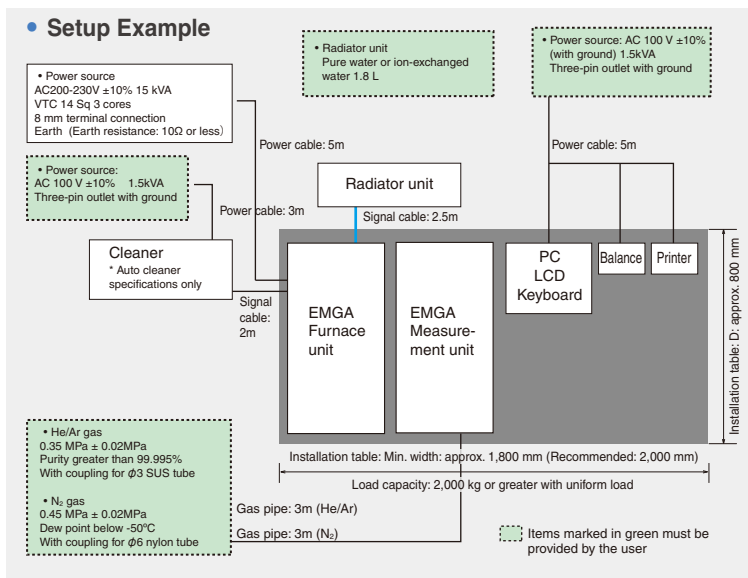
Cathode material
Anode material
Fuel cells
H₂ storage materials

It conforms to JIS G1239: 2014 and JIS G1228: 1997. Please contact us for "individual JIS H". Compliant with ASTM E1019-11, ASTM E1447-09, ASTM E1569-09, ASTM E1409-08. It complies with ISO 10720: 1997, ISO 15351: 1999 and ISO 17053: 2005.

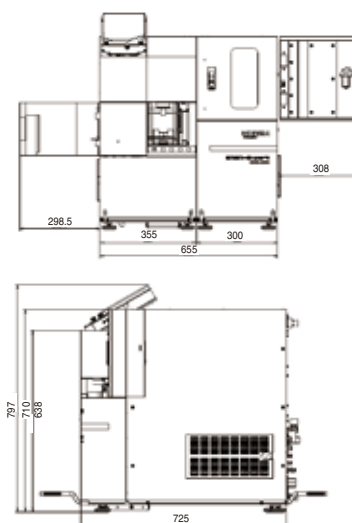
Specifications

		EMGA-Expert Series EMGA-30E	EMGA-Pro Series EMGA-20P+H	EMGA-Expert Series EMGA-20E	EMGA-Pro Series EMGA-20P
Measurement target element		Oxygen/Nitrogen/Hydrogen		Oxygen/Nitrogen	
Measurement gas type		CO/CO ₂ /N ₂ /H ₂ O		CO/CO ₂ /N ₂	
Detector	Oxygen	NDIR: Detection with CO/CO ₂			
	Nitrogen	TCD			
	Hydrogen	NDIR: Detection with H ₂ O		-	
Measurement range* * Up to 100% wt is possible by decreasing the sample weight	Oxygen	0.04 ppm - 5%	Low : 0.1 ppm - 0.3% or High : 0.1% - 5%	0.04 ppm - 5%	Low : 0.1 ppm - 0.3% or High : 0.1% - 5%
	Nitrogen	0.04 ppm - 3%	Low : 0.1 ppm - 0.3% or High : 0.1% - 3%	0.04 ppm - 3%	Low : 0.1 ppm - 0.3% or High : 0.1% - 3%
	Hydrogen	0.08 ppm - 0.25%	0.08 ppm-0.25%	-	
Precision repeatability	Oxygen	$\sigma_{n-1} \leq 0.02$ ppm or $RSD \leq 0.5\%$	Low : $\sigma_{n-1} \leq 0.05$ ppm or $RSD \leq 0.5\%$ or High : $RSD \leq 0.5\%$	$\sigma_{n-1} \leq 0.02$ ppm or $RSD \leq 0.5\%$	Low : $\sigma_{n-1} \leq 0.05$ ppm or $RSD \leq 0.5\%$ or High : $RSD \leq 0.5\%$
	Nitrogen				
	Hydrogen	$\sigma_{n-1} \leq 0.04$ ppm or $RSD \leq 2.0\%$		-	
Sample weight		1g** * *possible to decrease			
Cycle time		Approx. 160 sec			
Required gas		He/Ar : Purity greater than 99.995%, Pressure 0.35 MPa (Stainless steel tube (O.D. 3 mm) and suitable connector fitting within 3 m from unit Dry air or N ₂ as operating gas: Pressure 0.45 MPa (Nylon pipe (O.D. 6 mm) and suitable connector fitting within 5 m from unit)			
Dimensions		655 x 710 x 725 mm [W x H x D] (Sample window is positioned at 650 mm from table) Cleaner : 420 x 778 x 500 mm[W x H x D] / Radiator unit : 526 x 556 x 360 mm[W x H x D]			
Weight		197 kg (Furnace unit : 127 kg and Measurement unit : 70 kg) Cleaner : 28 kg / Radiator unit : 33 kg			
Power		Main unit : AC 200/220/230 ±10% 50/60 ±1 Hz 12 kVA (MAX) Vacuum cleaner : AC 100 V (Step-down transformer included) 50/60 ±1 Hz 1.5 kVA (MAX)			

Performance comparison table			Concentration range		
			Several ppm (mg / kg)	Dozens of ppm (mg / kg)	wt% order
Model name	EMGA-Pro (20P)	Low			
	EMGA-Expert (30E)	High			



• Dimensions



The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System ISO45001. We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.



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