HIDEN ANALYTICAL



Mass Spectrometers for Residual Gas Analysis Applications (RGA)

MASS SPECTROMETERS
for Residual Gas Analysis Applications (RGA)

Residual gas analysers (RGA) provide a unique window into the vacuum environment for contamination monitoring, leak detection and analysis of the species of interest within the vacuum chamber, water vapour for example. The Hiden residual gas analysers are quadrupole mass spectrometers configured in a broad range of products to address applications in vacuum processing, science and technology.

Hiden residual gas analysers are equipped with software that is intuitive and multi-level offering simple fail-safe* operation for a novice user whilst incorporating a broad range of useful and advanced features for the vacuum expert.

THE VACUUM RESIDUALS ROUTINELY ANALYSED INCLUDE:

Hydrogen, measured at mass 2, and of specific interest in UHV where outgassing can be the limiting factor for achieving ultimate vacuum.

Helium, measured at mass 4, and used as a search gas for leak detection. Hiden residual gas analysers include a dedicated leak detect mode, for fast response analysis of helium.

Water Vapour, measured at mass 18, is the most difficult residual to pump to UHV level without baking or pumping the vacuum chamber for extended periods.

Nitrogen and Oxygen, measured at mass numbers 28 and 32, with additional peaks measured for confirmation at mass numbers 14 and 16. The measurement of significant signal for the 'air peaks' is often the first indication of a chamber leak.

Hydrocarbons are analysed at several masses across a mass scan and typically can be identified at mass numbers 69 and 71, 55 and 57, 41 and 43, and 15 for alkanes and alkenes. The residual gas analyser broad mass scan with high sensitivity allows the user to get detailed information regarding the contamination level of the chamber.

Volatile Organic Compounds, measured at species specific masses including mass 78 for benzene, 91 for toluene, 31 for ethanol, and 45 for isopropyl alcohol.

Hiden's residual gas analysers analyse the above species with a real-time data display to give the vacuum user immediate and updated information about the health and trends of the partial pressure of the key vacuum residuals. Data is used for routine vacuum chamber monitoring, leak detection, for analysis of vacuum processes, and for advanced research studies.

WHAT OUR CUSTOMERS SAY:

"... I strongly feel (based on experience) that, products supplied by Hiden can be fully relied upon for their quality and reliability and equally well for the support from the Hiden family, right from the point of planning to the point of implementation."



*On board safety features include overpressure protection for both filament and detector by internal measurement as well as connection for an external overpressure protection device.

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HAL 3F 1000



HMT



UHV vacuum fired source

RGA SERIES

All Hiden residual gas analysers are application tested and calibrated to provide the highest quality performance, and they are backed by a 3 year warranty and lifetime service support.

- vacuum diagnostics
- reactive sputtering closed loop control
- leak detection
- vacuum furnace monitoring
- contamination analysis
- molecular beam studies
- semiconductor production
- UHV/XHV surface science
- vacuum process analysis
- UHV TPD



HALO 100 RC

THE HIDEN RGA SERIES INCLUDES THREE SPECIFICATION LEVELS:

HALO - for residual gas analysis.

HAL/3F - triple filter mass spectrometers for analytical applications.

HAL/3F PIC - pulse ion counting detection for fast event studies.



HAL/3F

CORE FEATURES/OPTIONS:

- mass range options: 50, 100, 200, 300, 510 amu
- ultra fast data acquisition - up to 1000 measurements per second
- twin burnout-resistant oxide coated iridium filaments
- real-time background subtract
- range of ion source and shroud options
- integral mass library
- advanced analysis capability for complex gas interpretation
- high sensitivity helium leak detection, mass selectable for alternative search gases

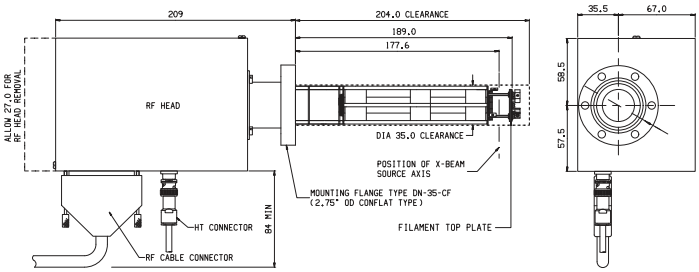


HAL/3F PIC

HALO
for Residual Gas Analysis



HALO 201 RC



HALO Analyser and RF Head

- **vacuum fingerprint: histogram & peak profile scan**
- **trend analysis: monitor multiple species > 80 partial pressure values in real-time**
- **leak detection**
- **zero blast and baseline drift are eliminated: compare and analyse vacuum chamber residual gas/vapour species**

Detector options:

- Faraday-only, Faraday/Electron Multiplier

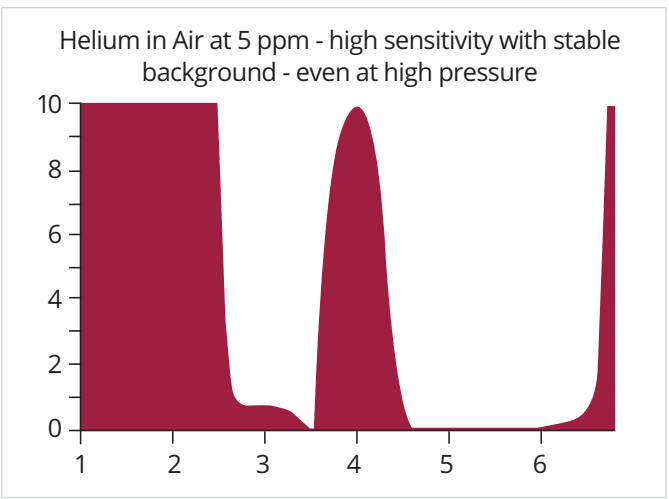
Sensitivity with:

- Faraday - detection to $1x10^{-11}$ mbar

- Electron Multiplier - detection to $2x10^{-14}$ mbar

Maximum Operating Pressure:

- $1x10^{-4}$ mbar



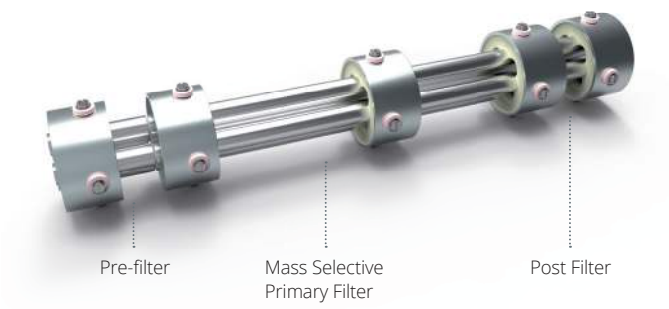
Hiden's RGA sensitivity for helium is 5 times* that of a typical analyser providing excellent leak detection performance.

FEATURES:

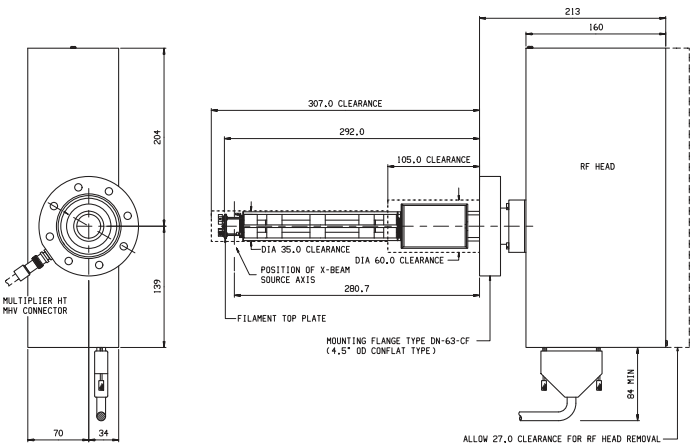
- mass range options: 100, 200 and 300 amu
- detector options: Faraday or Faraday and Electron Multiplier
- PC Windows controlled
- **Automated Electronic Beam Shutter EBS™** optimises noise suppression
- **Automatic DeSat™ mode** for high speed scanning even in the presence of saturating signals

*Based on reference to published relative sensitivity data.

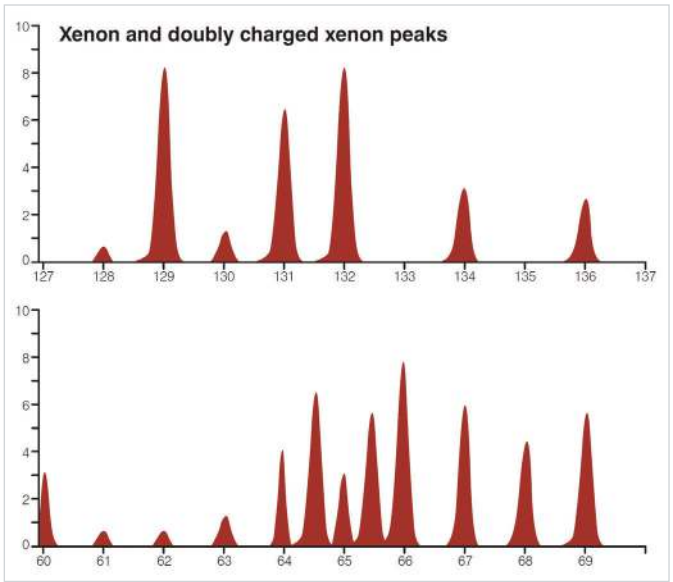
HAL/3F
Triple Filter Mass Spectrometer for Analytical Applications



Triple Filter Assembly



HAL/3F Analyser and RF Head



3F Performance includes enhanced sensitivity for high mass species and increased resolution capabilities

- **triple mass filter technology for high sensitivity with enhanced contamination resistance and abundance sensitivity**
- **application-specific ionisation sources for gas analysis, molecular beam measurement and UHV/XHV studies**

Mass range options:

- 50, 200, 300 and 510 amu
- Series 1000 for mass range options up to 5000 amu

Detection limit:

- Faraday detector – $2x10^{-12}$ mbar
- Single Channel Electron Multiplier – $5x10^{-16}$ mbar

Maximum operation pressure:

- $1x10^{-4}$ mbar

FEATURES:

- mass range options: 50, 200, 300 and 510 amu
- detector: Faraday and Single Channel Electron Multiplier
- full control of field axis potential: ion source emission, electron energy, ion energy
- **Automated Electronic Beam Shutter EBS™** optimises noise suppression
- **Automatic DeSat™ mode** for high speed scanning even in the presence of saturating signals

HAL/3F PIC

Triple Filter Mass Spectrometer with Pulse Ion Counting Detection for Fast Event Studies

- **Pulse ion counting detection for fast event studies including UHV TPD and for transient gas analysis**
- **7 decade continuous measurement from 1 c/s to 10^7 c/s**
- **Multi-channel scaler detector option with time resolution to 50 nanoseconds**

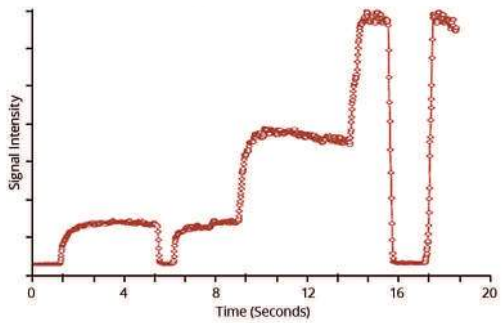
Mass range options:

- 50, 300 and 510 amu
- Series 1000 for mass range options up to 5000 amu
- Detection limit with pulse ion counting detector $5x10^{-16}$ mbar

Maximum operation pressure:

- $5x10^{-6}$ mbar
- $1x10^{-4}$ mbar with Faraday option

3F PIC Trend Analysis - >1000 measurements per second



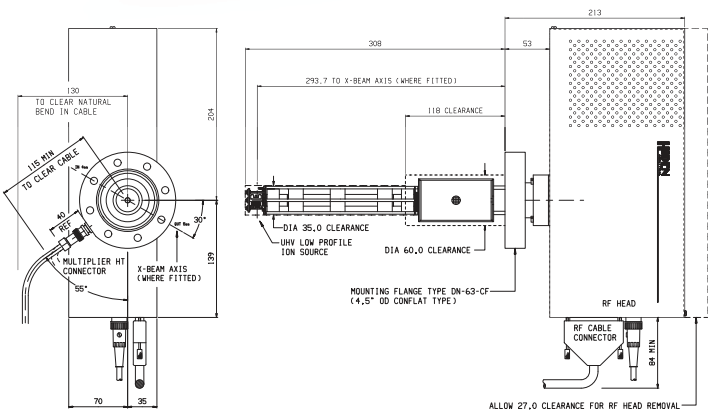
High quality transient data acquisition at PPM/PPB levels. Ideal for UHV TPD.



HAL/3F PIC

FEATURES:

- 7 decade dynamic range
- > 1000 measurements per second
- detection to $5x10^{-16}$ mbar
- signal gating for pulsed studies
- multi-channel scaler option with 50 nanosecond time resolution
- PCA mode - Predictive count accumulation mode. Significantly extends electron multiplier life.



HAL/3F PIC Analyser and RF

ION SOURCE OPTIONS



Standard and UHV low profile source



Laser cross beam source



UHV vacuum fired source

Hiden Analytical produces a wide variety of ion source types which can be fitted to our full range of RGAs. Ion source types are crucial to the performance of RGAs and having the ability to specify which source you require ensures our RGAs are custom configured for specific applications.

ION SOURCE OPTIONS

Standard RGA - A radially symmetric configuration for general applications.

UHV Low Profile - Optimised for UHV TPD studies enabling closer proximity of the ion source to the evolution surface.

Closed Sources - For high pressure studies with direct gas input used in conjunction with a differential pumping stage for the analyser.

Basic Cross Beam - The Basic Cross Beam source is used for analysis of molecular beams, where the beam may be liable to condense on ioniser surfaces. The source features an unobstructed pathway through the ionising region of the source. External shrouds are available to protect the quadrupole mass filter from condensing species.

XBS Cross Beam - The XBS Cross Beam is configured specifically for MBE deposition rate monitoring and control.

Laser Cross Beam Source - The Laser Cross Beam source includes two orthogonal unobstructed pathways for laser photon ionisation within the source cage region, providing an alternative to electron impact and electron attachment ionisation.

4 Lens Ion Optics with Integral Ioniser - Additionally enables analysis of low energy positive and negative ions generated externally to the analyser. For electron, photon and laser stimulated desorption studies.

Platinum Ion Source - This source is configured for improved operation in reactive gases. Radially symmetric, UHV compatible.

Gold Plated Ion Source - This source is configured to minimise the effects of source outgassing. Radially symmetric, UHV compatible. Available as Standard or Low Profile options.

Vacuum Fired Source - For UHV applications. Very low outgassing.

FEATURES:

- standard filament material is oxide coated iridium
- other materials available on request
- ion source options are interchangeable
- open and closed sources available
- range of cross beam sources available
- standard and low profile options available

HMT
High Pressure Residual Gas Analyser

The Hiden HMT quadrupole mass spectrometer is a unique dual mode RGA system capable of operating at pressures up to 5x10^{-3} mbar without the need for differential pumping. Operation at this pressure is achieved using a specially designed ion source/quadrupole filter combination and software which corrects for abundance non-linearity. The unique high pressure specification makes the HMT ideal for process monitoring applications.

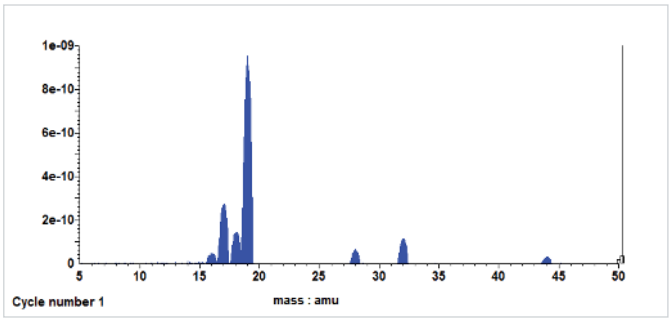
The HMT can also operate in RGA mode in the same way as a traditional quadrupole RGA. Dual Faraday and electron multiplier detectors provide partial pressure sensitivities down to the 10^{-14} mbar range.



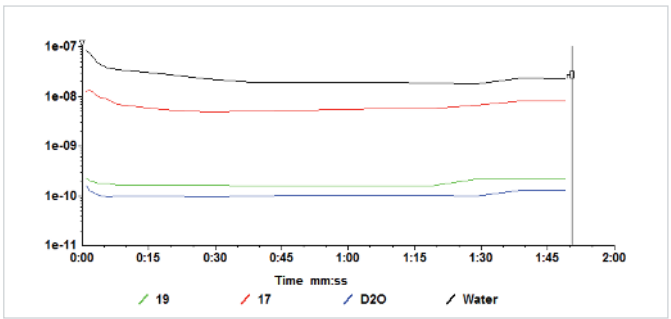
HMT

FEATURES:

- HMT mode for high pressure operation to 5x10^{-3} mbar
- RGA mode for high sensitivity operation to 2x10^{-14} mbar
- 100 amu mass range
- stability better than +/- 1% over 24 hours
- fast access mixed mode scanning
- real-time background subtraction

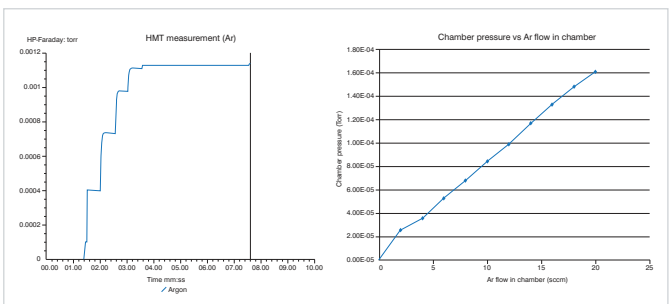


Profile mass scanning in RGA high sensitivity mode.



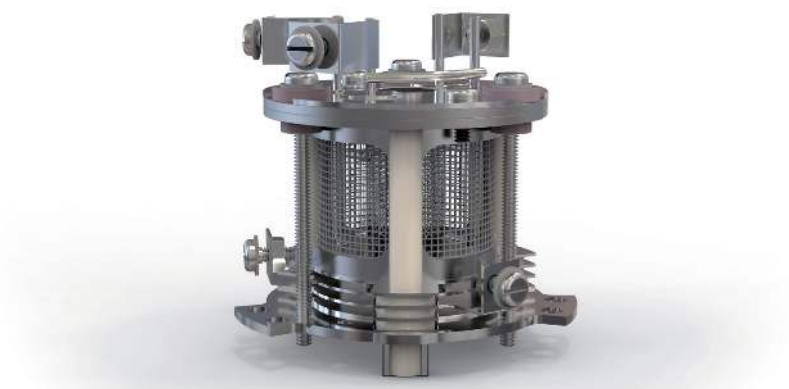
Multi-component trend analysis.

The performance of the HMT system operating in high pressure mode is illustrated in the graphs below where Argon fill gas flow is increased progressively.



HMT Analyser measuring Argon in the process chamber at pressure up to > 10^{-4} mbar.

HAL
for Demanding UHV and XHV Applications



Vacuum fired ion source.

Radiation Resistant as standard. Radiation Hard option available.



HAL 201 with vacuum fired ion source.

FEATURES/OPTIONS:

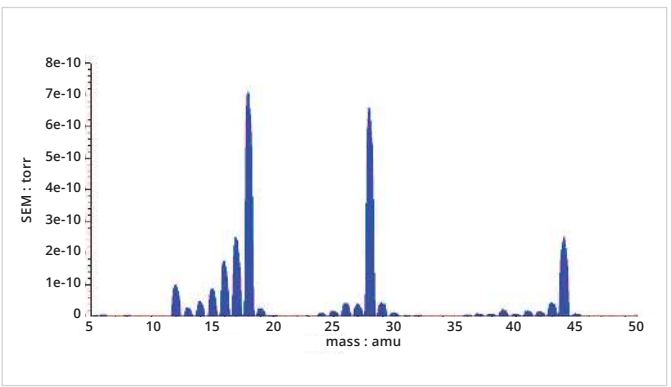
- mass range options: 100, 200 and 300 amu
- vacuum fired source for reduced ion source hydrogen outgassing
- gold plated ion source for reduced ion source peaks from electron stimulated desorption (ESD)
- electron impact ioniser with twin oxide coated iridium filament
- dual Faraday/Channeltron electron multiplier detector
- minimum detectable partial pressure of $1x10^{-15}$ mbar
- maximum operating pressure of $1x10^{-4}$ mbar
- radiation hard with remote RF version

The Hiden RGA for UHV is designed and configured for residual gas analysis in demanding UHV applications where critical measurements at UHV are required.

The HAL analyser can be configured either with a gold plated ion source for reduced ion source peaks from electron stimulated desorption (ESD) or with a vacuum fired UHV source for reduced hydrogen outgassing from the ion source. These specialised ion source configurations are ideally suited for applications where the total pressure is less than $5x10^{-10}$ mbar.

EPICS is the standard instrument control software used in many light sources around the world and the Hiden HAL system is fully compatible with EPICS software drivers.

- **beam lines**
- **Tokamaks/Torus facilities**
- **particle accelerators**
- **synchrotrons**
- **UHV chambers**



Typical profile spectrum for HAL system.

HAL 101X
for Synchrotron/Accelerator and Tokamak/Torus Applications in Harsh Radiation Environments

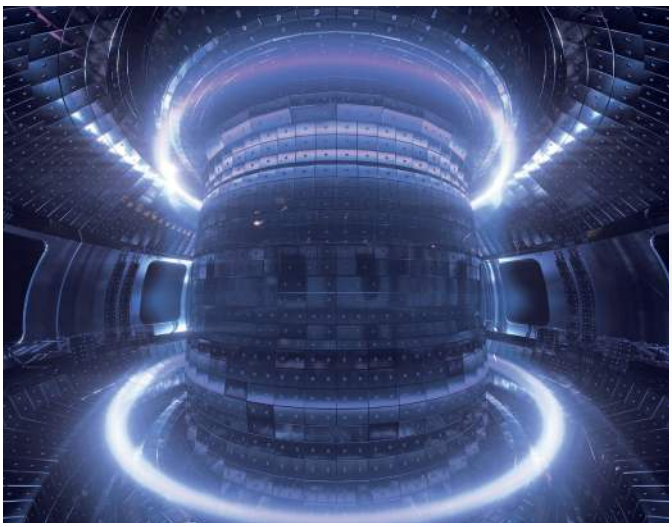
Issues arise in situations involving very hard radiation environments due to the potential degradation of unprotected active electronic components, with protection typically requiring complex and bulky radiation shielding.

The new and innovative Hiden HAL 101X RGA avoids all radiation shielding requirements by employing an original technique to completely eliminate use of active electronic components in the vicinity of the RGA vacuum gauge element. Control electronics can be located up to a full 140 metres from the RGA gauge with no reduction in quadrupole mass filter frequency and with the full 100 amu mass range and performance relative to the standard close-coupled system.





The National Synchrotron Radiation Research Center (NSRRC), Taiwan.



Tokamak Plasma Fusion Reactor



HAL 101X RGA

FEATURES:

- Includes Threshold Ionisation Mass Spectrometry (TIMS) mode for real-time quantification of hydrogen and helium isotopes
- multiple mass scanning modes
- real-time background subtraction
- automated mass scale alignment
- on-line adjustment of ion source and detector parameters
- individual mass channels can be monitored to identify any pressure divergence from user pre-set sensor levels

HALO 201 MBE
for Molecular Beam Epitaxy Applications



HALO 201 MBE analyser

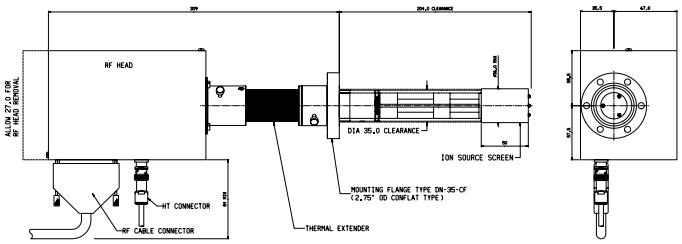
The Hiden HALO systems are designed for RGA, gas analysis and process monitoring applications including leak detection, trend analysis and vacuum survey.

The MBE specific analyser is constructed from compatible materials, designed for prolonged use in MBE environments and includes, as standard, molybdenum wiring in place of copper and a contamination resistant ion source shroud.

- **semiconductor**
- **oxides**
- **nitrides**
- **solar cells**



HALO 201 MBE with thermal extender option



HALO 201 MBE analyser and RF head

FEATURES/OPTIONS:

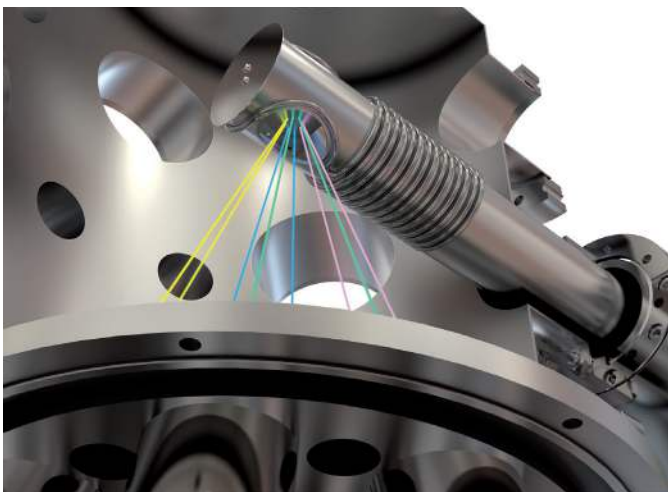
- molybdenum wiring in place of copper wiring to improve RGA system lifetime in MBE environments
- contamination resistant ion source shroud
- dual Faraday/Channelplate electron multiplier
- minimum detectable partial pressure of $1x10^{-11}$ mbar (Faraday) and $2x10^{-14}$ mbar (Channelplate)
- thermal extender option for RGA operation during bakeout

XBS
Deposition Rate Monitor for Molecular Beam Analysis & Deposition Control

The Hiden XBS system is a quadrupole mass spectrometer designed for monitoring multiple beam sources simultaneously and uniquely offers beam acceptance through a 70° cone. Species-specific analogue signals are used for beam intensity output to the users' source control modules.

Beam acceptance apertures are configured individually for each specific process chamber source position, manufactured as replaceable plug-in elements to enable retrospective modification in event of chamber alteration. Purpose-designed with high contamination resistance for monitoring evaporating components and fragments in MBE processes. Manufactured with a triple stage mass filter and water-cooled fully-shrouded probe to protect the probe from the radiant heat sources and to inhibit probe contamination.

- **monitor and control in MBE processes**
- **molecular beam studies**
- **multiple beam source analysis**
- **photoionisation studies**
- **desorption/outgassing studies**
- **monitoring and diagnostics of contaminants in the process chamber**
- **high performance RGA with 3F series triple-stage mass filter**
- **high-sensitivity helium leak check mode for vacuum quality verification**



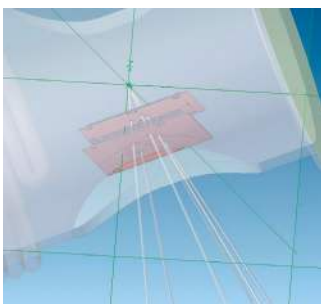
XBS on chamber

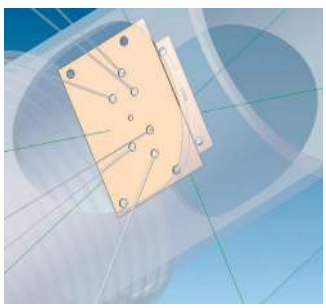


XBS probe with water cooled shroud

FEATURES:

- high sensitivity - minimum detectable partial pressure $2.5x10^{-14}$ mbar
- mass range: 320 or 510 amu
- cross beam ion source, beam acceptance through +/- 35° to transverse axis
- beam acceptance apertures configured for beam source positions
- growth rate determination typically < 0.01 Å s^{-1} (species dependent)
- optional water-cooled shroud





3F PIC SERIES
for UHV TPD

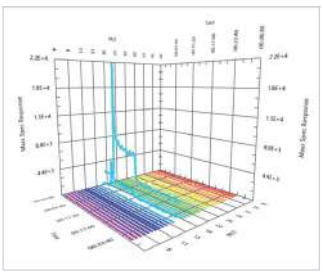
Hiden's 3F PIC Series quadrupoles are high precision triple filter analysers with digital detectors for ultimate sensitivity and time resolution in fast event studies such as UHV TPD. 3F PIC Series analysers are available with UHV compatible mass filter shrouds and a low profile ion source for close positioning to the desorption surface.

Application specific software enables the user to control temperature ramp profiles and collect data in the same program (TPDsoft) or to simply collect MS data and temperature in the same program (EGAsoft).

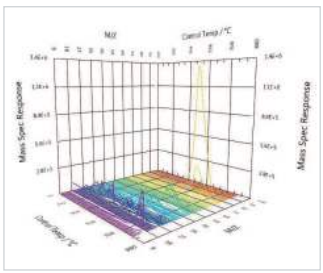
Both analogue and digital inputs are provided for synchronous acquisition start and sample temperature data display alongside mass channel data.



3F PIC with quartz shroud



3D bar data view in TPDsoft.



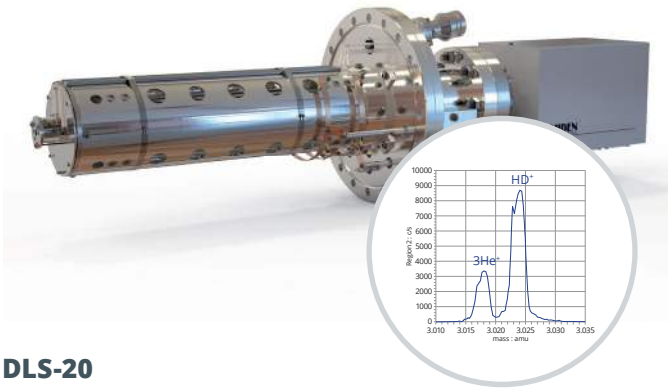
Display MS response vs. temperature.

FEATURES:

- low profile ion source
- range of shrouds
- fast data acquisition
- up to 1000 data points per second
- wide dynamic range
- MCS mode option for time resolution to 50 ns
- 7 decade continuous log scale
- gating input for pulsed gas studies down to 100 ns gating resolution

DLS SERIES

Ultra-high Resolution Mass Spectrometers for the Study of Hydrogen Isotopes and Applications in Nuclear Fusion Research



DLS-20

Unique dual-zone ultra-high resolution mass spectrometer with ultra-high sensitivity for the analysis of hydrogen and helium isotopes and light gases.

- **Industry first 20 mm rod diameter quadrupole mass filter for ultra-high mass resolution**
- **Software switchable dual-zone RF power supply for Zone H ultra-high resolution up to 22.5 amu and Zone 1 ultra-high stability to 200 amu**
- **0.006 amu mass separation in real time**
- **Sensitivity of both He in D_2 and D_2 in He is 1 ppm**
- **Detection of ^{3}He in HD**



DLS-2 / DLS-2X

Dual-zone switching mass spectrometers for hydrogen and helium isotope analysis and other light gases.

- **Two configurations available:**
  - **High Resolution Zone H up to 22.5 amu (0.02 amu real-time mass separation) + Standard Resolution Zone 1 up to 100 amu**
  - **Ultra-high Resolution Zone H up to 10 amu (0.0065 amu real-time mass separation) + Standard Resolution Zone 1 up to 44 amu**
- **Sensitivity of both He in D_2 and D_2 in He is 10 ppm**
- **DLS-2X: remote analyser mounting up to 140 m from sensitive electronics for fusion and harsh operating environments**



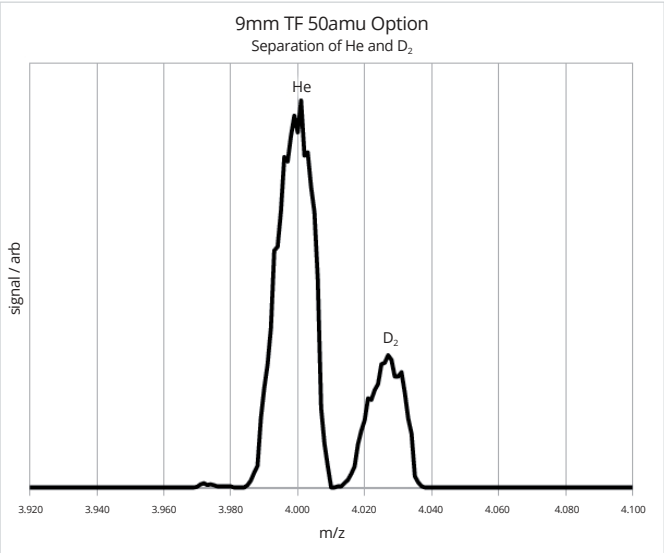
DLS-1

Mass spectrometer for real-time quantitative analysis of complex gas and vapour mixtures in fusion applications.

- **1-100 amu mass range**
- **Software driven recipes using threshold ionisation mass spectrometry (TIMS) for the real-time**
- **Quantification of hydrogen and helium isotopes and deuterated hydrocarbons**
- **Sensitivity of D_2 in He is 100 ppm**

1000 SERIES RGA

9 mm Quadrupole for Scientific Research Applications



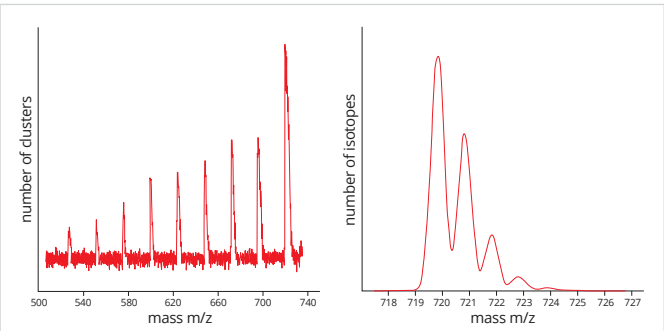
Mass spectrum highlighting the high-resolution performance of a Hiden 9 mm 3F RGA system operating at 5 MHz in zone 1. The peaks represent helium and deuterium, with a precise mass separation of 0.026 amu.



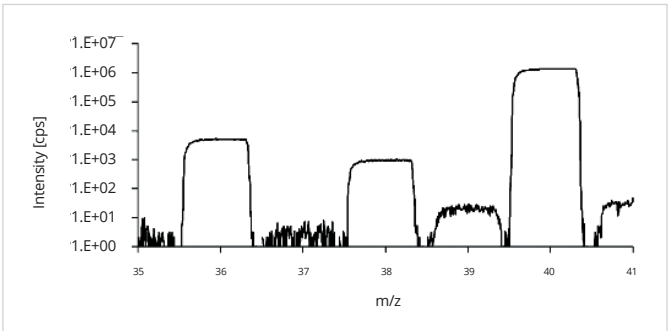
The HAL 3F 1000 Series systems are designed for gas analysis in high precision scientific and process applications.

The triple filter quadrupole minimises contamination from unwanted ions, where pre and post filters operate at RF only. In combination with the longer primary mass filter and wider rod diameter of 9 mm, this results in increased: mass resolution, ion sensitivity, stability for precision/ratio measurements and high mass transmission.

HAL 3F 1000



High mass transmission: Fullerene (C_{60}) vapour isotope fragment analysis.



High stability for precision isotope ratio measurements: $^{40}Ar/^{39}Ar$ geochronology research[1].

FEATURES:

- 9 mm molybdenum rod design
- mass range options: 50, 300, 510, 1000 and 5000 amu
- increased mass resolution, high mass transmission and ion stability
- full electron energy control 0-150 eV for complementary Threshold Ionisation Mass Spectrometry TIMS analysis mode
- with high sensitivity PIC detector and optional Faraday detector

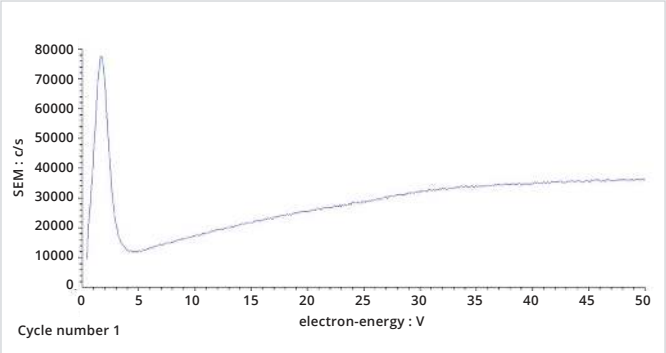
HAL 1000 series 9 mm: Researchers[1] concluded that the Hiden system outperformed their expectations, and is comparable to the magnetic sector instrument they routinely use in this field of research.

They measured the precision ratio of the $^{40}Ar/^{39}Ar$ isotopes over a two year period and concluded:

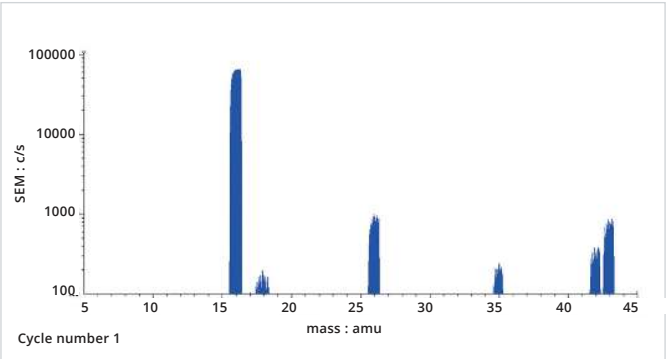
"Over two years the position of the flat peak centre did not move significantly even after maintenance events. For a^{40} Arbeam size of 1 x 10^6 cps, peak width is 0.9 amu at 10 cps and 0.84 amu at 5 x 10^5 cps,clearly separating it from neighbouring masses. The stability of the Hiden QMS compares favourably to the MAP215-50. Air standard $^{40}Ar/^{36}Ar$ of the Hiden QMS 257.9±1.3 (n=34 since July 2006) compares to 293.1±3.3 (n=739) measured with the magnetic sector mass spectrometer instrument since the beginning of 2007."[1]

[1] *Björn Schneider et al. 2009 Quaternary Geochronology* ***4*** *Pages 508-516*

EPIC & IDP SERIES
for UHV Analysis of Neutrals, Radicals & Ions



O^- ions formed by dissociative electron attachment $e + N_2O \rightarrow N_2^+ O^-$.



Mass spectrum of negative ions formed by low energy electron attachment.

The Hiden EPIC and IDP have all the features of high performance RGAs - but with the addition of pole bias mid-axis potential and negative ion capability making them outstanding research grade mass spectrometers.

The EPIC system is factory-upgradeable for inclusion of an energy filter, either the Bessel box or Hiden 45° sector field type, ensuring compatibility with the Hiden plasma/SIMS series including the EQP, EQS, PSM and SIM probes.

The Hiden IDP is for the direct analysis of low energy ions and neutrals from UHV surface science techniques. Applications include electron stimulated desorption, photon stimulated desorption and thermal desorption studies.

- **UHV surface science**
- **electron stimulated desorption**
- **photon stimulated desorption**
- **thermal desorption studies**
- **radical analysis**
- **energy and biofuels**
- **time resolved studies**

EPIC FEATURES:

- pole bias mid-axis potential
- positive and negative ion detection
- Electron Attachment Mass Spectrometry (EAMS)

IDP FEATURES:

- pole bias mid-axis potential
- positive and negative ion detection
- Electron Attachment Mass Spectrometry (EAMS)
- 4 lens ion optics



EPIC 1000 Series with shroud.



IDP 1000 Series (Ion Desorption Probe) with shroud.

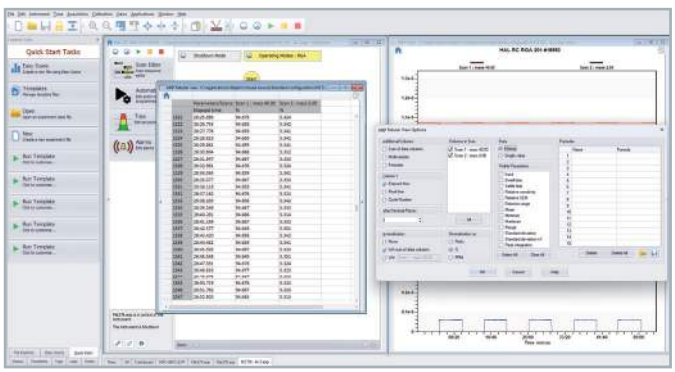
MASsoft PROFESSIONAL
Control Software

All Hiden instruments are supplied with MASsoft Professional mass spectrometer control software. MASsoft Professional is a multilevel software package allowing both simple control of mass spectrometer parameters and complex manipulation of data and control of external devices.

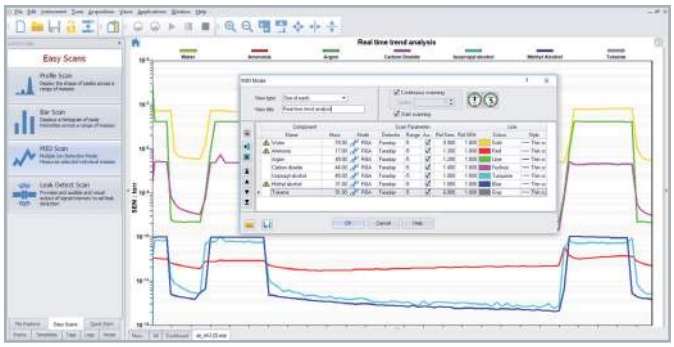
Quick start tabs with user configurable single key start functions means novice users can start collecting data within seconds.

Scan templates allow fast set up of scans from previous similar experiments.

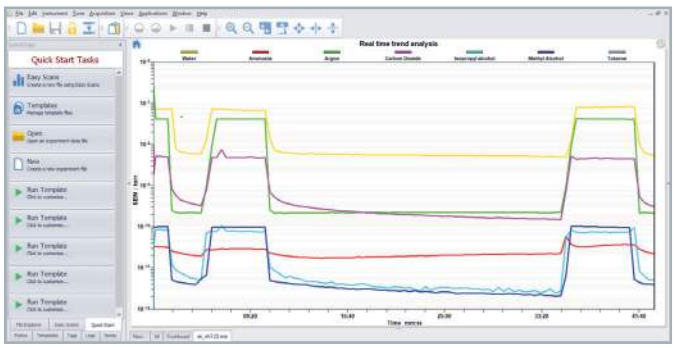
User selected alarm facilities (including status indication with message send and output drive capability) provide powerful control for process environments.



MASsoft PROFESSIONAL real time data normalisation



MASsoft PROFESSIONAL trend analysis (MID) setup



MASsoft PROFESSIONAL scan gallery



MASsoft PROFESSIONAL overview

FEATURES:

- Mass spectrometer ionisation energy control for soft ionisation of complex mixtures
- Export data to NIST MS database for analysis of unknowns
- Export to external data analysis software, e.g. Excel, Origin
- Control of external devices, e.g. MFCs, gas switching/ sampling valves and furnace PID controllers
- Output data as percentage or ppm files
- Real-time subtraction of overlapping peaks

Hiden**SUPPORT**

At Hiden Analytical, support is built around keeping your instrument productive throughout its lifetime. From application advice and tailored training to preventive maintenance and technical assistance, our service team helps you get the maximum return on your investment.

WHAT YOU CAN EXPECT

- Lifetime application support included with Hiden systems
- Free technical support for the life of your Hiden equipment
- Custom training tailored to your system and requirements, available separately
- Preventive maintenance and ongoing service package options to support long-term system performance
- Annual servicing and site visits by fully trained Hiden technicians, available through selected service packages
- Local representatives and support contacts for global enquiries

Support spans the full instrument lifecycle - helping users select, install, maintain and optimise systems for demanding research and process environments.

> ***"I strongly feel (based on experience) that, products supplied by Hiden can be fully relied upon for their quality and reliability and equally well for the support from the Hiden family, right from the point of planning to the point of implementation."***

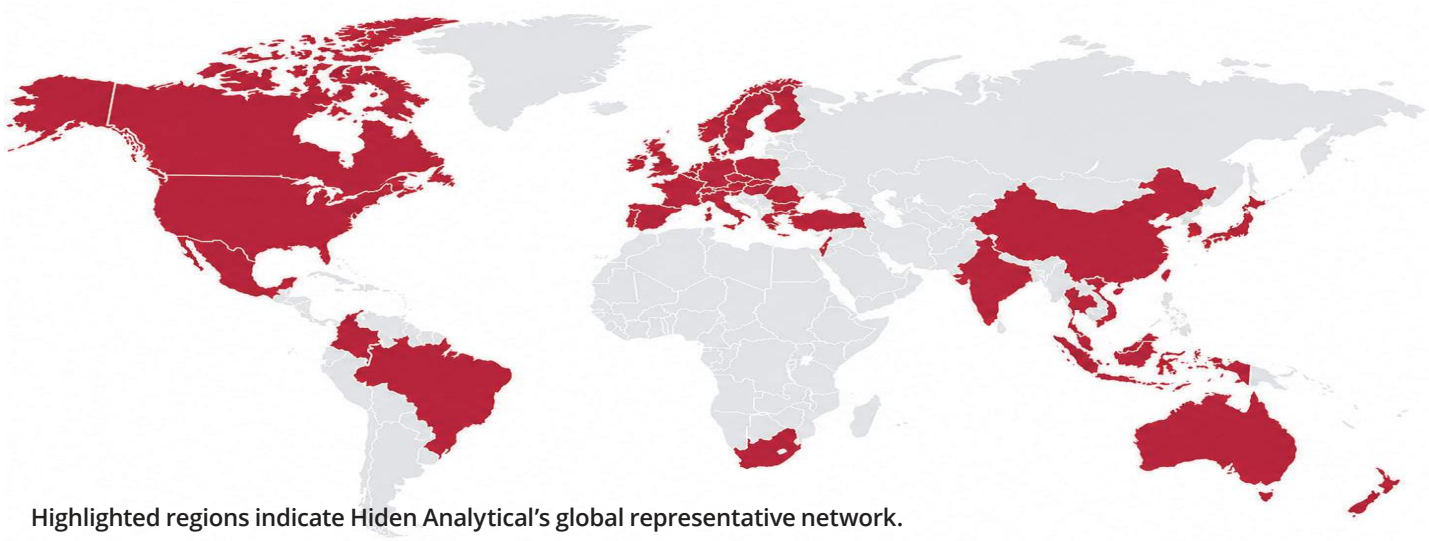
ABOUT HIDEN ANALYTICAL

Advancing Mass Spectrometry Solutions

More than 40 years of design, development and manufacture of quadrupole mass spectrometers for advanced research applications and specialist process monitoring.

Systems are configured for precision gas and vapour analysis, residual gas analysis, plasma diagnostics, UHV surface science, thermal analysis and surface analysis.

Hiden provides mass spectrometry solutions for research, development, routine analysis and process monitoring — with inlets, interfaces, probes, analysers, detectors and software selected to suit each application. Through a global network of offices, authorised representatives and service partners, Hiden supports customers across key research and industrial regions worldwide.



Highlighted regions indicate Hiden Analytical's global representative network.

Hiden**APPLICATIONS**

Hiden's quadrupole mass spectrometer systems address a broad application range in:

GAS ANALYSIS

- Dynamic measurement of reaction gas streams
- Catalysis and thermal analysis
- Electrochemical analysis
- Dissolved gas analysis
- Fermentation, environmental and ecological studies





SURFACE ANALYSIS

- UHV TPD/TDS
- ToF qSIMS and SIMS analysers
- End point detection in ion beam etch
- Elemental imaging – 3D mapping
- SIMS system with simultaneous dual polarity analysis

PLASMA DIAGNOSTICS

- Plasma source characterisation
- Etch and deposition process reaction kinetic studies
- Analysis of neutral and radical species





VACUUM ANALYSIS

- Partial pressure measurement and control of process gases
- Reactive sputter process control
- Vacuum diagnostics
- Vacuum coating process monitoring

HIDEN ANALYTICAL

Hiden Analytical Ltd.
420 Europa Boulevard
Warrington WA5 7UN England

T **+44 [0] 1925 445 225**
E **info@hiden.co.uk**
W **www.HidenAnalytical.com**

Sales Offices:

We have sales offices situated around the globe. **Visit our website for further information.**