



The *Stable* Isotope Company

CryoPrep Trace Gas Module



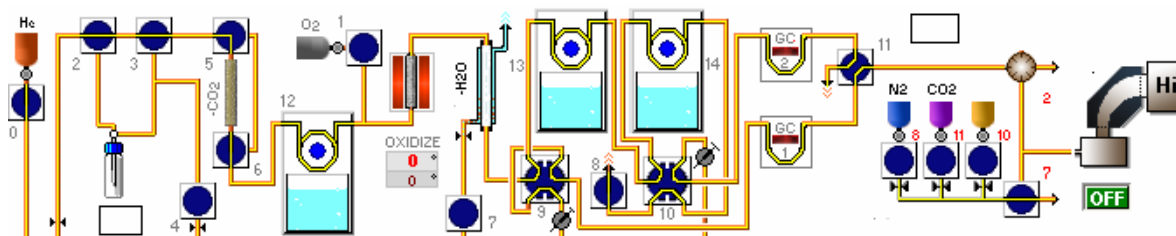
The trace gas module is a gas purification and concentration device for the 20-20 & GEO series of isotope ratio mass spectrometers.

By utilising gas chromatography, cryogenic focusing & combustion (in a variety of combinations), the CryoPrep allows fully automated analysis of isotope ratios in N₂O, CO, CO₂, N₂, NO, O₂ & CH₄ at atmospheric concentrations and has a further capability for measuring N₂/Ar ratios. The module is

provided with a stand-alone isothermal gas chromatograph and can use a gas autosampler.

The key features of the *CryoPrep* include:

- Automated cryo-trapping and focus device for condensable gases such as N₂O and CO₂.
- Can be used for high performance interfacing to TIC & TOC systems
- High temperature oxidation stage for converting CH₄ to CO₂. Built in oxygen supply for regeneration of chemicals.
- Flexibility to allow the user to configure their application for the measurement of up to three gas species from a single sample.
- Sub-sampling valve to allow analysis of gases at high concentrations.
- Full automation for unattended analysis of gases in septum sealed bottles (12, 30, 60, 125 and 250 ml).
- 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.
- Isothermal Gas Chromatograph with Poraplot-Q and Molsieve PLOT columns.
- On-board microprocessor for storage of furnace temperatures and valve status (guards against PC failure or temporary detachment).
- Total software control of the instrument system and data processing.
- The *CryoPrep* is a bench-top preparation module ready to be connected to the continuous flow interface of our 20-20 or GEO20-20 series of isotope ratio mass spectrometers.



CryoPrep Specifications:

Design	Bench top module containing cryo-trapping interface and oxidation furnace on 'swing out' plate to enable easy changing of combustion tube. GC columns housed in isothermal gas chromatograph.
Analytical Mode	Gas samples are flushed by helium from septum sealed bottles and purified by a user defined combination of gas chromatography, combustion, cryo-trapping and cryo-focusing.
Gas Chromatography	Dual selectable GC columns which include megabore capillary columns comprising of a Poraplot-Q and Molsieve PLOT columns to cover many gas analysis methods.
Cryo-focusing Stage	Cryo-trapping and focus device (3 automated cryo-units) which is capable of trapping and purifying condensable gases such as N ₂ O, CO ₂ and NO.
Sub-sampling valve	Valve to allow samples in the 1 ml range to be analysed as well as trace gases. Example applications are N ₂ and O ₂ analysis or N ₂ /Ar ratio analysis.
Oxidation stage	Ceramic capillary tube packed with oxidising chemicals for combustion of CH ₄ to CO ₂ . Close fitting conversion reactor with the facility to maintain a temperature of up to 1200°C.
Isothermal GC	Separate fan assisted oven with digital temperature controller. Temperature range: ambient to 250°C (0.3°C accuracy, 2°C uniformity).
Gas Control	High quality stainless steel diaphragm regulators.
Reference System	Isotope ratios are calibrated by a reference gas injection system that pulses a relevant bottle gas into the mass spectrometer or against internal standards of air placed in the autosampler rack.
Software	The software takes care of system operation (source ionization, IRMS data collection, peak scanning, flow diversion control) and data processing & reporting (isotope ratio reduction, peak detection).
Autosampler	A modified Gilson 222 autosampler has been designed for batch analyses of air samples. Sample trays to accommodate 12 ml, 30ml, 60ml, 125 ml or 250 ml bottles are provided.

Specifications:

Mode	D	¹³ C	¹⁵ N	¹⁸ O	³⁴ S
Trace Gas Analysis ³ (CryoPrep)	-	0.2 (CO ₂) (5 µl)	0.3 (N ₂ O) (45 nl)	0.4 (CO ₂) (5 µl)	-
	-	-	-	0.1 (O ₂) (10 µl)	-
	-	0.3 (CH ₄) (215 nl)	-	1.0 (N ₂ O) (45 nl)	-



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