

## Analytical Specifications

Detection Limits	SEM: < 10 ppb (without peak interference)
Mass Range	1 – 300 u, 1 – 512 u
Mass Resolution	Unit resolution
Response Time	$t_{90}$ < 300 ms (2-stage gas inlet)
Measurement Time	Typical < 1 s for one measurement cycle (process applications with 4 – 8 gas components) 4 ms per channel

## Technical Specifications

Number of Channels	Up to 1024 channels per run
Ion Source Configuration	Standard Crossbeam ion source with two filaments (yttrium or tungsten)
Communication Interfaces	Ethernet to PC, IoT-enabled OPC UA, PROFIBUS, PROFINET, MQTT, others on request
Dimensions	Standard 1200 x 1250 x 750 mm (w x h x d), approx. 220 kg 47 x 49 x 30 in. (w x h x d), approx. 485 lbs

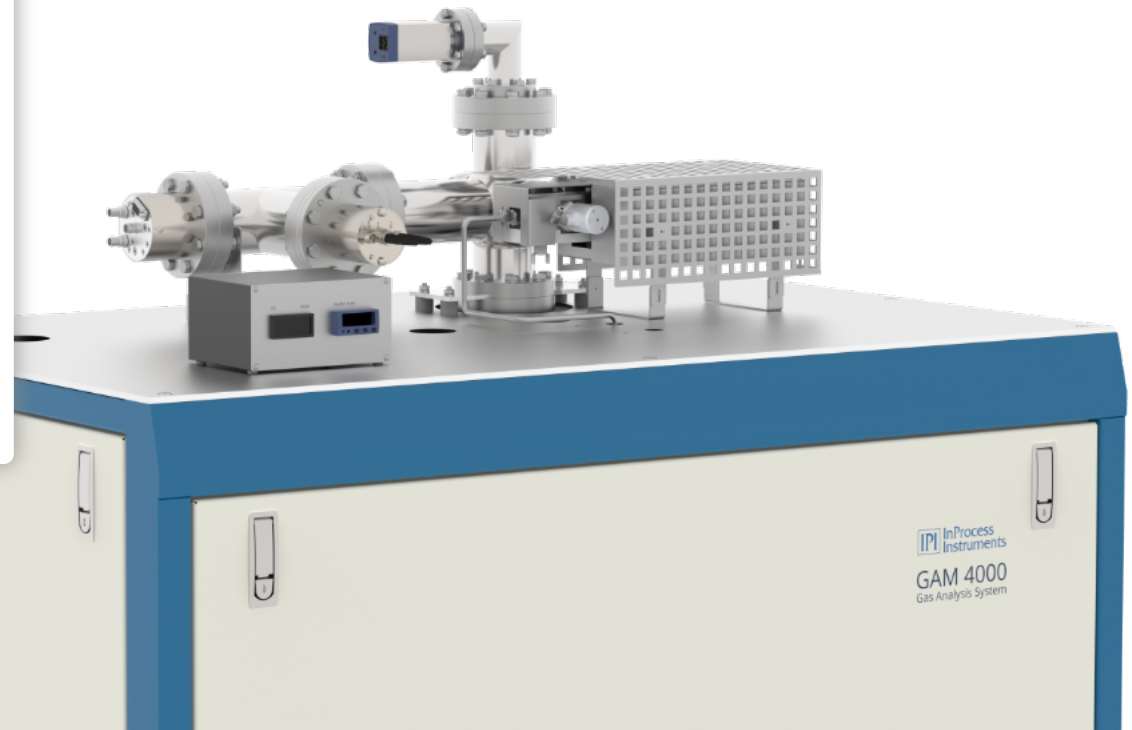
## System Requirements

Gas Quality	Temperature > Dew point Humidity Not condensing Particles < 4 µm particle size
Environmental Conditions (During Operation)	Temperature +15 to +35 °C (59 to 95 °F) Humidity < 75 %, not condensing
Power	230 VAC, 50 Hz, approx. 1.2 kVA (115 VAC, 50/60 Hz on request)
Cooling	Closed cycle water cooling with external chiller Optional: forced air cooling
Exhaust	KF16 high vacuum flange for connection to customer's exhaust system
Compressed Air	Min. 6 bar, filtered and oil-free

# GAM 4000

## Gas Analysis System

- Mass spectrometry system for research and development
- Open design, versatile and flexible in configuration
- Adaptable to a wide range of gas pressures and flows
- Intuitive software suite
- Fully computer controlled gas inlet system



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IPI InProcess  
Instruments  
GAM 4000  
Gas Analysis System

# GAM 4000

## The Analysis Platform

In research and development extraordinary results rely on accurate and reproducible measurement data. The effectiveness of a chemical reaction with a high yield of products combined with a minimum concentration of by-products requires a precise control of the synthesis and a continuous monitoring of all process parameters.

Combining first class analytical data acquisition hardware and a sophisticated software suite allows not only to extract crucial data from processes but also to control them to reach the best solution, product and experimental results.

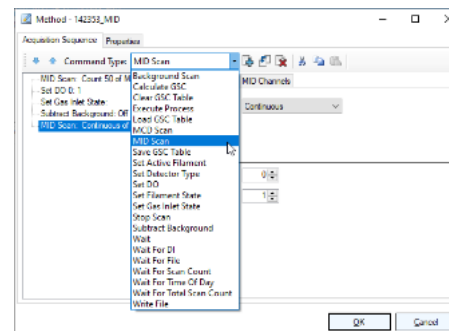
The GAM 4000 tabletop design allows an unobstructed access to the analyzer and the gas inlet setup. Because of its size, the table surface acts as a handy workspace for your own adaptations and modifications of the gas inlet setup that may become necessary when the scope of your projects change.

The idea of a flexible and modular analysis platform guarantees the usability of the system for high class research over decades.

## Software and Interfaces

IPI ProxiMass, our user-friendly system control and automation software, allows full software control of the data acquisition and gas handling systems via user definable methods and sequences.

The methods can be used for example to automatically switch between gas streams, purge the gas inlet system or perform a system calibration.

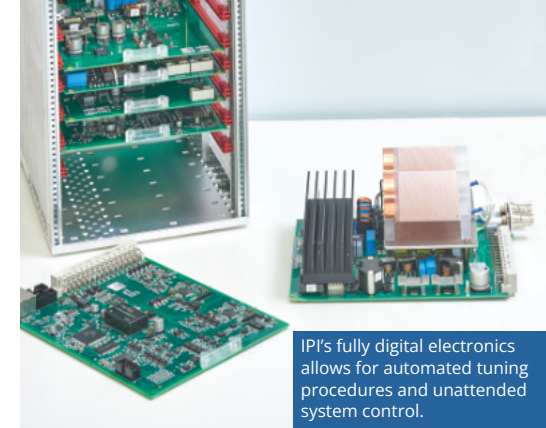


IPI ProxiMass system control and automation software allows the definition of complex methods to automate experimental procedures.

Measurement data are stored with system parameters to a database but may also be saved to CSV files.

IPI ProxiMass offers several software interfaces to connect to third party software systems or to be integrated into existing control environments.

It can act as a Modbus Server or Client, can be integrated with OPC UA over PROFIBUS or PROFINET communication protocol networks or act as an MQTT client which can be easily addressed and queried for example via python™ or LabVIEW™.

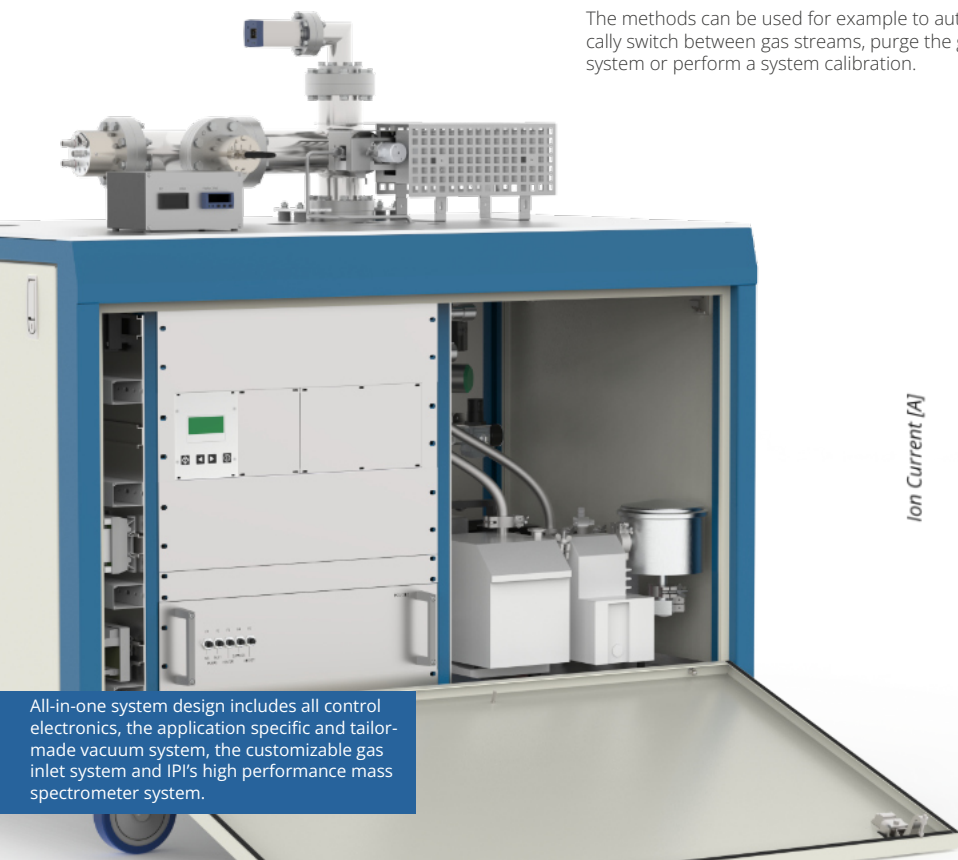


IPI's fully digital electronics allows for automated tuning procedures and unattended system control.

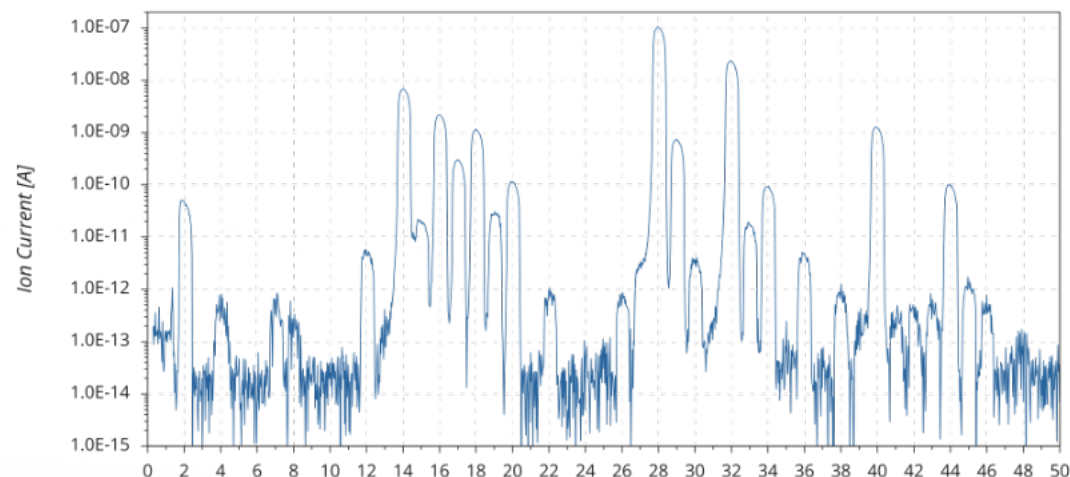
## Performance

The fully digital electronics of the GAM 4000 analyzer – unique on the market – perfectly reduce the well-known zero blast effect and ensure a clear distinction of the hydrogen peak from the background. The zero blast effect normally leads to a high signal at the very beginning of the spectrum with tailing up to  $m/z$  4 which normally makes it very difficult to resolve peaks of  $H_2$  and He.

The resolution value of a quadrupole mass spectrometer is one of the most important performance indicators. The resolution defines a spectrometer's suitability for a specific application or measurement task especially in isotope analysis.



All-in-one system design includes all control electronics, the application specific and tailor-made vacuum system, the customizable gas inlet system and IPI's high performance mass spectrometer system.



Mass spectrum of ambient air recorded with the system's secondary electron multiplier (SEM).



More Information