Zetasizer μV Essentials

MAN0429 Issue 1.0 December 2008

English

Head office:

Malvern Instruments Ltd.
Enigma Business Park,
Grovewood Road,
Malvern,
Worcestershire WR14 1XZ
United Kingdom.

Tel + [44] (0)1684-892456
Fax + [44] (0)1684-892789

Printed in England

Addendum to manual

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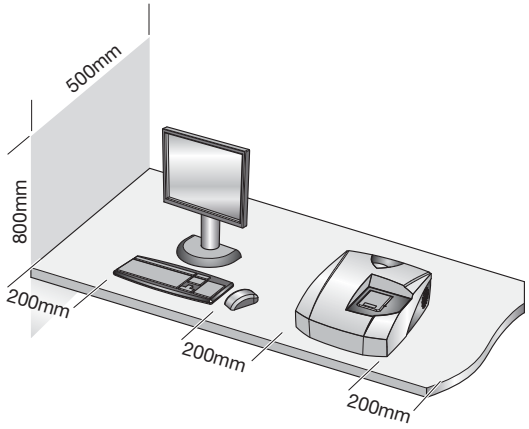
This Addendum presents new information for operating the Zetasizer APS and μV instruments. The content should be read in-place of, or in conjunction with, the sections indicated in the respective manuals. The information detailed will be incorporated into the next manual release for the instrument.

Space required - Read in place of relevant section on page 2-3 of the Zetasizer µV and Zetasizer APS Essentials Manual.

Space required (Zetasizer µV)

Provide enough space to allow easy access to all components and connections. This diagram shows the recommended space for a system.



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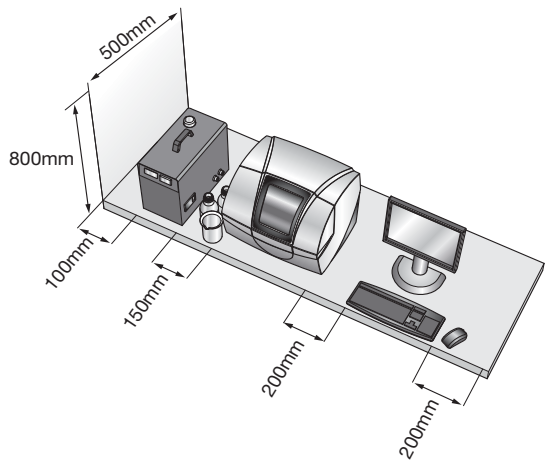
Allow at least **800mm** above the bench surface for access to the cell area. The system dimensions are given below:

Component	Width	Depth	Height
Zetasizer µV	350mm	410mm	170mm
Computer and printer	See manufacturer's documentation		

Space required (Zetasizer APS)

Provide enough space to allow easy access to all components and connections. This diagram shows the recommended space for a system. Always place the (optional) PTC-1 to the left of the instrument as the heat output is from the left side of the PTC-1 and this will prevent hot air being directed towards the APS.



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Allow at least **800mm** above the bench surface for access to the plate holder area. The system dimensions are given below:

Component	Width	Depth	Height
Zetasizer APS	500mm	390mm	320mm
PTC-1	200mm	385mm	310mm
Computer	Refer to manufacturer's literature.		

Positioning the Instrument - Read in place of relevant section on page 3-1 of the Zetasizer µV and Zetasizer APS Essentials Manual.

Positioning the Instrument

Warning!
Do not position the instrument such that the power cord, where it exits the product, is unreachable for disconnection.

Warning!
Do not obstruct the ventilation slots underneath the instrument, nor the fans on the rear panel. Restricting airflow can damage the instrument or cause overheating.

Replacing the system fuse - Read in place of relevant section on page 4-3 of the Zetasizer µV and on page 4-2 of the Zetasizer APS Essentials Manual.

Replacing the system fuse

Warning!
Fuses must not be replaced by the operator. Only the supervisor or a Malvern representative should attempt to change the fuse.

If the instrument does not power up, check the system fuses. These are located in the mains power switch on the rear panel.

Before changing a fuse, disconnect the instrument from the mains power.

Pull the fuse holders out and replace any faulty fuses with ones of the following specification:

Rating:	T 2A HRC 250v	(T = Time delay)
Size:	5mm x 20mm	

Table of contents

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Introduction to this manual

Introduction

This manual covers the operation and maintenance of the Zetasizer μV particle analyser.

Note
For the Zetasizer model, serial number, software and firmware version, left-click the μV icon in the right corner of the status bar.

Using this manual

Read the Health and Safety information in **Chapter 3** before using the instrument.

For more detail on the Zetasizer software, use its online **Help**. Each dialogue has a **Help** button giving information about it. **Advice** buttons present more sample-related content.

Menu commands

Software menu commands are referred to in the form **main menu-menu item**. As an example, the command **Configure-New SOP** refers to selecting the **New SOP** item in the **Configure menu**. Menu commands are shown in bold text.

Access to the instrument

Malvern personnel

Malvern personnel (service engineers, representatives, etc.) have full access to the instrument and are the only people authorised to perform all service procedures that may require the removal of the covers.

Warning!
Removal of the main covers by unauthorised personnel, even a supervisor, will invalidate the warranty of the instrument.

Supervisor

The supervisor is responsible for the management and safety of the instrument and its operation. The supervisor also trains the operators. They can perform all user maintenance routines identified in **Chapter 4**.

The supervisor has access to a more detailed manual in English.

Operator

An operator is a person trained in the use of the system. The operator can perform all user maintenance routines identified in **Chapter 4**, except changing the fuse.

Warning!
Failure to follow these guidelines could result in exposure to hazardous voltages and laser radiation.

Where to get help

Help desk

Direct all queries regarding the system to the local Malvern representative initially. Please quote the following information:

- Model and serial number of the instrument (located on the rear panel).
- The Zetasizer software version (select **Help-About** within the software).

Contact the United Kingdom help desk if the local Malvern representative is not available. The direct line to the United Kingdom Helpdesk is +44 (0) 1684 891800. This help line is primarily English speaking.

Remote support

Malvern Instruments offers a remote support service over the Internet. (A direct Internet connection must be available.)

Benefits include fast and efficient fault diagnosis, reducing downtime and costs. Online user training is also available, plus software updates.

Malvern Website - www.Malvern.com

The Malvern website offers a comprehensive range of particle characterisation resources for use by customers 24 hours a day, seven days a week.

Resources include software downloads, frequently asked questions, a knowledge base and **Application Notes**, plus information on other particle characterisation solutions that Malvern can provide.

2

Site requirements

This is a copy of Chapter 2 of the manual MAN0429 issue 1.0.

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Worcestershire WR14 1XZ
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Introduction

This document outlines site requirements for a Zetasizer μV. Ensure all these are met **before** the instrument is delivered.

Environmental conditions

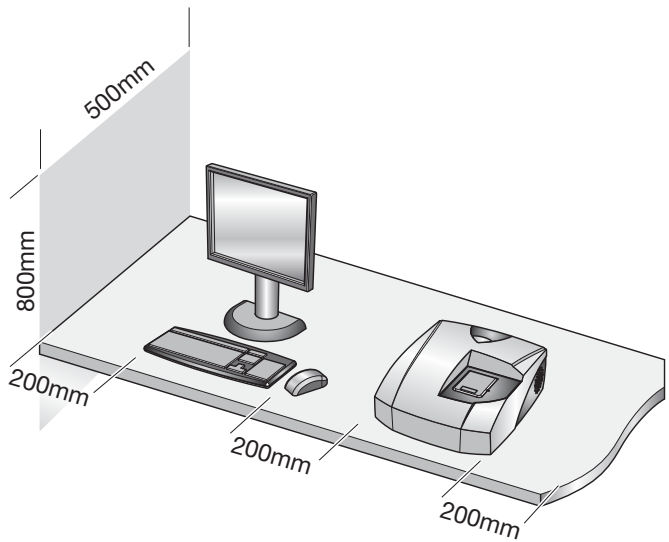
The site must be:

- Indoors and away from strong light (windows).
- Away from heat sources like radiators.
- Well ventilated (for noxious materials).
- On a horizontal vibration-free bench.

We recommend that the computer is positioned to the right of the instrument.

Space required

Provide enough space to allow easy access to all components. This diagram shows the recommended space for a system.



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Allow at least **800mm** above the bench surface for access to the cell area. The system dimensions are given below:

Component	Width	Depth	Height
Zetasizer µV	350mm	410mm	170mm
Computer and printer	See manufacturer's documentation		

Power requirements

The mains power supply must be clean and filtered. If necessary, fit an Un-interruptible Power Supply (UPS) to remove any spikes or noise. The power requirements are:

Component	Power requirement	Power sockets required
Zetasizer µV	~ 90V-260V AC, 50/60Hz, 100W	1
Computer	See manufacturer's documentation	
Computer monitor	See manufacturer's documentation	
Printer	See manufacturer's documentation	

Power cords and Power safety

The notes in this section indicate best practice. Adhere to these when connecting the instrument to the power supply.

Warning!
Do not operate this product with a damaged power cord set. If the power cord set is damaged in any way, replace it immediately.

Warning!
Do not use the power cord supplied with this product on any other products.

Power cord set requirements

Power cord sets must meet the requirements of the country where the product is used. For more information, contact a Malvern representative.

General requirements

The following requirements apply to all countries:

- The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
- The power cord set must have a minimum current capacity of 10A (7A in Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The area of the wire must be a minimum of 0.75mm^2 or 18AWG, and the length of the cord must be less than 3m.
- The power cord must be routed so it will not be walked on, pinched by items placed on or against it, or become wet. Pay particular attention to the plug, the electrical outlet and the point where the cord exits the product.

Computer specification

As with any software, running other software at the same time may affect the speed of the Zetasizer software.

Minimum recommended specification

Pentium P4 PC 2.8GHz, 512MByte RAM, 160GByte hard disk drive, 1024 x 768 screen resolution, CD-ROM drive, USB port, Windows XP Pro (SP2) operating system.

Note:
A laptop computer must have a free USB port to operate with the system.

Networks

The PC running the Zetasizer software can be connected to a network, but the Zetasizer software must be run locally.

Additional services

Purge specification

If measuring samples at low temperatures there is a risk of condensation occurring on the cell; this occurs when the measurement temperature is less than the 'dew point' of the ambient air surrounding the cell being measured. This is particularly likely in humid climates.

If this may be a problem the purge inlet port can be used to connect a dry air supply i.e. a supply with a dew point below the target temperature. This removes any moisture in the air immediately surrounding the cell and prevents condensation. If using the purge inlet connector, the air or Nitrogen supply must conform to this specification:

- Compressed air to DIN 8573-1
- Oil = Class 1
- Water = Class 3
- Particulate = Class 3
- Pressure = 100 kPa g

Caution!
The purge air line supply must conform to the above specification. Failure to meet this specification may result in permanent damage to the instrument and invalidate the warranty.

Telephone socket specification

The telephone socket for remote support needs a direct Internet connection.

Laser safety

Zetasizer μV instruments are Class 1 laser products and as such, require no special laser safety considerations during normal operation. However, during servicing (which must be performed by a qualified Malvern representative), the servicing engineer may be exposed to class 3b or above laser radiation. We therefore recommend that the administrative controls recommendations of the Laser Safety Regulations (IEC 60825-1(1993) +A1(1997)+A2(2001) are implemented.

Health and safety

General warnings and Safety regulations

Warning!
The instrument or samples to be measured may be hazardous if misused. Read and fully understand this section before operating the system.

Warning!
Use of the system in a manner not specified by Malvern Instruments Ltd may impair the protection provided by the system.

The instrument must only be stored or operated in environmental conditions conforming to **Chapter 2**.

Electrical warnings and Safety regulations

Warning!
The Zetasizer μV contains high voltage components. Only Malvern trained personnel are permitted to remove its main cover.

The instrument is mains powered and all power cables and electrical sockets should be treated accordingly. Do not place cables where they may become wet.

Should the instrument become wet (e.g. sample or dispersant is spilt), switch it off and disconnect it from the mains power supply immediately. Scrupulously clean and dry the instrument before re-applying power.

Warning!
This product **must** be connected to a protective earth.
The metal parts of the optical unit and the accessories are earthed via a protective earth connection.

PAT testing

If PAT testing is required, connect the earth lead to the earth stud underneath the rear right-hand corner of the instrument. We recommend that the product is PAT tested annually, or if it is suspected that its electrical safety has been compromised.

Power cords and Power safety

The notes in this section indicate best practice. Follow these when connecting the instrument to the power supply.

Warning!
Do not operate this product with a damaged power cord set. Replace a damaged power cord set immediately.

Warning!
Do not use the supplied power cord on any other products.

Power cord set requirements

Power cord sets must meet the requirements of the country where the product is used. For further information on the requirements, contact a Malvern representative.

General requirements

These requirements apply to all countries:

- The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
- The power cord set must have a minimum current capacity of 10A (7A in Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.

- The area of the wire must be a minimum of 0.75mm^2 or 18AWG, and the length of the cord must be less than 3m.
- The power cord must be routed so it will not be walked on, pinched by items placed on or against it, or become wet. Pay particular attention to the plug, the electrical outlet, and the point where the cord exits the product.

Power safety information

The following notes are guidelines for connecting the Malvern Instruments power supply using single and multiple extension leads, connection via AC Adapters and use of Uninterruptible Power Supplies (UPS).

Warning!
To prevent electric shock, plug the instrument or accessory into correctly earthed electrical outlets.
The power cord supplied is equipped with a grounding connection to ensure grounding integrity is maintained.

Advice on use of Extension leads

Follow this advice when using **single or multiple socket extension leads**. These are also called 'trailing sockets'.

- Ensure the lead is connected to a wall power outlet and **not** to **another** extension lead. The extension lead **must** be designed for grounding plugs and plugged into a grounded wall outlet.
- Ensure that the total ampere rating of the products being plugged into the extension lead **does not exceed** the ampere rating of the extension lead.
- Use **caution** when plugging a power cord into a multiple socket extension lead. Some extension leads may allow a plug to be inserted incorrectly.

  Incorrect insertion of the power plug could result in permanent damage to the instrument or accessory, as well as risk of electric shock and/or fire. Ensure that the ground connection (prong/pin) of the power cord plug is inserted into the mating ground contact of the extension lead

Advice on use of AC adapters (when used)

Warning!
Do not use adapter plugs that bypass the grounding feature, or remove the grounding feature from the plug or adapter.

- Place the AC adapter in a ventilated area, such as a desk top or on the floor.
- The AC adapter may become hot during normal operation. Take care when handling the adapter during or immediately after operation.
- Use only the Malvern-provided AC adapter approved for use with the instrument and/or accessory. Using another AC adapter may cause a fire or explosion.

Advice on use of Uninterruptible Power Supplies (UPS)

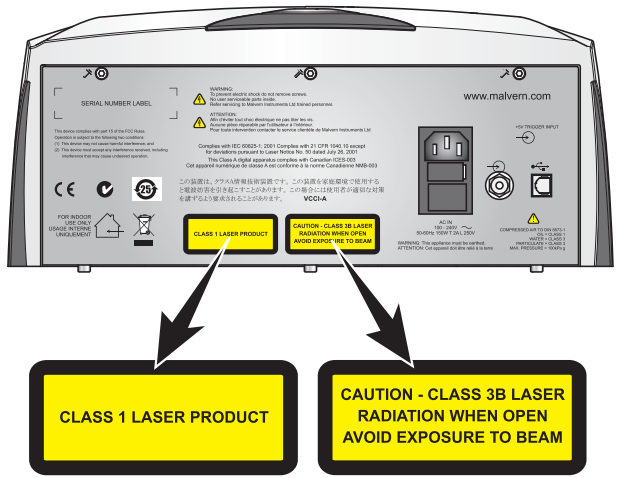
- To help protect the instrument and/or accessory from sudden, transient increases/decreases in electrical power, use a surge suppressor, line conditioner or UPS.

Laser safety regulations

The Zetasizer μV is a Class 1 laser product. As such, there is no exposure to laser radiation in normal operation of the instrument.

Caution!
The use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This diagram shows the location of the laser warning labels:



The standard laser has a maximum cw-power of 60mW at 830nm.

Temperature warnings

Warning!
The warning triangles on the cuvette lid and thermal cap warn of potentially hazardous temperatures within the cell area. The temperature range of the cell area is 2°C to 90°C.

Sample handling warnings

- Always handle all substances in accordance with the **COSHH (Control Of Substances Hazardous to Health) regulations** (UK) or any local regulations concerning sample handling safety.
- Before using any substance, check the **Material Safety Data Sheets** for safe handling information.
- Use the instrument in a well ventilated room, or preferably a fume cupboard, if fumes from the sample or dispersant are toxic or noxious.
- Wear personal protective equipment as recommended by the **Material Safety Data Sheets** if toxic or hazardous samples are being handled, particularly during sample preparation and measurement.
- Wear protective gloves when handling hazardous materials, or those that cause skin infections or irritations.
- Do not smoke during measurement procedures, particularly where inflammable samples are used or stored.
- Do not eat or drink during measurement procedures, particularly where hazardous samples are used or stored.
- Take care when handling glass (e.g. beakers). Hazardous materials may enter a wound caused by broken glass.
- Always test a new sample or dispersant for chemical compatibility before use.
- After measuring hazardous samples, scrupulously clean the system to remove any contaminants before making another measurement.
- Always label samples for analysis using industry standard labelling, particularly if they are handled by a number of staff or stored for long periods. Clearly mark any operator hazard and associated safety precautions that are required for the handling of dangerous materials.

- It is important to keep a record of all hazardous substances used in the system for protection of service and maintenance personnel.
- Always adopt responsible procedures for the disposal of waste samples. Most local laws forbid the disposal of many chemicals in such a manner as to allow their entry into the water system. The user is advised to seek local advice as to the means available for disposal of chemical wastes in the area of use. For recommendations see the **Materials Safety Data Sheets**.
- The surfaces of the system may be permanently damaged if samples are spilt onto them. If a spillage occurs, disconnect the system from the power supply before scrupulously cleaning it up.

Moving the system

If it is necessary to move the system, follow these guidelines:

- Always disconnect the computer and power supply before attempting to move the system.
- Always adopt proper lifting techniques to avoid back injury.
- Always lift the instrument by holding the handholds under its base. Never lift an instrument by its covers. Refer to the **Unpacking instructions** provided.
- If the system is moved large distances, we recommend that it is repacked in its original packaging.

Disposal of the instrument

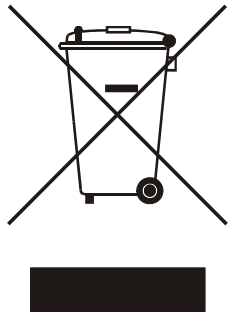
Dispose of the system responsibly. Follow these guidelines:

- Disable the laser in such a way as to make it impossible for it to be powered up. Ask the local Malvern representative for advice.
- Decontaminate the instrument if hazardous materials have been used in the system.
- Refer to any local regulations on disposal of equipment.

European Union and other European countries

This regulation applies in the European Union and other European countries with separate collection systems.

Here the system must be disposed of in accordance with the European **Disposal of Electrical & Electronic Equipment** regulations.



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This symbol on the product or on its packaging indicates that when the last user wishes to discard this product it must not be treated as general waste. Instead it shall be handed over to the appropriate facility for the recovery and recycling of electrical and electronic equipment.

By not discarding this product along with other household-type waste, the volume of waste sent to incinerators or landfills will be reduced and natural resources will be conserved.

For more detailed information about recycling of this product, please contact the local city office, a waste disposal service, or the Malvern representative.

Maintenance

Introduction

Warning!
No one except a qualified Malvern representative must remove the main cover.

This instrument has been designed so that supervisor/operator maintenance is kept to a minimum. This chapter explains the routine user maintenance procedures that can be performed. These procedures are:

- Cleaning the instrument.
- Cleaning the cells.
- Replacing the system fuse.

Cleaning the instrument

Warning!
Before cleaning, always disconnect the instrument from the power supply and disconnect all electrical cables.

Caution!
The surfaces of the instrument may be permanently damaged if samples or dispersants are spilt on them. If a spillage occurs, disconnect the system from the power supply before cleaning it up.

- Clean the covers periodically using a damp cloth.

- **Never** use excessive liquid to clean the instrument and always avoid electrical components (connectors, etc.).
- **Always** ensure that the instrument is completely dry before applying power.
- The paint has a solvent resistant finish, but it is good practice never to use a solvent-based solution. It may damage the painted surfaces.
- **Never** use an abrasive cleaner on the instrument as this may damage the painted surfaces.
- **Never** use compressed air.

Cleaning the Cells

It is very important that the cells are cleaned thoroughly between measurements and especially between different types of sample. Any cross-contamination between samples can seriously affect the results.

Cleaning Cuvettes

There are two main types of cuvette available, **disposable polystyrene** and **reusable glass or quartz**.

Disposable polystyrene

Never attempt to clean and re-use disposable cuvettes. Cleaning disposable cuvettes will cause small surface scratches that will give inaccurate results.

Reusable glass or quartz

The cleaning procedure for glass or quartz cuvettes is dependent on the sample that was measured, therefore specific instructions can not be given here. However, the following advice should be followed:

- Rinse the cuvette with the same dispersant that was used for the measurement, i.e. if the sample was dispersed in water - use clean water to rinse it.
- Try submerging the cuvette in an ultrasonic bath of clean solvent.
- Once clean, wipe the cuvette with a lint free tissue (photographer's lens cleaning tissues are recommended).
- The smaller and more dilute the sample being measured, the more important the cleanliness of the cuvette.

Replacing the system fuse

Warning!
Fuses must not be replaced by the operator. Only the supervisor or a Malvern representative should attempt to change the fuse.

If the instrument does not power up, check the system fuses. These are in the mains power switch on the rear panel.

Before changing a fuse, disconnect the instrument from the mains power.

Pull the fuse holders out and replace faulty fuses with others of the following specification:

- Rating – F 5A L 250v
- Size – 5mm x 20mm