DS2500 Liquid Analyzer

Ω Metrohm

DS2500 Liquid Analyzer

Manual

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1   Introduction

This manual provides you with a comprehensive overview of the installation and maintenance of the DS2500 Liquid Analyzer. The DS2500 Liquid Analyzer is operated with the control software. You can find information on operating the instrument in the tutorial and in the manual for the control software *(see 8.105.8032 Tutorial Vision Air Local and 8.105.8036 Tutorial Vision Air Network and Server)*.

> **ℹ NOTICE**
>
> You can request application descriptions in the form of
> **Application Notes** and **Application Bulletins** from your
> Metrohm representative or download them from
> *http://www.metrohm.com*.

1.1   Instrument description

The DS2500 Liquid Analyzer is a compact measuring instrument for transmission measurement in the near-infrared wavelength range. The polychromatic light is dispersed by the monochromator built into the DS2500 Liquid Analyzer into monochromatic wavelengths before hitting the sample. This keeps heating of the sample to a minimum. The instrument operates in a wavelength range from 400 to 2,500 nm.

In order to ensure that each sample can be measured at the optimal temperature, the DS2500 Liquid Analyzer heats the sample to the desired temperature before the analysis. The DS2500 Liquid Analyzer can be actively cooled so that there is no delay between measurements at various temperatures.

The DS2500 Liquid Analyzer is designed for quality monitoring of the production processes. Use the DS2500 Liquid Analyzer for the following purposes:

- Quick and non-destructive incoming goods inspection of liquids
- Production process monitoring
- Pre-delivery inspection of the final product

Liquid samples can be measured using the DS2500 Liquid Analyzer.

The DS2500 Liquid Analyzer is a durable instrument that is resistant to moisture, dust, vibrations and temperature fluctuations. As a result, the DS2500 Liquid Analyzer can be used in a variety of production facilities.

The DS2500 Liquid Analyzer is operated with the control software via an external computer.

1.2 Intended use

The DS2500 Liquid Analyzer is designed for use in production facilities. The DS2500 Liquid Analyzer can be used for incoming goods inspection or atline or offline for production process monitoring.

Usage requires the user to have basic knowledge and experience in handling chemicals. Knowledge with respect to the application of the fire prevention measures prescribed for laboratories is also required.

Adherence to this technical documentation and compliance with the maintenance specifications make up an important part of intended use.

Any utilization in excess of or deviating from the intended use is regarded as misuse.

Specifications regarding the operating values and limit values of individual products are covered in the "Technical specifications" section *(see chapter 6, page 38)*.

Exceeding and/or not observing the mentioned limit values during operation puts people and components at risk. The manufacturer assumes no liability for damage due to non-observance of these limit values.

The EU declaration of conformity loses its validity as soon as modifications are carried out on the products and/or the components.

1.3 About the documentation

CAUTION

Read through this documentation carefully before putting the instrument into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the instrument.

1.3.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

*(5-**12**)*	**Cross-reference to figure legend**
	The first number refers to the figure number, the second to the instrument part in the figure.

1	**Instruction step**
	Carry out these steps in the sequence shown.
Method	**Dialog text**, **parameter** in the software
File ▶ New	Menu or menu item
[Next]	**Button** or **key**
⚠	**WARNING**
	This symbol draws attention to a possible life-threatening hazard or risk of injury.
⚡	**WARNING**
	This symbol draws attention to a possible hazard due to electrical current.
♨	**WARNING**
	This symbol draws attention to a possible hazard due to heat or hot instrument parts.
☣	**WARNING**
	This symbol draws attention to a possible biological hazard.
❗	**CAUTION**
	This symbol draws attention to possible damage to instruments or instrument parts.
ℹ	**NOTE**
	This symbol highlights additional information and tips.

1.4   Safety instructions

1.4.1   General notes on safety

⚠ **WARNING**

Operate this instrument only according to the information contained in this documentation.

This instrument left the factory in a flawless state in terms of technical safety. To maintain this state and ensure non-hazardous operation of the instrument, the following instructions must be observed carefully.

1.4.2   Electrical safety

The electrical safety when working with the instrument is ensured as part of the international standard IEC 61010.

⚠️ **WARNING**

Only personnel qualified by Metrohm are authorized to carry out service work on electronic components.

⚠️ **WARNING**

Never open the housing of the instrument. The instrument could be damaged by this. There is also a risk of serious injury if live components are touched.

There are no parts inside the housing which can be serviced or replaced by the user.

Supply voltage

⚠️ **WARNING**

An incorrect supply voltage can damage the instrument.

Only operate this instrument with a supply voltage specified for it (see rear panel of the instrument).

Protection against electrostatic charges

⚠️ **WARNING**

Electronic components are sensitive to electrostatic charges and can be destroyed by discharges.

Do not fail to pull the power cord out of the power socket before you set up or disconnect electrical plug connections at the rear of the instrument.

1.4.3 Flammable solvents and chemicals

 WARNING

All relevant safety measures are to be observed when working with flammable solvents and chemicals.

- Set up the instrument in a well-ventilated location (e.g. fume cupboard).
- Keep all sources of flame far from the workplace.
- Clean up spilled liquids and solids immediately.
- Follow the safety instructions of the chemical manufacturer.

1.4.4 Recycling and disposal
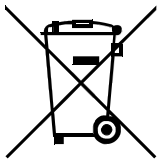
This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old instrument will help to prevent negative effects on the environment and public health.

More details about the disposal of your old instrument can be obtained from your local authorities, from waste disposal companies or from your local dealer.

2   Overview of the instrument

2.1   Front

Figure 1   Front DS2500 Liquid Analyzer

1	**Lid**	**2**	**Sample compartment**
3	**LED display**	**4**	**Feet (shock-absorbing)**
5	**Lamp compartment**	**6**	**Cover plate**

2.2   Rear
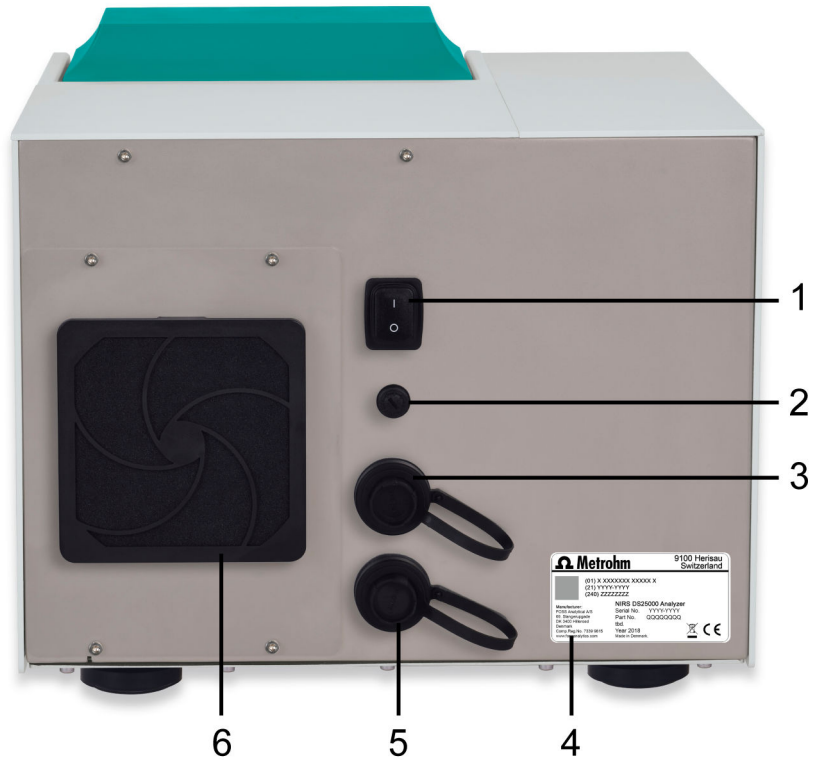
Figure 2   Rear DS2500 Liquid Analyzer

1	**On/off switch**	**2**	**Fuse holder**
	For switching the instrument on and off		
3	**Power socket**	**4**	**Type plate**
	Sealed with protective cap		
5	**LAN connection socket**	**6**	**Fan**
	Sealed with protective cap		With filter

2.3 Sample holders
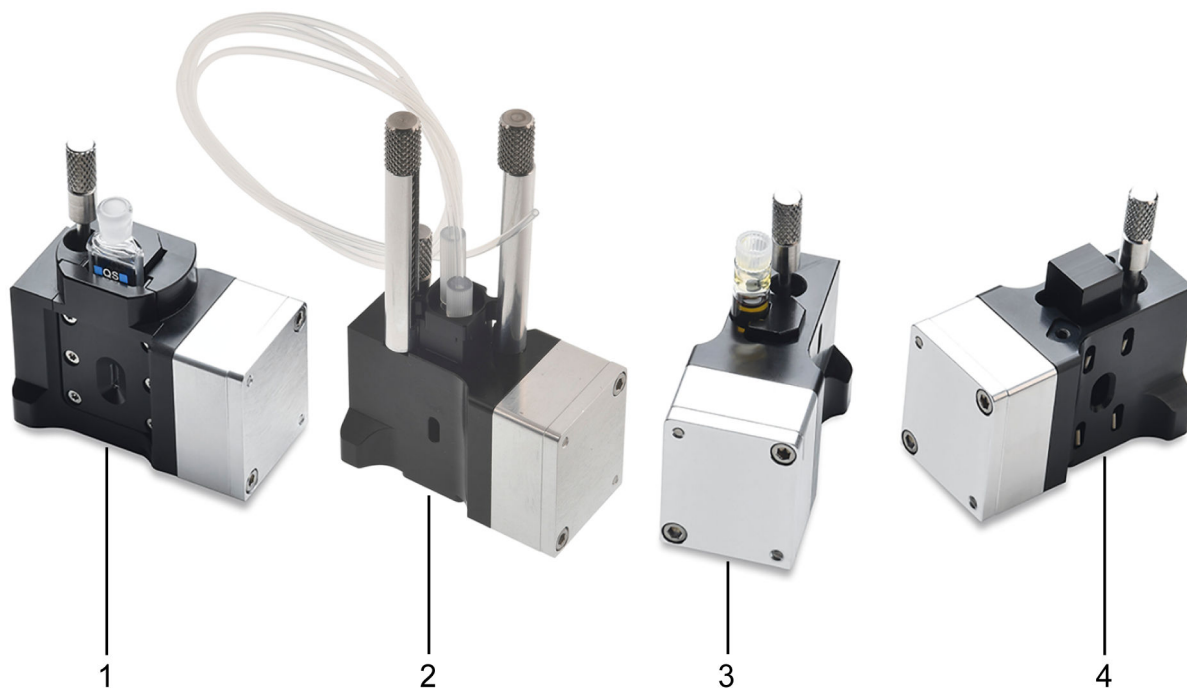
Figure 3   DS2500 Liquid Analyzer sample holders

1	**DS2500 holder for cuvettes**	**2**	**DS2500 holder for flow cells**
3	**DS2500 holder for disposable vials**	**4**	**DS2500 Liquid Wavelength Standard**

3   Installation

3.1   Unpacking and inspecting the instrument

3.1.1   Packaging

The instrument is supplied in protective packaging together with the separately packed accessories. Keep this packaging, as only this ensures safe transportation of the instrument.

3.1.2   Checks

Immediately after receipt, check whether the shipment has arrived complete and without damage by comparing it with the delivery note.

3.2   Location

The instrument has been developed for operation indoors and may not be used in explosive environments.

Place the instrument in a location of the laboratory which is suitable for operation, free of vibrations, protected from corrosive atmosphere, and contamination by chemicals.

The instrument should be protected against excessive temperature fluctuations and direct sunlight.

3.3   Connecting the instrument to the power grid

> **WARNING**
>
> **Electric shock from electrical potential**
>
> Risk of injury by touching live components or through moisture on live parts.
>
> - Never open the housing of the instrument while the power cord is still connected.
> - Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
> - Unplug the power plug immediately if you suspect that moisture has gotten inside the instrument.
> - Only personnel who have been issued Metrohm qualifications may perform service and repair work on electrical and electronic parts.

Connecting the power cord

Accessories

Power cord with the following specifications:

- Length: max. 2 m
- Number of cores: 3, with protective conductor
- Instrument plug: IEC 60320 type C13
- Conductor cross-section 3x min. 0.75 mm^2 / 18 AWG
- Power plug:
  - according to customer requirement (6.2122.XX0)
  - min. 10 A

> **ℹ NOTICE**
>
> Do not use a not permitted power cord!

1 Plugging in the power cord

- Plug the power cord into the instrument's power socket.
- Connect the power cord to the power grid.

3.4 Connecting the data cable

In order to control the DS2500 Liquid Analyzer, connect it to a computer either directly or via a local network (LAN).

For direct connection to the network card of a computer, use the supplied data cable.

Additional steps might be required for connecting via your local network. As network configurations vary considerably across different companies, exact details are not provided in this manual. Have your network specialist establish the connection between the instrument and the company network.

Connecting the computer directly

Accessories

- DS2500 data cable
- Computer with installed control software

1 Remove the protective cap from the LAN connection socket *(2-**5**)*.

2 Plug the cable into the LAN connection socket *(2-**5**)* and tighten it.

3 Connect the other end of the data cable to the computer's network cable connector.

3.5 Switching on the instrument

Switching on the instrument

1 Turn the on/off switch *(2-1)* to position **I**.

- The LED display on the front of the DS2500 Liquid Analyzer *(1-3)* lights up.
- The instrument performs a self-test.
- The sample compartment lid opens.

2 Wait until the control software has recognized the instrument.

3.6 Initial start-up

The initial start-up of the DS2500 Liquid Analyzer is carried out by trained and instructed specialists from Metrohm and/or its representative(s).

3.7 Temperature control

The DS2500 Liquid Analyzer supports a temperature range between 25 °C and 80 °C. The minimum temperature that can be set must be 10 °C above the ambient temperature $T_{min} = T_{ambient} + 10$ °C

To achieve a temperature of 25 °C, the ambient temperature must be 15 °C. As the ambient temperature in most laboratories is approx. 25 °C, Metrohm recommends to set the temperature to a minimum of 35 °C.

3.8 Setting up accessories

The following sample cups can be used with the DS2500 Liquid Analyzer:

Intended use	Holder for sample cups	Order number
Fast and convenient analysis	DS2500 holder for 2 mm disposable vials	6.7492.000
	DS2500 holder for 4 mm disposable vials	6.7492.010
	DS2500 holder for 8 mm disposable vials	6.7492.020
	DS2500 holder for 10 mm disposable vials	6.7492.030
High precision	DS2500 holder for 1 mm cuvettes	6.7492.100
	DS2500 holder for 2 mm cuvettes	6.7492.110
	DS2500 holder for 5 mm cuvettes	6.7492.120
	DS2500 holder for 10 mm cuvettes	6.7492.130
High sample throughput and automation	DS2500 holder for flow cells	6.7493.000
Calibration	DS2500 liquid wavelength calibration standard	6.7494.000

3.8.1 Calibrating the instrument

The DS2500 Liquid Analyzer is calibrated with an external wavelength standard *(see "Calibration with an external wavelength standard", page 13)* and with an internal wavelength standard *(see "Calibrating the instrument with an internal wavelength standard", page 13)*.

⚠️ **WARNING**

Hot surface

Danger of burning due to hot components. The sample holder can be heated to a maximum of 80 °C. After operation, the sample compartment, the sample holder and the sample vessel are very hot.

- Wear protective gloves when handling sample holders and samples.

Calibration with an external wavelength standard

The external calibration is usually carried out by a regional Metrohm service representative during the start-up of the instrument.

If necessary, the external standard can also be obtained separately (article number 6.7494.000). The user can repeat the external calibration if needed.

Calibrating the instrument with an external wavelength calibration standard

Accessories
- DS2500 liquid wavelength calibration standard (6.7494.000)

1 **Using the wavelength calibration standard**
- Place the wavelength calibration standard in the sample compartment.
- Optionally place the cover plate on the sample compartment. If the sample holder is heated, the cover plate protects the user from the heat that is generated.
- Tighten the screw.

2 **Calibrating the instrument**

Start the calibration in the control software *(see 8.105.8032 Tutorial Vision Air Local and 8.105.8036 Tutorial Vision Air Network and Server)*.

Calibration with an internal wavelength standard

Carry out the internal calibration once a different type of sample vessel to the one used in the previous measurement is inserted. The path length is relevant. Carry out an internal calibration after a DS2500 holder for 2 mm disposable vials was replaced with a DS2500 holder for 8 mm disposable vials, for example.

Calibrating the instrument with an internal wavelength standard

Accessories
- Sample holder

1 **Inserting the sample vessel**
- Define with which sample vessel the next measurement is to be carried out.
- Insert the selected sample vessel.

> **ℹ** **NOTICE**
>
> If an incorrect sample vessel was inserted for the calibration with the internal wavelength standard, the error **auto linearization failed** may be displayed during the routine analysis.

2 **Calibrating the instrument**

Start the calibration in the control software *(see 8.105.8032 Tutorial Vision Air Local and 8.105.8036 Tutorial Vision Air Network and Server)*.

3 **Repeating the calibration**

Once a sample vessel with a different path length has been inserted, repeat the internal calibration. To do this, start with Step 1 again.

For additional information on the calibration with the internal wavelength standard, see *8.105.8032 Tutorial Vision Air Local or 8.105.8036 Tutorial Vision Air Network and Server*.

3.8.2 Analyzing liquid samples

> **⚠** **WARNING**
>
> **Hot surface**
>
> Danger of burning due to hot components. The sample holder can be heated to a maximum of 80 °C. After operation, the sample compartment, the sample holder and the sample cup are very hot.
>
> ▪ Wear protective gloves when handling sample holders and samples.

Fast and convenient analysis

Accessories
- Suitable holder for disposable vials *(see chapter 3.8, page 12)*
- Disposable vial
- Lint-free cloth
- Pipette

1 **Preparing the vial**

- Add the sample liquid to the disposable vial using a pipette.
- Wipe away sample residue and fingerprints from the outside of the disposable vial using a lint-free cloth.

2 **Inserting the holder for disposable vials**

- Place the holder for disposable vials in the sample compartment.

Figure 4   Place the disposable vial in the sample compartment.

- Tighten the screw.
- Insert the disposable vial with sample liquid into the holder.

3 **Analyzing a sample**

- Optionally place the cover plate on the sample compartment. If the sample holder is heated, the cover plate protects the user from the heat that is generated.
- If the **Automatic start** function is activated in Vision Air, close the lid to start the measurement.
  If the **Automatic start** function is **not** activated in Vision Air, start the analysis using Vision Air.

The sample is measured during transmission.

Vision Air defines whether the DS2500 Liquid Analyzer performs a reference scan after analyzing a sample. For this purpose, open the **Settings** tab in the **Methods** area. Define settings for the reference scan in the **Analysis** settings group.

If the function is activated, the DS2500 Liquid Analyzer then performs a reference scan. For this purpose, the sample is automatically moved out of the measuring beam. The DS2500 Liquid Analyzer records an absorbance spectrum of air as a reference spectrum.

4 **Removing the vial**

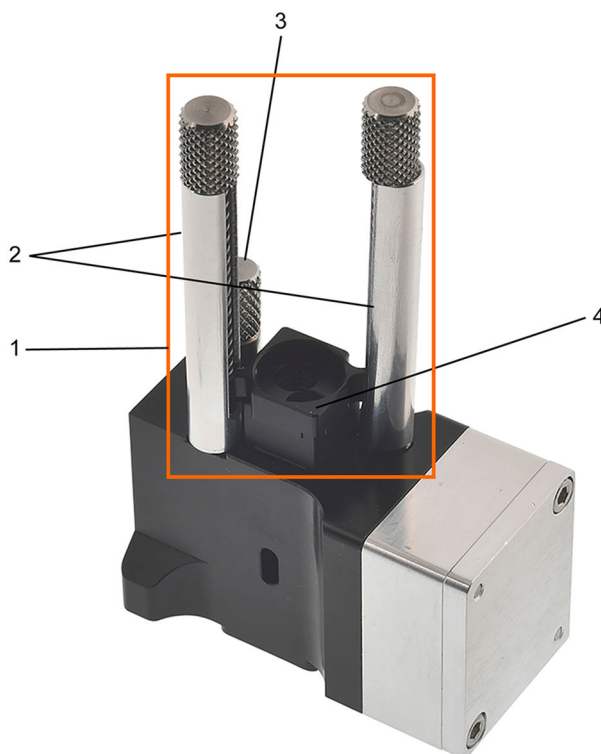Remove the disposable vial from the holder for disposable vials.

The measurement is complete.

Analysis with high sample throughput and automation

Accessories
- DS2500 Holder for flow cells (6.7493.000)
- Flow cell
- 2 tubings, suitable for flow cell

1	**Flow cell spring assembly**		**2**	**Flow cell positioning spring**
3	**Screw on sample holder** The screw on the sample holder is not part of the flow cell spring assembly.		**4**	**Flow cell assembly bridge**

1 Loosening the flow cell spring assembly
- The spring assembly is mounted to the holder at the time the instrument is delivered.
  There is a screw at the end of each positioning spring. Loosen both screws.
- Separate the spring assembly from the holder.

2 Inserting the DS2500 Holder for flow cells
- Place the holder in the sample compartment.
- Tighten the screw on the holder.

3 Connecting the flow cell

- There is an inner thread at the inlet and the outlet of the flow cell. On each inner thread, mount a tubing with a matching outer thread.

4 Inserting the flow cell in the DS2500 Holder for flow cells

- The flow cell has a window. The holder has openings. Insert the flow cell in the holder so that the window of the flow cell is positioned at the openings of the holder.

5 Mounting the flow cell spring assembly

- The holder has 2 openings for the positioning springs of the spring assembly. Place the spring assembly on the holder. The following is to be observed:
  - The 2 tubings of the flow cell are in the center of the bridge.
  - The 2 positioning springs are in the openings of the holder.
- Fasten the screws on the positioning springs.

6 Connecting the flow cell

- Connect the inlet of the flow cell to a sample changer.
- Connect the outlet of the flow cell to the waste container.

7 Analyzing samples

- Start the analysis with Vision Air. Leave the lid open.
  The samples are measured in transmission mode.
- Vision Air defines whether the DS2500 Liquid Analyzer performs a reference scan after analyzing a sample. For this purpose, open the **Settings** tab in the **Methods** area. Define settings for the reference scan in the **Analysis** settings group.
  If the function is activated, the DS2500 Liquid Analyzer then performs a reference scan. For this purpose, the sample is automatically moved out of the measuring beam. The DS2500 Liquid Analyzer records an absorbance spectrum of air as a reference spectrum.
  After the reference scan, the spring assembly pushes the flow cell back into the starting position. The flow cell is again in the measuring beam.
- To minimize cross contamination, rinse the flow cell and the corresponding tubings after each measurement. To this end, pump suitable chemicals through the flow cell.

8 Removing the flow cell

- Once all samples are measured, remove the flow cell and the holder. Proceed as follows:
  – Separate the connection between flow cell and sample changer as well as flow cell and waste container.
  – Remove the spring assembly.
  – Remove the flow cell from the holder.
  – Loosen the screw on the holder and remove the holder from the sample compartment.

The measurements are complete.

4 Operation

The DS2500 Liquid Analyzer is operated with the control software.

You can find information on control software in the tutorial on control software *(see 8.105.8032 Tutorial Vision Air Local and 8.105.8036 Tutorial Vision Air Network and Server)*.

5 Maintenance

The DS2500 Liquid Analyzer requires appropriate care. Excessive soiling of the instrument leads to functional disruptions and shortens the service life of the durable mechanical and electronic components.

5.1 Maintenance by Metrohm Service

Maintenance of the DS2500 Liquid Analyzer is best carried out as part of an annual service appointment by Metrohm specialist personnel. If you work with caustic and corrosive chemicals, a shorter maintenance interval is required.

Metrohm Service offers every form of technical advice for maintenance and servicing of all Metrohm instruments.

5.2 Maintenance by the user

Table 1   Maintenance tasks and intervals

Maintenance task	Maintenance interval
Performance test in the non-regulated area *(see 8.105.8032 Tutorial Vision Air Local and 8.105.8036 Tutorial Vision Air Network and Server)*	monthly
Clean the instrument *(see chapter 5.2, page 20)*	when necessary
Clean the sample holder *(see chapter 5.2, page 20)*	when necessary
Clean the sample compartment *(see chapter 5.2, page 20)*	when necessary
Replace the lamp *(see chapter 5.2, page 20)*	After a burning time of 3,500 hours or if the *Performance Test* or the *Instrument diagnostic Test* yields unsatisfactory results
Check the fan filter and replace it if necessary *(see chapter 5.2, page 20)*	monthly

Maintenance task	Maintenance interval
Replace the fuse	if blown

(see chapter 5.2, page 20)

5.2.1 Cleaning the instrument

The instrument requires appropriate care. Excess soiling of the instrument may result in functional disruptions and a reduction in the service life of the durable mechanical and electronic components.

Clean the instrument using a lint-free cloth and ethanol.

NOTICE

Do not use aggressive solvents such as acetone. Aggressive solvents can damage the surfaces of the instrument.

CAUTION

Spillage of chemicals or solvents

Damage to the instrument due to spillage of chemicals or solvents!

- Clean the instrument immediately if chemicals or solvents are spilled on it.
- The plug connections (particularly the power plug) absolutely must be protected against contamination.

CAUTION

Inward seepage of liquid

Instrument damage through inward seepage of liquid!

- The instrument has been designed so that liquid is largely prevented from being able to get inside the instrument. However, unplug the power plug immediately if you suspect that corrosive media have gotten inside the instrument. This is the only way to prevent extreme damage to the instrument electronics. Contact Metrohm Service immediately.

WARNING

Only trained personnel may open the instrument's housing.

5.2.2 Cleaning the sample holder

Clean the sample holder using a lint-free cloth and ethanol.

ℹ	**NOTICE**
	Do not use aggressive solvents such as acetone. Aggressive solvents can damage the surfaces of the instrument.

In the event of heavy soiling, one part of the sample holder can be cleaned in a dishwasher. The sample holder consists of two parts. The front part contains no electrical components. The rear part contains electrical components. To separate the two parts from each other, unscrew the two screws on the front part of the sample holder. Clean the front part of the sample holder in a dishwasher.
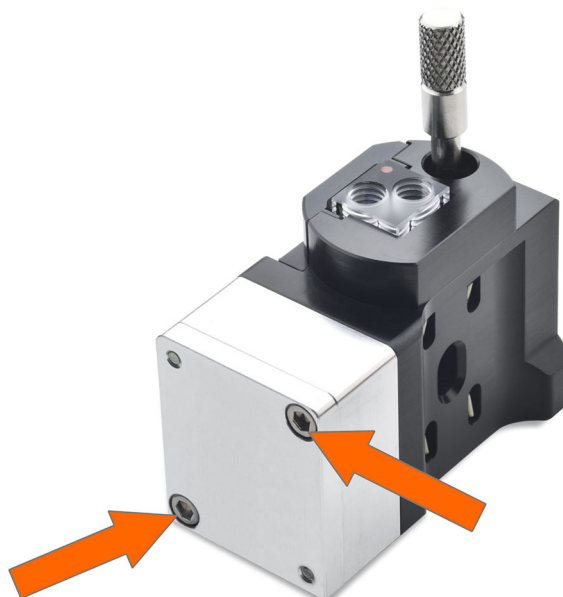
Figure 5   Disassembling the sample holder

5.2.3 Cleaning the sample compartment

Dirt, dust and sample deposits in the sample compartment can influence the analytical results.

Clean the sample compartment using a lint-free cloth and ethanol.

ℹ	**NOTICE**
	Do not use aggressive solvents such as acetone. Aggressive solvents can damage the surfaces of the instrument.

5.2.4 Replacing the lamp

Replace the lamp once it is blown or when its performance is insufficient. Signs of insufficient lamp performance include:

- Noise impairs the measurements.
- The repeatability of the wavelengths deteriorates.
- The performance test is no longer completed successfully.

Removing the lamp

Accessories
- Screwdriver

WARNING

Electric shock from electrical potential

Risk of injury by touching live components or through moisture on live parts.

- Never open the housing of the instrument while the power cord is still connected.
- Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
- Unplug the power plug immediately if you suspect that moisture has gotten inside the instrument.
- Only personnel who have been issued Metrohm qualifications may perform service and repair work on electrical and electronic parts.

WARNING

Hot surface

Danger of burning due to hot lamp. The lamp is extremely hot immediately after operation.

- Allow the lamp to cool down for approx. 10 to 15 minutes.
- Remove the lamp carefully.

NOTICE

Clean the instrument before replacing the lamp. This prevents dust from damaging the lamp's reflector.

> **ⓘ NOTICE**
>
> **Spare part**
>
> A new spare lamp is available from your Metrohm representative under the article number 6.7430.050.
>
> - We recommend keeping spare lamps in stock.
> - Only use original lamps in the instrument.

1 Switching off the instrument
- Turn the on/off switch *(2-1)* to the position **O**.

2 Disconnecting the instrument from the energy supply
- Disconnect the power cord.
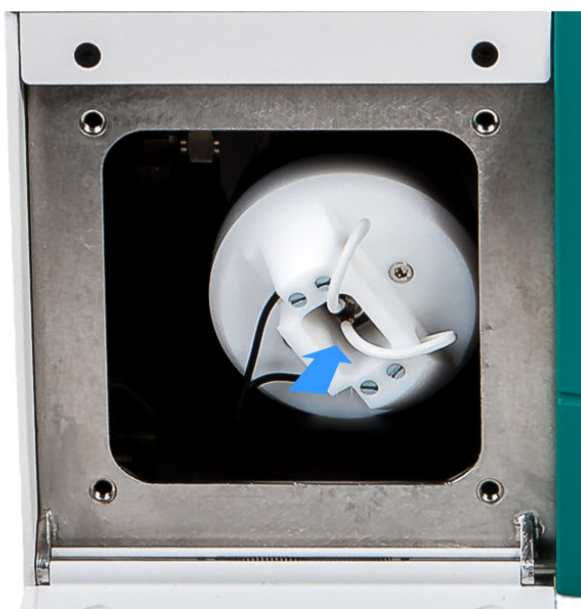- Wait 10 to 15 minutes until the lamp has cooled down.

3 Opening the lamp compartment
- Open the lid of the lamp compartment *(1-5)*.
- Take the hex key out of the guide rail.
- Unscrew the four sealing plate screws using the hex key and put them aside.
- Remove the sealing plate and put it aside.
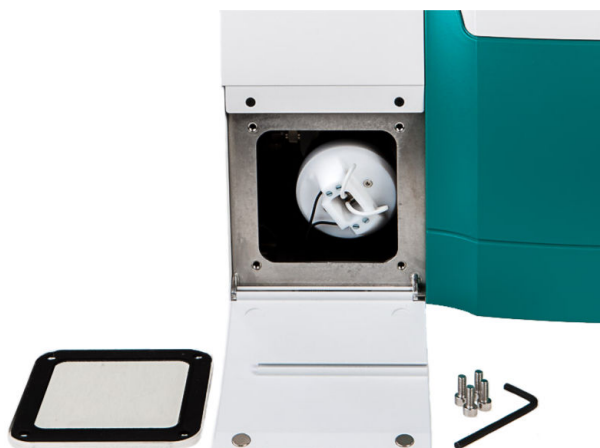
4 **Removing the lamp holder**

- Push the 2 mm white lamp holder inwards.

- Rotate the white lamp holder 45° counterclockwise.
- Carefully pull the white lamp holder out straight.
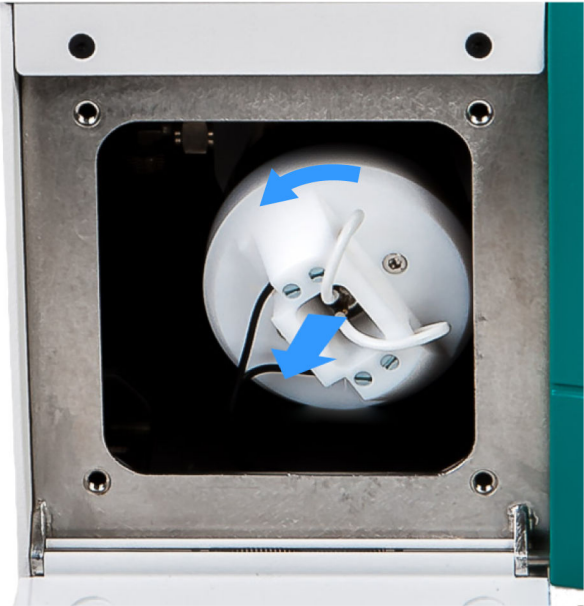
- Place the lamp on the lid with the reflector facing down.
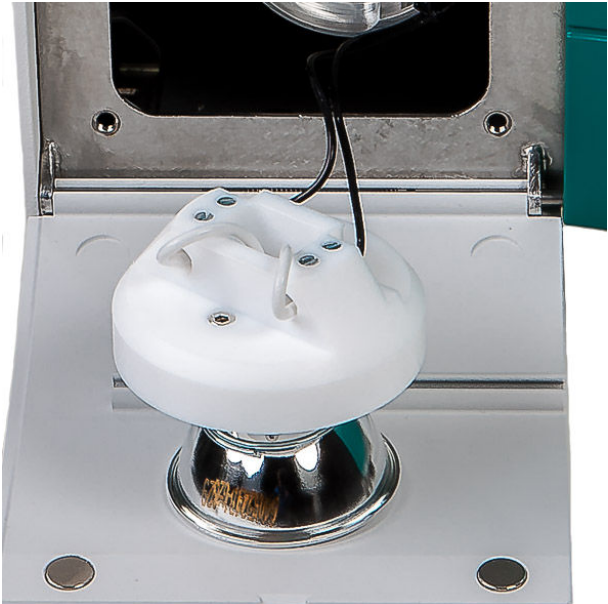
5 **Disconnecting the cables**

> ⓘ **CAUTION**
>
> **Functional disruption**
>
> Do **not** unscrew the screw terminals of the black cables.
>
> Only unscrew the screw terminals of the white cables.

- Loosen the screw terminals of the white cables using a small screwdriver.

- Carefully remove the cables from the terminals.
- Bend the cables upwards so that they stand vertically.
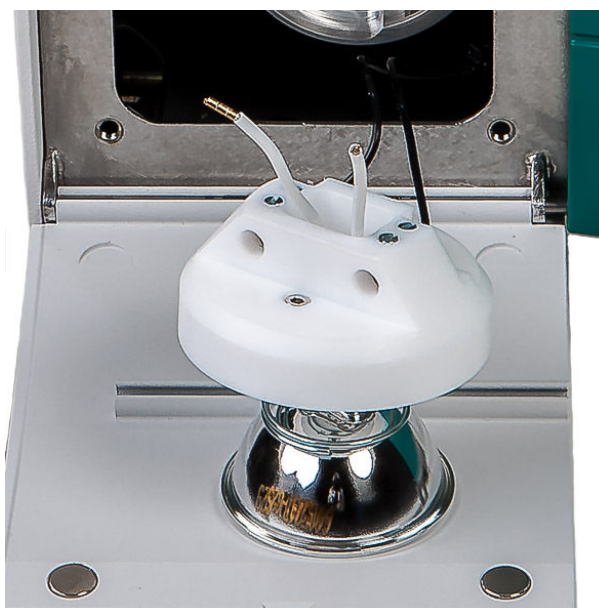
6   **Removing the lamp from the holder**
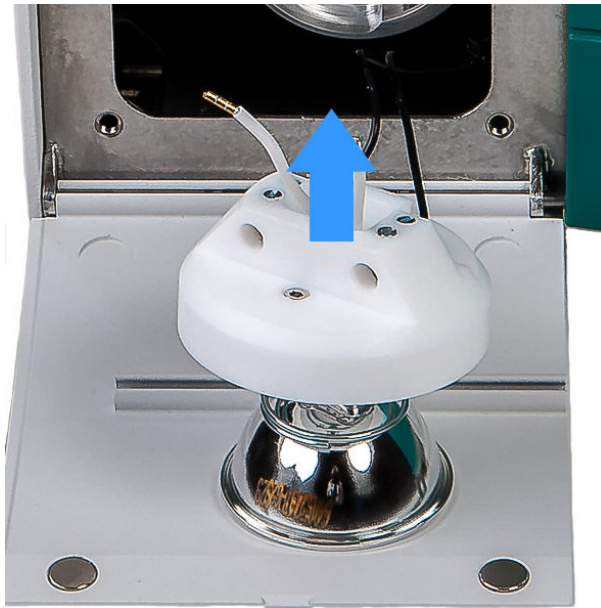
- Hold the lamp by the reflector.
- Lift the lamp holder off the lamp and the cables.

TIP: Bend the cables to mark the lamp as used.

Installing a new lamp

Accessories
- Spare lamp (6.7430.050)
- Screwdriver

> **! CAUTION**
>
> **Damage to the lamp**
>
> Fingerprints and greasy deposits damage the lamp.
>
> Do not touch either the glass part of the lamp or the inside of the reflector.

1 Keeping the new lamp ready

- Take the new lamp out of the packaging.
- Position the lamp cables upright so that the cables will fit through the rectangular opening of the lamp holder.
- Place the lamp on the lamp compartment lid with the reflector facing down.

2 Inserting the lamp into the lamp holder

- Guide the lamp cables through the rectangular opening of the lamp holder.
- Attach the lamp holder to the cable side of the lamp. The spring on the lamp holder keeps the lamp in the correct position.
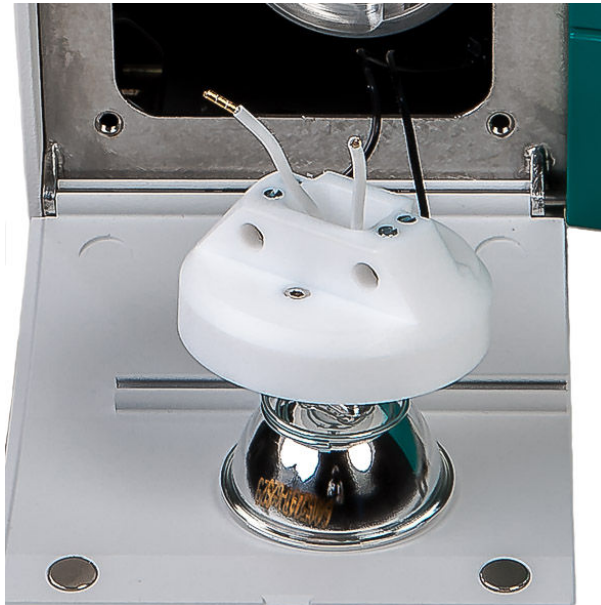
3 **Connecting the lamp cables**

- Push the two white cables all the way into the corresponding screw terminal by hand or using tweezers.
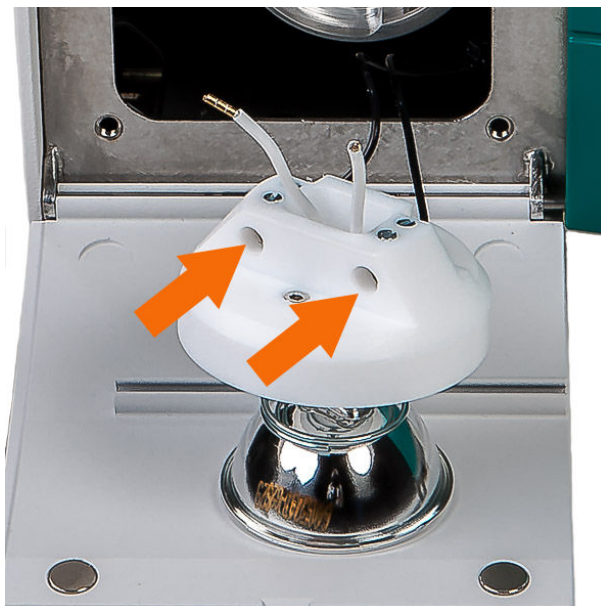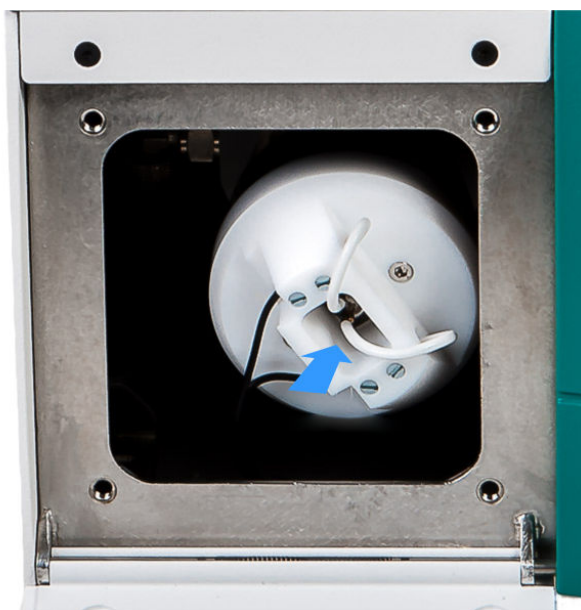

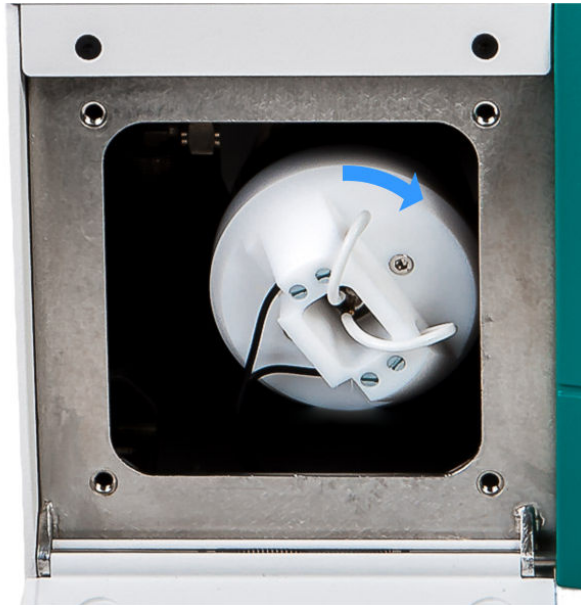- Tighten the screw terminals using the small screwdriver.
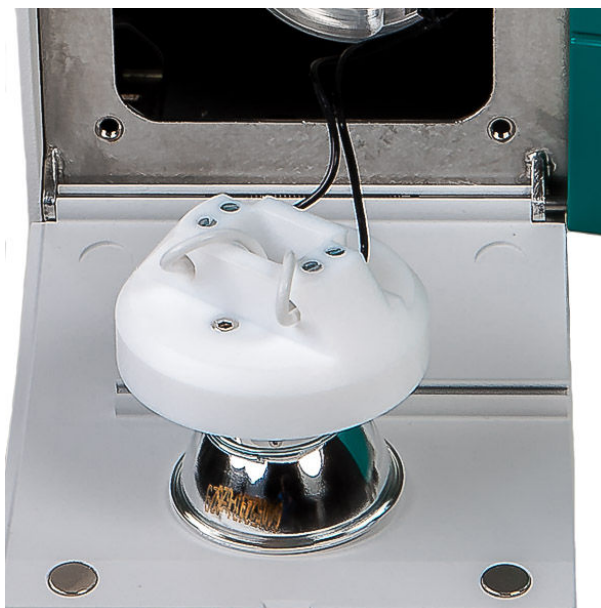
4 **Inserting the lamp holder**

- Push the white lamp holder carefully all the way into the opening.

- Rotate the white lamp holder 45° clockwise.

- Let go of the white lamp holder.

5 | **Closing the lamp compartment**

- Place the sealing plate onto the opening. Make sure that no cables are being pinched.
- Insert the four screws and tighten them in crosswise sequence using the hex key.
- Push the hex key into the guide rail on the lid.
- Close the lid.

6 | **Calibrating the instrument**

Recalibrate the instrument every time a lamp is replaced.

- Switch on the instrument.
- Wait for at least 2 hours while the instrument warms up.
- Recalibrating the instrument *(see 8.105.8032 Tutorial Vision Air Local and 8.105.8036 Tutorial Vision Air Network and Server).*

5.2.5   Replacing the fan filter

Clean the fan filter at least once a month. If the instrument is operated in a dusty or otherwise dirty environment, check the fan filter weekly or twice a week as necessary.

The fan is on the rear of the instrument. The filter cover is attached to the fan filter by means of four plastic latches.

Replacing the fan filter

Accessories
- Fan filter, if replacement is required.

1 Switching off the instrument
- Turn the on/off switch *(2-**1**)* to the position **O**.
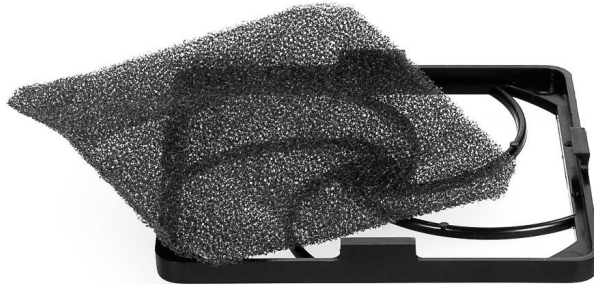

2 Removing the filter cover

Grab the filter cover with both hands and take it off starting from the top and then proceeding to the sides.

3 Checking the state of the filter

Take out the filter and inspect it carefully.

- If you cannot see any small tears in the filter, clean the filter and reinstall it.
- If the filter is damaged, install a new filter.

4 **Cleaning the filter**

- Blow out the dirty filter with a compressed air duster spray.
- Alternative: Rinse the dirty filter with clean water and allow to dry.

5 **Mounting the filter**

Place the new or cleaned filter symmetrically into the filter cover.

Do not crumple or fold the filter. The edges must form a good seal.

6 **Mounting the filter cover**

Mount the filter cover to the frame starting on the bottom and push it in place until all latches snap in.

7 **Switching on the instrument**

Turn the on/off switch *(2-1)* to the position **I**.

5.2.6   Replacing a fuse

The fuse is located in the fuse holder *(2-2)* on the rear of the instrument, directly underneath the on/off switch *(2-1)*.

Replacing the fuse

Accessories
- Spare fuse type: 250 V, 5 A, slow-acting fuse, 20 mm

1 Switching off the instrument
- Turn the on/off switch *(2-1)* to the position **O**.

  NOTICE

Unplug the power cord as well. This prevents the instrument from being switched on accidentally while you insert the fuse.

2 Removing the faulty fuse
- Unscrew the fuse holder *(2-2)* by hand or, if necessary, unscrew the holder using a size 5 flat-head screwdriver.
- Take the faulty fuse out of the holder.

3 Inserting the new fuse
- Insert a new fuse of the same type into the holder.

- Place the fuse holder back into the opening on the rear of the instrument and tighten by hand.

4 **Switching on the instrument**

- Plug the power cord back in.
- Turn the on/off switch *(2-1)* to the position **I**.

6 Technical specifications

6.1 Interfaces

Ethernet connection port	Ethernet connection for data transmission to a computer

6.2 Power connection

Nominal voltage range	100–240 V (±10%, autosensing)
Frequency	50 and 60 Hz (autosensing)
Power consumption	max. 125 W
Protection	5 AT

6.3 Ambient conditions

Nominal function range	5 - 40 °C At max. 60% humidity, non-condensing
Storage	−20 - 70 °C At max. 93% humidity, non-condensing

6.4 Dimensions

Measurements

Length	490 mm
Width	375 mm
Height	300 mm (closed) 534 mm (opened)

Weight	27 kg
Additional free space	at least 200 mm (on the sides and rear)

6.5   Housing

Material	Steel sheet Aluminum ABS - Acrylonitrile butadiene styrene
IP degree of protection of the sample compartment	54

7 Accessories

Up-to-date information on the scope of delivery and optional accessories for your product can be found on the Internet. You can download this information using the article number as follows:

Downloading the accessories list

1 Enter *https://www.metrohm.com/* into your Internet browser.

2 Enter the article number (e.g. **2.929.0010**) into the search field.

The search result is displayed.

3 Click on the product.

Detailed information regarding the product is shown on various tabs.

4 On the **Included parts** tab, click on **Download the PDF**.

The PDF file with the accessories data is created.

ℹ NOTICE

Once you have received your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.

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