



**Malvern
Panalytical**
a spectris company

ZETASIZER NANO BASIC GUIDE



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About the Zetasizer Nano

The Zetasizer Nano range of instruments provides the ability to measure three fundamental characteristics of particles or molecules in a liquid medium: particle size, zeta potential and molecular weight. Depending upon the accessories used, the system also has the ability to perform: microrheology, autotitration and trend measurements.

The system enables measurement over a wide concentration range and offers the precise temperature control necessary for reproducible, repeatable and accurate measurements.

The Zetasizer Nano range has been designed so that a minimal amount of user interaction is necessary to achieve excellent results. The use of Standard Operating Procedures (SOPs) and features such as the Folded capillary cell alleviate the need for constant attention.

About this manual

This manual covers the following instruments:

Instrument	Model Number	Measurement Types
Nano S (Red badge)	ZEN1600	Particle size and molecular weight
Nano S (Green badge)	ZEN1500	Particle size and molecular weight
Nano Z (Red badge)	ZEN2600	Zeta potential
Nano Z (Green badge)	ZEN2500	Zeta potential
Nano ZS (Green badge)	ZEN3500	Particle size, molecular weight and zeta potential
Nano S90 (Red badge)	ZEN1690	Particle size - 90° optics
Nano ZS90 (Red badge)	ZEN3690	Particle size and zeta potential - 90° optics
Nano ZSP (Red badge)	ZEN5600	Particle size, molecular weight and zeta potential, microrheology

This manual provides the essential information necessary for ensuring safe and efficient operation of the Zetasizer Nano. This manual:

- Provides essential health and safety information, which all users must read.
- Provides information on the site requirements of the system.
- Describes the Zetasizer Nano hardware components and setup procedures.

- Provides a brief description of the measurement process.
- Describes the basic maintenance procedures.
- Provides the specifications of the instrument.

Product documentation structure

This manual fits into the following information structure for this product:

- **Basic Guide** — provides the essentials required to get started, including health and safety. All users must read this manual before using the system.
- **User Manual** — provides detailed information on how to use the system.
- **Accessories Guide** — in-depth information about the optional accessories.
- **Help system** — integrated with the Zetasizer Nano software, provides information on all software features.

Read this manual in conjunction with the main *Zetasizer Nano User Manual* and the *Zetasizer Nano Accessories Guide*.

If using the MPT-2 Titrator and Vacuum Degasser, refer to the *Titrator and Degasser User Manual* where necessary.



WARNING!

The instrument and the samples measured may be hazardous if misused. Users must read the Health and Safety information in this guide before operating this system.

Zetasizer Nano range options

The Zetasizer Nano series of particle analyzers consists of a range of different instrument models fitted with a choice of 'red' or 'green' lasers. The models and their measurement specifications are described in the table below. For details on the accessory options, see the *Zetasizer Nano Accessories Guide*.

Zetasizer Nano	Size range maximum (diameter)	Size range for Zeta potential (diameter)	Molecular weight range (Daltons)
S	0.3 nm to 10 µm	-	342 Da to 2x10 ⁷ Da
Z	-	3.8 nm to 100 µm	-
ZS	0.3 nm to 10 µm	3.8 nm to 100 µm	342 Da to 2x10 ⁷ Da
S90	0.3 nm to 5 µm	-	342 Da to 2x10 ⁷ Da
ZS90	0.3 nm to 5 µm	3.8 nm to 100 µm	342 Da to 2x10 ⁷ Da
Nano ZSP	0.3 nm to 10 µm	3.8 nm to 100 µm	342 Da to 2x10 ⁷ Da
* Compatible but not recommended because of low sensitivity.			

The S90 and ZS90 instruments use optics that have a 90° scattering detector angle for size measurements.

A complete list of measurement specifications is included later in this manual.

Laser type

The laser fitted is identified by the color on the oval badge on the cover.

- Instruments with a black and red badge on the instrument cover either have a 4 mW 632.8 nm 'red' laser or a 10 mW 632.8 nm 'red' laser (Nano ZSP only).
- Instruments with a black and green badge have a 532 nm 'green' laser.

Generally, red lasers are least suitable for blue samples, while green lasers are least suitable for red samples.

High Temperature instruments have **HT** on the main instrument label. High Temperature and other build options exist for all the instruments in the table above.



Note:

To view the Zetasizer model, serial number, software and firmware version, left-click the Nano icon in the right corner of the status bar on the Zetasizer software.

Cells and cuvettes

A range of cells and cuvettes are available to use with the Zetasizer instrument. The following table lists the cells and their application. For more details, see the *Zetasizer Nano Accessories Guide*.

Cell	Application
Disposable polystyrene cuvettes – Standard and Small volume	Size and Zeta potential (with dip-cell)
Folded capillary cell	Size and Zeta potential
High concentration cell	Size and Zeta potential
Quartz glass cuvettes – Square, Standard, Low and Ultralow Volume, Flow	Size, Molecular weight and Zeta potential (with dip-cell)
Universal Dip cell	Zeta potential
Surface Zeta Potential cell	Zeta potential

Access to the instrument

Malvern Panalytical personnel

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



WARNING!

Removal of the main covers by unauthorized personnel, even a supervisor, will void 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 and can perform user maintenance routines.

Operator

An operator is a person trained in the use of the system. The operator can perform some user maintenance routines identified.



WARNING!

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

Assumed information

General

The Zetasizer Nano can be used with a variety of Zetasizer Nano accessories that allow it to measure a variety of samples. The basic function of these is to prepare and deliver the sample to the optical unit for measurement.

For more details of any accessory, refer to the *Zetasizer Nano Accessories Guide*.

Naming convention

Within this manual:

- The Zetasizer Nano is referred to as “the optical unit” or “the instrument.”
- The accessories are referred to directly, for example as the “MPT-2 Titrator,” “the Vacuum Degasser,” or as “the accessory”
- The combination of the optical unit, one or more accessories, and the computer is referred to as “the system.”

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.

Where to get help

This section provides information on how to get help with your system.

Help desk

All queries regarding the system should initially be directed to your local Malvern Panalytical representative, providing the following information:

- **Model and serial number of the instrument.** The serial number is shown on the Zetasizer software status bar — roll over the **Nano icon** to display.
- **The software version.** To find this, select **Help-About** in the software. Alternatively, move the mouse over the instrument status bar icon. The **Application Version** is the main firmware version number to note.

Contact the International Helpdesk if the local Malvern Panalytical representative is not available:

Telephone: +44 (0) 1684 891800 or **email:** helpdesk@malvernpanalytical.com.

If located in the United States, contact the United States Helpdesk if the local Malvern Panalytical representative is not available:

Telephone: 1 508 768 6450 or **email:** support.us@malvernpanalytical.com.



Note:

The help lines are primarily English speaking.

Remote support

Malvern Panalytical offers a remote support service, delivered by an Internet connection. Benefits include fast and efficient fault diagnosis and reduced downtime and costs.

www.malvernpanalytical.com

The Malvern Panalytical website offers a comprehensive range of resources for customer use 24 hours a day, 7 days a week.

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General safety issues



WARNING!

Use of the system in a manner not specified by Malvern Panalytical may impair the protection provided by the system.

Site requirements

The system has specific site requirements that must be enforced to ensure safe operation of the instrument. Refer to [Site requirements on page 21](#).

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 or the fans on the rear panel. Restricting airflow can damage the instrument or cause overheating.

Purge warnings (MPT-2 Titrator)



WARNING!

- If a Nitrogen supply is used, the system must be located in a well ventilated environment.
- Turn **off** the supply when not in use.

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 for the standard instrument, 2 °C to 120 °C for the High Temperature option.

Laser safety warnings

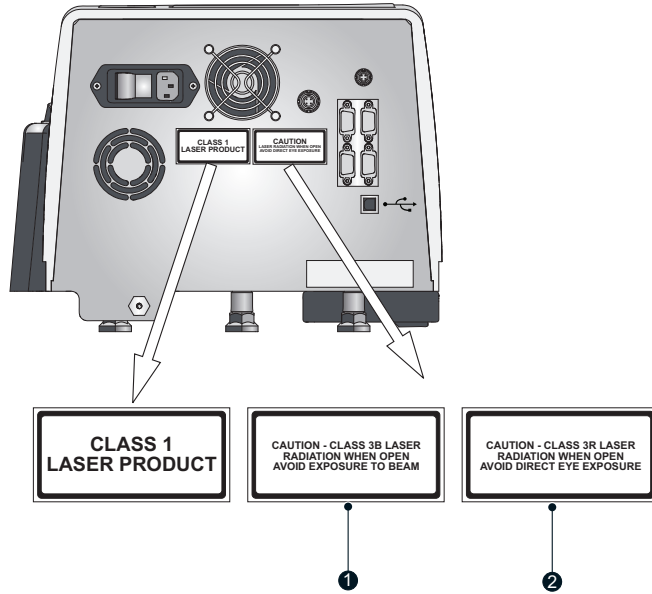
The Zetasizer Nano optical unit is a **Class 1** laser product and, as such, there is no exposure to laser radiation in its normal operation. The laser passes through the cell area but this area is enclosed when the cell is fitted. When the cell area lid is open, a mechanical laser shutter prevents exposure to laser radiation.



WARNING!

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The following diagram shows the location of the laser warning labels and the table below lists the specifications:



1. 532 nm 'Green' laser (Class 3B) (Nano S, S90) and 633 nm 'Red' laser (Class 3B) (Nano ZSP)
2. 633 nm 'Red' laser (Class 3R) (Nano Z, S, ZS, S90, ZS90)

Item	Specification
Zetasizer Nano Z, S, ZS, S90, ZS90 specification for 'Red' laser	
Light source	He-Ne Laser
Power	Internal laser maximum output of less than 4 mW (CW)
Beam wavelength	632.8 nm
Zetasizer Nano S, S90 specification for 'Green' laser	
Light source	Frequency doubled DPSS Nd:YAG Laser
Power	50 mW
Beam wavelength	532 nm
Zetasizer Nano ZSP specification laser	
Light source	He-Ne Laser
Power	10 mW
Beam wavelength	633 nm

Electrical safety warnings

Take care when measuring samples not to spill liquid or powder over the system covers. Conducting materials or liquids can damage insulation and cause dangerous conditions. If a spillage occurs, disconnect the power and carefully clean up before re-applying power to the system. Users who suspect powder or liquid has entered the covers should call a Malvern Analytical representative to arrange a service call.



WARNING!

Never attempt to remove the covers; always contact a Malvern Analytical representative.

PAT testing

If PAT testing is required, connect the earth lead to the appropriate earth stud. Malvern Analytical recommends 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 unit.



WARNING!

Only operate this product with the power supply unit provided with the instrument.

Power cord set requirements

Power cords must meet the requirements of the country where the product is used. For further information contact your Malvern Analytical representative.

General requirements

The requirements listed below are applicable to all countries:

CHAPTER 2 HEALTH AND SAFETY

- 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 0.75 mm² or 18 AWG, and the length of the cord must be less than 3 m.
- The power cord must be routed to avoid: being walked on, pinched by items placed upon it or against it, or made wet. Pay particular attention to the plug, the electrical outlet, and the point where the cord exits the product.



WARNING!

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



WARNING!

Do not use the power cord received with this product on any other products.

Power safety information

The following notes indicate guidelines to follow when connecting the Malvern Panalytical 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. Never use the system without a properly connected protective earth conductor.

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



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 of the instrument or accessory. Use care handling the adapter during or immediately after operation.
- Use only the Malvern-provided AC adapter approved for use with the instrument and/or accessory. Use of another AC adapter may cause a fire or explosion.

Advice on use of Uninterruptible Power Supplies (UPS)

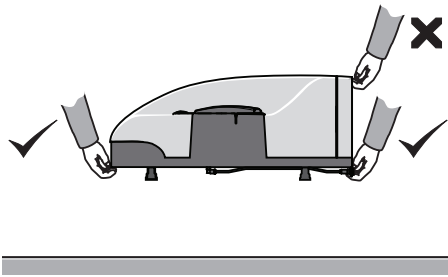
To help protect the instrument and/or accessory from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner or UPS.

Moving the system

Follow the guidelines in this section if it is necessary to move the system.

Moving the optical unit

- Disconnect the computer and power supply before attempting to move the system.
- Always lift the instrument by holding it under both of its short sides, with a firm grip on the metal base plate. Never lift an instrument by its covers:



WARNING!

The optical unit weights 20 kg. Adopt proper lifting techniques to avoid back injury.

- If moving the instrument large distances, Malvern Panalytical recommends repacking the instrument in its original packaging.

Moving accessories

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

- Disconnect the power supply before attempting to move the accessory.
- Disconnect and drain or vent any tubing that carries fluid or compressed air, including sample tubing, before moving the accessory.
- Lift the accessory by holding it under the base.



WARNING!

The Titrator weighs 5.3 kg and the Vacuum Degasser dispersion unit weighs 2.75 kg. Adopt proper lifting techniques to avoid back injury.

- If moving the accessory large distances, Malvern Panalytical recommends repacking the unit in its original packaging.

General maintenance warnings



WARNING!

Before performing any maintenance operation, read and observe all safety warnings listed in this chapter.



WARNING!

The system contains no internal serviceable parts. Never attempt to remove the covers of the optical unit or an accessory. Removal of the covers voids the warranty and may expose the user to dangerous laser radiation.



WARNING!

Failure to follow these guidelines could result in the emission of laser radiation or exposure to hazardous voltages. Laser radiation can be harmful to the body and can cause permanent eye damage. The Zetasizer Nano accessory units do not contain a laser but are connected to the optical unit that does.

Optical unit warnings



WARNING!

Before cleaning, always disconnect the unit from the power supply and computer and disconnect all electrical cables. Ensure the unit is completely dry before re-applying power.

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 Safety Data Sheets for safe handling information.
- Use the instrument in a well ventilated room, or preferably within a fume cupboard, if the 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. microscope slides and 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, carefully clean the system to remove any contaminants before making another measurement.
- Always label samples for analysis using industry standard labeling, 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.

- 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. Refer to the Safety Data Sheets.
- The surfaces of the system may be permanently damaged if samples are spilled on them. If a spillage does occur, disconnect the system from the power supply before scrupulously cleaning up the spillage.

Fumes



WARNING!

Use the system in a fume cupboard if using dispersants that emit hazardous fumes. Consult Malvern Panalytical before using dispersants with ignitable vapor.

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Environmental conditions

The site must be:

- Away from strong light sources (such as windows)
- Away from strong heat sources (such as radiators)
- Well ventilated (for noxious samples)
- On a horizontal vibration-free bench built to support the weight of the system (shown below):

Unit	Weight
Zetasizer Nano	20 kg
MPT-2 Titrator	5.3 kg
Vacuum Degasser	2.75 kg

Store and operate the system in the following conditions (accurate measurements are sample-dependent, for example dry powders may stick together in high humidity):

Condition	Requirement
IP rating	Designed to meet IP41B
Operational conditions	5 °C to 40 °C (41 °F to 104 °F)
Storage conditions	-20 °C to 50 °C (-4 °F to 122 °F)
Humidity	Maximum humidity 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C.
Altitude	Up to 2000 m
Mains supply voltage fluctuations	Up to ± 10% of nominal voltage
Overvoltage category	II (IEC 60664)
Pollution degree	2 (BS EN 60664-1:2003)
Installation category	II (BS EN 60664-1:2003)

- Do not obstruct power sockets - they may need to be disconnected in an emergency.
- Do not pass electrical cables through areas where liquids can be spilled.

Space required

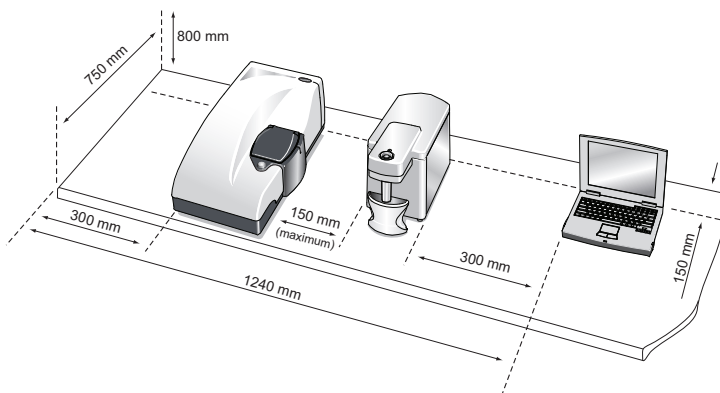
Provide enough space to allow easy access to all components and connections. Allow at least 800 mm above the bench surface for access to the cell area and accessories. The following table lists the component dimensions.



Note:
The height listed is with the cuvette holder closed.

Component	Width	Depth	Height
Zetasizer Nano	320 mm	622 mm	260 mm
MTP-2 Titrator	170 mm	390 mm	260 mm
Vacuum Degasser	75 mm	250 mm	130 mm
Computer and printer	See manufacturer's documentation		

The following diagram shows the minimum recommended space required for a typical system using an MPT-2 Titrator, and its computer.



MPT-2 titrator services

Nitrogen purge specification



WARNING!

A Nitrogen supply must be used in a well ventilated environment.

The MPT-2 Titrator has a purge connector for connection of a Nitrogen purge supply. This can be used to blanket the area directly above the sample and prevent any absorption of Oxygen that may change the pH characteristics of the sample, for example, cause a pH drift.

If a Nitrogen supply is required, it must conform to the following specifications:

- The Nitrogen supply must be dry, free from oil, and filtered to remove any contaminants that could affect the sample.
- The flow rate should be adjustable between 2 and 20 ml/min.

Computer specification

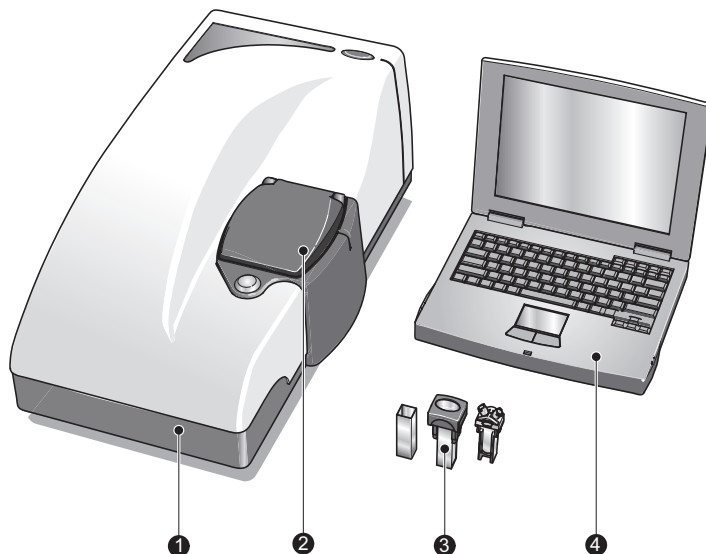
Contact the Malvern Panalytical Helpdesk or website for the recommended computer specification. This is also provided in the Software Update Notification.

CHAPTER 4 SYSTEM OVERVIEW

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Overview

The following image shows a typical Zetasizer instrument and its components. A cell is filled with the sample and loaded into the cell area on top of the instrument. A computer with Zetasizer software is installed and controls the instrument.



1. Zetasizer instrument
2. Cell area on top of instrument
3. Cell
4. Computer with Zetasizer software installed

The software is used to control the measurement of the sample. There are two basic ways to make a measurement:

- **Manual measurements** — all of the measurement settings are specified before the measurement and some further user input is required during the running of the measurement. The measurement process is also split into key stages which are paused after the

completion of each stage.

Manual measurements tend to be used for one-off measurements or as part of a method development, for example, establishing the optimal settings for measuring the sample and then saving into a SOP file.

- **Standard Operating Procedure (SOP) measurements** — most of the measurement settings are stored within a SOP file which has been previously created by the user. Once a SOP has been initiated, the measurement sequence requires less user intervention than a manual measurement.

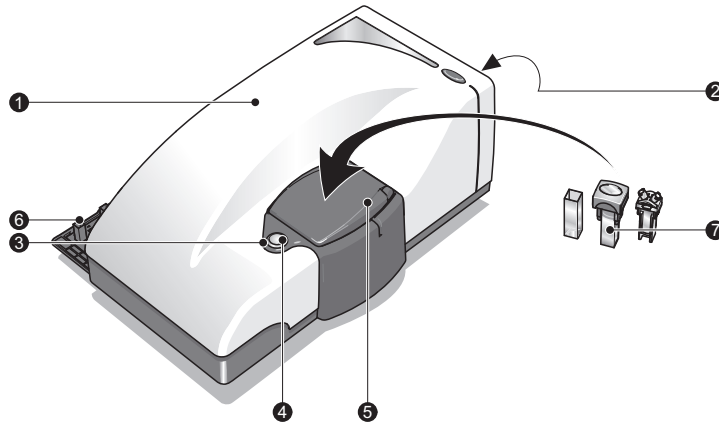
As SOPs lock-down most of the measurement settings, they improve consistency and provide greater repeatability; features that are important in quality controlled environments.

For a full description of the hardware and software in the Zetasizer Nano system, see the following manuals:

- *Zetasizer Nano User Manual*
- *Zetasizer Nano Accessories Guide*
- *MPT-2 Titrator and Degasser Manual*

Optical unit

The following image and corresponding table lists and describes the components in the optical unit.



- | | |
|-----------------------|-----------------------|
| 1. Optical unit | 5. Cell area |
| 2. Rear panel | 6. Cuvette holder |
| 3. Status indicator | 7. Cells and cuvettes |
| 4. Cell access button | |

Two labels are positioned on the cover of the optical unit. One identifies the instrument and the other identifies the instrument model.

Status indicator

The status indicator is an illuminated ring (or bezel) positioned around the cell access button. It shows the operational state of the instrument. The following table lists the indicator color and state and the function.

Color and state	Function
Amber - flashing	Start-up initialization routine is running.

Color and state	Function
Amber	“Standby”. Instrument is functioning correctly but is either not connected to the computer or the software has not been started.
Green	Instrument is functioning correctly and is ready to start a measurement.
Green - flashing	Instrument is performing a measurement.
Red	Instrument has detected an error. The measurement will be stopped.

Cell access button

The cell access button is positioned in the middle of the status indicator. Press the cell access button to open the cell area lid.

Cell area



WARNING!

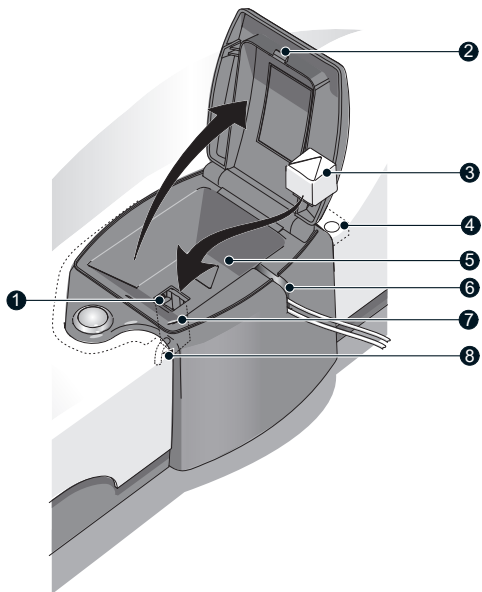
The system is capable of heating the cell to high temperatures. Care should be taken when removing the cells if a measurement has been performed at high temperatures. It is recommended that the cell area is allowed to cool before removing the cell.

The cell area is where all cells are inserted to undertake a measurement. The cell area is completely self-enclosed and controls the sample temperature over the range 0 °C to 90 °C (up to 120 °C for high temperature instruments).

For more information about the cell area, see the *Zetasizer Nano User Manual*.

CHAPTER 4 SYSTEM OVERVIEW

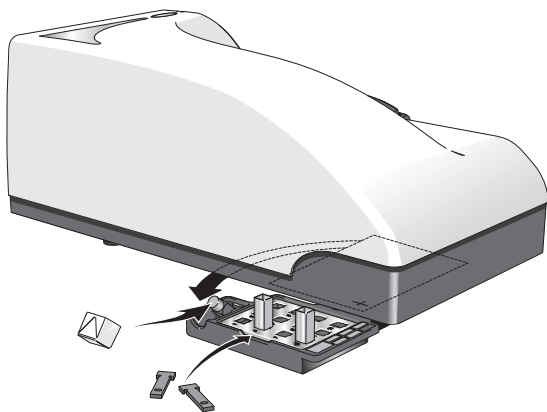
The following image lists the components in the cell area of the optical unit.



- | | |
|------------------|--|
| 1. Electrodes | 5. Cell basin |
| 2. Cell area lid | 6. Access channel for Titrator and flow cell tubes |
| 3. Thermal cap | 7. Cell clamp |
| 4. Drain channel | 8. Drain port |

Cuvette holder

The cuvette holder swings out from the instrument and is used for storing the up to 12 cells before and after use.



For more information on the cuvette holder, see the *Zetasizer Nano User Manual*.

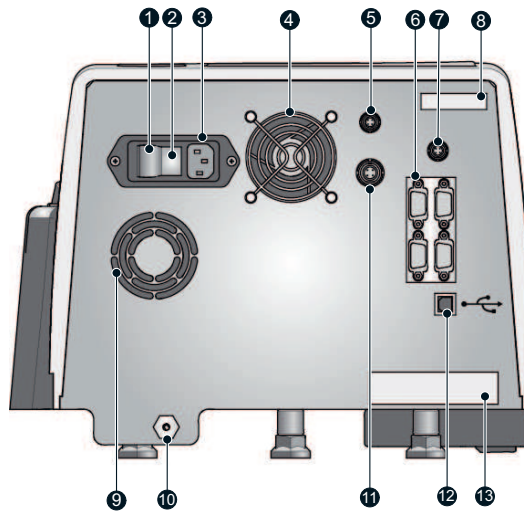
Rear panel

The rear panel provides all the connections. The following image and corresponding table lists and describes the components on the rear panel.



WARNING!

Do not obstruct the ventilation slots underneath the instrument or the cooling fans on the rear panel.



- | | |
|--------------------------|--|
| 1. Power switch | 8. Mod record |
| 2. Fuse holder | 9. Cooling fan |
| 3. Power input socket | 10. Purge connection |
| 4. Cooling fan | 11. Green laser power supply unit input |
| 5. Flow-made connection | 12. Computer connection |
| 6. Accessory connections | 13. Serial number and model number label |
| 7. Accessory input | |

Details about connections

The following table lists and describes details about the connections on the rear panel of the optical unit, the main component of the Zetasizer Nano system.

Real panel component	Description
Power input socket	Mains power input socket for the instrument.
Fuse holder	Fuse for the instrument. For details on replacing the fuse, see Replacing the system fuse on page 61
Power switch	The on/off power switch for the instrument.
Computer connection	The USB cable from the computer is connected here.
Accessory connections	<p>Two types of connections are available:</p> <ul style="list-style-type: none"> • CAN Ports. Use these ports to connect any Malvern Panalytical supported accessory that requires a CAN connection (Controller Area Network). • RS232 Ports. Use these ports to connect any Malvern Panalytical supplied accessory that requires an RS232 connection. <p>Accessories are controlled using the Zetasizer software. Consult the respective accessory manual for details.</p>
Cooling fans	In conjunction with ventilation slots underneath the instrument, the fans provide cooling to the internal components of the Zetasizer.
Serial number and model number label	Identifies the actual Zetasizer Nano model and its serial number. Please quote all numbers in any correspondence with Malvern Panalytical.
Mod record	Indicates any instrument updates. This is used for reference by the Malvern Panalytical service personnel.
Accessory output	A 12V output supply is provided on the rear panel to connect to any Malvern Panalytical supplied accessory that requires an external voltage source. Consult the respective accessory manual for details.
Green laser PSU input	If the instrument uses a 532 nm 'green' laser, connect the laser PSU to this connection.
Purge connection	Used to connect a dry-air supply for use in humid climates. For more information about the purge connection, see MPT-2 titrator services on page 24
Flow-mode connection	This connection is used when inputting a signal from an external measuring source, such as an Ultra-violet absorption detector or Refractive index detector to

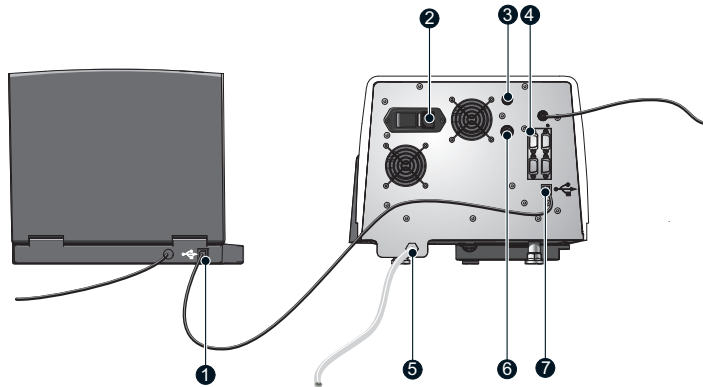
Real panel component	Description
	<p>the Zetasizer Nano. A real-time parameter reading from the device can be directly inputted into the Nano optics unit and added to the Nano sample record.</p> <p>The Connector input voltage specification is: -5V to +5V (analogue).</p>

Connecting the Zetasizer Nano

This section describes how to install the system for initial system setup.

Installing the system

The following image and table below list and describe the connections for installing the Zetasizer Nano.



- | | |
|-------------------------------------|----------------------------------|
| 1. Computer with Zetasizer software | 5. Purge air port |
| 2. Power cable connection | 6. Laser power supply unit input |
| 3. Input signal cable connection | 7. USB input connection |
| 4. Accessory connections | |

Perform the following steps to install the Zetasizer Nano:

CHAPTER 4 SYSTEM OVERVIEW

1. Connect the USB cable to the connector marked USB on the rear panel of the Zetasizer Nano.
2. Connect the other end of the cable to the USB connection on the computer.
3. Connect the power cable to the power socket on the rear panel of the instrument.



WARNING!

This product must be connected to a protective earth.

4. Make all of the computer connections (mouse, keyboard, power, and so on) by following the instructions provided with the computer.
5. Install the following options as required:
 - If purge air is required, connect it to the purge air port at the base of the rear panel.
 - If the instrument is fitted with the 532 nm 'green' laser option, connect the laser power supply unit to the power supply unit input on the rear panel.
 - If accessories are used, connect those to the appropriate ports as described in their respective user manuals.
 - If the instrument is connected to an external detector, and the flow-mode facility is used, connect the input signal cable to the input signal connection.

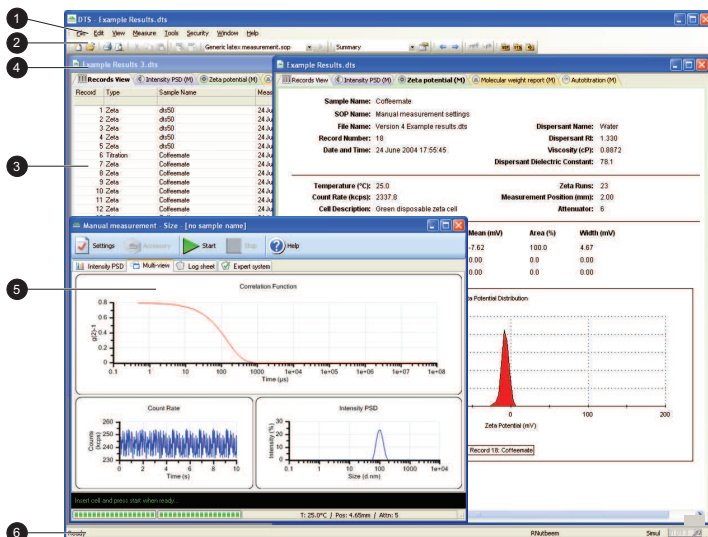
CHAPTER 5 SOFTWARE OVERVIEW

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Zetasizer software

The Zetasizer software controls the system during a measurement and then processes the measurement data to produce either a size, zeta potential, or molecular weight result. It displays the results and allows reports to be printed.

The following image and corresponding table list and describe the components in a typical screen in the Zetasizer software.



- | | |
|----------------------------|--------------------------------|
| 1. Menu bar | 4. Title bar |
| 2. Toolbars | 5. Measurement display |
| 3. Measurement file window | 6. Status bar and Status icons |

Toolbars

The toolbars contain a selection of tools that can be used to perform the most popular operations. Each tool has its equivalent commands within the menu bar.

For more information about toolbars, see the *Zetasizer Nano User Manual*.

Measurement file window

The **Measurement** file window displays all the information for a single measurement file. You can display more than one measurement file window at a time. The contents of the window changes when a **Record** or **Report** tab is selected.

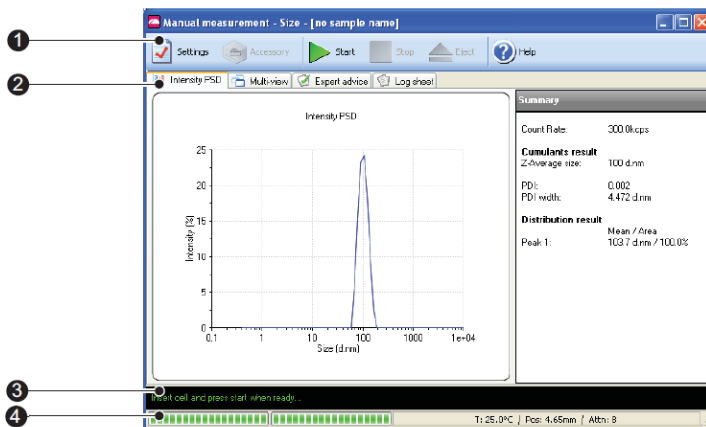
The **Measurement** file window contains the following:

- **Measurement file workspace**

When performing zeta potential measurements, it may be unnecessary to see parameters associated with size measurements in the measurement file window. A **measurement file workspace** called **zeta potential** is available that displays only parameters associated with zeta potential measurements.

Measurement display

The Measurement display shows the progress of the measurement as the measurement is being performed. The screen display shown changes depending on the type of measurement being performed and the view tab selected.



1. Button bar
2. Tab views

3. Status bar
4. Progress meter

Button bar

The button bar provides the controls for the measurement operation.

Button	Action
Settings	Open the measurement settings window. You can add extra comments and changes to the measurement parameters prior to the measurement being started.
Start/Stop	Start and stop the measurement. If you click the Stop during a measurement, it must be started again from the beginning. Stop does not act like pause - you are asked if you wish to abort the measurement.
Help	Open the Help file.
Accessory	Open the MPT-2 Titrator Manual control window. Click the Start to close the manual

Button	Action
	window.
Eject	Zetasizer APS instrument only.

Tab views

The **Tab** views enable the progress and results of the measurement to be viewed. The first tab shows the results, and will change with respect to the measurement type and results view selected. In the previous example, this tab is labelled Intensity **PSD** to identify that intensity results are being viewed. This tab shows different graph plots relevant to the measurement type selected. The other three tabs windows — **Multi-view**, **Log sheet** and **Expert advice** — are standard for each Measurement type.

- The views displayed in the first (result) tab, can be altered by right-clicking on the graph and selecting from the list displayed. A graph only, or a graph with a summary table will be shown depending upon the view chosen. The **Result** tab is named after the result view chosen.
- The Multi-view tab displays the results in three smaller windows. As with the first (result) tab, the view in each separate window can be altered by right-clicking in the window and selecting a different view from the list displayed. The size of each window can altered by moving the borders around.

Status bar and Status icons

The status bar provides an indication of the instrument's current operating state and an extended description of the tool icons. If required, use the **View-Toolbars-Customize** menu item to disable it.

The right portion of the status bar includes icons to indicate which instrument is connected and any additional features that are installed.

Progress meter

The progress meter shows how far the measurement has progressed plus the number of measurements performed and the measurement runs completed. Also shown are the temperature, measurement position, and attenuator settings.

Menu bar

The menu bar contains the main menu headings for all software functions.

Menu name	Description
File	Use the File menu to either create a New Measurement or SOP file, or to open an existing Measurement or SOP file.
Edit	Use the Edit menu to move and manipulate records in the Measurement file window(s). You can cut, copy, paste, and delete records into their own measurement file or into other measurement files.
View	Use the View menu to select which reports to display in the measurement file window and which Toolbars to display.
Measure	Select the Measure menu when ready to perform a measurement. Choose to use either an existing measurement SOP (Measure-StartSOP...) or manually set up the measurement and sample details (Measure-Manual).
Tools	Use the Tools menu to aid in the measurement, display, and reporting functions of the software.
Security	Use the Security menu to configure the software to limit each user's access to various functions, and to prevent unauthorized changes.
Window	Use this menu to alter the view characteristics of any measurement file windows that are open. You can minimize, tile, and cascade the measurement file windows.
Help	Use the Help menu to access the help topics.

For more details about each menu, see the *Zetasizer Nano User Manual*.

Installing the software

If, at some point in the future, the computer used with the instrument is changed, you must install the software on the new computer. Consult the software update notification supplied with the software.

Perform the following steps to install the software:

CHAPTER 5 SOFTWARE OVERVIEW

1. Insert the Zetasizer software CD into the CD drive.
2. If Autorun is enabled on the computer, the software starts to install automatically. Follow all on-screen instructions to complete the installation.
3. If Autorun is not enabled, select **Start-Run-Setup** and follow the on-screen instructions.



Note:

If the software is subsequently updated with a new version, any custom reports, parameter settings and SOPs are preserved.

CHAPTER 6 QUICK START: USING THE SYSTEM

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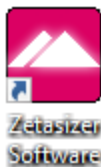
Turning on the system

If it is not already switched on, perform the following steps to turn on the Zetasizer Nano and start the Zetasizer software:

1. Close the lid and turn on the optical unit, switch on power at the power socket, and turn the power switch on at the rear of the unit.

A beep sounds to indicate the instrument has been turned on and the initialization routine will begin, followed by a second beep once the instrument has finished the routine. Two further beeps indicate the instrument has reached the default temperature of 25 °C.

2. If it is not already switched on, turn on the computer.
3. Do either of the following:
 - a. Click the Zetasizer Software icon on the desktop:



- b. Click the **Start** menu and select **Malvern Panalytical** and then select **Zetasizer Software**.
4. Allow the instrument to power up for at least 30 minutes before you begin making measurements.



Note:

All laser based measuring instruments should be powered up for approximately 30 minutes before making measurements. This is to prevent any thermal equilibration problems affecting the measurement results.

Running the installation test macro

The Zetasizer Nano system includes an installation test macro and the Zeta potential standard.

The installation test macro allows you to perform a Sizing and a Zeta measurement to run through the processes involved with preparing a sample, running a measurement, and also to ensure the system is performing properly.

Perform the following steps to unpack the Zeta standard and to run the installation test macro:

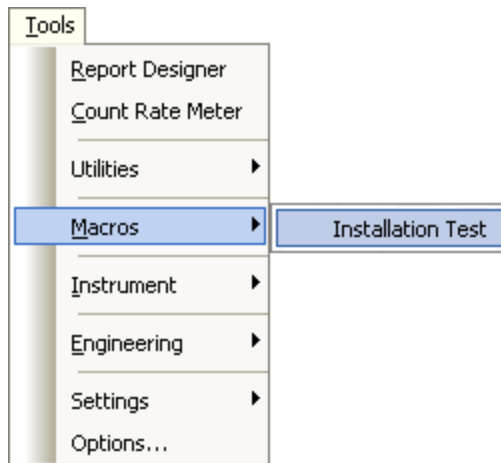
1. Unpack the Zeta potential transfer standard.



Note:

Once unpacked, store the zeta potential transfer standard in a refrigerator at a temperature range of 4 - 8 °C. If the standard is stored outside this range, it could give inaccurate test responses.

2. Start the Zetasizer Nano software.
3. Once the software has started, select Tools-Macros-Installation Test, as shown:

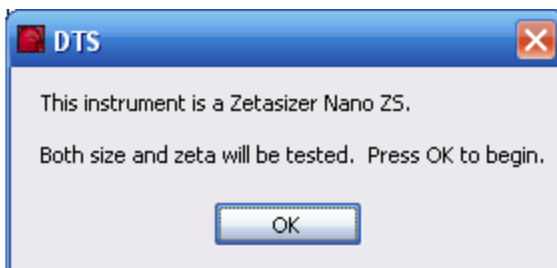




Note:

The results are saved to a measurement file named **Installation Test.dts** which opens automatically.

- The instrument reports what it is going to test: size, zeta potential or both, as shown below.



Tip:

The type of test(s) performed depends on the instrument's specification – **S: size, Z: zeta potential** and **ZS or ZS90: both zeta potential and size.**

- Click **OK** to start the test.

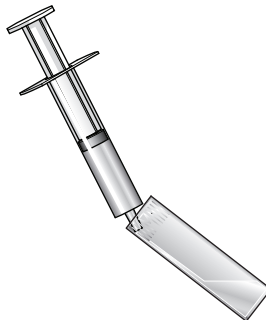
Performing the Size test

Perform the following steps to run the Size test:

- Remove the square plastic cuvette (not the glass one) from the consumables pack.
- Fill the cuvette with between 1.0 mL and 1.5 mL of the supplied Zeta potential transfer standard from the syringe as follows:

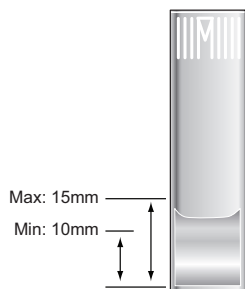
CHAPTER 6 QUICK START: USING THE SYSTEM

- a. Tilt the cuvette and allow it to fill slowly.

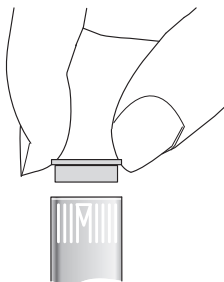


Tip:
To stop bubbles from forming, let the sample flow down the inside.

- b. Check to ensure the sample depth is between 10 mm and 15 mm by placing the cuvette against the diagram on the inside of the cell area lid, as shown:



3. Push the lid securely onto the cuvette as shown:

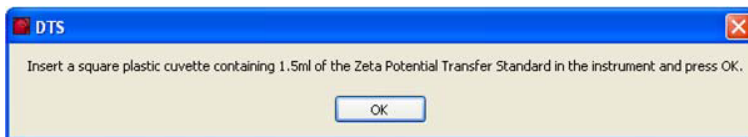


Note:

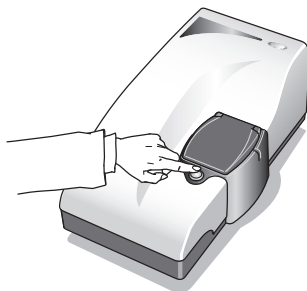
Most cuvettes have a triangle or spot mark, as shown below. This mark **must** face towards the front of the Zetasizer Nano.



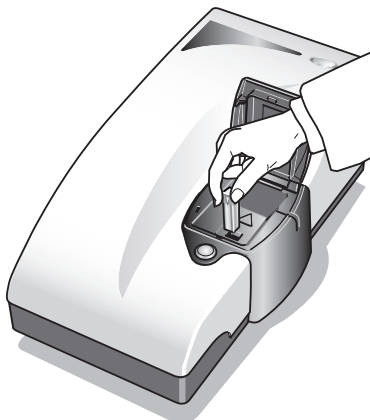
4. Click **OK** in response to the following prompt:



5. Press the button to open the chamber lid:



6. Push the cuvette down so that it is firmly located and then push the chamber lid down.



7. See [Test results on page 54](#) to continue.

Performing the Zeta potential test

Cell preparation

It is recommended to flush the cell to ensure cleanliness and reduce risk of bubble formation. The recommended procedure requires two syringes; filtered deionized (DI) water; and ethanol or methanol:

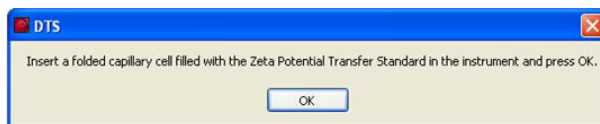
CHAPTER 6 QUICK START: USING THE SYSTEM

1. Flush the cell with ethanol to facilitate wetting.
2. Fill one of the syringes with the DI water and place in one of the sample ports on the cell, the empty syringe is placed into the other port.
3. Flush the contents of the full syringe, through the capillary, into the empty syringe, then flush back.
4. Repeat this process 4 more times before removing the syringes and performing a final flush with the dispersant being used for the measurement.

After this, the cell is ready for use. Never attempt to clean the optical surface of the folded capillary cell as this will cause small surface scratches that will give inaccurate results.

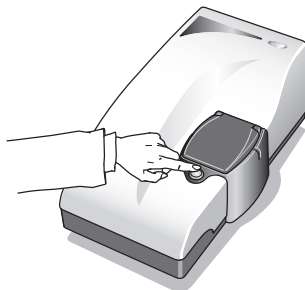
Zeta potential test

Perform the following steps to run the Zeta potential test:



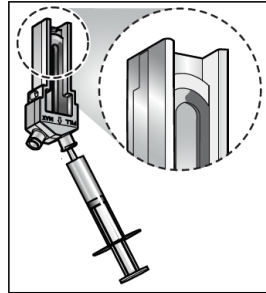
Load the appropriate cell in the instrument, following the procedures below, then click **OK**.

1. Clean the cell according to the cell preparation steps above.
2. Press the button to open the measurement chamber:

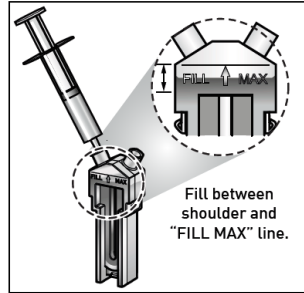


3. Fill the cell according to the cell type below:

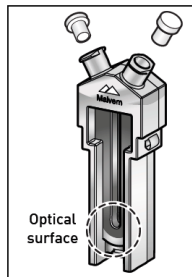
DTS1070 cell:



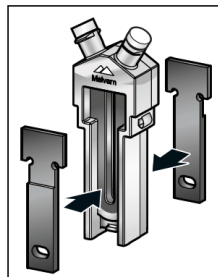
Invert the cell and slowly inject the sample from its syringe into the cell, filling the U tube to just over half way.



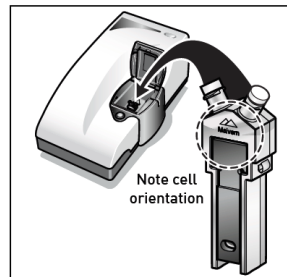
Check no air bubbles form in the cell - Tap the cell gently to dislodge any that form. Turn the cell upright and continue injecting slowly until the liquid reaches the fill area as shown. Remove syringe.



Fit one stopper firmly, the other one loosely, to avoid pressurisation of the cell. Remove any spillage from the electrodes.



Fit the thermal contact plates as shown. These are stored in the pull out cuvette holder, located under the instrument.



When inserting the cell, ensure that the Malvern logo faces towards the front of the instrument. Press down until the cell clicks into place. Before starting an experiment, ensure the software is set up to use the DTS1070 cell.

4. After inserting the respective cell into the cell holder until it stops, close the measurement lid as shown:

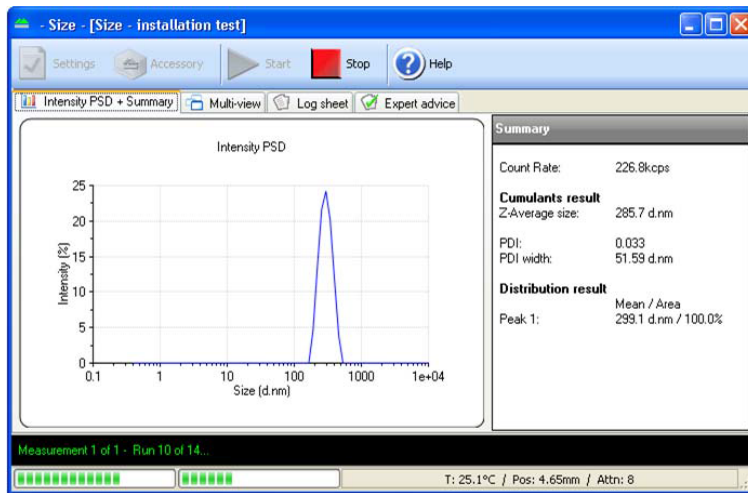


5. See [Test results](#) below to continue.

Test results

The Size and Zeta potential tests each take approximately six minutes to run.

After a two-minute equilibration period, the software shows the test running, as shown:



When the test finishes, the system displays a prompt indicating if the test passed or failed.



Note:

Test results are stored as a record in the measurement file [Installation test.dts](#).

Passing the tests

If the performed test or tests pass, it indicates that the system is set up correctly.

If testing both the size and the Zeta potential test, the system first runs the Size test and then prompts for the Zeta capillary cell for the Zeta potential test. If *both* tests pass, it indicates that the system is set up correctly.

Failed tests

If a failure message is displayed for either test type, you will need to re-run both tests. Perform the following steps to repeat the measurement:

1. Insert a new sample in a new cuvette/cell and measure it, ensuring that:
 - The correct cell type is used.
 - The measurement chamber lid is closed properly.
 - There are no bubbles in the sample.
 - The cell is clean and free from fingerprints, grease, and dust.

2. If rerunning the Size test, perform the following steps (refer to [Performing the Size test on page 48](#) for more details):
 - Check that between 1.0 mL and 1.5 mL is injected into the cuvette (giving a sample depth of 10 mm to 15 mm).
 - Check that the triangle on the cuvette faces forward.

3. If rerunning the Zeta potential test, perform the following steps:
 - Wet another cell thoroughly using ethanol or methanol as described in [Performing the Zeta potential test on page 51](#) and then check that there are no scratches on it. Wipe it dry with a lint-free cloth (Malvern Panalytical recommends camera lens cleaning pads).



CAUTION!

Do not try to clean the optical area on the front of the “U” part of the cell as this will cause small scratches which can distort the result.

- Check that the capillary cell is filled.
- Ensure that the cell plugs are inserted firmly.

If the test continues to fail, contact the local Malvern Panalytical representative. For details, see [Where to get help on page 7](#).

Running a SOP



Once the instrument is set up and its performance validated with the Zeta transfer standard, it is ready for use. Measurements are made using Standard Operating Procedures (SOPs). Malvern Panalytical supplies some default SOPs. Supervisors and advanced users can create additional SOPs.

This is a summary of the procedure only. For more detailed information on the process, including sample preparation and cell selection, see the *Zetasizer Nano User Manual*.

Perform the following steps to run a SOP:

1. Close the lid and turn on the instrument. Wait 30 minutes for the laser to stabilize.
2. Start the Zetasizer Nano software.
3. Prepare the samples according to the guidelines given in the *Zetasizer Nano User Manual*.
4. Choose the cell(s) appropriate for the sample and measurement type. For details on selecting and preparing the measurement cell, see the *Zetasizer Nano Accessories Manual*.
5. Fill the cell(s) with the prepared sample.
6. Do the following to make a SOP measurement:
 - a. In the Zetasizer software, select **Measure-Start SOP**. The list of available SOPs are displayed.
 - b. Select the **SOP** required and click **Open**.
 - c. Follow any on-screen instructions that are displayed. The system displays the Measurement display.

CHAPTER 6 QUICK START: USING THE SYSTEM

- d. When requested, insert the cell into the instrument and wait for the temperature to stabilize.
 - e. Click **Start** (). The measurement will be made and the results displayed and saved to the measurement file you selected when you started the SOP.
7. Note the messages in the black status bar (near the base of the window) which shows the progress of the measurement.
 8. When the measurement finished, click the  button in the upper right corner of the window to close the window.

For more detailed information, see the *Zetasizer Nano User Manual*.

CHAPTER 7 MAINTENANCE

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About maintenance procedures



Note:

Maintenance procedures and details of consumable parts kits for the individual accessories are provided in their respective user manuals.

An operator can perform all procedures except replacing fuses.

Cleaning cells and accessories

Clean cells thoroughly between measurements, especially between different types of sample. Cross-contamination between samples can seriously affect the results.

Refer to the *Zetasizer Nano Accessories Guide* for information on cleaning and maintaining the cell and accessories associated with the Zetasizer Nano instrument.

Cleaning the covers



CAUTION!

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

Do the following to maintain the covers:

- Periodically clean the covers thoroughly using a mild soap solution.
- Never use excessive liquid for cleaning and always avoid electrical components (such as connectors) and the cell windows.
- Never use a solvent-based solution for cleaning; it may damage the surface.

Replacing the system fuse



WARNING!

Fuses must not be replaced by the operator. Only the supervisor or a Malvern Panalytical 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.

1. Before changing a fuse, disconnect the instrument from the mains power.
2. Pull the fuse holders out and replace faulty fuses with others of the following specification:
 - Rating: T 2A L 250V (T = Time delay)
 - Size: 5 mm x 20mm

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EU Declaration of Conformity

The CE badge on this product signifies conformance to the relevant European Directives — consult the Declaration of Conformity certificate for the product for more information.

Canadian Regulatory Information (Canada only)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Note that Canadian Department of Communications (DOC) regulations provide, that changes or modifications not expressly approved by Malvern Panalytical could void your authority to operate this equipment.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

VCCI acceptance (Japan only)

The Voluntary Control Council for Interference (VCCI) mark on this product signifies compliance to Japanese EMC regulations as specified by VCCI.

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策
を講ずるよう要求されることがあります。 **VCCI-A**

Translation:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

FCC Notice (US only)

The Federal Communications Commission (FCC) mark on this product signifies conformance to FCC regulations relating to Radio Frequency Devices. These have been satisfied by testing the product against, and being found to be compliant with:

FCC CFR 47 Part 15:October 2011.Class A digital device.

The device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Note:



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Note:

Changes or modifications not expressly approved by Malvern Panalytical could void the user's authority to operate the equipment.

Disposal of Electrical & Electronic Equipment

When the need arises to dispose of the system, this should be done in a responsible manner. Follow these guidelines:

CHAPTER 8 REGULATORY INFORMATION

- Refer to local regulations on disposal of equipment; in Europe refer to the information below.
- Seek advice from the local Malvern Panalytical representative for details.
- Decontaminate the instrument if hazardous materials have been used in it.

The following is applicable in the European Union and other European countries with separate collection systems.



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 your local city office, your waste disposal service, or your Malvern Panalytical representative.

CHAPTER 9 SPECIFICATIONS

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Specifications (Optical unit)

The following table lists the specifications of the Zetasizer Nano optical unit. For a complete list of specifications and accessories, refer to the respective user manuals.

All specifications are correct at time of publication, but may be subject to alteration.

Parameter		Specification
Size		
Nano S, ZS, and ZSP	Range (maximum diameter)	0.3 nm - 10 microns *
	Minimum sample volume	12 µL
	Concentration - minimum	0.1 mg/mL 15 KDa protein
	Maximum concentration	40% w/v †
	Measurement angles (water as sample dispersant)	175° (S), 13° and 90° (ZS90)
Nano S90 and ZS90	Range (maximum diameter)	0.3 nm - 5 microns **
	Minimum sample volume	20 µL
	Concentration - minimum	10 mg/mL 15 KDa protein
	Maximum concentration	Dilute
	Measurement angles (water as sample dispersant)	90° (S90), 13° and 90° (ZS90)
Zeta potential	Sensitivity	1 mg/mL 15 KDa protein (ZSP) 10 mg/mL 66 KDa protein (Z, ZS, ZS90)
	Zeta potential range	> ± 500 mV
	Mobility range	>± 20 µ.cm/V.s
	Maximum sample concentration	40% w/v †
	Minimum sample volume	20 µL (using diffusion barrier)
	Maximum sample conductivity	200 mS/cm
	Conductivity accuracy	± 10%

CHAPTER 9 SPECIFICATIONS

Parameter		Specification
Molecular weight *	Molecular weight range (estimated from DLS)	1000 Da to 2x10 ⁷ Da (S, ZS, ZSP, S90, ZS90) †
	Molecular weight range (calculated by Debye plot)	1000 Da to 2x10 ⁷ Da (S, ZS, ZSP) † 10,000 Da to 2x10 ⁷ Da (S90 & ZS90) †
Measurement technique	Size:	
	Nano S, ZS, ZSP	Dynamic light scattering (NIBS®)
	Nano S90 and ZS90	Dynamic light scattering (90 degrees)
	Zeta potential	M3-PALS®
	Molecular weight	Static light scattering
Product laser class		Class 1 compliant, IEC 60825-1(1993)+A1(1997)+A2(2001)
Laser attenuation		Automatic, transmission 100% to 0.0003%
Laser (Nano S, Z, ZS, Z90, ZS90)	Standard - Red	<p>CDRH and CE compliant (Class IIIa laser product (CDRH) / Class 3R laser product (IEC60825-1(1993)+A1(1997)+A2(2001))</p> <ul style="list-style-type: none"> Type: HeNe gas laser Max. output power: 4 mW Beam diameter: 0.63 mm (1/e²) Beam divergence: 1.5 mrad Beam wavelength: 632.8 nm
	Option - Green	<p>CDRH and CE compliant (Class IIIB laserproduct (CDRH) / Class 3B laser product (IEC60825-1(1993)+A1(1997)+A2(2001))</p> <ul style="list-style-type: none"> Type: Frequency doubled DPSS Nd:YAG laser Max. typical output power: 50 mW Beam diameter: 0.32 mm (1/e²) Beam divergence: < 2.5 mrad Beam wavelength: 532 nm
	Laser (Nano ZSP) Standard - Red	CDRH and CE compliant (Class IIIa laserproduct (CDRH) / Class 3B laser product (IEC60825-1(1993)+A1(1997)+A2(2001))

CHAPTER 9 SPECIFICATIONS

Parameter	Specification
	<ul style="list-style-type: none"> • Type: HeNe gas laser • Max. output power: 10 mW • Beam wavelength: 632.8 nm
Detector	Avalanche photodiode, Q.E. >50% at 633 nm
Condensation control	Purge facility using dry air
Temperature control range	0 °C to 90 °C (to 120 °C with High Temperature option)
Temperature accuracy	± 0.1 °C at 25 °C, ± 0.2 °C at 0 °C, ± 0.5 °C at 90 °C
Compatible cell temperatures	0 °C to 120 °C – Glass and Quartz cells, High concentration cell
	0 °C to 70 °C – Folded capillary cell, plastic disposable cells
	0 °C to 50 °C – Dip cell
Dimensions	W:D:H, 320 mm x 600 mm x 260 mm - with cuvette holder closed
Weight	20 kg
Power requirements	AC 100-240V, 50-60 Hz
Power consumption	Max. 100 W
Ambient operating conditions Humidity	+10 to +35 °C (+50 to 95 °F) 10 to 90% (non-condensing)
Recommended computer specification	Contact the Malvern Analytical Helpdesk or website for the recommended computer specification, otherwise consult the Software Update Notification document supplied on the software CD.
* Peak mode range (diameter), 0.6 nm - 8.9 microns, sample dependent	
** Peak mode range (diameter), 0.6 nm - 3 microns, sample dependent	
† Sample dependent	

Chemical compatibility

Components of the Zetasizer Nano that may come into contact with the sample are manufactured from materials that are considered to give the widest protection from chemical attack. However, it is important to check that any sample or titrant used is chemically compatible with the materials mentioned.



WARNING!

Malvern Panalytical advises that before inserting a sample, you check its chemical compatibility against the materials identified below. It is also recommended that you perform a test on the material with the sample before continuing with more permanent usage.

For details on cleaning and maintenance procedures, see [Maintenance on page 59](#).

Cell area

The only time the cell area may come in contact with the sample is if there is a spillage within the cuvette or cell. The materials list below details all components that may come into contact if this occurs.

Component	Materials
Cell basin assembly (lid, basin and drain channel)	Polypropylene The outside of the cell basin and top of the cell lid is coated with a solvent resistant paint. This paint displays similar resistance properties to polypropylene. The inside of the cell basin and drain channel are not coated.
Drain tub	Tygon, F-4040-A
Electrodes	Gold plated beryllium/copper
Cell holder	Aluminium (anodised)

Cells and cuvettes

Refer to the descriptions in the *Zetasizer Nano Accessories Guide* for the materials used for each of the available cells.



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