RGM2 Process Gas Monitor

The ULVAC Qulee RGM2 Process Gas Monitor is engineered for advanced process control and diagnostics in semiconductor and thin-film manufacturing environments. Designed to meet the demands of applications such as etching, CVD, and ALD, it integrates ULVAC's proprietary ion source technology and advanced pumping systems to deliver stable, reliable measurement results. This enables precise, real-time monitoring of reactive gases, providing immediate feedback on gas composition and process stability during critical production steps.

By tracking changes in gas species and concentration, the RGM2 enhances endpoint detection and process optimization, helping operators determine when etching or chamber cleaning is complete to minimize any over-etching and improving yield consistency. The high-sensitivity residual gas analysis capability allows the detection of trace contaminants and by-products that may affect film quality or tool performance, while its fast response and wide mass range make it ideal for continuous monitoring in demanding production environments.

Model: RGM2-201F

Applications for the ULVAC Qulee RGM2 Process Gas Monitor

- **CVD (Chemical Vapor Deposition) Process Monitoring** – Real-time analysis of precursor and by-product gases to ensure stable film growth conditions.
- **ALD (Atomic Layer Deposition) Process Control** – Monitoring pulse timing and precursor reactions to maintain layer uniformity and film quality.
- **Etching Process Endpoint Detection** – Tracking gas composition changes to precisely determine when etching or chamber cleaning is complete.
- **PVD (Physical Vapor Deposition) Chamber Analysis** – Detecting residual gases and contaminants that can impact coating adhesion or purity.
- **Vacuum System Leak Detection** – Identifying trace leaks or air ingress through analysis of partial pressures in process chambers.
- **Reactive Gas Process Optimization** – Measuring reactive species to fine-tune process gas ratios for improved yield and throughput.
- **Contamination and Residual Gas Analysis (RGA)** – Detecting impurities or by-products that can degrade thin-film or semiconductor device performance.
- **Preventive Maintenance and Tool Health Monitoring** – Continuous monitoring of vacuum environment health to predict and prevent process drift or tool failures.

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Key Features & Advantages

- Designed for advanced process control and diagnostics in semiconductor, thin-film, and reactive gas applications
- Handles harsh, reactive, and corrosive gases with long-term stable measurement performance
- Equipped with ULVAC's proprietary V-magnet closed ion source for consistent, reliable analysis
- Minimizes gas separation and prevents decomposition or adsorption from thermal reactions in the ionization chamber
- Provides high ionization efficiency and high sensitivity for precise measurement results
- Compact, vertically integrated design offers the world's smallest footprint—ideal for space-limited production lines
- Compact channel control valve prevents thermal decomposition and adsorption, maintaining accuracy
- Short gas path reduces response time, enabling faster real-time feedback
- Maintenance-friendly design reduces filament replacement from 120 minutes (two operators) to only 10 minutes by a single technician
- Dual-filament design ensures continuous operation without halting production if one filament fails
- Enhanced preventive maintenance functions monitor ion sources and secondary electron multiplier tubes
- Includes traceability function for the analytical tube for improved maintenance tracking (Patent No. 5016031)
- High sensitivity gas analysis achieved using only a Faraday cup detector
- Compact exhaust and control system integration improves installation flexibility

Operational Specifications

- Operated via Qulee QCS software, compatible with Windows 8/10/11 (Standard on Windows 11)
- Ethernet connection supports remote process monitoring from startup to measurement
- Dedicated display unit allows PC-less operation for on-site functionality
- Touch panel interface enables real-time status checks and full system control
- Built-in preventive maintenance system automatically predicts service timing and reduces downtime

PROCESS PRESSURE	INPUT VOLTAGE	CONFIGURATION
0.5~30Pa	AC100~120V	RGM2-201F - 30 Pa AC100V
10~500Pa	AC100~120V	RGM2-201F - 500 Pa AC100V
0.5~30Pa	AC200~240V	RGM2-201F - 30 Pa AC200V
10~500Pa	AC200~240V	RGM2-201F - 500 Pa AC200V

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RGM2-201 F Configuration

Reduced Operational Costs

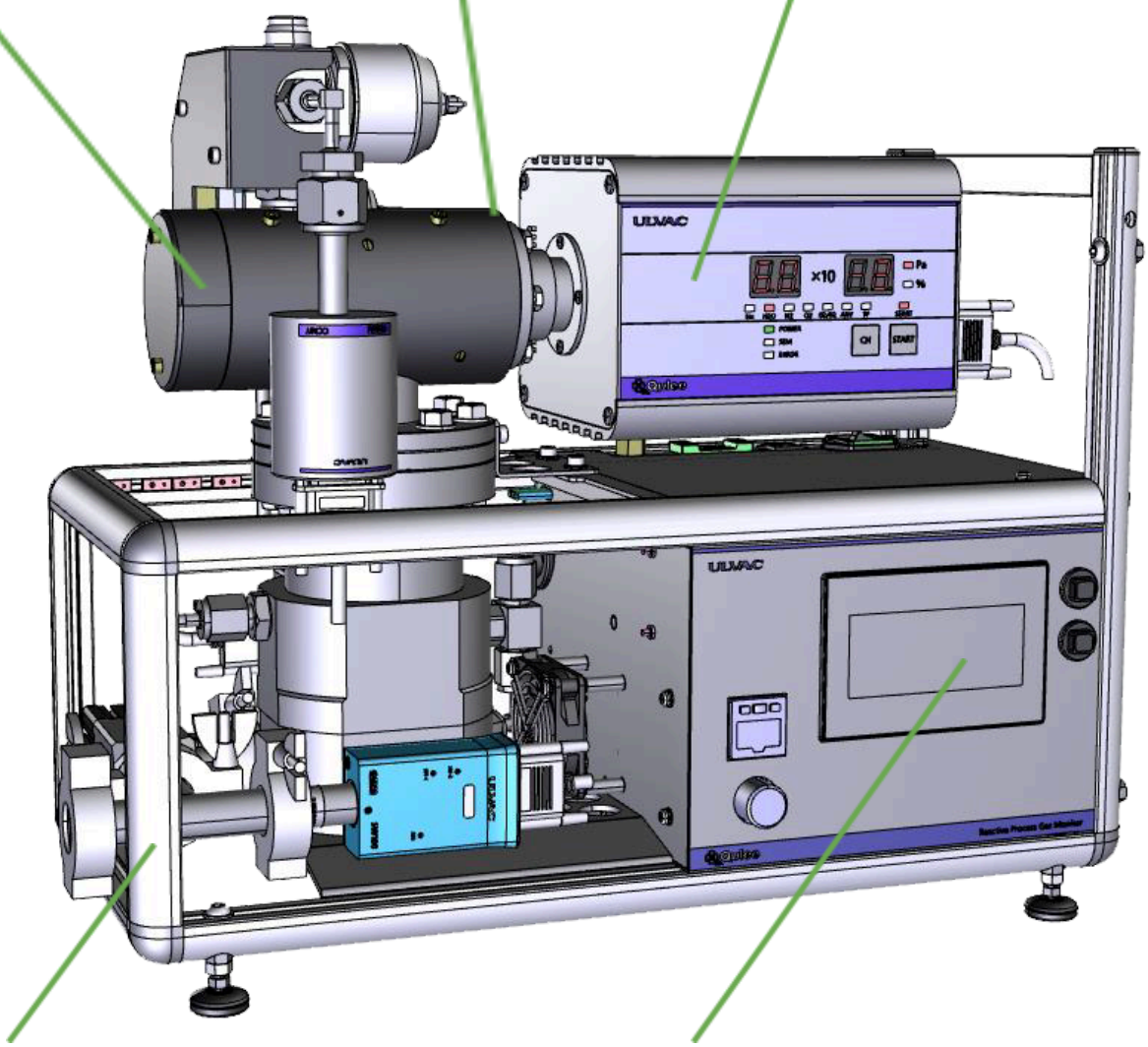
- ULVAC's proprietary closed ion source with a high-sensitivity V-shaped magnet (high sensitivity even at low emission current)
- Increases filament life by reducing direct contact with process gases

Streamlined Serviceability

- Orthogonal gas introduction system
- Easy filament replacement (without removing the analysis tube)

Stable Operation in Production Environments

- Integrated Quadrupole Mass Spectrometer
- The Faraday Cup achieves high sensitivity
- Does not use secondary electron multiplier tubes, which are consumable and require calibration.



Compact Size & Flexible Installation

- Can be installed vertically or horizontally
- Smallest Footprint in Its Class (502×230×424mm)
- Integrated exhaust system and control system

Operational Efficiency & Smart Connectivity

- Control the system from the front panel - or -
- Link the system to your PC for remote control

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SPECIFICATIONS

Sensor

Mass number range (amu)	1~200
Resolution (M/ΔM)	M/ΔM=1M(10%P.H.)
detector	Faraday Cup (FC)
Sensitivity (A/Pa) *1	1e-5A/Pa (Direct orifice installation, Ie=50uA) N2 gas =5e-4Pa at Ee50V
Minimum detected partial pressure (Pa) *1	e-10Pa (EE50V, Ie500uA)
Total pressure measurement function *1	Yes.
Total pressure measurement range *1	1e-3 ~ e-6 Pa
ion source	Closed Ion Source with Magnet
filament	Ir/Y2O3 2 pieces (one of them is spare)
Ionization voltage (EE; eV)	20~70eV (50 V setting is recommended for Ie50 uA)
Emission current (IE; uA)	50uA/500uA (EE50V, 50uA recommended for process measurement)

*1 The spare filament (FIL2) is not applicable.

Differential Exhaust System

Connecting flange	VCR1/2 "Osnut Equivalent
Specification pressure	Select from 0.5~30 Pa/10~500 Pa
Turbomolecular pump	UTM70B (70L/s)
Foreline pump	None ForealImport: KF16 Guaranteed operating foreline pressure: 500 Pa or less Pirani Vacuum Gauge for Foreline Pressure Checking: SW100-A
Vacuum gauge for monitoring equipment pressure	Capacitance Manometer “Model:CCMT”

Power / Facilities Connections

Power supply voltage	Select from AC100~120 V/6 A, AC200~220 V/3 A
Compressed air	Dry N2:0.4MPa