

mks

Mass Spectrometry Solutions

WWW.MKSINST.COM

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 N_2 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

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

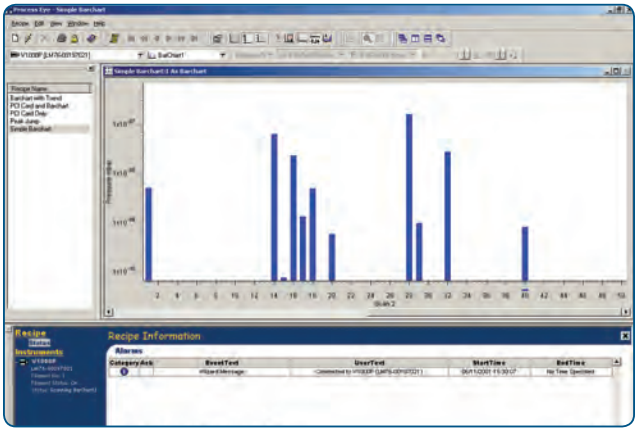
The Vision 2000-P analyzer uses Process Eye Professional, a highly flexible, modular application operating under 32bit or 64bit Windows XP, Vista, Server 2008 or Windows 7. Designed with a "client/server" structure, Process Eye Professional incorporates TCP/IP protocol for full network compatibility. 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.

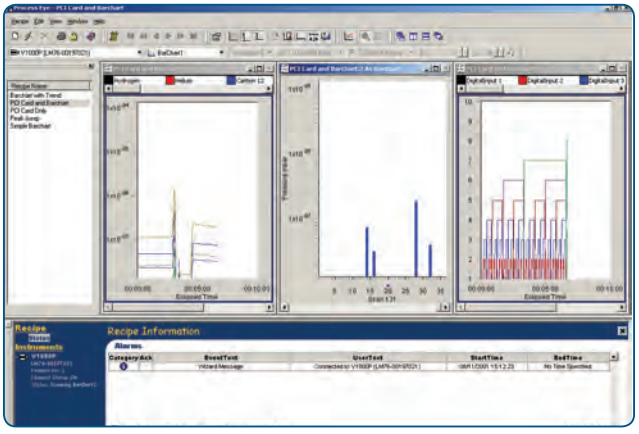
The flexibility of Process Eye Professional allows recipes to be configured that will:

- 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

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

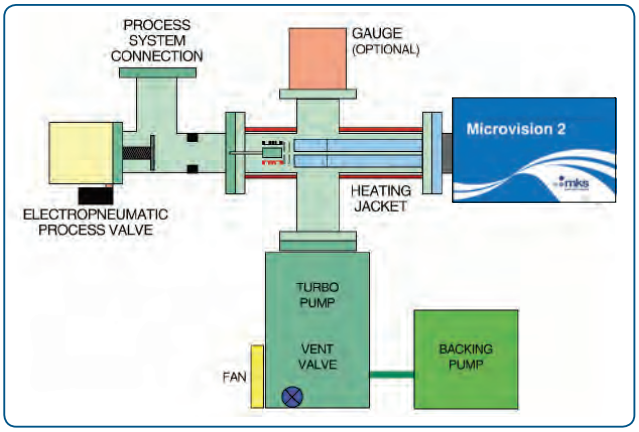
Control Module Weight	1.7 kg
Power	88-264 VAC, 47/63 Hz, 600 Watts
Maximum Operating Conditions	Electronics: 10-40°C, 80% RH (non-condensing)
LED Status Indication	Interlock status, filament emission, SEM, power and communications
I/O Capability	4 analog inputs and 2 outputs (plus 1 dedicated gauge input). 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

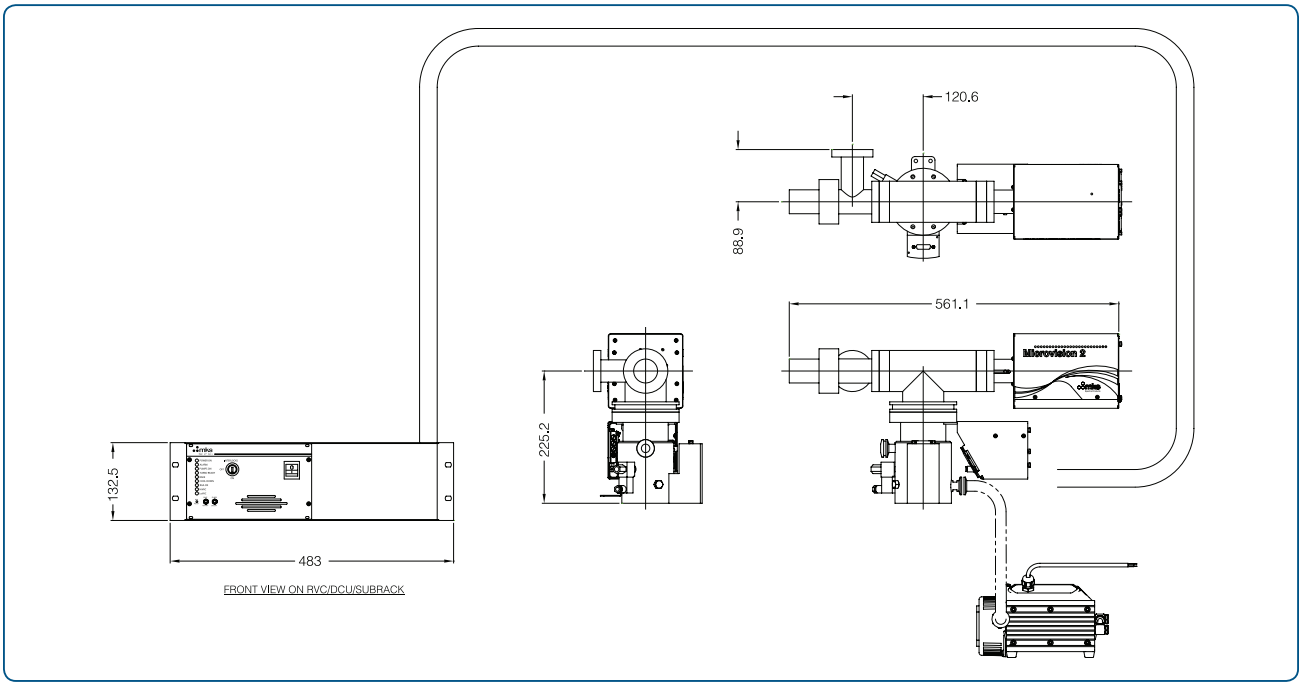
Length	33' (10 m) standard RGA and 10' (3m) with mobile RGA platform. Other lengths available dependent upon process system and customer requirements
Total Shipping Weight	44 lbs (20 Kg) may vary depending upon backing pump and instrument rack requirements

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.

MKS Instruments, Inc.
Global Headquarters

2 Tech Drive, Suite 201
Andover, MA 01810

Tel: 978.645.5500
Tel: 800.227.8766 (in USA)
Web: www.mksinst.com

MKS Instruments, Inc.
Mass Spectrometry Solutions

3635 Peterson Way
Santa Clara, CA 95054

Tel: 408.750.0300

MKS Instruments, Inc.
Mass Spectrometry Solutions

Cowley Way
Crewe, Cheshire CW1 6AG

Tel: +44.1270.250150

Vision 2000-P - 2/18

© 2011-2018 MKS Instruments, Inc.
All rights reserved.

MKS products provided subject to the US Export Regulations. Diversion or transfer contrary to US law is prohibited.

Specifications are subject to change without notice. mksinst™, Process Eye™ and Vision 2000-P™ are trademarks of MKS Instruments, Inc. Microsoft® and Windows® are registered trademarks of Microsoft Corporation. Intel® and Pentium IV® are registered trademarks of Intel® Corporation. Conflat® is a registered trademark of Varian Vacuum Technologies.