

OMNIS Solvent Module



2.1009.0010

Product manual

8.1009.8002EN / 2021-07-23



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Technical Communication
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Table of contents

1	Overview	1
1.1	OMNIS Solvent Module – Product description	1
1.2	OMNIS Solvent Module – Product versions	1
1.3	Symbols and conventions	2
1.4	Further information	2
1.5	Accessories	2
2	Safety	4
2.1	Intended use	4
2.2	Responsibility of the operator	4
2.3	Requirements for operating personnel	5
2.4	Safety instructions	5
2.4.1	Danger from electrical potential	5
2.4.2	Danger from biological and chemical hazardous substances	5
2.4.3	Danger from highly flammable substances	6
2.4.4	Danger from leaking liquids	6
2.4.5	Danger during transport of the product	7
2.5	Design of warning messages	7
2.6	Meaning of warning signs	8
3	Functional description	10
3.1	OMNIS Solvent Module – Overview	10
3.1.1	Adsorption cartridge – Overview	12
3.2	OMNIS Solvent Module – Function	12
3.2.1	Adsorption cartridge – Function	13
3.3	OMNIS Solvent Module – Indicators and controls	13
3.4	System – Signals	14
3.5	OMNIS Solvent Module – Interfaces	15
4	Delivery and packaging	16
4.1	Delivery	16
4.2	Packaging	16
5	Installation	17
5.1	Installation by Metrohm	17
5.2	Setup location	17

1 Overview

1.1 OMNIS Solvent Module – Product description

The OMNIS Solvent Module is a pump module, which is either controlled manually or via the OMNIS Software. The OMNIS Solvent Module is also equipped with features to secure bottles.

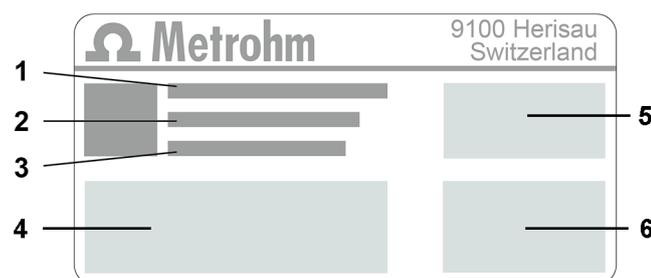
1.2 OMNIS Solvent Module – Product versions

The product is available in the following versions:

Table 1 Product versions

Article number	Designation
2.1009.0010	OMNIS Solvent Module

The article number and serial number for identifying the product can be found on the type plate:



1	(01) = Article number in accordance with GS1 standard	2	(21) = Serial number
3	(240) = Metrohm article number	4	Certification
5	Certification	6	Technical specifications



1.3 Symbols and conventions

The following formatting may appear in the documentation:

(5- 12)	Cross-reference to figure legend The first number refers to the figure number. The second number refers to the product part in the figure.
1	Instruction step Numbers indicate the order of the instructions steps.
Method	Names of parameters, menu items, tabs and dialog windows
File ► New	Menu path
[Continue]	Button or key

1.4 Further information

The Metrohm Knowledge Base <https://guide.metrohm.com> always provides the current version of this document. Further instructions, leaflets, release notes etc. may be available, depending on the product. You can directly access the required information or the associated PDF document using the full-text search function and filters.

1.5 Accessories

Up-to-date information on the scope of delivery and on optional accessories can be found on the Metrohm website. Download this information as follows:

Downloading the accessories list

- 1** Go to <https://www.metrohm.com>.
- 2** Enter the article number of the product (e.g. **2.1001.0010**) 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 the link to download the PDF.
The PDF file with the accessories data is loaded.



NOTICE

Metrohm recommends downloading the accessories list from the Internet and keeping it for reference purposes.

2.3 Requirements for operating personnel

Only qualified personnel may operate the product. Qualified personnel are persons who meet the following requirements:

- Basic regulations on occupational safety and accident prevention for chemical laboratories are known and complied with.
- Knowledge of handling hazardous chemicals is present. Personnel have the ability to recognize and avoid potential dangers.
- Knowledge regarding the application of fire prevention measures for laboratories is available.
- Safety-relevant information is communicated and understood. The personnel can operate the product safely.
- The user documentation has been read and understood. The personnel operate the product according to the instructions in the user documentation.

2.4 Safety instructions

2.4.1 Danger from electrical potential

Contact with electrical potential can cause serious injuries or death. To avoid danger from electrical potential, observe the following:

- Operate the product only if it is in perfect condition. The housing must also be intact.
- Only use the product with the covers fitted. If covers are damaged or missing, disconnect the product from the energy supply and contact the regional Metrohm service representative.
- Protect live components (e.g. power supply unit, power cord, connection sockets) against moisture.
- Always have maintenance work and repairs on electrical components carried out by a regional Metrohm service representative.
- Disconnect the product from the energy supply immediately if at least one of the following cases occurs:
 - The housing is damaged or open.
 - Live parts are damaged.
 - Moisture penetrates.

2.4.2 Danger from biological and chemical hazardous substances

Contact with biological hazardous substances may cause poisoning from toxins or infections from microorganisms. Contact with aggressive chemical substances may cause poisoning or chemical burns. To avoid danger from biological or chemical hazardous substances, observe the following:

2.4.5 Danger during transport of the product

Chemical or biological substances may be spilled during the transport of the product. Parts of the product may fall down or may be damaged. There is a risk of injury from chemical or biological substances and pieces of broken glass. To ensure safe transport, observe the following:

- Remove loose parts (e.g. sample racks, sample vessels, bottles) before transport.
- Remove liquids.
- Lift and transport the product with both hands on the base plate.
- Lift and transport heavy products only according to instructions.

2.5 Design of warning messages

There are 4 hazard levels for warning messages. The following signal words are used for classifying the hazard levels in warning messages:

- **DANGER** indicates a hazardous situation which, if not avoided, will result in serious injury or death.
- **WARNING** indicates a hazardous situation which, if not avoided, could result in serious injury or death.
- **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE** indicates a hazardous situation which, if not avoided, could result in property damage.

Warning messages differ in design (color and warning sign) depending on the hazard level:



DANGER

Type and source of danger

Consequences when not observing the notice: An irreversible injury that may result in death is very probable.

- Measures to avoid the danger



WARNING

Type or source of danger

Consequences when not observing the notice: A serious injury that may result in death is probable.

- Measures to avoid the danger



CAUTION

Type or source of danger

Consequences when not observing the notice: A minor to moderate injury is probable.

- Measures to avoid the danger

2.6 Meaning of warning signs

This documentation uses the following warning signs:

Table 2 Warning sign according to ISO 7010

Warning sign	Meaning
	General warning sign
	Warning of electrical voltage
	Warning of hand injuries
	Warning of sharp object
	Warning of hot surface
	Warning of biological hazard
	Warning of toxic materials



Warning sign	Meaning
	Warning of flammable materials
	Warning of corrosive substances
	Warning of optical radiation
	Warning of laser beams

Depending on the intended use of the product, the corresponding warning sign stickers must be placed on the product.



3 Functional description

3.1 OMNIS Solvent Module – Overview

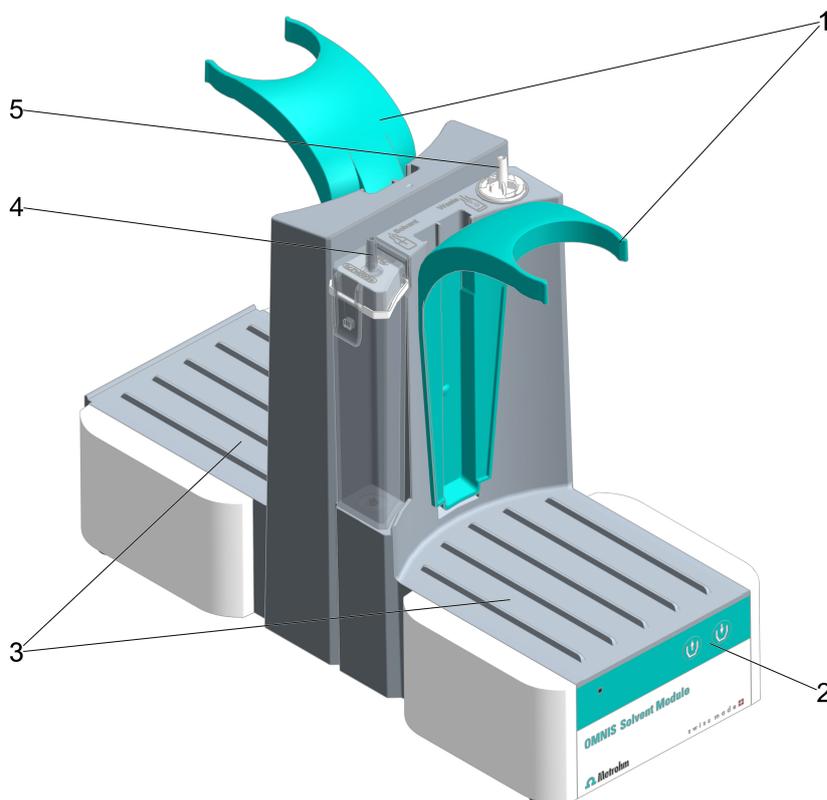


Figure 1 OMNIS Solvent Module – Front

<p>1 Bottle holder</p>	<p>2 Controls</p>
<p>3 Platform For chemical bottles</p>	<p>4 Tubing connector for cartridge Tubing connection between OMNIS Solvent Module and reagent bottle (Solvent)</p>
<p>5 Tubing connector Tubing connection between OMNIS Solvent Module and waste bottle (Waste)</p>	

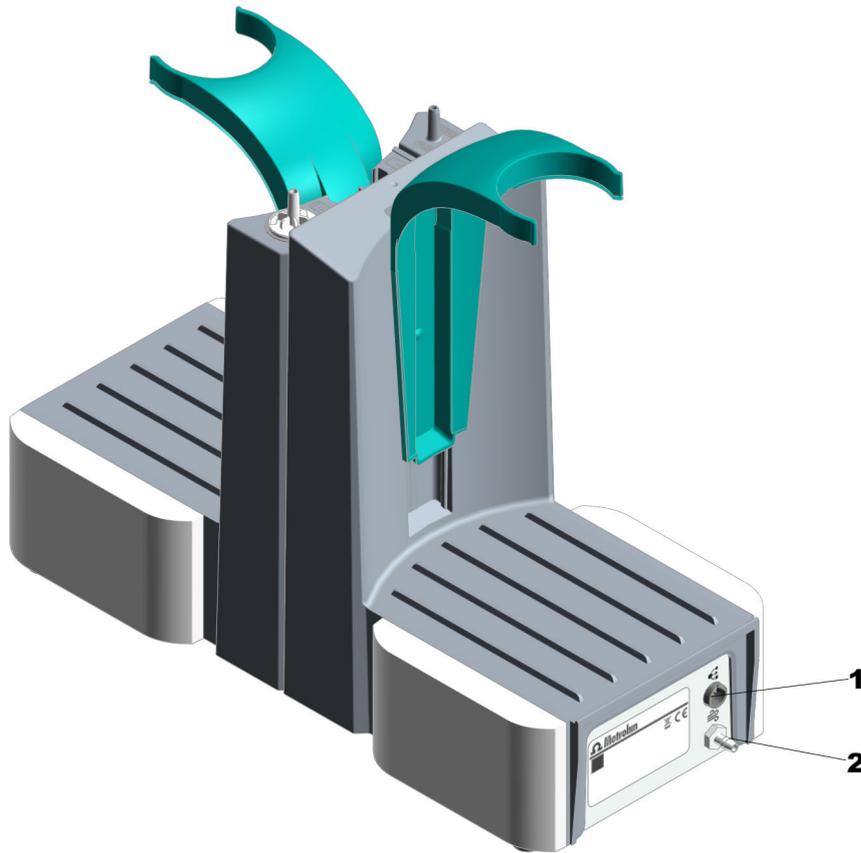


Figure 2 OMNIS Solvent Module – Rear

1 MDL connector

MDL = Metrohm Device Link. Connection socket for connecting cables between OMNIS instruments

2 Air vent

Nozzle for inlet air and exhaust air

3.1.1 Adsorption cartridge – Overview

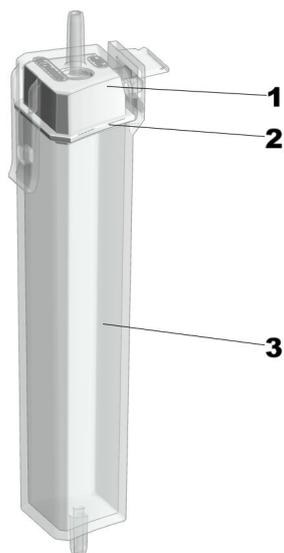


Figure 3 Adsorption cartridge (6.01807.000)

1 Cartridge lid

With tubing olive for the PVC tubing leading to solvent bottle

2 Seal

Integrated in the cartridge lid

3 Cartridge housing

With connection nipple for OMNIS Solvent Module

3.2 OMNIS Solvent Module – Function

The OMNIS Solvent Module contains one membrane pump and one valve.

With the integrated membrane pump, new reagent (Solvent) can be added without the titration cell having to be opened and the waste (e.g. the titrated solution) can be aspirated from the titration cell.

To achieve this, air only is pumped through the pump and a positive or negative air pressure is created by switching the valve.

With positive air pressure in the reagent bottle, the liquid flows through the tubing and into the titration cell.

With negative air pressure, the waste is aspirated from the connected titration cell.

The Siphon Breaker on the reagent bottle prevents liquid from seeping into the titration cell after the pumping procedure.

3.2.1 Adsorption cartridge – Function

When pumping solvent out of the solvent bottle, the following air stream is led through the adsorption cartridge where it is dried.

For this, the adsorption cartridge must be filled with molecular sieve which has to be replaced regularly, see and the adsorption cartridge must be connected to the solvent bottle, see *OMNIS Solvent Module – Mounting the bottles* (see chapter 5.4, page 19).



NOTICE

Make sure

- that the lid of the adsorption cartridge is tightly sealed.
- that the cotton loosely covers the whole base of the adsorption housing.

3.3 OMNIS Solvent Module – Indicators and controls

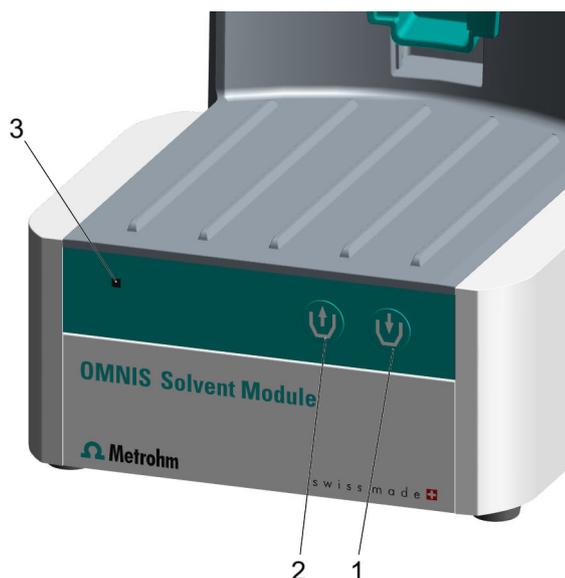


Figure 4 OMNIS Solvent Module – Indicators and controls

1 Add key

Deliver liquid (Solvent) into the titration cell

2 Aspirate key

Aspirate waste from the titration cell

3 Status display

Multi-colored

Indicators

The status of the instrument is displayed with the status display (4-3), see *System – Signals* (see chapter 3.4, page 14).

Controls

The keys (4-1) and (4-2) are used for the hardware-side operation of the OMNIS Solvent Module.

Table 3 Behavior of the keys

Operation mode	Function of the pump
Long pressing (> 1 s)	The liquid is delivered for as long as the key is pressed. The delivery duration is saved.
Short pressing (\leq 1 s)	The liquid is delivered as long as the last saved delivery duration. The delivery is stopped by pressing the key again.

3.4 System – Signals

System components with status indicators show their operating status with colors and/or flashing patterns. The meaning of the colors and flashing patterns is explained in the following table.

Visual signal		Meaning
	LED lights up yellow.	System start or initialization
	LED flashes yellow (slowly).	Ready for connection setup or locking
	LED flashes yellow (fast).	Connection setup started or locking underway
	LED lights up green.	Ready for operation
	LED flashes green (slowly).	In operation
	LED flashes red (fast).	Malfunction or error

Some system components only use part of the explained flashing patterns.

3.5 OMNIS Solvent Module – Interfaces



Figure 5 OMNIS Solvent Module – Interfaces and connectors

1 MDL connector

MDL = Metrohm Device Link. Connection socket for connecting cables between OMNIS instruments

2 Air vent

Nozzle for inlet air and exhaust air (e.g. for controlled extraction of methanol vapor with tubing)



4 Delivery and packaging

4.1 Delivery

Inspect the delivery immediately upon receipt:

- Check the delivery against the delivery note to ensure completeness.
- Check the product for damage.
- If the delivery is incomplete or damaged, contact your regional Metrohm representative.

4.2 Packaging

The product and accessories are supplied in protective special packaging. Keep this packaging to ensure safe transportation of the product. If a transport locking device is present, keep this as well for future reuse.

5 Installation

5.1 Installation by Metrohm

As a basic rule, the installation of the system is carried out by the regional Metrohm service representative.

5.2 Setup location

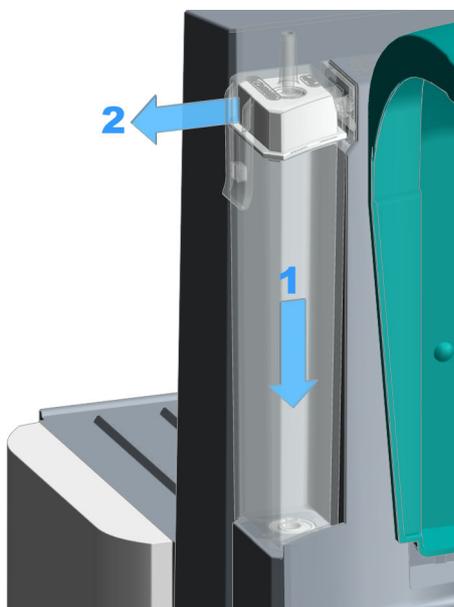
The product is only suitable for operation indoors and may not be used in explosive environments.

The following requirements apply to the setup location:

- The room is well ventilated, protected against direct sunlight and excessive temperature fluctuations.
- The setup space is stable and free of vibrations. The setup space must be suitable for the dimensions and weight of the components (see Technical specifications).
- All cables and connectors are accessible during operation. The cables are safely installed (no tripping hazards).
- The workplace is ergonomically designed and ensures trouble-free operation of the product.

5.3 OMNIS Solvent Module – Removing and mounting the adsorption cartridge

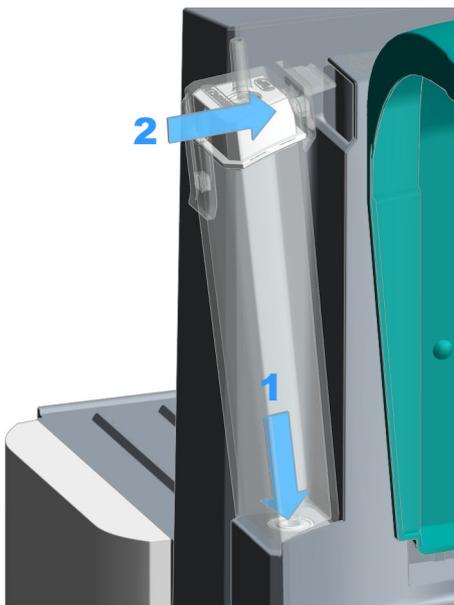
Removing the adsorption cartridge from the OMNIS Solvent Module



1. Remove the PVC tubing from the tubing olive.
2. Press the integrated cartridge of the OMNIS Solvent Module down (**1**). At the same time, carefully pull it outwards (**2**) until you hear it click out of the OMNIS Solvent Module.
3. Lift the cartridge out of the seal of the OMNIS Solvent Module and remove it.

Mounting the adsorption cartridge onto the OMNIS Solvent Module

The adsorption cartridge is filled with molecular sieve and sealed tightly, see .



1. Place the cartridge into the seal of the OMNIS Solvent Module and press it down (1). At the same time, tilt it inwards (2) until you hear it click into place.
2. Mount the PVC tubing of the solvent bottle onto the tubing olive.

5.4 OMNIS Solvent Module – Mounting the bottles



NOTICE

The reagents used for Karl Fischer titration must be kept as dry as possible, even if they are conveyed from supply bottles that have been open for a long time. The connected adsorption cartridge prevents humidity from entering the reagent bottle.



Setting up the waste bottle (Waste)

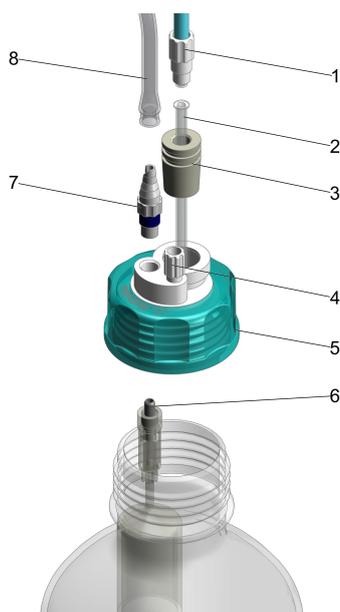


Figure 6 Equipping the GL 45 bottle cap for the waste bottle (Waste)

1	M8 PTFE tubing (6.1805.200)	2	Short PTFE cannula (6.1819.050)
3	Ground-joint stopper SGJ 14/M8 (6.1446.090)	4	M6 threaded stopper (6.1446.040)
5	Bottle cap for GL 45 (6.1602.105)	6	Overflow protection (6.1623.000)
7	Tubing olive (6.1808.050)	8	PVC tubing (6.0184.210)

- 1** Place the threaded stopper (6-4) in the M6 connector (smallest opening) of the bottle cap (6-5) and screw it tight.
- 2** Introduce the overflow protection (6-6) from below into the M8 connector (second-smallest opening) of the bottle cap and fasten it.



NOTICE

Make sure that the overflow protection (6-6) is connected to the M8 connector from which the PVC tubing (6-8) leads to the tubing olive of the OMNIS Solvent Module.

- 3** Place the tubing olive (6-7) in the M8 connector of the bottle cap from above and screw it tight.
- 4** Plug a PVC tubing (6-8) onto the tubing olive.
- 5** Insert the ground-joint stopper (6-3) into the remaining opening of the bottle cap.
- 6** Insert the short PTFE cannula (6-2) into the ground-joint stopper (6-3) from above and pull it through.
Make sure that the cannula is pulled through as far as it will go.
- 7** Insert an M8 PTFE tubing (6-1) into the ground-joint stopper (6-3) from above and screw it tight.
- 8** Place the fully equipped bottle cap (6-5) on the clear glass bottle (or on a different bottle with GL 45 thread) and screw it tight.

Setting up the reagent bottle (Solvent)



NOTICE

Only use the reagent bottle (Solvent) with Siphon Breaker!
Other bottle caps are not permitted.

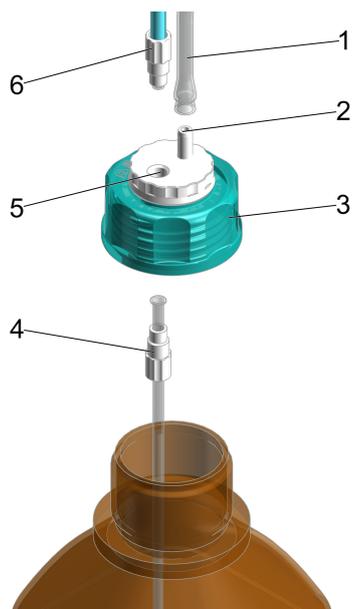


Figure 7 Equipping the Siphon Breaker for the reagent bottle (Solvent)

1	PVC tubing (6.01804.210)	2	Tubing olive, integrated
3	Siphon Breaker (6.01600.200)	4	M8 aspiration tubing (6.01805.130)
5	M8 connector, integrated	6	M8 PTFE tubing (6.1805.200)

- 1 Insert the M8 aspiration tubing (7-4) with the screw nipple from below into the M8 connector of the Siphon Breaker (7-3) and screw it tight.



NOTICE

Make sure that the M8 aspiration tubing (7-4) is fastened from below to the Siphon Breaker and the M8 PTFE tubing (7-6) for the KF titration cell is fixed in place from above.

- 2 Insert an M8 PTFE tubing (7-6) into the M8 connector (7-5) of the Siphon Breaker from above and screw it tight.
- 3 Plug a PVC tubing (7-1) onto the tubing olive (7-2).
- 4 Place the fully equipped Siphon Breaker (7-3) on the reagent bottle (Solvent) and screw it tight.

Mounting and connecting the bottles to the OMNIS Solvent Module

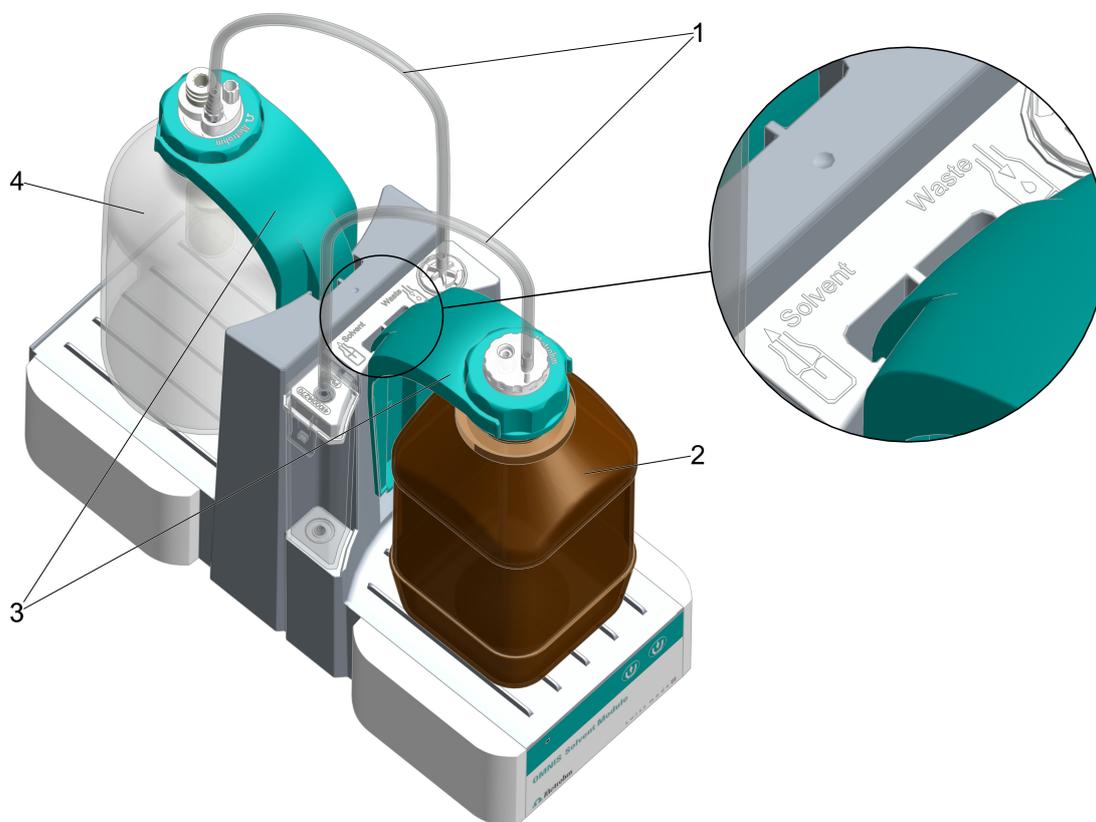


Figure 8 Arrangement of the bottles on the OMNIS Solvent Module, the necessary connections and symbols of the tubing connectors – Overview

1 PVC tubings

From the Siphon Breaker to the adsorption cartridge of the OMNIS Solvent Module and from the waste bottle (Waste) to the OMNIS Solvent Module

2 Reagent bottle (Solvent)

3 Bottle holder (2 pieces)

4 Waste bottle (Waste)



NOTICE

Make sure to limit the time the open reagent bottle (Solvent) and the KF titration cell are exposed to humidity.

The KF titration cell must be fully equipped and mounted on the OMNIS Titrator, see , except for the 2 M8 PTFE tubings from the aspiration tip and the dosing tip.

**Prerequisites:**

- The adsorption cartridge is filled with fresh molecular sieve, see .
- The Siphon Breaker for the reagent bottle is fully equipped and screwed tight on the reagent bottle (Solvent).
- The GL 45 bottle cap for the waste bottle is fully equipped and screwed tight on the waste bottle (Waste).

- 1** Place the fully equipped reagent bottle (Solvent) (8-2) on the front platform of the OMNIS Solvent Module.
- 2** Place the fully equipped waste bottle (Waste) (8-4) on the rear platform of the OMNIS Solvent Module.
- 3** Secure both bottles with a bottle holder (8-3) each.
- 4** Plug a PVC tubing (8-1) between the Siphon Breaker and the adsorption cartridge onto the **Solvent** tubing connector.
Plug the other PVC tubing (8-1) between the GL 45 bottle cap and the OMNIS Solvent Module onto the **Waste** tubing connector.

**NOTICE**

To connect the OMNIS Solvent Module with the KF titration cell, see [Required link is broken](#)
get id: NOT-FOUND_ID_127cc05d456c7d3e0a0002022ae0a557-8b5c2f07456c7d3e0a00020en-US.

6 Start-up

6.1 Initial start-up by Metrohm

As a basic rule, the initial start-up of the system is carried out by the regional Metrohm service representative.



NOTICE

Addition and aspiration can also be controlled via the OMNIS Software.



WARNING

Electrical potential

Contact with electrical potential can cause serious injuries or death.

- Operate the product only if it is in perfect condition. The housing must also be intact.
- Only use the product with the covers fitted.
- Protect live components (e.g. power supply unit, power cord, connection sockets) against moisture.
- Always have maintenance work and repairs on electrical components carried out by a regional Metrohm service representative.

Prerequisite:

- The product is switched off and disconnected from the energy supply.

Required accessories:

- Cleaning cloth (soft, lint-free)
- Water or ethanol

1 Clean the surface with a damp cloth. Remove persistent contamination with ethanol.

2 Wipe the surface with a dry cloth.

3 Clean the connectors with a dry cloth.

9 Troubleshooting

Messages on malfunctions and errors are displayed in the control software or in the embedded software (e.g. on the display of an instrument) and contain the following information:

- Descriptions of causes of malfunctions (e.g. jammed drive)
- Descriptions of problems with the control (e.g. missing or invalid parameter)
- Information on how to solve the problem

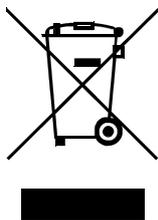
System components with status display elements also indicate malfunctions and errors with a red flashing LED.

Troubleshooting on the product is often only possible with the control software or the embedded software (e.g. initializing, moving to a defined position).

See also

System – Signals (chapter 3.4, page 14)

10 Disposal



Properly dispose of chemicals and of the product to reduce negative effects on the environment and public health. Local authorities, waste disposal companies or dealers provide more detailed information on disposal. Observe the WEEE EU directive (WEEE = Waste Electrical and Electronic Equipment) for the proper disposal of waste electronic equipment within the European Union.



11 Technical specifications

11.1 Ambient conditions

Nominal function range	+5 to +45 °C	at max. 80% relative humidity, non- condensing
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Storage	+5 to +45 °C
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11.2 OMNIS Solvent Module – Energy supply

Nominal voltage	24 VDC
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11.3 OMNIS Solvent Module – Dimensions

Measurements

<i>Width</i>	142 mm
<i>Height</i>	250 mm
<i>Depth</i>	335 mm

Weight

<i>Type</i>	2.7 kg
-------------	--------

11.4 OMNIS Solvent Module – Housing

Materials

<i>Base</i>	1.4301	stainless steel
<i>Enclosure</i>	PBT	poly(butylene terephthalate)
<i>Front foils</i>	PET	poly(ethylene terephthalate), mat

IP degree of protection IP 30

11.5 OMNIS Solvent Module – Connectors specifications

Energy supply via MDL
Socket round plug

MDL Metrohm Device Link

11.6 Display specifications

Status display LED multi-colored

11.7 OMNIS Solvent Module – Liquid handling specifications

Pump

<i>Type</i>		membrane
<i>Number</i>	1	
<i>Flow rate</i>		
Add	600 mL/min	depending on the fill level in the respective bottle
Aspirate	300 - 400 mL/min	depending on the fill level in the respective bottle