

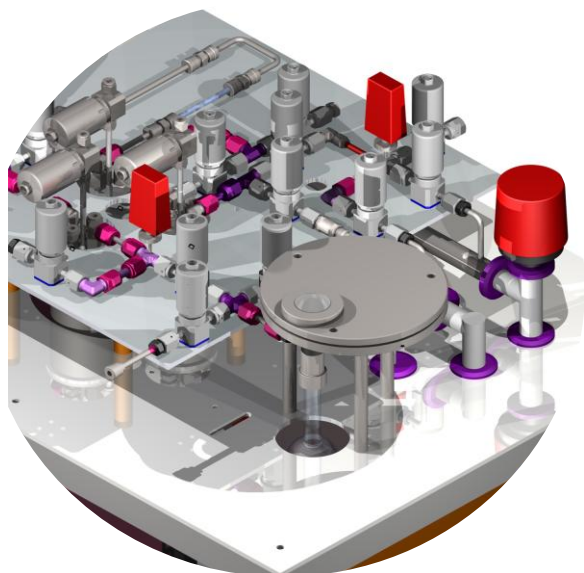


Isotope Atmospheric CO₂ Extraction System

ORYX CO₂

Introduction

The ORYX CO₂ is a fully automated system for preparing and purifying CO₂ gas directly from atmospheric samples. The purified samples are then transferred to a dual-inlet IRMS for high-precision isotopic analysis. Typically, results are better than 0.02‰ sd for mass 45 and 0.03‰ for mass 46.

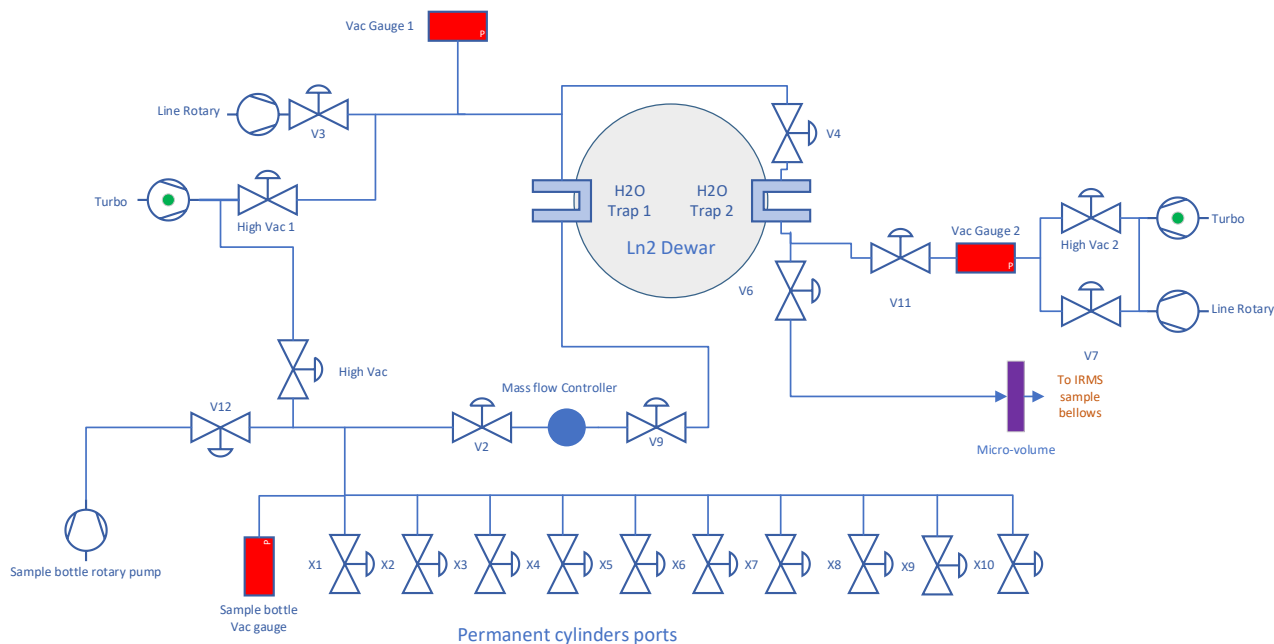


The ORYX can be integrated with most modern IRMS systems, including the Thermo Ultra. Gas connections are made directly to the IRMS bellows and/or systems inlet block.

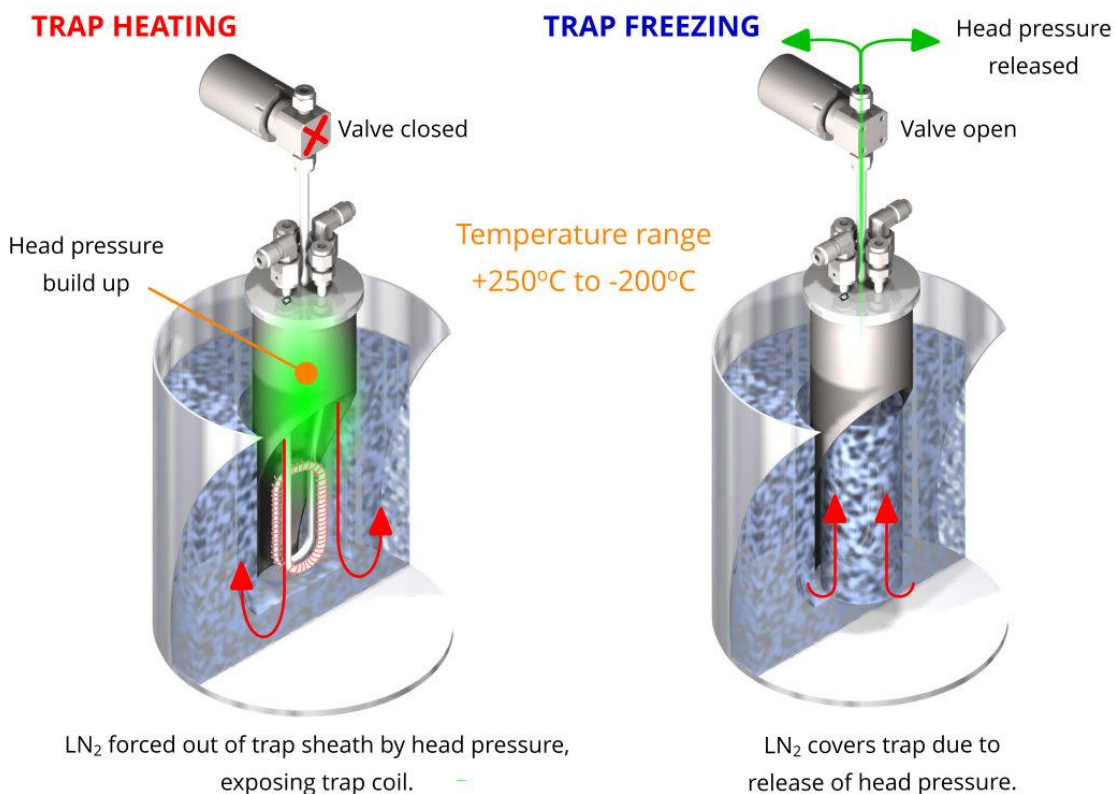
How the ORYX works

The ORYX utilises a series of variable-temperature cryo-traps to collect and purify CO₂ directly from atmospheric sample collection bottles. The flow of sample through the traps is regulated by a high-precision Mass Flow Controller (MFC).

The flow rate can be adjusted throughout sample collection, either directly through the ORYX software or via an ORYX software method.



The cryo-traps use a variable-head pressure system to raise and lower the level of liquid nitrogen without physically moving the trap. This provides safe and accurate trap cooling and heating.



Automated sample flow control

Helium flow through the system is regulated using high-precision mass flow controllers. This enables flow rates from 0 to 100 ml min⁻¹ (1 ml increments).

The flow rates are software-controlled and can be altered directly through the ORYX software interface. Automated changes can also be added to the sample preparation method.

The ability to control flow rates in real time provides three benefits:

1. Variable flow rates for different sample processing methods.
2. Bi-directional flow across the traps, allowing back-flushing during the system cleaning process.
3. The ability to place the ORYX in gas saver mode between sample preparations.

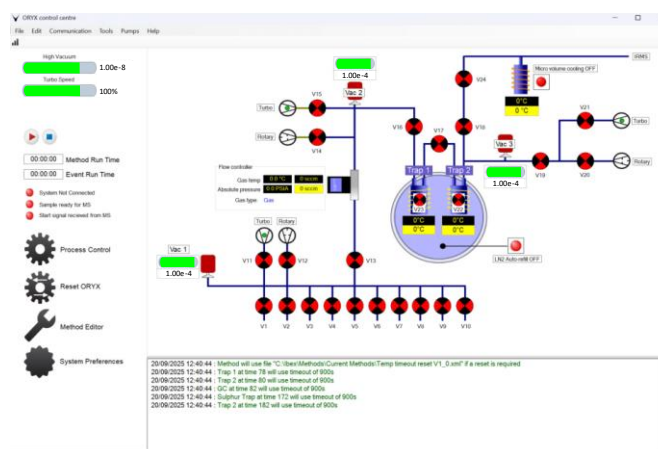


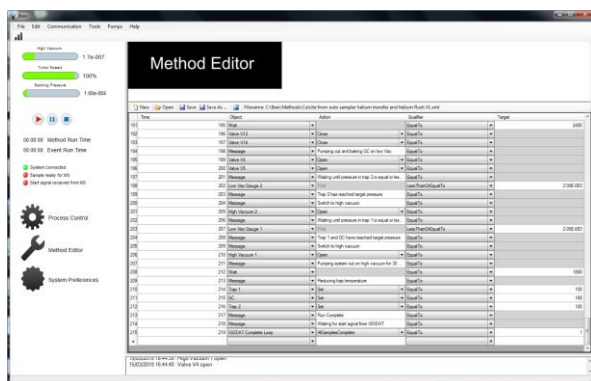
ORYX Control Centre Software

The ORYX Control Centre software (OCC) provides a fully integrated control and monitoring platform. Seamlessly linking with ISODAT/Qtegra sequence files, methods and scripting language.

Real-time control and readbacks for all functional objects are available on the main OCC screen, including valve states, flow rates, trap temperatures, and vacuum pressures.

Adding custom controls and objects is also possible using the system's plug-and-play features. This includes pressure gauges, valves and other bespoke equipment.

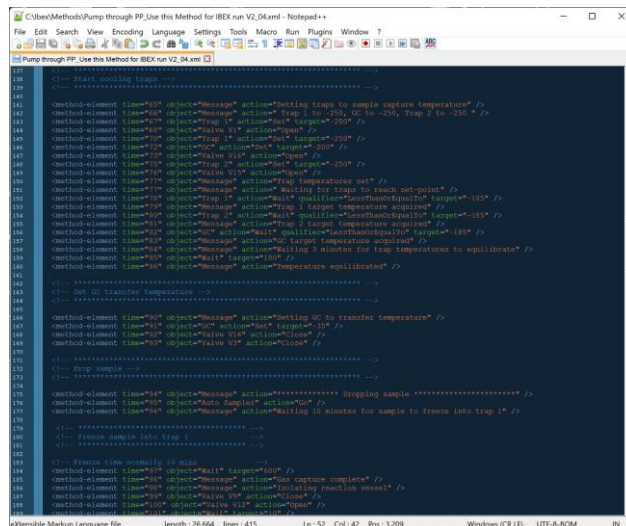




Existing methods can be edited with a few mouse clicks.

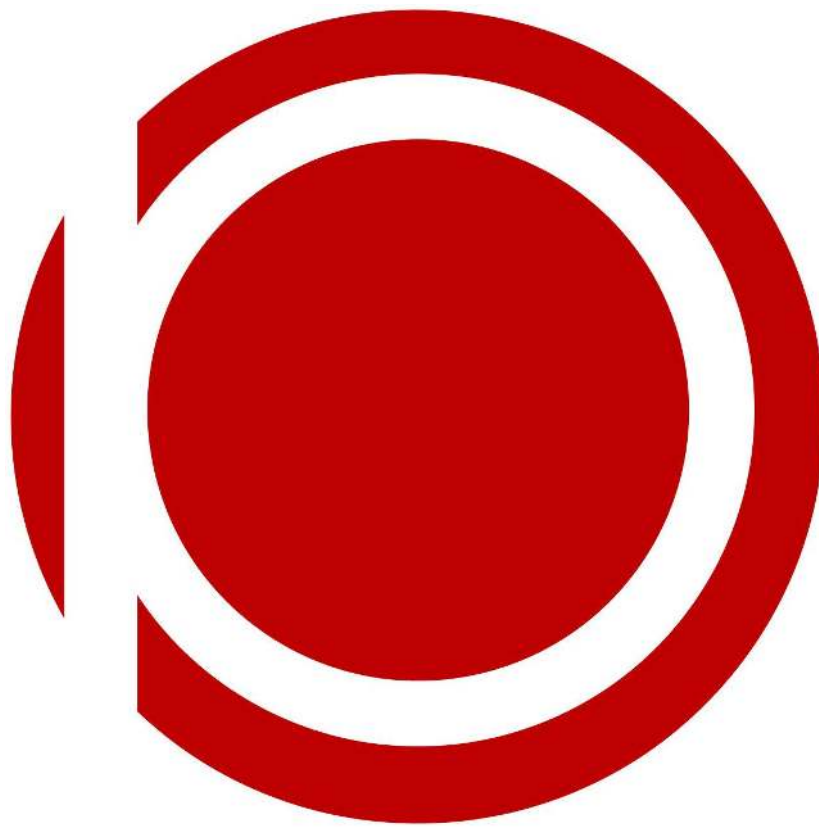
Advanced users can also edit and deploy methods using any XML editor.

Custom analytical methods can be created using the OCC method editor. This requires no prior scripting or coding knowledge. New methods can be created and deployed in minutes.



ORYX functionality and specifications

CRYO TRAP PERFORMANCE
The system includes two cryo-traps (two water traps and one cold finger). Water traps Max Temp +250 °C Min Temp -197 °C Temperature increments 1°C
MASS FLOW CONTROLLER
Air Mass Flow can be controlled from 0 to 100 ccm Control resolution 1 ccm Flow direction is reversible (trapping or backflush)
LIQUID NITROGEN CONSUMPTION
Approximately 45 litres per day. It is recommended that the customer provide a 90-litre (or larger) LN₂ storage vessel to supply the ORYX preparation system.
SULPHUR TRAP
Silver wool trap (Optional) Volume 3 ml
IBEX CONTROL CENTRE SOFTWARE
Compatible with ISODAT and Qtegra Requires Windows 7 or above
VACUUM SYSTEM
1 x DX85 Edwards turbo molecular pump 2 x RV5 Edwards rotary pumps 1 x Edwards Penning gauge 3 x Edwards Pirani gauge 2 x Edwards TIC/gauge controller Scroll pump options are available if preferred. Please note that alternative components may be used if they provide better performance than those described above.
Vacuum Fittings
All Vacuum joints and seals use VCR connections. All tubing is Ultron finished or equivalent



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