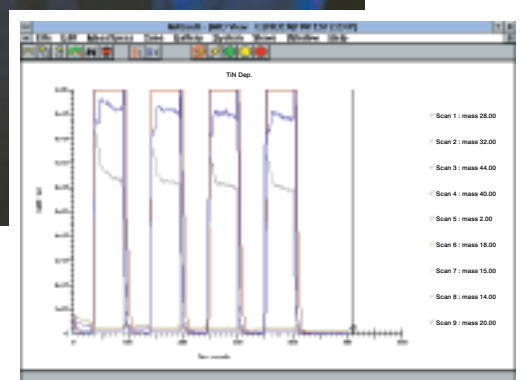
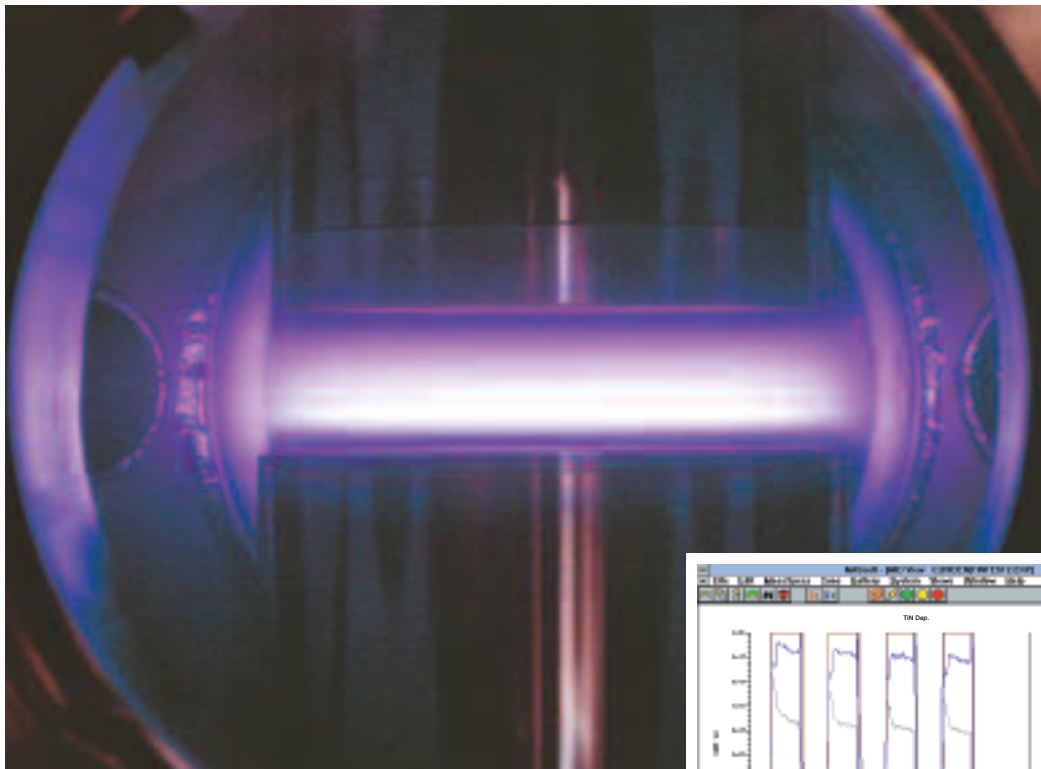


Hidden HPR-30 Series Process Gas Analysers

High Performance Process Control Gas Analysers for Vacuum, Plasma and Thin Film Process Monitoring



HIDDEN

ANALYTICAL



EXCELLENCE IN PROCESS MONITORING

Instruments for Exact Science

For over 20 years Hiden Analytical have been a global leader in the design and manufacture of Quadrupole Mass Spectrometers for vacuum, plasma, semiconductor and thin film process monitoring. Around the world our systems are routinely used in research and process applications where exceptional performance and reliability, backed by highly professional support and training, are imperative.

Working closely with both industrial and academic centres of excellence, Hiden is committed to providing leading edge process control solutions with state-of-the-art technology.

From our purpose built applications and development laboratory, where "real world" processing conditions are emulated, Hiden's Process Gas Analysers satisfy the gas monitoring requirements of the world's most successful semiconductor, flat panel display and disk manufacturing companies.



HPR-30 SERIES PROCESS GAS ANALYSERS In-Situ User Friendly Gas Monitoring Systems

For fast, precise and reliable monitoring of thin film and semiconductor processes, the HPR-30 - a compact, on-line, fully automatic process gas analysis system - brings together an extensive range of quadrupole mass spectrometers, differential pumping systems and inlet configurations, each designed to satisfy the specific requirements of individual process applications.

At the heart of the HPR-30 a sophisticated user interface provides for hands free data acquisition, process control through "intelligent trips" and instant "process views" from Hiden's integral Scan Gallery. Extensive communications and networking facilities together with DDE (dynamic data exchange) and Process Status Panels all ensure that critical information is immediately available at each stage of the manufacturing process.

Designed specifically for use by both process and equipment personnel the HPR-30 provides fast diagnosis of process problems, clear analysis of reagent gas and contaminant levels and quality information for product traceability - **real analytical performance in a compact, easy to use RGA package.**



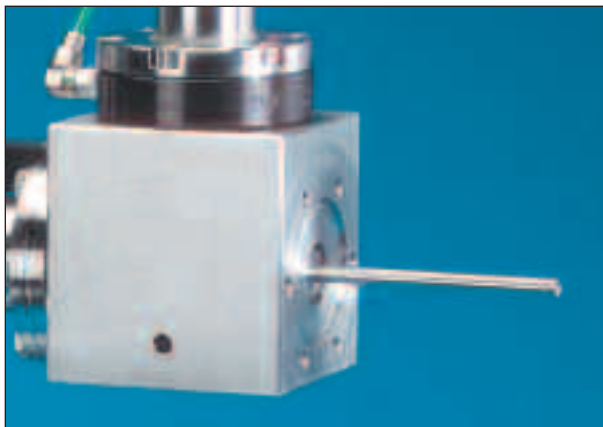
HPR-30 SERIES Application Specific Systems for Process Integrity

Sputter Deposition	Vacuum Diagnostics
CVD	Leak Checking
Evaporation	Base Pressure Fingerprinting
Plasma Etch	Process Gas Purity
Vacuum Coating	Pump-Down Profiles
PECVD	In-Process Contaminant Monitoring
Vacuum Heat Treatment	Bake-Out Cycles
Reactive Ion Etch	Target Burn-In
LPCVD	Wafer Outgassing
MOCVD	Virtual Leaks

HIDEN HPR-30: TOTAL CONTROL IN VACUUM PROCESSING

System Flexibility for Ease of Installation

The HPR-30 is a compact, bolt-on, in-situ process gas analyser designed with the versatility to operate as a mobile or fixed station monitoring system with small footprint for installation in semiconductor and thin-film processing equipment, where space is at a premium. With the integral Ethernet LAN facility up to 30 systems can be accommodated on a single network with bridges being used to connect additional instruments, making the HPR-30 ideally suited to multi-chamber monitoring and tool integration. Hiden's Windows™ MASsoft PC operating software - the platform for all instruments in the Hiden RC product range - ensures that for single and multiple systems alike ease of operation is assured, data integrity maintained and fail safe operation guaranteed.



Optimised Sampling for Fast Response

During each of the key stages in vacuum processing the unique re-entrant orifice design of the HPR-30 inlet provides for fast response to changes in process gas levels and compositions. Pneumatic valves and valve sequencer control module options provide for automatic operation at the process pressure and system base pressure, whilst intelligent trips ensure fail safe operation in the event of process chamber overpressure or accidental venting.

Take a Look from the Inside

Base-Pressure - Leak check, fingerprint and qualify your process chamber.

Back-Fill - Monitor reagent gas purity and gas supply line condition.

In-Process - Analyse process contaminants and chamber outgassing.

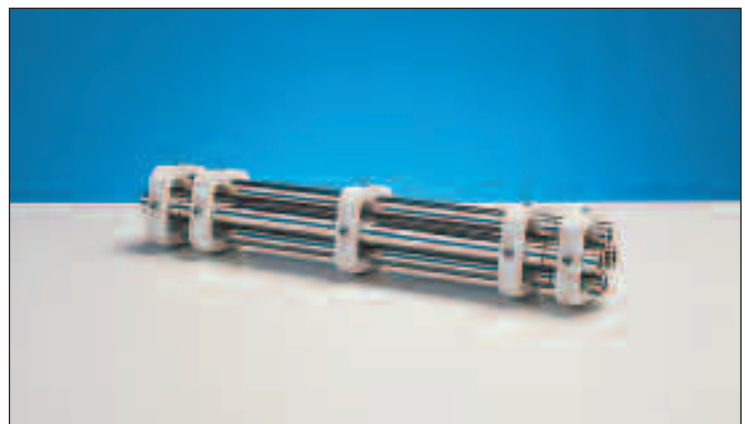
Pump-Down - Monitor pump down profiles to prevent unscheduled down-time.

Bake-Out - Measure, monitor and control optimum bake-out cycle times.

Triple Filter Technology

The HPR-30 range offers triple filter quadrupole options particularly suited to the analysis of aggressive gases in CVD and RIE. These along with our contamination resistant ioniser provide:

- ppb detection levels - for low level analysis of contaminants
- improved abundance sensitivity - for high resolution performance across the mass range
- long term stability - for reliable performance in aggressive gas conditions
- fast response - optimal inlet design ensures faithful monitoring of process gas and contaminant level changes
- durability - for improved MTBF



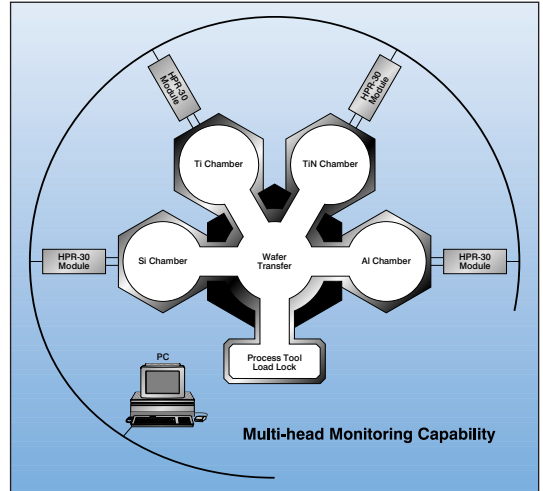
Simplified Spectra for Complex Processes

All HPR-30 systems are supplied with integral ion source control facility for complete control of our electron impact ion source. In reactive sputtering and aggressive CVD environments, where gases of interest can have spectral overlaps, even the most complex mix or reagent gases and contaminants can be separated, clearly identified and measured using our fast access variable electron energy feature.

HIDEN HPR-30: COMPACT SYSTEMS FOR MULTI-CHAMBER MONITORING

Multi-Chamber Applications

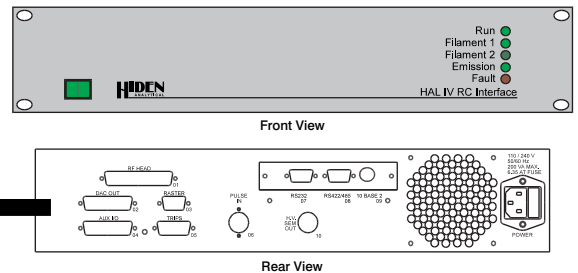
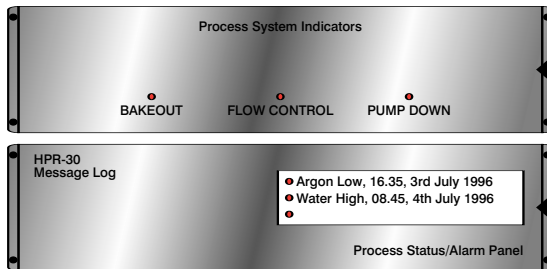
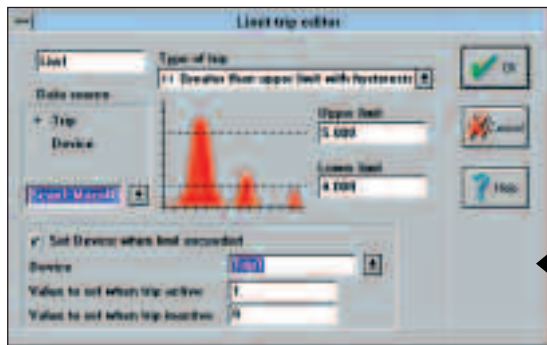
All HPR-30 systems support simultaneous multi-head operation through Windows™ MASoft PC software. Our multitasking software package (supplied as standard with all Hiden's Windows™ software controlled systems) and integral Ethernet LAN facility provide for multiple systems of any Hiden mass spectrometer type to be controlled from one PC providing the most cost effective use of hardware and space. All data is stored automatically ensuring that throughout each stage of the processing cycle no important event is overlooked. Extensive data view and export facilities ensure that process data is immediately available in the right format for routine reporting, quality records, system commissioning, Preventative Maintenance recovery and data archiving.



Flexibility and Reliability by Design

The HPR-30 provides an extensive range of analogue and digital input/output facilities to ensure full process control capability. Key process parameters can be recorded, displayed and reported alongside reagent gas and contaminant levels to allow Total Chamber Views. Our process status display panel options provide immediate visual identification of chamber non-conformance and ensure "through-batch" control as well as post-run analysis.

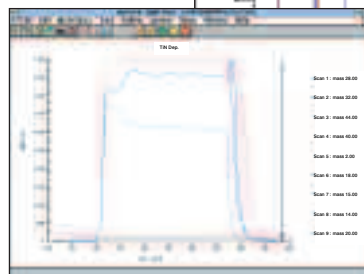
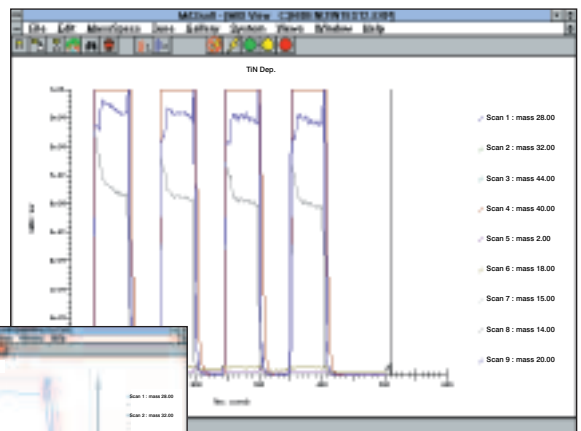
At all times the HPR-30 ensures reliable operation. Using internal trips configured to follow trends in chamber base, process and pump pressures the HPR-30 activates interlocks to isolate both the instrument and process chamber if these deviate outside the desired control limits.



Performance Benefits

Using our on-board gas library process gases and contaminants can be easily selected, by name, for continual analysis. During operation templates of process profiles can then be created providing unique fingerprints for each production system. Throughout the life of the tool these templates can then confirm chamber status in all areas of operation including commissioning, Preventative Maintenance recovery, bakeout cycling, vacuum diagnostics and chamber modifications.

- Statistical Process Control
- Process Templates
- Equipment Qualification
- Real Time Diagnostics
- Critical Parameter Monitoring
- Process Development
- Gas Management
- Yield Improvement Analysis



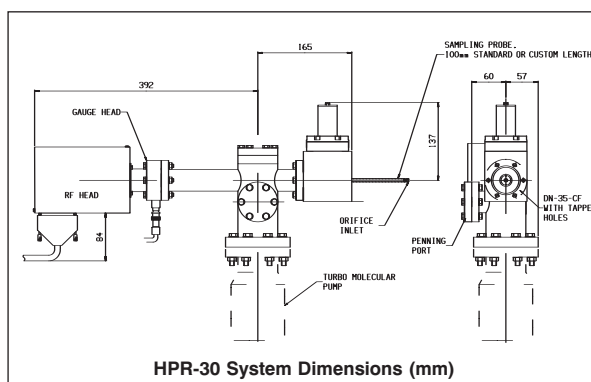
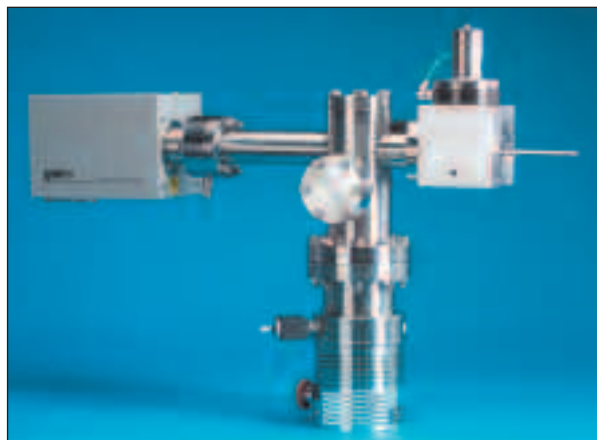
HIDEN HPR-30 TECHNICAL SPECIFICATION

GAS ANALYSER

Mass Range	: 200amu, 300amu, 510 amu.
Ion Source	: Direct inlet high pressure source.
Mass Filter	: 200 amu, 300 amu - Single Filter. 300 amu, 510 amu - Triple Filter.
Detector	: Faraday cup or dual Faraday cup/ Channeltron electron multiplier detector.
Detection limit (Triple Filter Option)	: 5×10^{-12} Torr with Faraday detector. 2×10^{-14} Torr with Channeltron detector.
Filaments	: Twin filament, Thoriated Iridium as standard.
Ion Source Control	: All parameters adjustable in real time.
Cables	: 3m standard.
Analyser Bakeout	: 250°C.

SYSTEM CONTROL

Operating System	: Windows 3.x / Windows 95 / Windows NT.
Communication	: RS232, RS422, RS485, Ethernet LAN.
Max. number of sensors	: Limited only by resource of user PC.
Data Display	: Simultaneous multi-head display. Mixed mode scanning - including multi-window bar/profile/trend display/leak detect. Integral mass spectral library with full edit facility.
Input/Output	: Extensive analog/digital I/O capability.
Gas Selection	: Point and click automatic gas/mass select.
Alarms	: Extensive alarm options including high-to-low/low-to-high status indication with message send and output drive capability.
Vacuum Protection:	Overpressure monitor for filament protection.



VACUUM SYSTEM

Vacuum Manifold	: UHV vacuum manifold with isolation valve and re-entrant orifice inlet design. RGA manifold extension for base line fingerprinting.
Pumping	: 60l/s turbomolecular pump backed by two-stage rotary pump. Complete with pump controller, automatic vent delay valve and vacuum protection interface.
Gauges	: UHV Penning and Pirani gauge heads with controller including pressure sensing set-point and relay output for fail safe operation.
Manifold Bakeout	: Manifold bakeout heaters to provide UHV operating environment.

HPR-30 SYSTEM OPTIONS

Pumping	: Dry pumping for hydrocarbon free backgrounds. Corrosive/Reactive gas pumping for aggressive environments.
Valve Control	: Fully automatic valve operation and remote control.
Cables	: Custom cable sets made to measure.
Hardware cubicle	: Mobile or free standing.
Display	: "Go/No-Go" status indicator panel for reagent and contaminant gases.
Computer	: High specification PC compatible.
Reference Library	: Mass spectral library complete with 62,250 spectra on CD-ROM.
Statistical Process Control	: SPC software package with DDE from MASsoft.

HIDEN HPR-30 SERIES PRODUCT RANGE

Instrument	Mass Range	Detector	Detection Limit	Order Code
HAL 200 RC	200	Faraday	1ppm	142100
HAL 201 RC	200	Faraday/SCEM	50ppb	143100
HAL 301 RC	300	Faraday/SCEM	50ppb	145100
HAL/3F RC 301	300	Faraday/SCEM	10ppb	553010
HAL/3F RC 501	510	Faraday/SCEM	10ppb	555010

SCEM = Single Channel Electron Multiplier

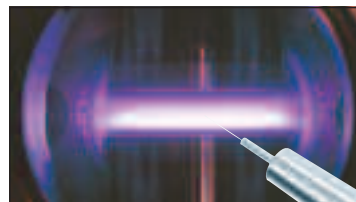
VACUUM SYSTEM AND ACCESSORIES

Component	Order Code
UHV vacuum manifold with re-entrant orifice inlet (including 3 interchangeable orifices)	303304
60l/s UHV turbomolecular pump set complete with two-stage rotary pump, controller, cables and stainless steel foreline bellows	303702
UHV Penning and Pirani gauge heads, controller and cables with pressure sensing setpoint	303806
RGA manifold extension for UHV measurements	303314
Fomblinised turbo and rotary pumps for reactive gas pumping applications	303721
Combined turbo/drag pump with diaphragm foreline pump for hydrocarbon free pumping	303731
Pneumatic valve option with automatic control module	303603
Custom Go/No-Go status indicator panel	800520
Bakeout heaters for UHV vacuum manifold	303330
Statistical Process Control software with DDE from MASsoft	800260
Mass spectral library with 62,250 spectra	800500
Fully mobile cart with lockable castors	303713

OTHER HIDEN PRODUCTS FOR RESEARCH AND DEVELOPMENT IN PLASMA PROCESSES

Complementing the range of HPR-30 systems for production control in thin film processes Hiden manufacture state-of-the-art systems for fundamental research in plasma applications:

- Hiden EQP**
 Plasma Sampling System
 A high transmission and resolution ion energy analyser and quadrupole mass spectrometer designed for detailed analysis of positive ions, negative ions, neutrals and radicals in plasma.
- Hiden ESP**
 Electrostatic Plasma Probe
 RF compensated Electrostatic Probe for routine, automatic analysis of the primary parameters in RF and DC plasma.



Manufactured in England by:

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ANALYTICAL

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