



HiCube™ RGA

The simple and flexible solution for gas analysis

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All in one

The new HiCube RGA pumping station offers you a simple, straightforward solution for your gas analysis needs. It is suitable for mobile applications, and offers high resolution and sensitivity. The combination of the PrismaPro in the mass range suitable for you and a oil-free HiCube turbopumping station offers you a measurement and analysis unit for a wide range of applications that features optimally integrated high-tech components.

Integrated safety

The integrated gas dosing/shut-off valve allows you to vary the inlet pressure within a regulating range from atmospheric pressure to high vacuum. The additional employment of an ActiveLine full-range gauge protects the mass spectrometer. The continuous pressure monitoring system automatically switches off the filament to protect against overpressure. That makes our all-in-one system unsusceptible to improper operation, saving operating costs over time.

Numerous connection options

The HiCube RGA is designed for universal use. Thanks to its digital and analog inputs and outputs and the PV MassSpec software that comes with the unit, it is also possible to integrate external signals. This allows both system control as well as process monitoring. The software's user-friendly interface provides holistic display of both the measured values as well as the signals from external components.

Wide variety of applications

The new HiCube RGA offers virtually unsurpassed versatility. Whether you'd like to use it for residual gas analysis, process monitoring, leak detection or quality control in connection with vacuum processes – what you get with the HiCube RGA, is a complete, ready-to-run vacuum solution for research and development, the semiconductor and coating industries, as well as any number of further industrial applications.

Anwendungen



RGA on experimental apparatus / experimental setups



Industrial applications, f.e. freeze drying



Process monitoring



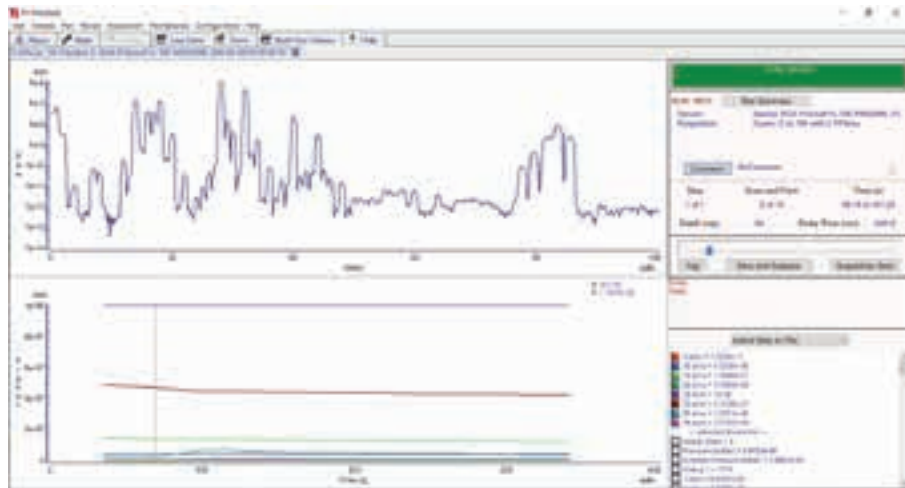
Advantages at a glance

- Residual gas analysis and helium leak detection mode
- Can be used from atmospheric pressure to high vacuum
- High resolution and sensitivity
- Filament protected by pressure monitoring
- Gas inlet system with integrated shut-off

Typical applications

Residual gas analysis

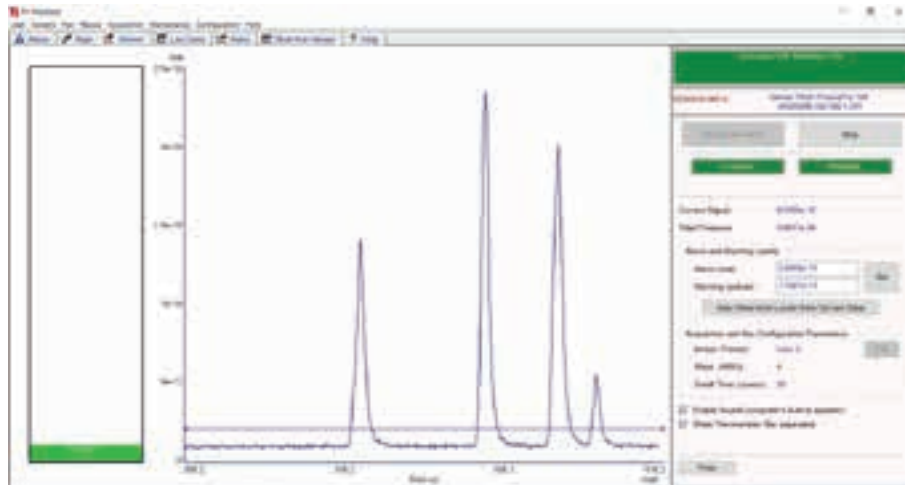
Analysis of the residual gas in a vacuum system provides insight into the composition of the remaining substances upon reaching the desired ultimate pressure or conditioning requirements. This enables conclusions to be drawn about the surface properties, desorption behavior, purity and leak-tightness of the system, as well as the composition of the process gas. That provides the user with important information about the condition of the vacuum chamber and/or the vacuum components.



Full scan of a residual gas spectrum in the range from 0 to 100 u.

Leak detection

The HiCube RGA features a helium leak detection mode that can be activated via software control. This functionality makes it easier for the user to find any leaks in the vacuum system.

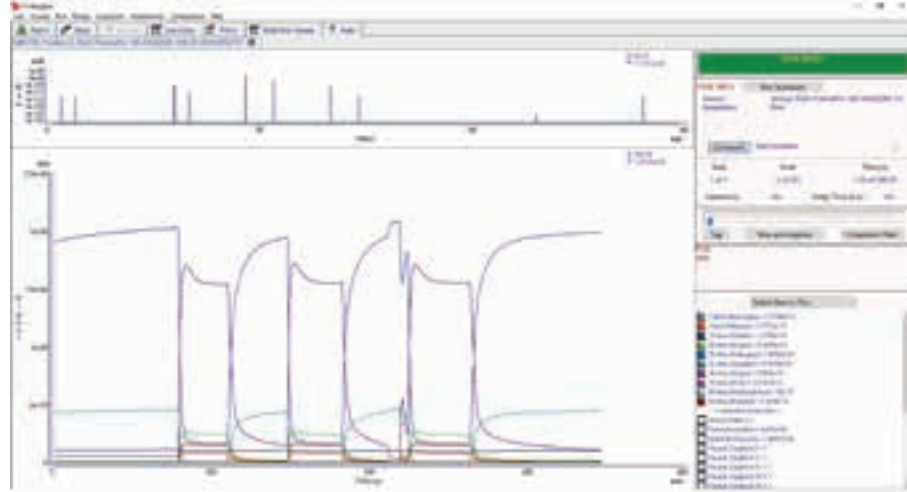


Helium leak test with several detected leaks.

Process monitoring

The HiCube RGA enables any number of selected mass intensities to be observed over time within a measurement range of up to 300 u¹⁾. Alarm cycling thresholds can be assigned to selected masses. If they are higher or lower than the desired limits, signals may be given to a higher level control system via digital outputs. This allows the HiCube RGA to provide realtime process observation and control.

The EVN 116 gas dosing valve additionally allows the pressure in the vacuum system to be adapted to suit the needs of the process in question, and an additionally integrated shut-off valve allows quick on/off control of the leak set-point.

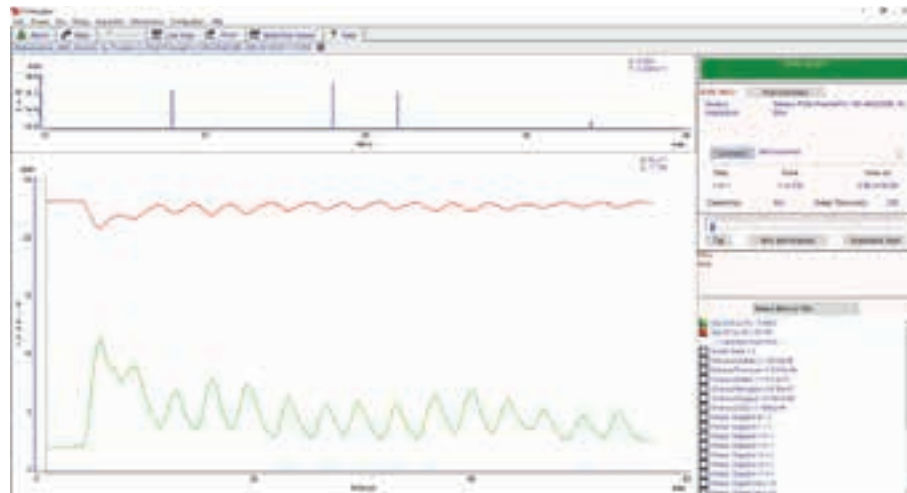


Representation of the temporal change of several selected masses for process monitoring.

Quality assurance and process optimization

The ability to provide quantitative determination of the gas composition and to determine the purity of process gases, as well as to monitor the gas composition in connection with vacuum coating processes, for example, is considered to be an important instrument in process documentation and quality assurance.

All measured values are stored even while the measurement is being performed, and can be tracked without having to stop the measurement. The measurement results can be exported for further analysis even while a measurement is still being performed.



Breath gas analysis with oxygen-nitrogen and carbon dioxide-oxygen ratio shown.

¹⁾ Depending on the selected version

HiCube™ RGA

Technical data, dimensions and order numbers

Technical data

Turbo pumpingstation	HiCube™ Eco
Power consumption	170 W
Voltage (range)	110 - 240 V; 50/60 Hz
Pumping speed for N ₂	67 l/s
Pumping speed of backing pump at 50 Hz	1 m ³ /h
Ultimate pressure	<1·10 ⁻⁷ hPa

Pressure gauge	PKR 361 active Pirani/cold cathode transmitter
Measurement range	from 1 · 10 ⁻⁹ to 1 · 10 ³ hPa

Valve ¹⁾	EVN 116 gas dosing/shut-off valve
Gas flow	adjustable from 5 · 10 ⁻⁶ to 3 · 10 ³ hPa l/s
Connection	DN 16 ISO-KF

PrismaPro ^{®2)}	QMG 250 F1	QMG 250 F2	QMG 250 F3	QMG 250 M1	QMG 250 M2	QMG 250 M3
Detector	Faraday (F)			C-SEM/Faraday (M)		
Mass range	1–100 u	1–200 u	1–300 u	1–100 u	1–200 u	1–300 u
Rod system, diameter/length	6 mm / 125 mm					
Min. detection limit, Faraday ³⁾	4 · 10 ⁻¹³ hPa	5 · 10 ⁻¹³ hPa	7 · 10 ⁻¹³ hPa			
Min. detection limit, C-SEM ³⁾⁴⁾	–	–	–	3 · 10 ⁻¹⁵ hPa	4 · 10 ⁻¹⁵ hPa	5 · 10 ⁻¹⁵ hPa
Ar sensitivity, Faraday ⁵⁾	5 · 10 ⁻⁴ A/hPa	4 · 10 ⁻⁴ A/hPa	3 · 10 ⁻⁴ A/hPa	5 · 10 ⁻⁴ A/hPa	4 · 10 ⁻⁴ A/hPa	3 · 10 ⁻⁴ A/hPa
Max. operating pressure, Faraday operation	5 · 10 ⁻⁴ hPa					
Max. operating pressure, C-SEM operation	–	–	–	5 · 10 ⁻⁵ hPa	5 · 10 ⁻⁵ hPa	5 · 10 ⁻⁵ hPa
Contribution to adjacent mass (40/41)	< 10 ppm	< 20 ppm	< 50 ppm	< 10 ppm	< 20 ppm	< 50 ppm
Operating temperature, analyzer	200 °C (max. 150 °C when operating with SEM)					
Operating temperature, electronics	5 – 50 °C					
Bakeout temperature, analyzer	300 °C					
Connection flange	DN 40 CF-F					
Resolution at 10 % peak height	0.5 – 2.5 u					
Dwell time	1 ms – 16 s/u					
Reproducibility of peak ratio	± 0.5 %					
Interface	Ethernet					
Supply voltage	100–240 V AC, 50/60 Hz					

HiCube™ RGA	
Total weight ⁶⁾	25.5 - 26.2 kg

¹⁾ Including digital position indication and integrated shut-off valve

²⁾ Incl. extended I/O module, open ion source, connection for electronics and analyzer on one axis (o°), yttriated iridium filament

³⁾ At a dwell time of 4 s

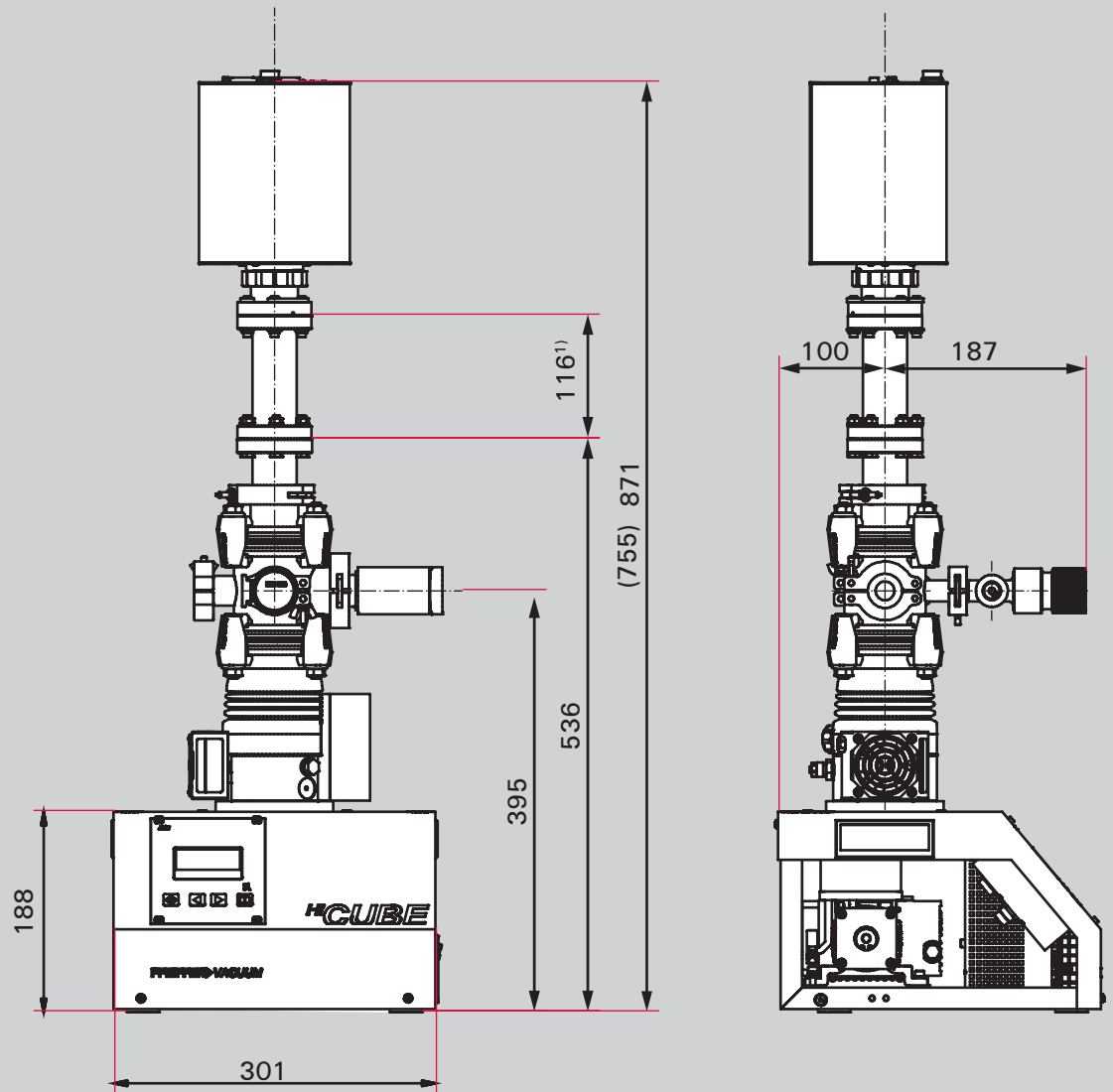
⁴⁾ C-SEM = Continuous Secondary Electron Multiplier

⁵⁾ Significantly higher sensitivity when operating with C-SEM

⁶⁾ Depending on the selected version

The HiCube RGA is optionally available with display unit (laptop)

Dimensions



¹⁾ Only for QMG 250 M, not applicable to QMG 250 F
Value in brackets applies to QMG 250 F

Dimension in mm

Order numbers

HiCube RGA						
with PrismaPro	QMG 250 F1	QMG 250 F2	QMG 250 F3	QMG 250 M1	QMG 250 M2	QMG 250 M3
Order number	PP S15 001	PP S15 002	PP S15 003	PP S15 004	PP S15 005	PP S15 006

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