

THE SERCON GROUP

HT-EA

HIGH TEMPERATURE
ELEMENTAL ANALYSER
PREPARATION MODULE





HT-EA HIGH TEMPERATURE ELEMENTAL ANALYSER PREPARATION MODULE

Sercon are dedicated to the design, manufacture and support of **Isotope Ratio Mass Spectrometers** and their associated **sample preparation systems**.

The Sercon high temperature elemental analyser (HT-EA) is the most robust 1450°C thermal decomposition device which provides high precision ^{18}O and ^2H sample analysis for both solid and liquid samples.

Designed in conjunction with industrial furnace manufacturers, the HT-EA uses technology to provide the system with no compromise reliable performance. Using a molybdenum liner, the system can provide the most cost effective analysis available. Where high sensitivity from small inorganic samples is required our glassy carbon technology provides the ultimate performance.

The HT-EA is a high temperature thermal decomposition (pyrolysis) elemental analyser preparation module for use as an upgrade for an existing elemental analyser or as a standalone device. It can be configured for both solid and liquid samples and operates at temperatures of 1450°C to ensure complete conversion of the sample to H_2 and CO gas.

During solid sample pyrolysis mode, a silver capsule containing the sample falls into the pyrolysis tube containing glassy carbon grit with a molybdenum liner, this method was developed by Dr. H. Stuart Williams of ANU. The pyrolysis products, CO , N_2 , and H_2 are purified by chemical processes. Due to the high temperatures inside the unit there is complete conversion of the sample, a GC column separates CO from N_2 and has no effect on the elution of H_2 .

Liquid samples are injected using a CTC GC-PAL sampler into a Sercon designed septum sealed port, the liquid is instantly vapourised



and carried in the helium stream onto the glassy carbon reaction bed where it is converted to CO and H_2 .

There are three choices of autosampler with the unit, the Sercon SL Solid sampler which is available in 66 or 132 place options, the Sercon ZB enclosed atmosphere sampler for hygroscopic samples, which encloses all samples in a helium purged atmosphere, available as 66 or 132 place, and the CTC GC-PAL sampler which is recognised as the most reliable and highest performance liquid sampler available.

The standalone HT-EA provides the above abilities but will also control its own sampler, helium carrier stream and GC oven enabling it to be immediately connected to the Sercon 20-22 series of IRMS.

The HT-EA is a bench-top preparation module ready to be connected to the continuous flow interface of our 20-22 or GEO 20-22 series of isotope ratio mass spectrometers.

- 66 place autosampler for unattended operation. 132 place and large sample version available as options.
- Liquid sampler and direct injection port easily fitted to the HT-EA.
- HT-EA standalone has high quality stainless steel diaphragm regulators for gas control, digital flow and pressure sensors, normally closed valves configured to save gas and preserve consumables in the event of a power failure.
- A single long-lifetime 1450°C furnace is used for pyrolysis, combustion or reduction applications.
- Total software control of the instrument system and data processing. Allows storage of sample analysis protocols to comply with good laboratory practice. Standby mode to preserve consumable life during periods of low use. Inter-file import/export facility from instrument PC to laboratory server or internet (allows rapid updating of software or transfer to common spreadsheet packages). System uses Sercon Callisto which is Windows 7 based.



- Direct injection port includes septum sealed port and Sercon designed flow switching to ensure rapid sample transport and zero dead volume.

EXTERNAL PRECISION

All specifications depend on the module being connected to a Sercon 20-22 or GEO 20-22 isotope ratio mass spectrometer and are for **n=5 samples**.

Gas	Reference Gas (‰ vs. Ref) (10 Nano amps)	Combustion/Pyrolysis (‰ vs. Ref)	Example data from test
CO (¹⁸ O)	0.1	0.3 (100 µg*, n=5) (1 ul water, n=5)	100µg O sd = 0.17% 1 ul water sd = 0.11 0/00
H ₂ (² H)	1.0	1.0 (200 µg*, n=5) (1 ul water, n=5)	sd = 0.43 0/00

* denotes amount of element per capsule

Power and Gases	
Power	100-240 VAC
Helium	99.999%





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