



Instruction Manual MKS Spectra Type 138A Portable Analytical System

SP102001 Rev 1.03
July 2009

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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EC DECLARATION OF CONFORMITY

Spectra SensorTech Ltd.
Cowley Way
Crewe
Cheshire
CW1 6AG
United Kingdom

DECLARES THAT THE FOLLOWING PRODUCTS:

LM62, LM10 VACSCAN 100
LM63, LM10, LM4 VACSCAN PLUS 100, 200
LM61, LM10, LM4, LM9 SATELLITE 100, 200, 300
LM56 MICROVISION
LM70, LM76 MICROVISION PLUS
LM77 VISION 1000P
LM79 VISION 1000I
LM89 VISION 1000B
LM90 VISION 1000 C / E
LM78 VAC CHECK
LM80 MINILAB

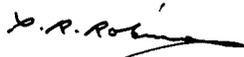
ARE IN CONFORMITY WITH THE FOLLOWING EUROPEAN
DIRECTIVES:

2004/108/EEC ELECTROMAGNETIC COMPATIBILITY DIRECTIVE
73/23/EEC LOW VOLTAGE DIRECTIVE AS AMMENDED 93/68 EEC

THE APPLICABLE STANDARDS ARE:

EN 61326:1998 ELECTRICAL EQUIPMENT FOR MEASUREMENT,
CONTROL & LABORATORY USE
EN 61010-1:1993 SAFETY REQUIREMENTS FOR ELECTRICAL
EQUIPMENT FOR MEASUREMENT,
CONTROL & LABORATRY USE.

SIGNED:



T.R.ROBINSON
EUROPEAN OPERATIONS MANAGER
DATE: 1ST JULY 2001

Additional Installation Maintenance and Operating Instructions

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

A) INSTALLATION

- 1) The installation procedures given in the operating and technical manuals must be followed, in addition to these instructions.
- 2) 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.
- 3) The short earthing braid supplied with some products must be fitted between the terminal on the RF head and one of the CF40 vacuum flange bolts.
- 4) 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 Spectra SensorTech Ltd.
- 5) Cables attached to all other ancillary signal and control ports must have a length of less than 3 metres. If greater length is required, Spectra SensorTech Ltd must be contacted for technical guidance on possible EMC and safety issues.
- 6) 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.

B) OPERATION

- 1) 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 Spectra SensorTech Ltd.
- 2) All instructions given in the operating manual must be followed.
- 3) Adjustments are strictly limited to those accessible from the control panel and computer keyboard and only when running software supplied by Spectra SensorTech Ltd.

C) MAINTENANCE



WARNING-DANGEROUS VOLTAGES EXIST INSIDE THE EQUIPMENT

- 1) Maintenance functions must only be carried out by competent persons.
- 2) During the warranty period, faulty equipment must be returned to Spectra SensorTech Ltd., unless special arrangements are made.
- 3) 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 Spectra SensorTech Ltd.
- 4) Equipment enclosures embody certain special fastening and bonding devices that affect EMC and safety performance. These must be correctly re-fitted after servicing.

WARRANTY

Type 138A Portable Analytical System

MKS Instruments Spectra Products (MKS Spectra) warrants that the equipment described in the face of this warranty (the "equipment") manufactured by MKS Spectra shall be free from defects in materials and workmanship for a period of one year from shipment. For the period commencing with the date of shipment of this equipment and ending one year later, MKS Spectra will, at its option, either repair or replace any part which is defective in materials or workmanship without charge to the purchaser. The foregoing shall constitute the exclusive and sole remedy of the purchaser for any breach by MKS spectra of this warranty.

The purchaser, before returning any equipment covered by this warranty, which is asserted to be defective by the purchaser, shall make specific written arrangements with respect to the responsibility for shipping and handling the equipment and any other incidental charges with MKS Spectra UK Global Product Support department.

This warranty does not apply to any equipment that has not been used in accordance with the specifications recommended by MKS Spectra for the proper and normal use of the equipment. MKS Spectra will not be liable under any circumstances for consequential or incidental damages in connection with or arising out of the sale performance or use of the equipment covered by this warranty.

INDEMNITY

Where the customer uses the goods or the services supplied by MKS Instruments Spectra Products either in (MKS Spectra) the manufacture, supply or distribution of any other goods; or in the provision of a service; (including without limitation, where the customer uses the goods or the services supplied by MKS Spectra in the manufacture and distribution of chemicals or as part of a manufacturing facility for chemicals) then the customer shall indemnify and hold harmless MKS Spectra from and against all loss, damages, costs and expenses awarded against or incurred by MKS Spectra in respect of such use by the customer or arising out of the manufacture, supply or distribution of those goods or the provision of that service (or without limitation arising out of the manufacture and

distribution of those chemicals or the use of the goods or services as part of that manufacturing facility).

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Errata and addenda

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Section 1. Safety



WARNING

Please read this section of the manual. It contains important safety information.

1.1. Symbols used in this manual

Definitions of WARNING, CAUTION and NOTE messages used in this manual.



WARNING

The WARNING sign denotes a hazard to personnel. WARNING boxes are used where failure to observe the instructions could result in personal injury or death.



CAUTION

The CAUTION sign denotes a hazard to equipment. CAUTION boxes are used where failure to observe the instructions could result in damage to the equipment or associated equipment.



NOTE

The NOTE sign denotes important information. It calls attention to a procedure, practice, condition, or the like, which is essential to highlight.

CAUTION and WARNING instructions MUST be observed. MKS Spectra accepts no liability for any injury or damage resulting from a failure to observe CAUTION or WARNING instructions.

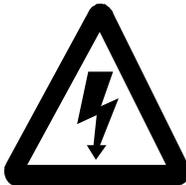
1.2. Warning symbols

1.2.1.General

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



The Exclamation Mark (ISO 3864, No.B.3.1) label.
Caution refer to the accompanying documents.
General caution.
Refer to the manual for detailed instructions.



The Electric Shock (ISO 3864, No.B.3.6) symbol.
Caution, risk of electric shock.
This is generally used on the instruments to warn of the presence of hazardous voltages.



Hot Surface (IEC 417, No.5041) symbol.
Caution risk of burns injury.
Generally used to indicate that the surface may become very hot during normal operation.

1.2.2. Other symbols

			
On (Supply)	Off (Supply)	Earth (ground)	Protective earth

IEC 417, No.5007	IEC 417, No. 5017	IEC 417, No.5017	(ground) IEC417, No.5019
			
Frame or chassis IEC 417, No.5020	Equipotentiality IEC 417, No.5021	Direct current IEC417, No.5031	Alternating current IEC417, No.5032
			
Both direct and alternating current IEC 417, No.5033-a	Class II equipment IEC 417, No. 5172- a	Three phase alternating current IEC 617-2 No.020206	

1.3. Safety procedures and precautions

Observe the following general safety precautions during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of intended use of the instrument and may impair the protection provided by the equipment. MKS Instruments assumes no liability for the customer's failure to comply with these requirements.

SERVICE BY QUALIFIED PERSONNEL ONLY

Operating personnel must not attempt component replacement and internal adjustments. Any service must be performed by qualified service personnel only.

GROUNDING THE PRODUCT

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting it to the product input or output terminals. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electrical shock.

GROUND AND USE PROPER ELECTRICAL FITTINGS

Dangerous voltages are contained within this instrument. All electrical fittings and cables must be of the type specified, and in good condition. All electrical fittings must be properly connected and grounded.

USE THE PROPER POWER CORD

Use only a power cord that is in good condition and which meets the input power requirements specified in the manual.

Use only a detachable cord set with conductors that have a cross-sectional area equal to or greater than 1.5 mm². The power cable should be approved by a qualified agency such as VDE, Semko, or SEV.

USE THE PROPER POWER SOURCE

This product is intended to operate from a power source that does not apply more voltage between the supply conductors, or between either of the supply conductors and ground, than that specified in the manual.

USE THE PROPER FUSE

Use only a fuse of the correct type, voltage rating, and current rating, as specified for your product.

KEEP AWAY FROM LIVE CIRCUITS

Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

USE CAUTION WHEN OPERATING WITH HAZARDOUS MATERIALS

If hazardous materials are used, observe the proper safety precautions, completely purge the instrument when necessary, and ensure that the material used is compatible with the materials in this product, including any sealing materials.

DO NOT OPERATE IN AN EXPLOSIVE ENVIRONMENT

To avoid explosion, do not operate this product in an explosive environment unless it has been specifically certified for such operation.

USE PROPER FITTINGS AND TIGHTENING PROCEDURES

All instrument fittings must be consistent with instrument specifications, and compatible with the intended use of the instrument. Assemble and tighten fittings according to manufacturer's directions.

CHECK FOR LEAK-TIGHT FITTINGS

Carefully check all vacuum component connections to the instrument to ensure leak-tight installation.

OPERATE AT SAFE INLET PRESSURES

Never operate at pressures higher than the rated maximum pressure (refer to the product specifications for the maximum allowable pressure).

INSTALL A SUITABLE BURST DISC

When operating from a pressurized gas source, install a suitable burst disc in the vacuum system to prevent system explosion should the system pressure rise.

KEEP THE UNIT FREE OF CONTAMINANTS

Do not allow contaminants to enter the unit before or during use. Contamination such as dust, dirt, lint, glass chips, and metal chips may permanently damage the unit or contaminate the process.

ALLOW THE UNIT TO WARM UP

If the unit is used to control dangerous gases, they should not be applied before the unit has completely warmed up. Use a positive shutoff valve to ensure that no erroneous flow can occur during warm up.

AVOID EXPLOSIVE GAS MIXTURES

Do not use this, or any other gauge with a hot filament, with explosive gas mixtures or with flammable gases, which could form explosive gas mixtures in air. If the filament or control circuit fails the filament could ignite the mixture. With some gas mixtures, an exothermic catalytic reaction could occur at the filament, causing ignition of the gas.

TAKE PRECAUTIONS TO AVOID POTENTIAL EXPLOSIONS

Precautions must be taken to avoid explosion due to overpressure during backfill operations. If any thermal conductivity gauge is calibrated for air/nitrogen, the measured pressure may vary considerably as a function of true pressure for other gases. Pressure indications above 100 Torr should not be used when backfilling. In a system, which is filled with a pressurized source, install a safety relief valve or rupture disk to limit pressure to safe limits.

HIGH VOLTAGE DANGER

High voltage is present in the instrument when it is turned on.

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Section 2.

Overview

This document concerns the Portable Analytical System (MKS Type 138A) as supplied by MKS Instruments (UK) Ltd. It is intended to be used in conjunction with the Spectra RGA manual 'Vac Check Manual' (LP101010 Rev 2.0 Aug 98).

The system is an analytical instrument based on a Residual Gas Analyser (RGA) intended to be used for vacuum system background gas identification and leak checking.

The important features of the instrument are as follows:

- Self contained (only requiring mains power connection).
- Mobile.
- Clean room compatible.
- Dry pumping system (no pump oils).
- Complete RGA control via external PC.
- Available with 100, 200 and 300 amu mass ranges.
- Available with faraday cup or electron multiplier detectors.
- Atmospheric inlet (optional).
- Bakeout heaters (optional).
- Windows software (optional).

Caution



The MKS Portable Analytical System is a precision instrument. Whilst every effort has been made to make it portable and robust it should still be handled with care.

Caution



To ensure that the instrument performs reliably good vacuum practice should be observed at all times.

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Section 3.

Installation

Caution



Initial installation and setup should only be carried out by MKS engineers.

3.1. Environmental Requirements

The following guidelines are intended to assist with the installation and use of the Type 138A Portable Analytical System.

1. Only use the instrument in a situation where the normal operating temperature of between 15°C and 30°C will always be maintained.
2. Ensure that the instrument is always used in the correct orientation and kept away from any sources of dust, oil or water.
3. Do not attempt to move the instrument whilst connected to the mains power supply.
4. Keep the ventilation panels and base of the instrument clear of any obstruction.
5. Do not subject the instrument to sharp knocks or continuous vibration.
6. The instrument **MUST NOT** be connected to any source of hazardous or toxic materials.

Caution



Failure to observe these environmental conditions could result in damage to the instrument.

3.2. Electrical Connections

Electrical connection to the instrument is via a 16A standard appliance connector (BS4343). The required supply is 8 amps at 230 volts/50 Hz.

Warning



Failure to observe the electrical connection requirements will result in damage to the equipment.

3.3. Testing

The customer should not connect or use the instrument until it has been checked and tested at the customers site by an MKS engineer.

Section 4.

Setup and operation

4.1. Setup

Provided the Portable Analytical System has been installed correctly it should operate without adjustment or setup.

The equipment contains no user adjustable parts apart from:

Sampling inlet system (see section '**Inlet System**').

Cold Cathode gauge set points (see section '**Cold Cathode Gauge**').

Bakeout heater temperature set point (see section '**Bakeout Heater**').

4.2. Operation

The Portable Analytical System has been designed to be easy to operate and self protection features have been built in. Operation can be split into two parts - operation of the vacuum system and use of the RGA control software. This manual only describes the vacuum system - the user should refer to the RGA manual before operating the RGA system.

The instrument can be used in two ways - with the analyser system mounted on the instrument frame or with it mounted remotely. The section '**Operation with remote mounted analyser**' below describes remote operation.

Warning



It is the responsibility of the customer to ensure that any users of the system are fully trained in its operation.

4.3. Switching on

After connecting the instrument to a suitable power supply it can be switched on using the switch labeled **MAIN POWER**. The indicator above the switch should illuminate. Mains power will now be supplied to the Laptop connector and to the Bakeout heater circuit.

The vacuum pumps can then be started by turning the **PUMPS** switch. This switch should illuminate to indicate that power has been applied to both the primary (diaphragm) pump and the turbo pump. The turbo pump will now take several minutes to run up to full speed.

When full speed is reached the **AT SPEED** indicator will illuminate. The Cold Cathode gauge controller will also switch on at this point. Press the lower button on the gauge controller to switch on the gauge head. The controller display will now read the pressure (in mbar) within the analyser housing. When the pressure goes below the lower set point (5×10^{-5} mbar) the power supply to the RGA electronics is switched on. The instrument is now ready for use. Refer to the Spectra RGA software manual to use the analyser.

4.4. Cold Cathode Gauge

The Cold Cathode gauge normally requires no setup. However the pressure setpoint is used to protect the RGA, and this may need to be adjusted depending upon the application. Refer to MKS before adjusting them.

The normal setting is 5×10^{-5} mbar (the pressure must go below this point before the analyser can be switched on)

Caution



Incorrect setting of the Cold Cathode gauge trips could result in damage to the instrument.

4.5. Switching Off

To switch off the instrument first turn the **PUMPS** switch to off. Then turn off the **MAIN POWER** switch to off ('0'). It is advisable not to move the instrument for several minutes to allow the turbo pump to stop.

The instrument can now be disconnected from the main electrical supply.

Caution



Follow the Switching off procedure before opening the vacuum system or before moving the instrument.

4.6. Bakeout Heater

The Portable Analytical System can be fitted with an optional analyser housing bakeout heater. This can be used to assist the removal of contaminants (particularly water vapour) from the analyser.

Before switching on the heater remove the RGA power supply unit from the end of the analyser housing. The bakeout heater is switched on using the switch marked **HEATER**, the indicator above the switch should illuminate. The heater temperature is controlled using the heater controller. Refer to the temperature controller manual for instructions on how to set the temperature. Note that the heater should normally only be used when the analyser is under vacuum. A temperature of 200°C should not be exceeded.

Caution



Temperatures in excess of 100°C may occur on the surface of the analyser housing

Warning



The instrument may be damaged if the maximum bakeout temperature is exceeded.

Warning



The instrument may be damaged if it is moved during bakeout.

4.7. Inlet System

The RGA analyser can be connected to the vacuum system to be tested in several ways:

- Via a flexible vacuum connection from the analyser (Conflat flange) with the analyser mounted in the case.
- With the analyser mounted directly on the vacuum system under test (remotely from the base unit or 'cart').
- Using the atmospheric inlet system.

The three methods of operation are described below.

4.8. Operation via flexible connection

The valve system on the instrument terminates in a DN CF40 (2¾ inch 'Conflat') flange. It is recommended that stainless steel bellows be used to connect the flange to the chamber under test.

It is good practice to minimise the length of the bellows to avoid water contamination from the inside surface of the bellows. The bellows can be evacuated by either the RGA system pumps or preferably the system pumps prior to use.

The RGA system has a dual valve inlet. This gives a wide operating pressure for the system but requires manual adjustment to set the pressure in the RGA head correctly. In general, for process pressures between 1×10^{-3} mbar and UHV the needle valve and needle isolation valve should be closed and the high conductance inlet valve opened and adjusted to give a pressure indicated on the instrument cold cathode gauge of better than 5×10^{-5} mbar. This will ensure that the

RGA is operating at its optimum pressure and that all interlocks are satisfied.

For process pressures between 1×10^{-3} and 10 mbar, the high conductance valve should be closed and the needle isolation valve opened which allows the needle valve itself to be adjusted to attain the required operating pressure as described above.

Note that the needle isolation valve should be opened during pumpdown to allow the interspace between the valve and the needle valve to be evacuated.

4.9. Operation with remote mounted analyser

To minimise pump down times of the connecting bellows, and to minimise water contamination in the bellows, the analyser assembly can be used remotely from the base unit (cart). This mode of operation also minimises any low background noise sometimes associated with close coupled diaphragm pumps.

Ensure that the instrument has been shut down and the mains power removed from the system. In addition it is recommended to check that the turbo pump has stopped. This can take up to 5 minutes after the system has been switched off.

To remove the analyser assembly from the base unit, loosen the securing hand wheel and lift the assembly clear of the cart. Care should be taken to avoid damaging any cables or connectors on the analyser assembly when the assembly is removed and that the umbilical cord is neatly coiled when re-assembling.

The operation of the inlet valves is as described above.

Caution  **Follow the Switching off procedure before removing the analyser from the cart.**

Caution  **When mounting the analyser unit on any remote process chamber or vacuum system ensure that it is adequately supported. The entire weight of the analyser should not be taken by the inlet flange alone.**

4.10. Operation with atmospheric inlet

For higher process pressures, up to atmosphere, the atmospheric inlet system should be attached to the analyser assembly. The atmospheric inlet system consists of a capillary tube and isolation valve; differential pumping across this device is achieved via the turbo backing line.

To attach the atmospheric inlet, remove the clamp at the turbo end of the backing line and secure the 'T' piece on the atmospheric assembly between the backing line and the turbo. This will allow the backing line to pump both the turbo and the atmospheric inlet.

The other end of the atmospheric inlet, which terminates in a DN CF40 (Conflat) flange, should be bolted to the dual valve assembly sealed with an appropriate copper gasket. To adjust the pressures in the system, close the main high conductance valve and have the needle valve closed with the isolation valve open. Adjust the needle valve until a pressure of better than 5×10^{-5} mbar is achieved.

Warning



Under no circumstances must the analyser unit be removed from or replaced into the instrument with it still connected to the main electrical supply.

Section 5.

Troubleshooting

1. Main Power switch does not light - primary pump does not start.

Check main power cable is connected.

Check main fuses (FS1 - located in the power inlet plug on the back panel).

2. Pump switch lights - primary pump does not start.

Check fuse FS3 - refer to MKS.

Check primary pump temperature. Allow to cool to reset pump internal thermal trip.

3. Primary pump cuts out.

Check primary pump temperature. Allow to cool to reset pump internal thermal trip. Check fan filters to ensure sufficient air flow.

4. Pump switch lights - turbo does not start.

Problem with turbo controller/turbo pump - refer to MKS.

Check fuse FS4.

5. Turbo starts - 'at speed' indicator does not light.

Poor vacuum due to leak - check all vacuum connections.

Poor vacuum due to primary pump performance - refer to MKS

Problem with turbo controller/turbo pump - refer to MKS.

6. Turbo cuts out.

Poor vacuum due to leak - check all vacuum connections.

Poor vacuum due to primary pump performance - refer to MKS
Turbo pump overheating. Check turbo cooling fan.
Problem with turbo controller/turbo pump - refer to MKS.

7. Cold Cathode gauge does not switch on.

Turbo pump not at speed.
Check fuse FS4.
Problem with gauge controller - refer to MKS.

8. Cold Cathode gauge does not indicate pressure.

Check connection to Cold Cathode gauge head.
Gauge head faulty/contaminated - refer to MKS.

9. RGA does not work - green LED on Electronics unit not lit.

Check RGA power supply cable connection.
Vacuum not low enough to trip low pressure trip point. Check
system for leaks.
Fault with RGA power supply - refer to MKS.

10. RGA does not work - green LED on Electronics lit.

Problem with electronics unit - refer to MKS.

11. No power to Laptop computer.

Check Laptop mains cable.
Check fuse FS5.

12. Heater Indicator does not illuminate.

Check fuse FS5.

13. Bakeout Heater indicator illuminates, heater controller does not indicate.

Problem with heater controller - refer to MKS

14. Heater controller indicates, heater does not get hot.
Check fuse FS2.

Section 6.

Troubleshooting

6.1. General

Only limited maintenance is required provided the Portable Analytical System has been correctly installed and used within its operational limits. The instrument has been designed and built with a minimum of user serviceable parts. Certain components do have specific requirements and these are outlined below. In all cases it is recommended that the unit be returned to MKS for service.

6.2. Primary Pump

This item requires periodic maintenance to ensure full performance. If a reduction in base pressure is observed the diaphragm and/or valves may need replacing. It is advisable to replace them after 5000 hours of operation. Refer to the pump manual for more information.

6.3. Turbo Pump

This is also essentially a maintenance free item. Refer to the turbo pump manual for more information.

6.4. Cold Cathode Gauge

The Cold Cathode gauge head should require no maintenance provided no contamination of the system occurs. If the gauge does become contaminated, the gauge manual contains instructions for cleaning. However it is recommended that the unit be returned to MKS.

6.5. RGA Head

The RGA head contains no user serviceable parts other than the filament.

Refer to the RGA Operation Manual for more information.

6.6. Service/Repair

Contact MKS Instruments UK Ltd should any problems be experienced with the instrument.

Warning



All returns to MKS Instruments must be free of harmful, corrosive, radioactive, or toxic materials.

Note



All returns to MKS Instruments must be authorised. Please contact the UK office before returning.

Appendix 1.

Related documents

- 1a. MKS Spectra – Microvision Plus manual
- 1b. MKS Spectra – RGA for Windows software manual
- 1c. MKS Spectra – Recall for Windows software manual

2. Vacuubrand – MZ2D Diaphragm pump - instructions for use.
3. Varian - Turbo-V70LP pumps - instruction manual.
4. Varian - Turbo-V70 controller - instruction manual.
5. Varian – 1½ inch Stainless Steel Valve – instruction manual.
6. HPS – 943 Digital Cold Cathode Controller operating manual (if fitted).
7. HPS – I-Mag[®] Sensor operation manual (if fitted).
8. CAL - 3200 Temperature Controller instruction manual (if fitted).

Note; all the MKS Spectra manuals will be found with this manual in the Spectra A5 size white ring binder.

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Appendix 2.

Returns form

The returns form provides MKS Spectra with vital Health and Safety clearance

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.

We CANNOT work on any equipment that could have been in an environment where it could have been exposed to hazardous materials (this includes any vacuum system, any laboratory) being in possession of a completed returns form.

RETURNS FORM

1. 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 returns 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