Vision 2000-P Manual

SP102006.103
March 2013

As part of our continuous product improvement policy, we are always pleased to receive your comments and suggestions about how we should develop our product range. We believe that the manual is an important part of the product and would welcome your feedback particularly relating to any omissions or inaccuracies you may discover.

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Spectra™ Products

Declaration of Conformity
Vision 2000P (LM116)

Declaration:

MKS Instruments UK Ltd. hereby declares that the Vision 2000P (LM116) product complies with the EMC and LVD directives and the following standards:

2004/108/EEC ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

The item detailed above has been tested in accordance with:

EN 61326-1:2006 - Electrical equipment for measurement, control & laboratory use

2006/95/EC LOW VOLTAGE DIRECTIVE

The item detailed above has been tested in accordance with:

EN61010-1:2010 (3rd Edition) Safety requirements for electrical equipment for measurement, control & laboratory use

The technical documentation required to demonstrate the product meets with the requirements of the directives is available for inspection by the relevant authorities.

I hereby declare that the Vision 2000P (LM116) product meets with the requirements of the above referenced European Standards and complies with the referenced European Directives.

Signed:

Stephen Drysdale
General Manager
22 March 2013

CE

Additional Installation Maintenance and Operating Instructions

In order to comply with European regulations, the following procedures must be followed:

Installation

The installation procedures given in the operating and technical manuals must be followed, in addition to these instructions:

- The mains power cable must conform to local regulations and must have a protective earth (PE) conductor securely connected to the power plug protective earth contact.

- Only cables supplied with the equipment may be used for interconnections. If extension cables are required to obtain a greater separation between control unit and RF head, or if longer serial communications cables are required, they must be supplied by MKS Instruments UK Ltd.

- Cables attached to all other ancillary signal and control ports must have a length of less than 3 metres. If greater length is required, MKS Instruments UK Ltd must be contacted for technical guidance on possible EMC and safety issues.

- The vacuum system on which the analyser/RF head is mounted must be earthed, to a protective earth, preferably to the same protective earth as the control unit.

Operation

The equipment is not authorised for use as a critical component in a life support or safety critical system without the express written approval of MKS Instruments UK Ltd.

All instructions given in the operating manual must be followed.

Adjustments are strictly limited to those accessible from the control panel and computer keyboard and only when running software supplied by MKS Instruments UK Ltd.

Maintenance

WARNING-DANGEROUS VOLTAGES EXIST INSIDE THE EQUIPMENT

Maintenance functions must only be carried out by competent persons.

During the warranty period, faulty equipment must be returned to MKS Instruments UK Ltd., unless special arrangements are made.

There are no user replaceable parts in the electronic equipment. Certain components are EMC and safety critical and must not be substituted. Replacement parts are available from MKS Instruments UK Ltd.

Equipment enclosures embody certain special fastening and bonding devices that affect EMC and safety performance. These must be correctly re-fitted after servicing.

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WARNING

This section of the manual contains important safety information.
Please read it carefully.

Important safety information is highlighted by the use of WARNING and CAUTION boxes. The use of these boxes is described below:

WARNING

WARNING boxes are used where failure to observe the instructions could result in personal injury or death.

CAUTION

CAUTION boxes are used where failure to observe the instructions could result in damage to the equipment or associated equipment.

Instructions in CAUTION and WARNING boxes MUST be observed.

MKS Instruments accepts no liability for any injury or damage resulting from a failure to observe instructions in CAUTION or WARNING boxes.

Warning Symbols

Various warning labels and symbols may be attached to the instrument their general use is explained below.

Warning!
Danger of an electric shock.

Warning!
Danger of personal injury or damage to the unit. Refer to manual for instruction

Warning!
Hot surface.

PE (Protective Earth)
All equipment external to the RVC must be earthed at this point.

Fuses

The Vision 2000-P systems must be powered down and disconnected from the mains supply before changing any fuses.

See the RVC2 User Manual for the fuse locations and values.

Electrical Connections

The Vision 2000-P must be powered down and isolated from the mains power supply before any electrical connections are made.

On the rear panel of the Microvision2 there are no hazardous voltages on any of the ports (electrical connectors). Connections must not be made that may place hazardous voltages or currents on these ports. MKS Instruments must be consulted before any non-MKS Instruments cables or accessories are connected to these ports. Consult the relevant manual for detailed descriptions of these connectors.

If you are unclear about any of the safety information contained in this section of the manual please contact your local MKS Instruments facility before proceeding.

Installation

The Vision 2000-P is a self contained RGA system for sampling directly from PVD process chambers. It consists of four main parts:

- The RGA vacuum chamber that bolts directly on to the process chamber.
- The equipment sub-rack housing an RVC2 Vacuum Controller
- The interconnecting cables.
- The operating PC.

The RGA vacuum chamber contains the quadrupole residual gas analyser with a differentially pumped PVD source, a high conductance isolating valve, a turbomolecular pump, and the sampling orifice interface with optional pressure reduction. This assembly is surrounded by an electrical heating jacket. A bracket fitted to the turbo pump acts as a securing point for the cable trunking.

The backing pump is a dry diaphragm pump and a stainless steel foreline connects it to the turbo pump.

A 19inch sub rack houses the Remote Vacuum Controller (RVC2) and cables running between the sub rack and the RGA vacuum chamber are fitted into trunking to give additional protection.

CAUTION

There may be minor differences between one Vision 2000-P system and another.

There are small differences between Vision 2000-P systems, these variations are usually due to the type of process tool to which the Vision 2000-P is to be fitted, the type of process to be monitored and the pressure regime from which the system will be sampling.
The design variations are purely to give the user the best possible system to meet the needs of the application. This manual covers all variations of Vision 2000-P. The shipment report will detail your particular system and you should refer to this when the manual gives details of options.

Initial checks

When you receive the equipment carefully check each item before removing the packaging to ensure that no physical damage has occurred during shipment. Also check that all the boxes have been received by checking against the packing slip.

If there has been obvious damage during shipment or if there are items listed on the packing slip as shipped which have not arrived, immediately contact your local MKS Spectra facility or sales/service representative.

Carefully unpack the various parts of your Vision 2000-P system. Again, check for any signs of damage.

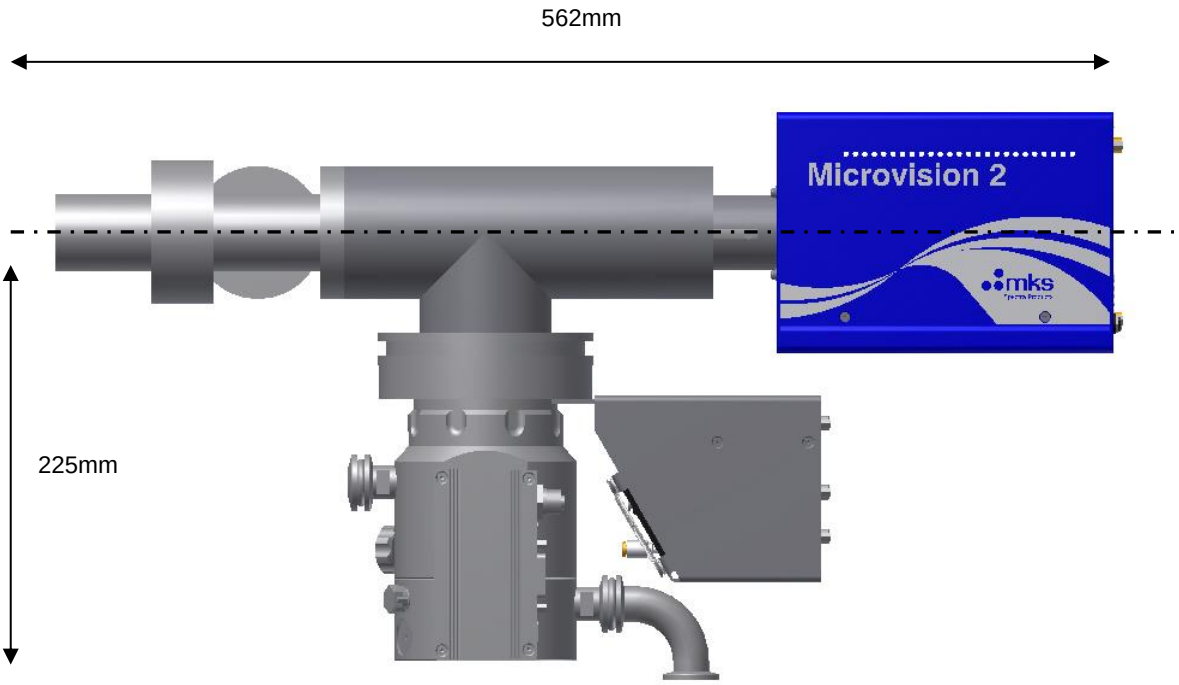
Find the shipment report and check for any missing items. Keep the shipment report safe, this is an important document and you will need to refer to it later.

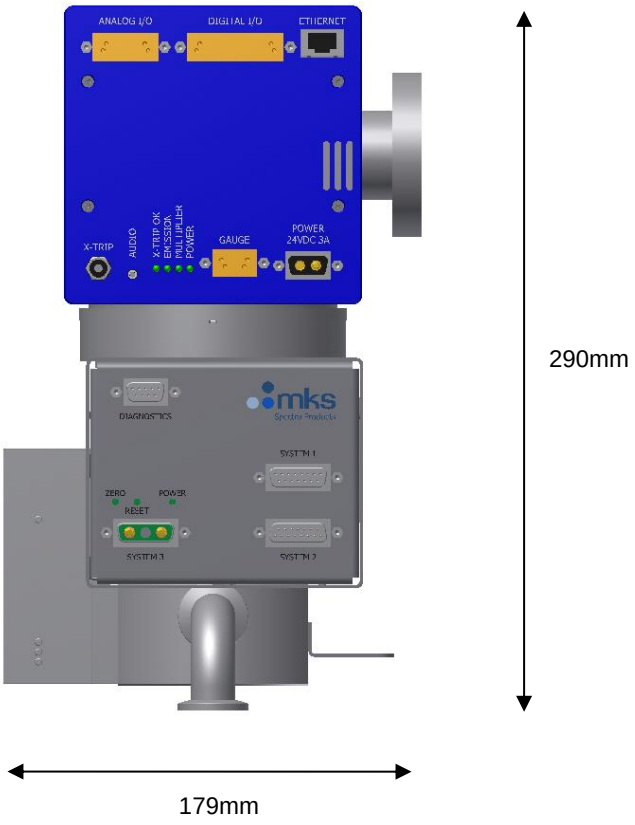
We suggest you keep the packaging material until the system is up and running as this seems to dramatically reduce the chances of something needing to be returned!

Most insurance claims for shipment damage must be placed within 7 days from the date of delivery - in WRITING. So, don’t delay Check It Out!

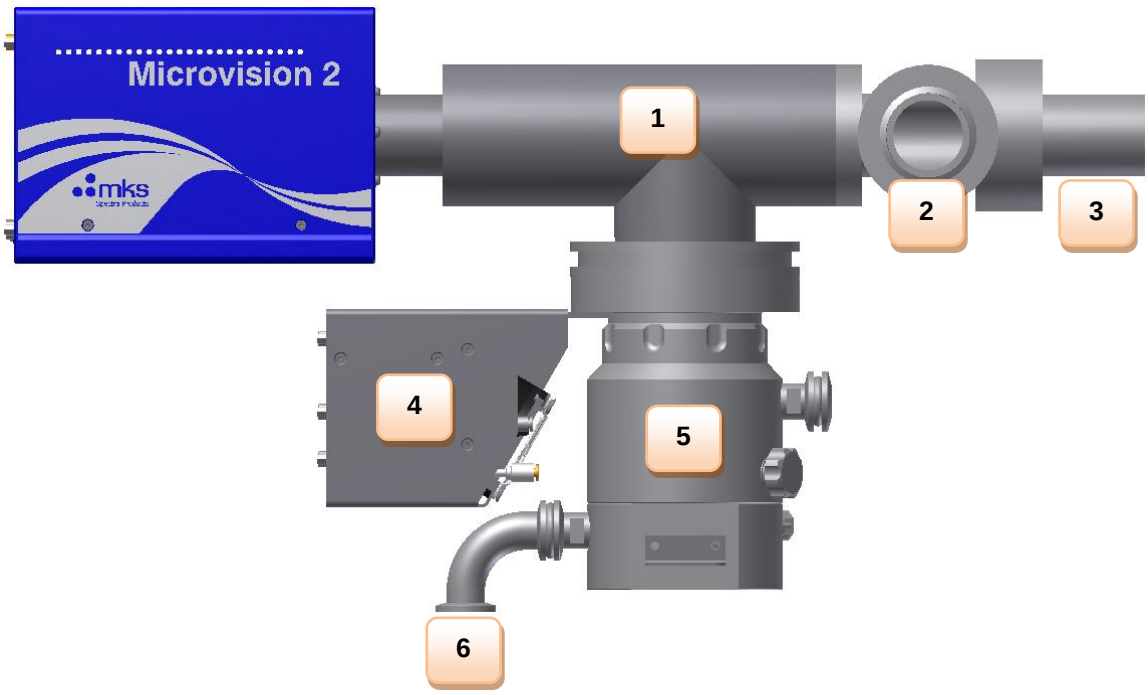
You are now ready to assembly the Vision 2000-P system.

Dimensions


562mm
Microvision 2
225mm


ANALOG I/O
DIGITAL I/O
ETHERNET
X-TRIP
AUDIO
GAUGE
POWER
24VDC 3A
290mm
179mm

System Components



Item Ref	Description
1	RGA Chamber
2	Chamber Mounting Flange
3	Isolation Valve
4	System Interface Module (LM108)
5	Turbo Molecular Pump
6	Foreline Port

CAUTION

The vacuum system interface components are of high precision and should only be fitted by competent personnel.

RGA vacuum chamber overview

The Vision 2000-P is supplied with the RGA vacuum chamber already assembled; the quadrupole analyser is fitted into the chamber, the turbomolecular pump is also fitted as is the Electro pneumatic isolation valve. This isolation valve we refer to as the process valve and is controlled by the RVC2.

The flange of the right-angled valve contains the orifice disk holder which provides a relatively high degree of pressure reduction between the process chamber and the RGA sampling chamber along with the fixing for the PVD ceramic source coupling.

Please refer to the shipment report for details of the inlet pressure reduction.

It is possible to change the orifice disk which may be desirable if at a future time the Vision 2000-P is moved to another process tool or the process being monitored changes. Changing the orifice is detailed later in this manual but it is important to consult your local MKS Spectra facility before making any changes.

Warning, exposed metal surfaces reach high temperatures during bake-out. Allow an adequate cooling down period before handling

Main chamber installation

This is a job that requires two people; one to support the Vision 2000-P system while the other fits the bolts to the flange.

Fit the assembly to the process chamber using a clean CF35 copper gasket. The Vision 2000-P can be mounted with the RGA sampling chamber horizontal, and the turbo pump hanging down vertically, or mounted with the sampling chamber vertical. In this orientation, the foreline port of the turbo pump MUST be vertical and facing down.
Tighten the six M6 nuts making sure that the gasket has not moved out of place.

Connecting the backing pump

Position the diaphragm pump close to the Vision 2000-P RGA vacuum chamber and connect the stainless steel foreline to the turbo pump using a KF16 centring O-ring and clamp.
Connect the other end of the foreline to the diaphragm pump by using a KF16 centring O-ring and clamp.

Heater jacket

The Vision 2000-P is supplied with the heater jacket fitted. There is no need to remove the heater jacket during the installation and testing procedure. The heater jacket enables the quadrupole chamber to be baked which should be done before you start to acquire good data.

Microvision 2 installation

Rotate the locking ring on the RF/analyser connector so that the slot lines up with the keyway on the connector tube. Hold the Microvision 2 unit so that the keyway lines up with the locating key on the analyser flange.

Gently slide the Microvision 2 unit on to the analyser. TAKE GREAT CARE the pins on the vacuum feedthrough are easily damaged. DO NOT force the Microvision 2 unit on to the analyser.

When all of the pins are engaged, push the Microvision 2 firmly onto the analyser to ensure electrical continuity. The last 3mm (1/8”) is important. When correctly fitted the front face of the RF/analyser connector should butt up against the analyser flange.

Finally, pinch up the cap head bolt on the locking ring to secure the Microvision 2 in place.

Electrical installation

WARNING

The electrical installation must be carried out by qualified personnel in accordance with local standards and regulations.

The electrical installation should be carried out after the vacuum system installation. Please follow the next sections, in sequence.

Electrical specification

See the RVC2 and Microvision2 User Manuals for specifications

WARNING

This appliance must be earthed

Equipment rack

The Remote Vacuum Controller (RVC2) is fitted into a 19 inch sub-rack. The sub-rack should be fitted into a 19 inch equipment rack using four M6 screws, plastic cup washers and cage nuts.

Interconnecting cables

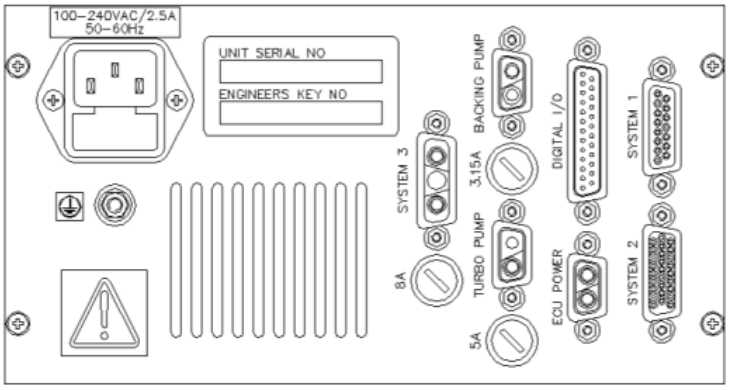
All the cables which run between the equipment rack and the RGA vacuum chamber are fitted into plastic trunking which provides a good degree of protection. The trunking complete with cables will be supplied completely disconnected. All the cables have been marked at both ends and have been chosen to minimise the risk of making a wrong connection. The table below gives cable functions and cable destination.

Mains power

There is a single mains power connection to the Vision 2000-P which is made to the RVC2. Connect the mains power cable to a suitable single-phase supply:

See the RVC2 User Manual for specifications

RCV Connections



RVC (Rack) End	Destination / Notes
System 1	Main wiring loom
System 2	Main wiring loom to Interface Module (System Box)
System 3	Main wiring loom to Interface Module (System Box)
Turbo Pump	Turbo pump control module
ECU Power	Microvision2 - Power
Digital IO	Microvision2 – Digital IO
Backing Pump	Backing pump power connection
IEC Mains Connector	Local mains supply (see Specifications)

Interface Module Connections

System Box	Destination / Notes
System 1	VacOK Connection
System 2	RVC
System 3	RVC
Diagnostics	Not used

Connecting to the process tool (VacOK)

There is one connection to be made between the Vision 2000-P system and the process tool. This is a 3 meter cable labelled “VacOK” fitted at one end with a 15-way Male D-type connector and terminated with a 2-pin connection block labelled “VacOK”.

When supplied, the connection block is fitted with a shorting link between the two pins. This must be removed and an appropriate termination made, see below:

Failure to utilise this interlock may result in the RGA being exposed to tool pressures outside its working range which could severely damage the RGA.

This is a control signal which must come from the process tool to indicate that the pressure is low enough to open the process valve on the Vision 2000-P. The precise value will depend on the configuration of the Vision 2000-P inlet, please refer to the shipment report for the maximum process pressure.

The Vision 2000-P has been configured to connect to a no-volts relay contact, when the contact is closed the pressure is OK.

PC Connection

Vision 2000-P systems are used in conjunction with MKS Instruments Process Eye Professional software running on a PC. If a PC has been supplied as part of the system, the software will have been installed onto the hard drive and will have been fully tested as part of the complete system.

There is one Ethernet connector at the rack-end of the loom into which you should connect, via an STP patch lead to the Ethernet Port of the host PC.

The PC, its monitor and any accessories (e.g., printer) will need their own mains power supply connection. These are not provided directly from the Vision P system.

If you are supplying your own PC, install Process Eye Professional by following the instructions in the relevant manual(s).

You are now ready to power up the system. Please read the next section of this manual before you do.

Operation

Overview

This section gives an overview of the Vision 2000-P system operation.

The Microvision2 control unit receives power from the RVC2. The power switch on the RVC2 must be ON to operate the system. When it is started, the Microvision2 senses the presence of the vacuum system controller (RVC2) and interlocks its operation to it.

Process Eye Professional is started from the PC by an icon on the desktop. The vacuum system must be started-up using this application program before the RGA filament can be turned on. However, to facilitate bringing-up an installation quickly, the turbopump may be started and Bakeout initiated, directly from the RVC2 panel, without use of the computer software.
The operation of the vacuum system controller is fully described in the Remote Vacuum Controller manual.

The pumps are switched on from the Remote Vacuum Controller window or from the RVC2 and the sequence of events is as follows:

- The turbopump will start and begin to accelerate.
- When the turbo reaches 95% of full speed, the RVC2 indicates Pump Up to Speed.
- At this point the RGA filament may be switched on and the background spectra in the RGA chamber may be observed.

Before a process sampling valve can be opened, the corresponding “VacOK” signal from the tool must be met.

A process valve can be opened either manually or automatically from the Process Eye Professional software interface to the RVC2.

CAUTION

Check the complete installation thoroughly before proceeding.

Start up

Set the Remote Vacuum Controller (RVC) “Interlocks” key switch to ON and the power switch to On (I)

On your PC, start Process Eye Professional. The software will detect that the RVC2 is fitted and the Remote Vacuum Controller status and control panel will be available at the bottom of the Process Eye Professional window.

To start the Vision 2000 P vacuum system, click on the turbopump button.
The colour of the button indicates the status:

Red = off
Yellow = starting
Green = running at full speed

More information about the RVC operating software can be found in the manuals for the RVC2 and Process Eye Professional.

The Vision 2000 P may also be started from the RVC2 directly. This is useful if the PC is disconnected or the Process Eye software is not running. To start the system from the RVC2, briefly press the PUMPS switch on the front panel. Note that this control can also be used to turn the turbopump OFF.

The turbo pump controller will indicate when the pump is up to speed and the Turbopump indicator in the RVC window will change from yellow to green. Note that the turbopump controller will be programmed to a set-point of 95% of rated speed.

After the turbopump has reached full speed, you may switch the RGA filament on, but we recommend waiting at least 10 minutes after the adsorbed gas load in the RGA vacuum chamber to reduce before switching a filament on.

Switch the RGA filament on and look at the RGA chamber background spectrum using a Process Eye Professional Bar-Chart recipe (refer to the Process Eye Professional documentation for further details).

The pressure is likely to be quite high but should be falling. If the pressure is very high switch the filament off and wait a little while for the pressure to fall.

Now, check that the process valves function correctly. Ensure that there is a good vacuum in the process chamber. The pressure in the process chamber must be below the corresponding sample-valve pressure set-point to permit you to open a sampling valve.

With the Remote Vacuum Controller in the manual mode and a filament on, open the process valve. The process valve will open and you will be able to see a spectrum of the process chamber.

Once you have established that the process valve is working correctly, close the valve. Minimizing exposure to corrosive process gases when not actively monitoring them will protect RGA system operating life.

Leak checking

At this point you will have assembled the system, checked that it is working and you that you can see a background spectrum. The next thing to do is to leak check the Vision 2000-P.

The vacuum system used in the Vision 2000-P was fully leak checked as part of the assembly and test procedure before it left the factory. You need to leak check in case any leaks have occurred due to shipping damage and to check the one seal you have made between the Vision 2000-P and the process chamber.

Ensure that the process valve is closed.

To leak check you will need a cylinder of helium fitted with a regulator and a length of flexible hose to spray helium around the Vision 2000-P. You can use a different tracer gas (other than oxygen and nitrogen) as long as it is safe and you modify the mass being monitored in the leak-hunting recipe accordingly. Helium is preferred, and any grade will do.

Run a Leak Hunt recipe in Process Eye and check that the probe gas is set to mass 4 for helium (or the appropriate mass, if you are using another gas).

As the Vision 2000-P uses a Microvision2 there can be an audio tone available via headphones or powered speaker if enabled in the recipe. Alternatively, position the monitor so that you can see the screen while you are leak-checking. Please consult the Microvision2 manual for details of the audio output.

Starting at the top of the Vision 2000-P vacuum system slowly and carefully spray helium over the entire system paying particular attention to the vacuum seals. Watch the monitor or listen to the audio tone for a signal indicating a leak.

Once the RGA vacuum chamber is leak-tight, check the part of the Vision 2000-P between the process valve and the process chamber.

Open the process valve and spray helium over the valve, the seal to the process chamber and the connecting pipe work.

If you do find a leak shut down the system, fix the leak and start again.
Remember you may need to break the seal between the Vision 2000-P and the process chamber in which case you will also have to shut down the process chamber.

Heating and Baking

Warning, exposed metal surfaces reach high temperatures during bake-out.
Allow an adequate cooling down period before handling

The heater circuit maintains normal running temperatures of 25°C on the RGA sampling chamber and 50°C at the inlet, in Bake mode, these temperatures rise to 180°C and 150°C respectively.

Preset, limited power is applied to these heater jackets any time the turbopump is on. This improves gas response time by reducing the residence time of gases on the walls, especially polar species. From the time of starting the turbopump, allow at least 2 hours for temperature equilibration. During this time, background gas levels will vary, significantly.

Before you can start to use the system to its full potential, you will need to run it for sufficient time to allow the background in the RGA vacuum chamber to drop.
Baking the system will significantly reduce this time. This should be done after the system has run for at least an hour to allow the pressure in the system to drop below $1x10^{-5}$ mBar. We recommend baking the RGA vacuum chamber for at least 20 hours.

Optimum bake-out is achieved by having the inlet valve open with the process chamber at the normal operating pressure of very clean and dry inert gas, or by having all inlet valves closed.

The quadrupole should be running with the filament on, but MUST be using the faraday detector.

DO NOT use the multiplier detector during baking!
DO NOT use the electron multiplier detector within the first two hours after terminating baking!

CAUTION

The Electron Multiplier (SEM) MUST NOT be operated at temperatures above 90^{o}C. Do NOT bake with the SEM selected. After baking ends, wait at least 2 hours before using the SEM!

The electron multiplier will be seriously damaged if it is operated at temperatures above 90^{0}C!

No damage is caused to the multiplier by high temperatures provided it is not switched on.

The only remedy when a multiplier has been damaged due to being operated at higher temperatures is to replace it.

Baking can be started (and stopped) directly at the RVC2 with the BAKE button. It can also be controlled through the RVC status and control panel of Process Eye Professional.

The total pressure should gradually start to rise and you should bake the system at least until that pressure starts to drop.

It is useful to create timed bakeout recipes to run with the Faraday detector and turn the bake Off after a preset time so the system can cool down unattended. The default Bake period is 8 hours.

To improve the background further it is recommended that you run and degas both filaments. The amount of time spent in reducing the background peaks depends entirely on the application and is left to the discretion of the customer. If you switch the system off it will vent to atmosphere introducing water vapour and you will have to bake again. Venting to clean dry nitrogen or argon is strongly recommended.

System shut down procedure

It is important to follow the procedure outlined below to shut down and switch off the Vision 2000-P system.

1. Switch off the RGA filament and wait for 15 minutes for the filament to cool down.

2. Switch off the turbo pump from the RVC2 Window within Process Eye Professional, or by pressing the PUMPS switch on the RVC2.

3. Switch off the RVC2.

4. Allow the turbopump to come to a complete stop

Maintenance

Generally, Vision 2000-P systems require very little maintenance with the frequency of routine maintenance being dependant on the application. The operating pressure, amount and type of gases being pumped will have an effect on the system.

In general, it is a good idea to schedule maintenance of the Vision 2000-P, including preventative measures, such as renewing filaments, to coincide with planned maintenance of the process system.

Operating pressure

The Vision 2000-P system has a special PVD ion source. The optimum operating pressure of this source is $2x10^{-3}$ to $5x10^{-3}$ mbar, but may be used at pressures up to $1x10^{-2}$ mbar. As the ion source pressure increases above the optimum, the peak heights become significantly non-linear - that is, they do not rise as much as the pressure. Monitoring processes at pressures higher than $1x10^{-2}$ mbar requires inlet pressure reduction.

In this system, pressure reduction is accomplished by incorporating a flow restricting orifice in the interface coupling flange between the ion source and the inlet isolation valve. This extends the maximum process monitoring pressure directly in proportion to the pressure reduction. Please refer to the shipment report for the type of pressure reduction, if any, fitted to your system.

Accessing the orifice disk

The RGA chamber side of the right-angle valve's flange holds the ceramic socket which mates with the gas inlet tube on the PVD ion source and the orifice disk. You may need to replace the orifice if it were to become blocked or a different process is to be monitored. Please see your shipping information for the supplied orifice disk size.

1. Shut down the Vision 2000-P system by following the System Shutdown Procedure instructions and remove the heater jacket and the Microvision 2 from the RGA vacuum chamber.

2. Remove the V2000P from your chamber.

3. Remove the six M6 bolts holding the right-angle valve to the RGA sampling chamber and remove the right-angle valve.

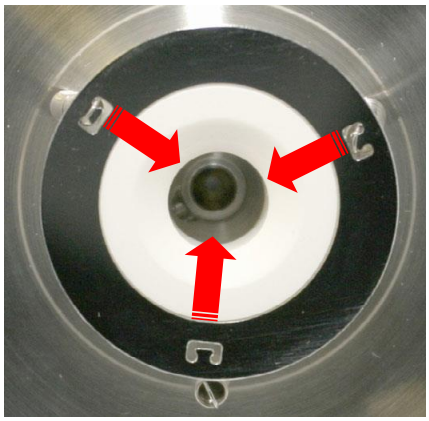
Refitting the inlet flange

To re-fit simply follow the removal procedure in reverse. Take care to ensure the ceramic socket mates correctly with the gas inlet tube on the PVD source.

Once the Vision 2000-P system is re-assembled it must be leak checked before re-fitting the heater jacket.

Replacing the orifice – Type 1 Disk

Orifice removal and insertion must be carried out with the tool provided with your system



Remove the ceramic coupling retaining ring by easing the retaining springs from their fitting points.

Remove the retaining ring and the ceramic PVD coupling.

The ceramic retaining ring is held in springs fixed to threaded grub screwed into the flange.

place on the inlet flange by three screws. The grub screws are then

Unscrew and remove the three

screws from the flange.

Orifice Disk Tools

Orifice disk insertion and removal tools are supplied as part of the V2000P toolkit. Do not attempt to remove or insert an orifice disk without using these tools. If they are missing from your toolkit, please contact your local MKS Spectra facility for replacements.

Clean each tool before use using IPA.

Tool Guide
The “Tool Guide” is fixed to the inlet flange using the three screws supplied, replacing the ceramic coupling assembly, and acts as the name suggests, as a guide for either the removal or insertion tools.

Removal Tool
The removal tool has a smaller diameter head than the insertion tool, this is to deform the orifice disk and allow easy removal from the tapered hole into which the orifice disk is fitted.

Insertion Tool
The insertion tool has a head slightly less in diameter than the orifice disk itself, and is used to fit the orifice disk into the tapered hole.

Fitting the Tool Guide

Fit the Tool Guide to the inlet flange using the three screws supplied.

Removing the Orifice Disk

Insert the Removal Tool into the guide and push the tool into the orifice disk. Press firmly until the tool bottoms against the guide.

Remove the tool and Tool Guide and remove the Orifice Disk from the flange.

DO NOT RE-USE THE ORIFICE DISK

Fitting a new Orifice Disk

Ensure you have purchased the correct size orifice disk for your application, advice on the size and part number can be sought via your local MKS office.

Keep the disk in its original packaging until needed.

Do not handle the Orifice Disk, use tweezers gently as not to deform or scratch the disk.

The orifice disk is marked with a black spot to indicate its fitting orientation. This dot should face towards the inlet side of the flange.

Offer the new disk to the tapered hole in the inlet flange, this should be done with the Tool Guide removed, as the disk needs to be offered as squarely as possible to the hole to avoid fouling.

Without disturbing the new Orifice Disk, carefully re-fit the tool guide to the inlet flange.
Once the guide is secured, check again that the new Orifice Disk is lying squarely in the tapered hole. If not, it must be re-positioned.

Use the Insertion Tool to push the Orifice Disk into the tapered hole. Some resistance will be felt as the disk seats into position. There should be a slight gap between the shoulders of the tool guide and the insertion tool.

Once the disk has been pushed fully home, remove the Insertion Tool and Tool Guide.

Inspect the orifice disk for correct seating, with no gaps visible around the disks edge.

Note: The disk will be slightly cupped after correct fitting.

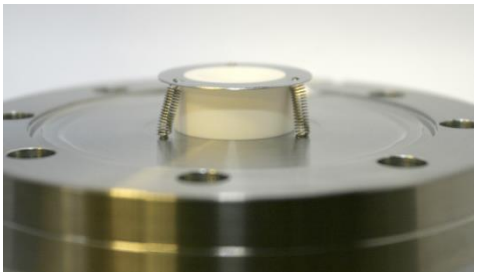
Re-assembling the Inlet Flange

Re-fit the springs to the Inlet Flange ensuring that they are not cross-threaded. Insert until the uppermost face of the grub screw is flush with the face of the Inlet Flange.

Secure the Retaining Ring by using two of the three springs.

From the side without a spring fitted, slide the Ceramic Coupling under the Retaining Ring, paying attention to the couplings orientation, which should be with the shouldered face uppermost.

Once the Ceramic Coupling is in place, check that the Retaining Ring is seated correctly around the shoulder of the Ceramic Coupling.

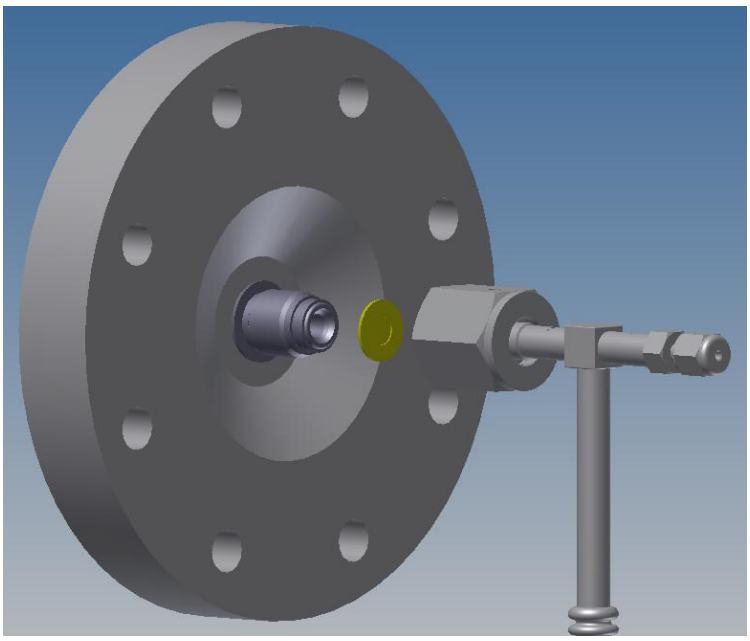


Clean all handled parts with a suitable solvent and re-fit the Inlet Flange to the chamber using a new copper gasket, by firstly sliding the bypass connection through the oven wall and then carefully locating the Ceramic Coupling over the PVD ion-source of the quadrupole.

Replacing the orifice – Type 2 VCR

Later versions utilize a VCR orifice disk which makes replacement easier as there is no need to remove any vacuum flanges.

Disk part number – 800010097



To replace the disk, loosen the VCR fitting using a ¾" spanner, the disk is fitted into a formed holder which is clipped onto the machined face of the inlet flange. Remove the old disk and replace with the new part, refit the holder to the inlet flange and retighten the VCR fitting.

Vision 2000-P electronics

The RGA control unit (Microvision 2) supplied as part of your Vision 2000-P system is designed specifically to operate with a PVD ion source. No damage will be caused to the analyser or the electronics if a replacement standard RGA control unit is fitted but the performance will be dramatically reduced. This is of particularly relevance to customers who operate more than one MKS RGA.

Diaphragm pump maintenance

Unlike rotary pumps diaphragm pumps are free from routine maintenance. You may need to clean or replace valves and diaphragms in the pump from time to time. Please consult the pump manual.

Turbo pump maintenance

The maintenance schedule is detailed in the turbo pump user manual.

Mass spec maintenance

The only routine maintenance required by the quadrupole is to change the filaments. The filaments will wear out in time and changing filaments is fully described in the Microvision 2 manual. Also, the ion source may need to be cleaned which would be done as part of the filament replacement procedure, again this is fully described in the Microvision 2 manual.

CAUTION

The quadrupole analyser is a delicate instrument which is easily damaged and can be expensive to repair. The safest place for the analyser is in its vacuum chamber, so leave the analyser where it is until you have everything ready.

Removing the analyser

Before you can change the filaments or clean the ion source the quadrupole analyser must be removed from the vacuum chamber. Before removing the analyser check that you have all the parts and tools ready for the maintenance work. Also, have ready something to stand the analyser on, a small vice is useful for this.

The process valve fitted between the RGA chamber and the process chamber will allow the RGA chamber to be vented to atmosphere without affecting the process chamber. We would recommend venting the RGA chamber when the process chamber is not being run, just in case there is an unexpected accident.

To remove and replace the analyser you will need:

One pair of suitably sized spanners
One CF40 copper gasket

1. Shut down the Vision 2000-P system.
2. Make a note of the orientation of the analyser with respect to the vacuum chamber. This is most easily done by making a mark on the vacuum chamber in line with the locking pip on the analyser's feedthrough housing.
3. Remove the six M6 bolts.
4. Carefully withdraw the analyser from the vacuum chamber. Leave the old copper gasket in place until you are ready to fit the new one, it will help protect the knife edge from accidental damage.

Re-fitting the analyser

1. Note the gas inlet tube on the top of the analyser source. Look into the vacuum chamber and note the ceramic socket which the gas inlet tube must mate with when you re-fit the analyser.
2. Clean, using a suitable solvent, and dry the new copper gasket then slip it over the analyser in place of the old one.
3. Carefully, insert the analyser into the vacuum chamber trying not to let the leads touch the wall of the vacuum chamber. Make sure the gasket does not slip out of its slot as you push the flanges together. Make sure that the gas inlet tube on the top of the analyser mates with the ceramic socket. When properly mated the analyser flange should be flush with that of the vacuum chamber. If the two flanges are not parallel, the gas inlet tube is not in the ceramic socket.
4. Rotate the analyser flange so that it is in the correct orientation.
5. Bolt the flanges together remembering to tighten opposite bolts equally.
6. Re-fit the Microvision 2.

Detailed views and information on the analyser can be found in the Microvision2 user manual.

Returning Your Equipment

If you wish to return your instrument for service, please follow these simple guidelines:

Contact your local MKS service facility to obtain a Returns Material Authorisation (RMA) number. We will require some instrument details, such as the serial numbers, date of purchase and a fault description.

Fill in the relevant sections of the Health and Safety Returns Form below, or we can provide you with a copy. This form MUST accompany the instrument when returned, delays in providing this completed form will lead to delays in the servicing of the instrument.

Securely package all items to be returned, using the original packaging where possible and send to the address provided by the relevant service department.

Support Contact Numbers

Europe (UK) +44 (0) 1270 250150
USA +01 408-750-0347

Health and safety clearance form

1. This form must be used when returning analysers and other equipment for service.

2. A completed copy of this form should be faxed or sent by post to ensure that we have this information before we receive the equipment.

   A further copy should be handed to the carrier with the equipment.

3. Failure to complete the form or comply with the procedure will lead to delays in servicing the equipment.

RETURNS FORM

1. This form must be completed when returning equipment for service or repair.

2. Please complete the form and fax or send by first class post to the appropriate Spectra facility. Fax numbers and addresses can be found on the inside front page of this manual. Please ensure that we have this information before we receive the equipment. A copy should also be given to the carrier.

FAILURE TO COMPLETE THIS FORM OR COMPLY WITH THE PROCEDURE WILL LEAD TO DELAYS IN SERVICING THE EQUIPMENT

Please Complete The Following

Our RMA number: Customer P.O. No.

Customer Bill To Address:
Company
Department
Address

City
Zip/Postal Code

Customer Return To Address (if different from above):
Company
Department
Address

City
Zip/Postal Code
User's Name: Phone No.:

Equipment Shipped
Item 1: Serial No.:

Item 2: Serial No.:

Item 3: Serial No.:

Please describe the system fault in detail:

Details of all substances pumped or coming into contact with the returned equipment.
Chemical names:

Precautions to be taken in handling these substances:

Action to be taken in the event of human contact or spillage:

I hereby confirm that the only toxic or hazardous substances that the equipment specified above has been in contact with are named above, that the information given is correct and that the following actions have been taken:
1. The equipment has been securely packaged and labelled.
2. The carrier has been informed of the hazardous nature of the consignment.

Signed: Title:

Date: Phone No.: