



Vision 2000-P™

HIGH PERFORMANCE PROCESS MONITORING SYSTEM

Many process monitoring systems fail to deliver user requirements because they present data in a format that is not easily understood by the operator. The value of the trace gas analysis is often lost, and the RGA may never deliver the payback intended.

The Vision 2000-P™ represents a different concept in process monitoring, requiring minimum operator interaction or RGA knowledge. The Vision 2000-P incorporates the “smart head” RGA technology of the Microvision 2 with a closed ion source and close-coupled inlet.

This state-of-the-art RGA technology is integrated with Process Eye™ Professional Control Platform, a recipe based, user-configurable software program. The advanced technology available in the Vision 2000-P provides users with simple, effective, process monitoring operation including:

- ppb level detection of contaminant gases during PVD processes
 - Sensitivity to detect even small amounts of contamination sometimes introduced during preventative maintenance cycles
- Faster PM recovery through vacuum analysis
 - Constant baseline vacuum troubleshooting
- Single push button operation to start recipes

Features & Benefits

Baseline monitoring of PVD chambers for air leaks and background contamination levels

- Ability to track process gas mixture composition where two gases are utilized (i.e. Ar and N₂ in TiN deposition)
- Vacuum troubleshooting for fast PM recovery
- Can be integrated with a wide variety of PVD tools
- Remote Vacuum Controller (RVC) for fail-safe PC-based operation and control
- Available with Process Eye Professional software for
 - Automated, recipe based operation
 - User configurable, intelligent alarms
 - High level tool integration
 - Advanced data presentation (i.e. simultaneous bar chart/trend screen displays)
- Simultaneous multiple-sensor operation capability

Applications

The Vision 2000-P is an application-specific process monitoring system designed to monitor contamination levels within semiconductor and thin film PVD process tools and to alert of conditions that can negatively impact product yield. In addition, the Vision 2000-P optimizes vacuum quality with

- Contamination monitoring, including hydrocarbons, to sub-ppm levels during PVD process
- Residual gas monitoring, including air and water



Mass Spectrometry Solutions

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Description

Closed Ion Source

Each Vision 2000-P incorporates a closed ion source and a custom inlet valve with an optimized high conductance, low surface area path to the PVD process chamber. With this source, the system is able to monitor the complete PVD process cycle, from base vacuum to process pressures of up to $1e-2$ mbar, without the need for a pressure reduction inlet.

By maximizing the ratio between process gas signals and the gas background in the differentially pumped Vision 2000-P analyzer housing, the closed ion source enables ppb levels of detection for trace contaminants in the process gas. Exceptionally good residual hydrogen detection can be achieved with the high performance electronics.

Remote Vacuum Controller

Each Vision 2000-P system incorporates a Remote Vacuum Controller (RVC) module that provides fail-safe protection for both the process tool and the RGA.

Furthermore, it allows full operation and control of RGA system components (filaments, pumps, inlet valves, etc.) from the system PC. The compact, remotely mounted rack module includes the RVC and power supplies. The unit is easily mounted onto any standard 19" tool rack for mounting on a process chamber or other compatible location. 33' (10 m) cables for ease of remotely locating the probe assembly are included as standard.

Mobile RGA Platform

Any Vision 2000-P can be mounted on a mobile RGA platform with the convenience of being able to move the RGA easily between chambers as the need arises. The mobile platform has an integrated laptop table and mounts the electronics on the trolley. Using a standard 10 foot (3m) cable loom the platform can be conveniently located away from the RGA mounting point on the tool chamber.

Process Eye™ Professional Control Platform

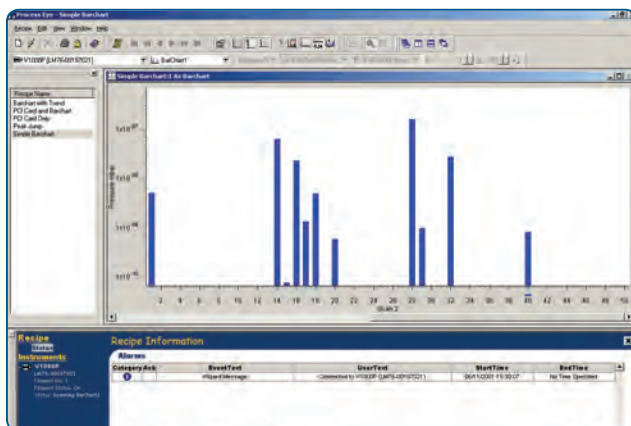
The Vision 2000-P analyzer uses Process Eye Professional, a highly flexible, modular application operating under 32bit or 64bit Windows XP, Vista, Server 2008 or Windows 7. Designed with a "client/server" structure, Process Eye Professional incorporates TCP/IP protocol for full network compatibility. Process Eye Professional uses recipes to specify the way in which the instrument scans, displays data, and responds to the data acquired. Recipes are user configurable using the "Recipe Wizard" and are ideal for monitoring repetitive processes and analyses.

Associated bar chart spectra and recently captured spectra are stored in a data buffer for easy review. Recipes can be linked together for the optimum monitoring of various phases of a particular process, or to facilitate automatic calibration using pre-defined calibration recipes. The single button push (or external signal) initiation of a Process Eye Professional recipe eliminates the need for highly skilled, full time operators.

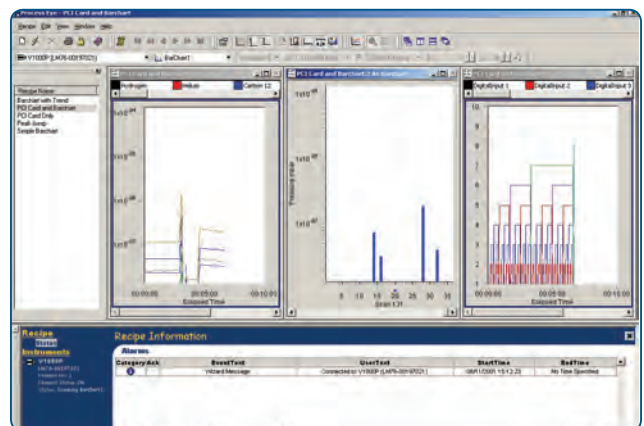
The flexibility of Process Eye Professional allows recipes to be configured that will:

- Define data acquisition and data display parameters, along with any on-line data processing required to convert data into relevant units and information
- Display data in simultaneous "bar chart" and "data trend" formats, allowing the comprehensive and clear investigation of significant trend events
- Incorporate custom warnings and alarms, triggered or terminated when data highlights that process conditions have deviated from normal conditions
- Monitor and display other parameters as trends, in relevant units (temperature, gas flow rate, power, pressure, etc.) which are linked into the Vision 2000-P analyzer through its flexible analog and digital I/O

In addition, Process Eye Professional provides "live history" for quick on-line review of data trend events. Recently captured bar chart spectra are stored in a data buffer and can be reviewed by moving a cursor over the associated trend plot.



Standard bar chart with log pressure axis



Simultaneous log bar chart/trend analysis display, illustrating wide dynamic range scanning. Power supply potentials versus time is also shown.



Specifications

Performance

| | |
|---|--|
| Mass Range Options | 1-100 amu standard; 1-200 and 1-300 amu optional |
| Ion Source | High conductance closed ion source |
| Filaments | Replaceable twin Tungsten or Thoria filaments |
| Mass Filter | Double filter (1" "RF only" pre-filter with 4" main filter) |
| Detector System | Dual (Faraday and secondary electron multiplier) |
| Maximum Analyzer Operating Pressure | 7.6e-3 Torr (1e-2 mbar) at the ion source inlet (standard), higher pressure optional |
| Minimum Detectable Partial Pressure | <2e-11 Torr (for total pressures <1 x e-4 Torr on inlet) |
| Minimum Detectable Concentration (trace gas detection limit) | <100ppb for all common gases except <10ppm for H ₂ |
| Mass Stability | Better than ±0.1 amu over 8 hours |
| Resolution | Better than 10% valley between peaks of equal height throughout the mass range |

Analyzer & Housing

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|--------------------------------------|--|
| Mounting Flange | DN35CF (70mm/2.75" OD) Conflat® flange |
| Vacuum Hardware | 60 l/s Turbomolecular pump with high conductance analyzer housing, inlet system, right angle valve, automated vacuum controller (RVC) completely interlocked and integrated. |
| Foreline Pump | Dry diaphragm standard; Other options available |
| Analyzer Housing Base Pressure | Better than 5e-9 Torr after bakeout |
| Bakeout Temperature & Bakeout Jacket | Included for 180°C bakeout |
| Total Weight | 33 lbs. (15 kg) to bolt on Process System |
| Mechanical Support | Optional stands and brackets are available |
| Mobile RGA Platform | Optional RGA trolley to improve versatility (footprint 18x24", 455x604mm) |
| Pneumatics | 60-80 psig CDA |

Control Unit/PC

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|-----------------------------------|--|
| Control Module Weight | 1.7 kg |
| Power | 88-264 VAC, 47/63 Hz, 600 Watts |
| Maximum Operating Conditions | Electronics: 10-40°C, 80% RH (non-condensing) |
| LED Status Indication | Interlock status, filament emission, SEM, power and communications |
| I/O Capability | 4 analog inputs and 2 outputs (plus 1 dedicated gauge input). Optional support for a large number of both analog and digital inputs and outputs, including relay control |
| Other Facilities | Leak check headset socket, external filament trip socket, instrument reset |
| Software | Process Eye Professional fully network compatible control platform generating under Microsoft® Windows® 2000, XP* or Vista* (*recommended) |
| Communications | Ethernet CAT-5e |
| Minimum PC Specification Required | Intel® Pentium IV® or AMD Athlon XP 1.2GHz, 1GB RAM, 120 GB hard drive, dependent upon total number of sensors on the computer and the operating system in use. Multi-Sensor installation may require higher specifications. |
| Simultaneous Multi-Sensor | Process Eye Professional client/server configuration offers flexible multi-sensor operation. |
| Compliance | CE |

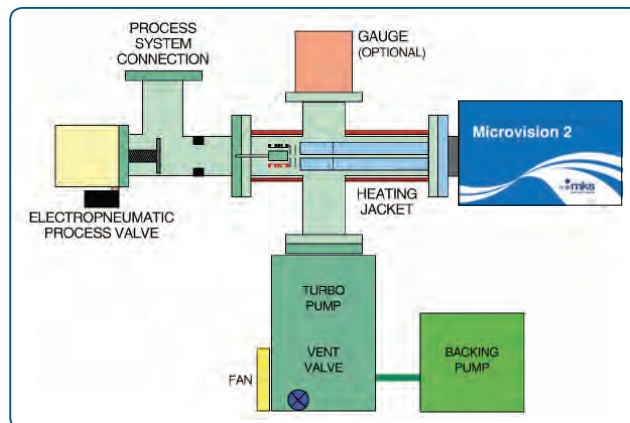
RGA Controller to Vacuum System Cables

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|-----------------------|--|
| Length | 33' (10 m) standard RGA and 10' (3m) with mobile RGA platform. Other lengths available dependent upon process system and customer requirements |
| Total Shipping Weight | 44 lbs (20 Kg) may vary depending upon backing pump and instrument rack requirements |

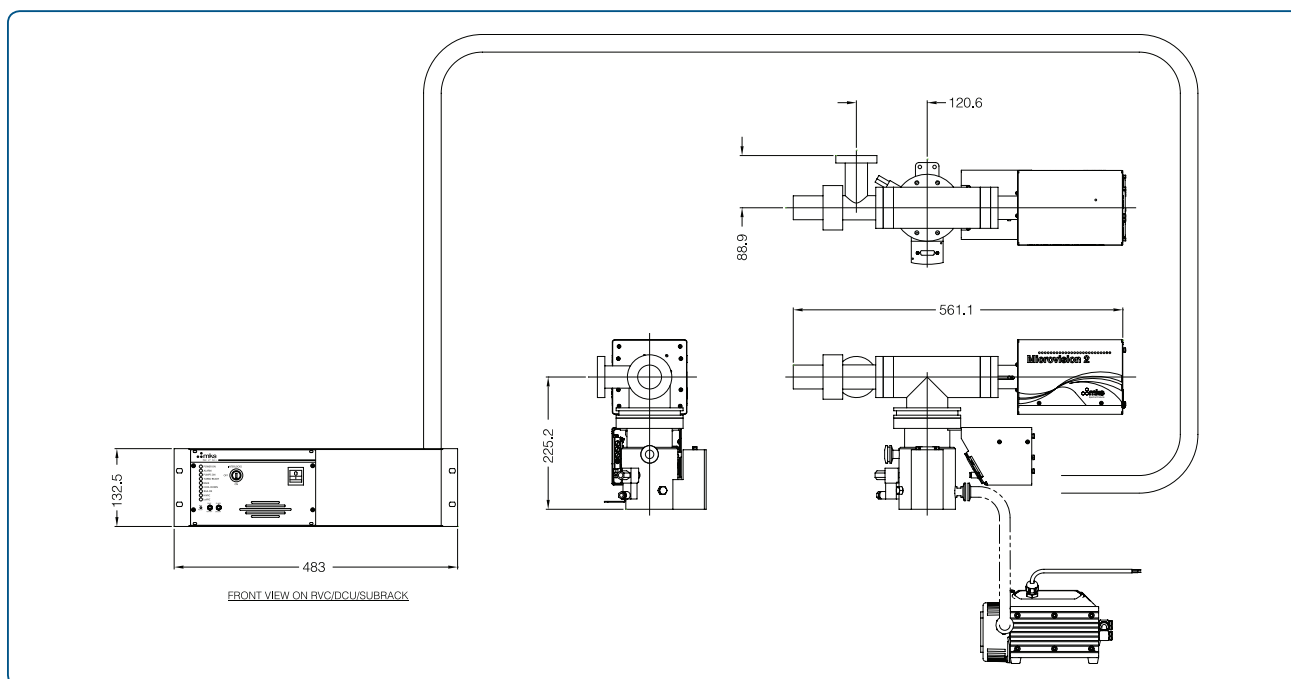


Ordering Information

Please contact your local MKS office for price and availability information.



Vision 2000-P™ High Performance Process Monitor System Integration



Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in millimeters.



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