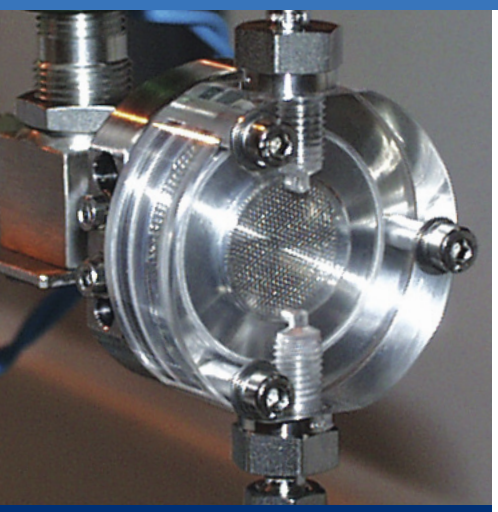
Hiden HPR40 Membrane Inlet Mass Spectrometer System



vacuum analysis

surface science

plasma diagnostics

gas analysis

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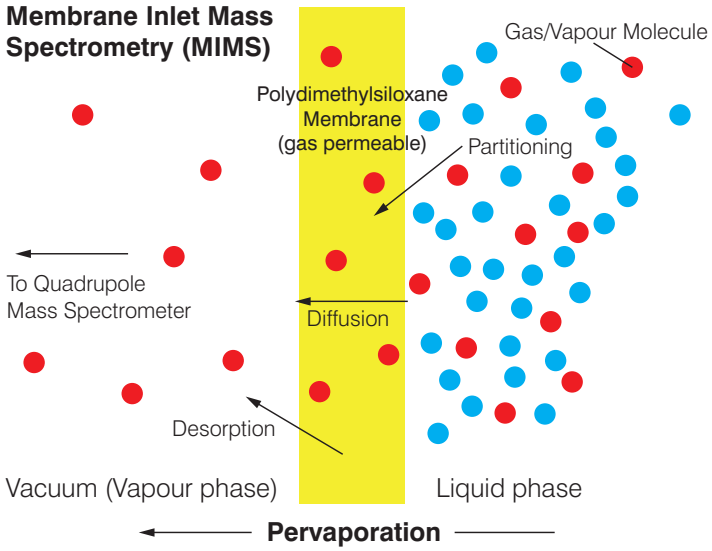
HPR40 MIMS Overview



Typical Enrichment Factors WRT N_2

CO_2	- 12.0
CH_4	- 3.2
C_3H_8	- 13.6
CH_3OH	- 46.4
SO_2	- 50.0
C_3H_6O	- 19.6
$C_6H_5CH_3$	- 30.4

The Hiden HPR40 Membrane Inlet Mass Spectrometer (MIMS) is a compact bench-top gas analysis system for quantitative analysis and monitoring of dissolved/evolved gases.

The inlet probe uses a permeable membrane that allows small levels of the dissolved species to pass through it and onto the ion source of a precision quadrupole mass spectrometer.

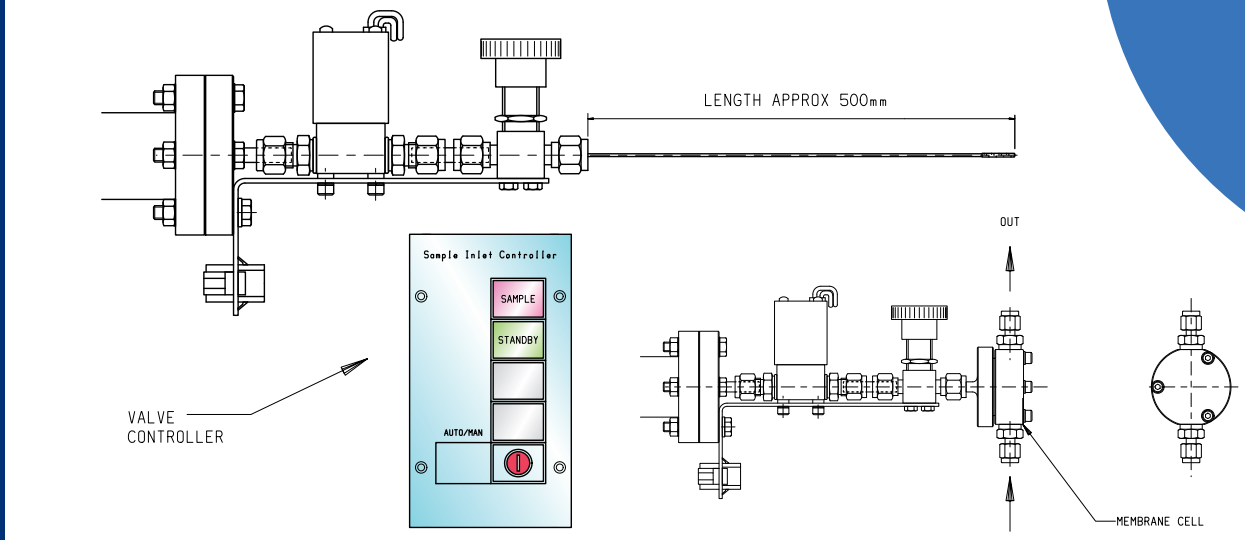
A manual isolation valve allows control of the sampling and a solenoid safety valve provides protection for the mass spectrometer and vacuum system in case of membrane failure.

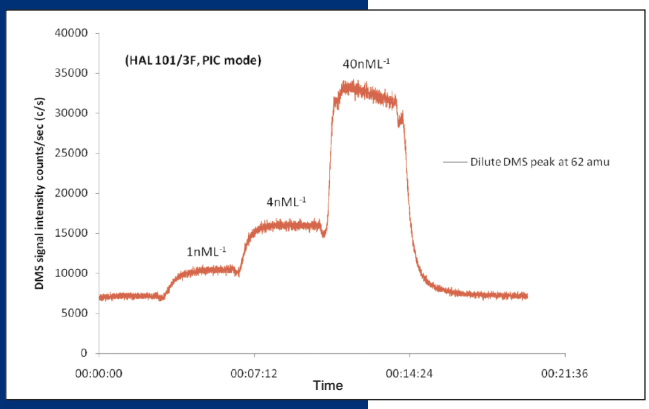
The system offers the facility for analysis to sub-ppm levels and is suited to gas analysis applications, where sample volume is small, and for environmental applications where detection of a low concentration level is required.

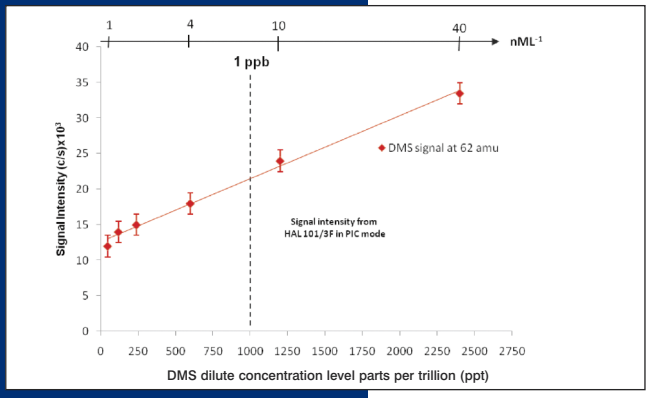
Both dissolved species probe inlets and circular membrane carrier inlets are available to address a broad range of applications including:

- Soil core analysis
- Fermentation process analysis
- Water analysis in Estuary, River or Reservoir
- Groundwater contamination studies
- Methane production control
- Microbiological / Enzyme activity studies
- Environmental monitoring

HPR40 MIMS technology…at a glance







Data obtained with assistance from P.D.Tortell, Department of Botany, University of British Columbia

HPR40 Inlets

The HPR-40 probe inlet includes a manual isolation valve, solenoid safety valve and power supply connector mounted on a support bracket together with a conflat DN-35-CF mounting flange. The solenoid valve provides protection for the mass spectrometer and vacuum system in case of membrane failure. As an option, a 4- or 8-way Multistream selector, for multiplexed simultaneous sampling from up to four or eight reactors can also be included.

The circular membrane carrier inlet is ideal for the analysis of flowing samples with sample flow across the membrane. The HPR40 Analyser provides real-time analysis of disolved gases.

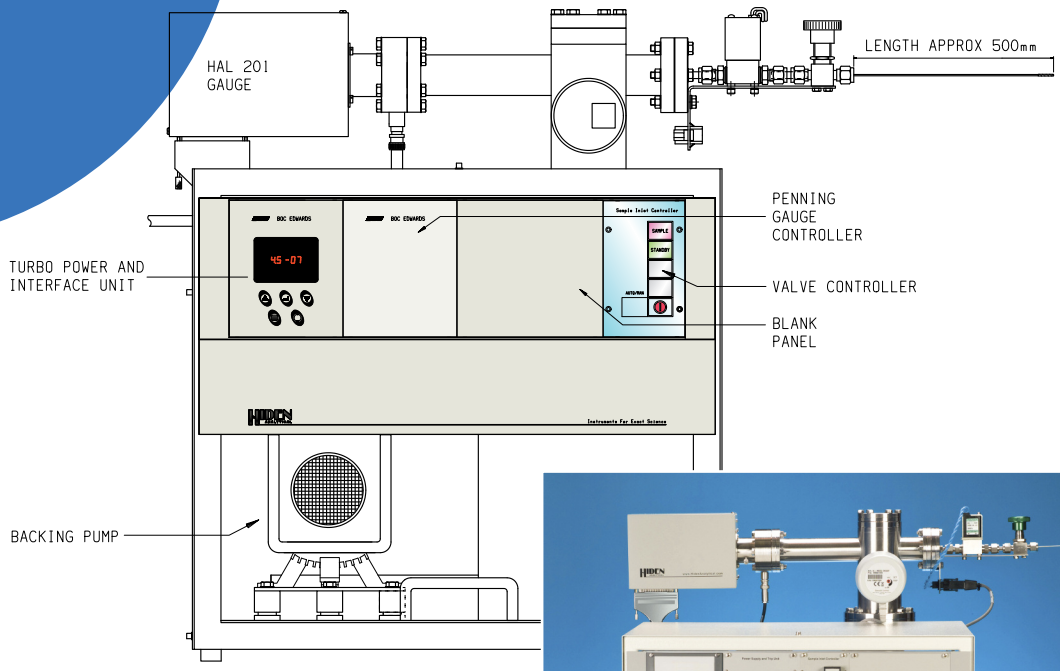
HPR40 Example Data

The HPR40 was used to detect and analyse low level, down to 60 parts per trillion (≥ 60ppt), concentrations of CH_3SCH_3, Dimethylsulphide (DMS, a trace substance naturally evolved from micro-organic species in oceanic waters, and is implicated in global climate change and regulation).

The HPR-40 configured with a triple filter QMS provides detection levels into the parts per trillion (ppt) range. Current research in the area of oceanic studies is striving for detection levels of DMS $<2nML^{-1}$. The specific application shows levels of ≈ 60 ppt are attainable, corresponding to dilute DMS concentrations of ≤ $1nML^{-1}$.

HPR40 MIMS

HPR40 MIMS technical specifications



Specifications

Mass Range: 200 or 300 amu

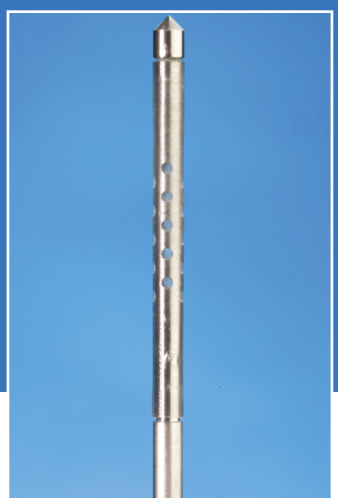
Operating modes: Threshold Ionisation
Multiple Ion Detection
Bar Scan
Profile Scan

Mass Spectrometer: Single (HAL 201 RC) or Precision Triple (HAL/3F 301 RC) Filter Quadrupole

Ion Source: Electron impact with dual filaments

Inlet: 4 or 8 way multiplexed inlet for sampling from multiple probes or dissolved species circular membrane inlet carrier, including liquid flow connections, ideal for water circulation.

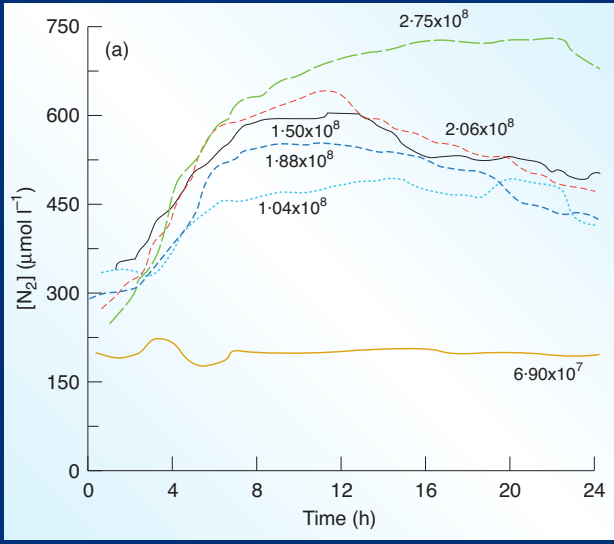
Data Acquisition and Control: 32 bit MASsoft operating system with HAL 7 Microprocessor.

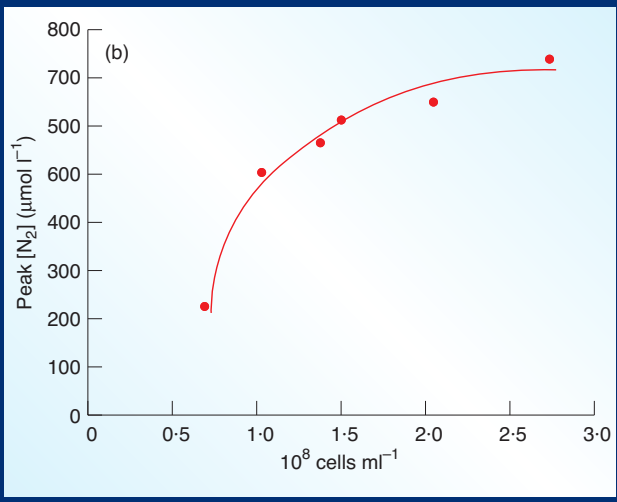


5 configurable I/O TTL lines
2 analog inputs
2 trip relay outputs
3 RS485 (multi protocol)
8 digital inputs compatible with 5V and 24V logic levels
8 open collector digital outputs (30V, 500mA max)
4 analog outputs, 0-10V, 14bit.

And the following communications to a PC:
RS232, USB 2.0, 10/100Base-T LAN

HPR40 Example Data - Denitrification Studies





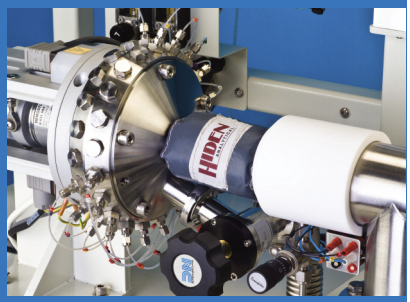
Denitrification by *Pseudomonas stutzeri* in a sterile lake water microcosm supplemented with succinate and nitrate

JR Firth and C Edwards, Journal of Applied Microbiology 2000, 88, 853-859

Other products for Gas Analysis

HPR20 (with Quartz Inlet Capillary)

QIC Biostream



MIMS

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TECHNICAL DATA SHEET 171