

OMNIS Titrator



2.1001.0X20

Product manual

8.1001.8002EN / 2022-01-12



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Technical Communication
Metrohm AG
CH-9100 Herisau

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1 Overview

1.1 OMNIS Titrator – Product description

The OMNIS Titrator is the central instrument of an OMNIS titration system. The OMNIS Titrator is responsible for the energy supply to all of the modules in the titration system and for communication between the titration system and the OMNIS Software. The scope of the functions of the OMNIS Titrator is defined in the selected function license.

1.2 OMNIS Titrator – Product versions

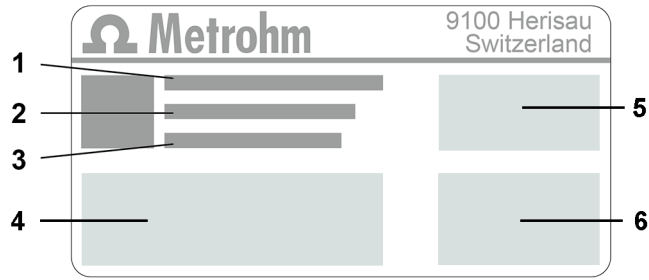
The product is available in the following versions:

Table 1 Product versions

Article number	Designation	Magnetic stirrer	Function license
2.1001.0010	OMNIS Titrator	without	individual
2.1001.0020	OMNIS Titrator	with	individual
2.1001.0110	OMNIS Basic Titrator	without	Basic
2.1001.0120	OMNIS Basic Titrator	with	Basic
2.1001.0210	OMNIS Advanced Titrator	without	Advanced
2.1001.0220	OMNIS Advanced Titrator	with	Advanced
2.1001.0310	OMNIS Professional Titrator	without	Professional
2.1001.0320	OMNIS Professional Titrator	with	Professional

Information on function licenses is available on the [Metrohm website](#) or from the regional Metrohm representative.

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 dialogs
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.
-  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:



- Label the product according to regulations if it is used for substances that have a potential for chemical hazards and are generally subject to the Hazardous Substances Ordinance.
- Wear personal protective equipment (e.g. protective glasses, gloves).
- Use exhaust equipment when working with vaporizing hazardous substances.
- Dispose of hazardous substances in accordance with regulations.
- Clean and disinfect contaminated surfaces.
- Only use detergents that do not cause any unwanted side reactions with the materials to be cleaned.
- Dispose of chemically contaminated materials (e.g. cleaning material) in accordance with regulations.
- Proceed as follows in case of a return shipment to Metrohm AG or a regional Metrohm representative:
 - Decontaminate the product or product component.
 - Remove the labeling for hazardous substances.
 - Create a declaration of decontamination and enclose it with the product.

2.4.3 Danger from highly flammable substances

Using highly flammable substances or gases may cause fires or explosions. To avoid danger from highly flammable substances, observe the following:

- Avoid ignition sources.
- Use protective grounding.
- Use exhaust equipment.

2.4.4 Danger from leaking liquids

Leaking liquids may cause injuries and may damage the product. To avoid danger from leaking liquids, observe the following:

- Check the product and its accessories for leakages and loose connections.
- Replace leaking parts and connecting elements without delay.
- Tighten loose connecting elements.
- Do not loosen tubing connections under pressure.
- Do not remove aspiration tubing under pressure.
- Carefully pull the ends of the tubing out of the containers.
- Carefully let liquids from tubing drain into suitable containers.
- Insert the buret tips completely into the containers.
- Remove and dispose of leaked liquids in accordance with regulations.
- If you suspect that liquid has penetrated the instrument, disconnect the instrument from the energy supply. Then have the instrument checked by a regional Metrohm service representative.

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 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 Single-workplace titration system – Overview

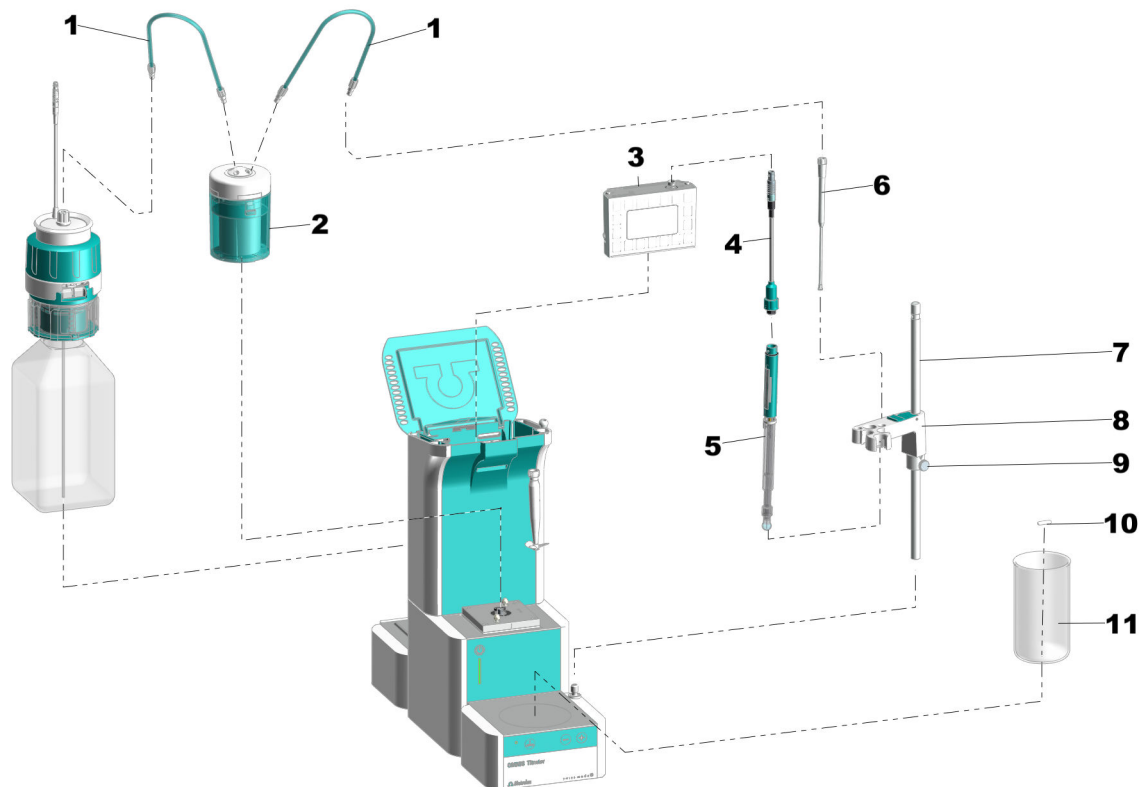


Figure 1 Single-workplace titration system – Front

1	FEP tubing	2	Cylinder unit
3	Measuring module	4	Electrode cable
5	Electrode	6	Antidiffusion tip
7	Support rod	8	Electrode holder
9	Clamping ring	10	Stirring bar
11	Sample beaker		

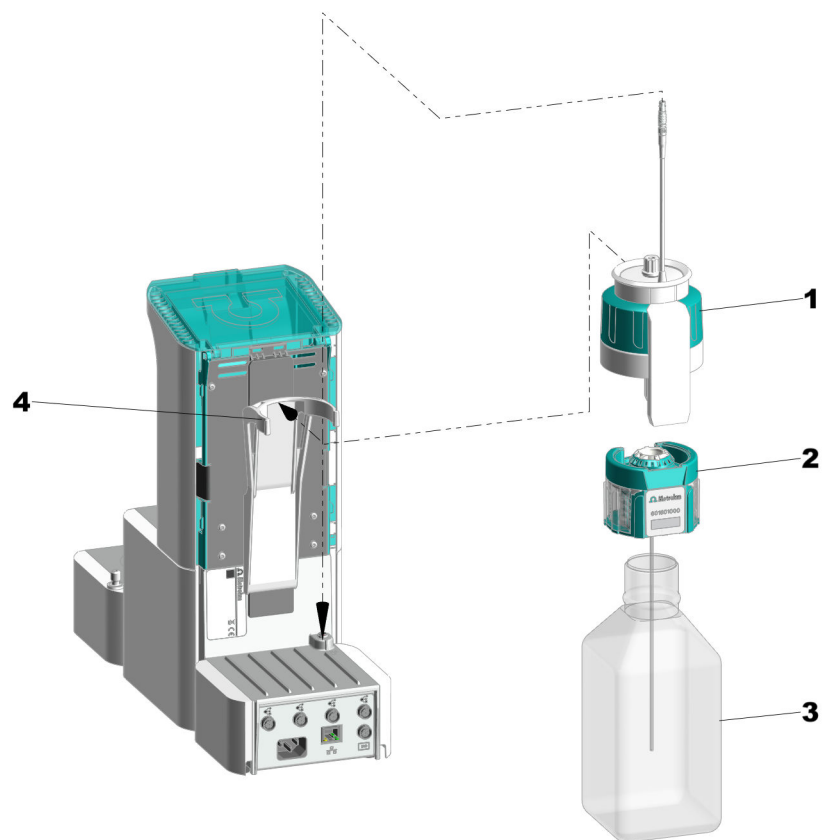


Figure 2 Single-workplace titration system – Rear

1 OMNIS Liquid Adapter

2 Bottle cap multi-use

3 Chemical bottle

4 Bottle holder

3.2 Single-workplace titration system for volumetric Karl Fischer titrations – Overview

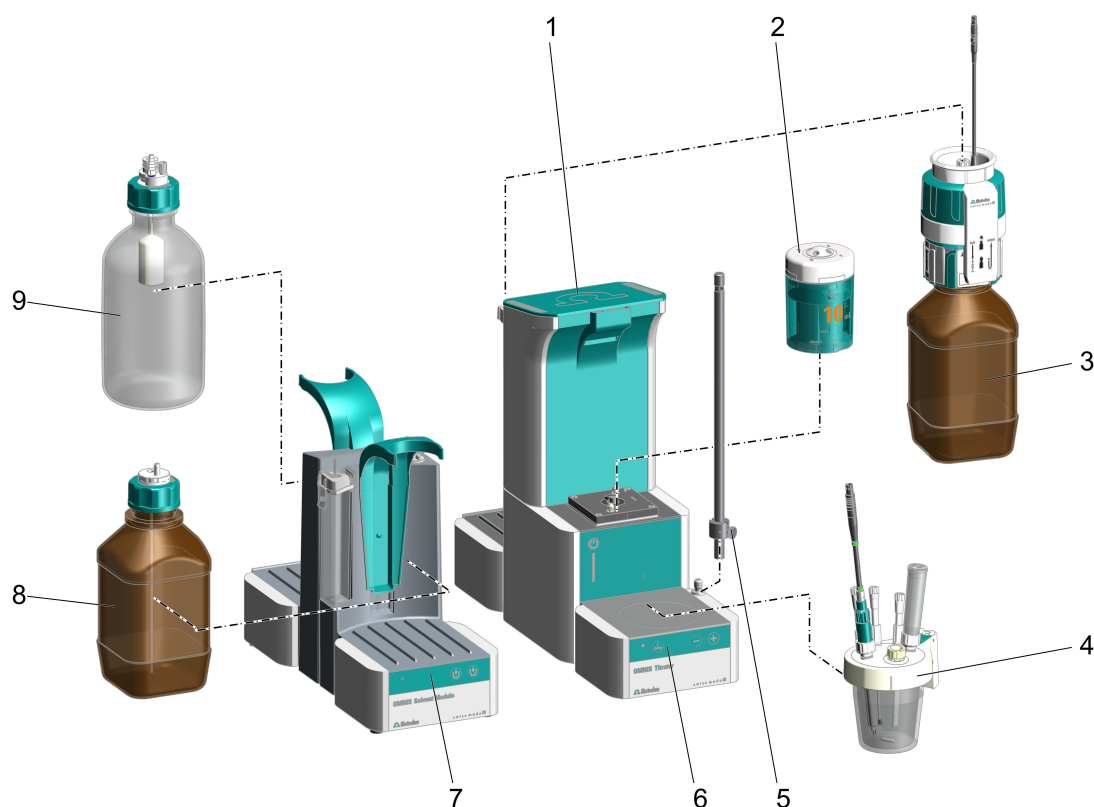


Figure 3 Single-workplace titration system for volumetric Karl Fischer titrations

1 Measuring Module Analog installed	2 Cylinder unit Metrohm recommends 10 mL cylinder units for Karl Fischer titrations.
3 Chemical bottle (titrant) with OMNIS Liquid Adapter	4 Karl Fischer titration cell (volumetric)
5 Support rod with mounted clamping ring	6 OMNIS Titrator with magnetic stirrer
7 OMNIS Solvent Module	8 Chemical bottle (Solvent) with Siphon Breaker
9 Chemical bottle (Waste) with overflow protection	



3.3 OMNIS Titrator – Overview

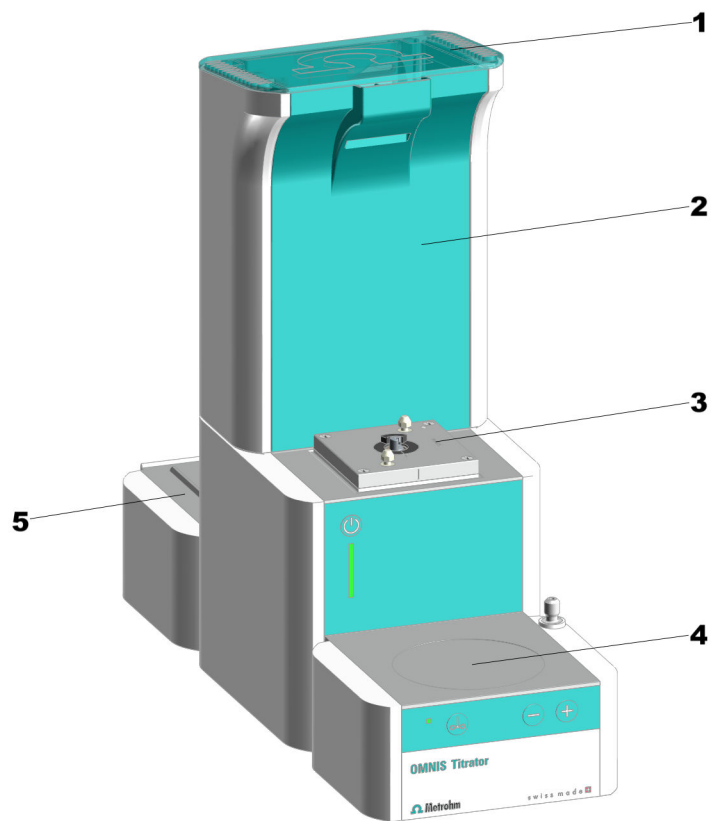


Figure 4 OMNIS Titrator – Front

1	Lid	2	Space for measuring modules
3	Dosing drive	4	Magnetic stirrer
5	Platform For chemical bottles		



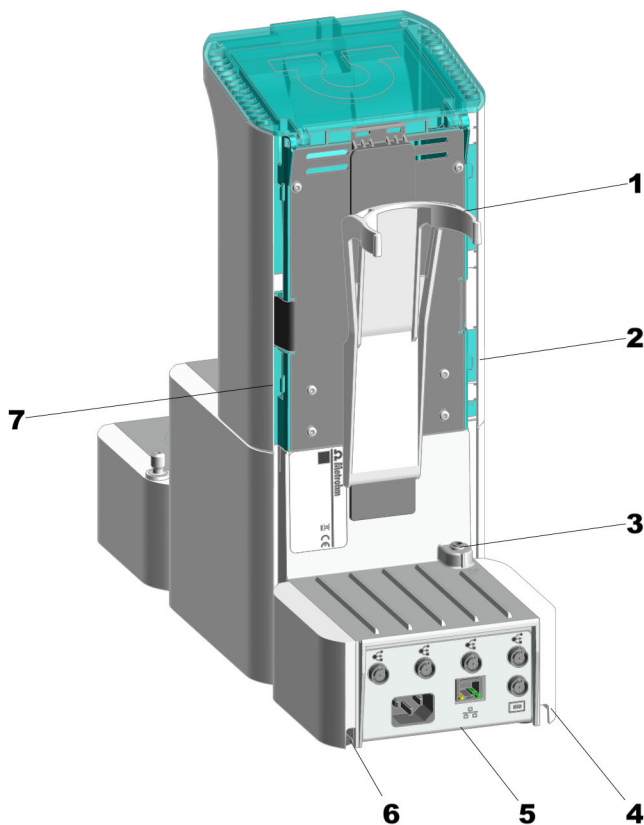


Figure 5 OMNIS Titrator – Rear

<p>1 Bottle holder</p>	<p>2 Cable guide On the side to the right. For Liquid Adapter cable</p>
<p>3 MSI connector MSI = Metrohm Solution Identification. Connection socket for Liquid Adapter cable</p>	<p>4 Cable guide Bottom right</p>
<p>5 Interfaces</p>	<p>6 Cable guide Bottom left</p>
<p>7 Cable guide On the side to the left. For rod stirrer cable or electrode cable</p>	



3.3.1 Magnetic stirrer – Overview

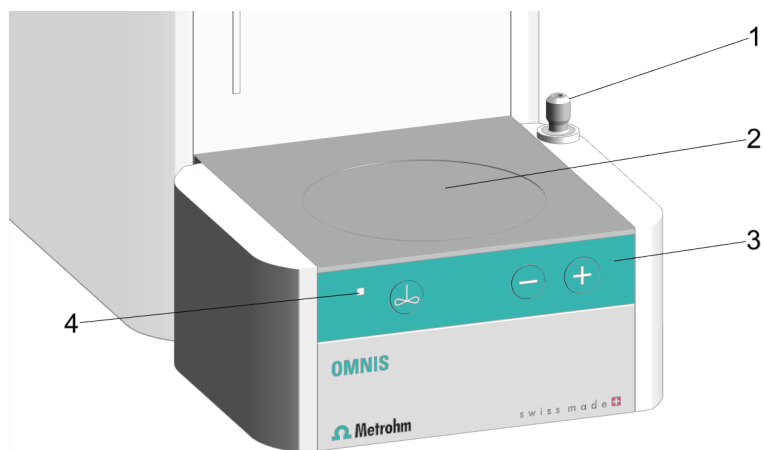


Figure 6 Magnetic stirrer – Overview

1	Stand attachment	2	Stirring area
3	Control bar	4	Status display LED. Multi-colored



3.3.2 Magnetic stirrer with accessories – Overview

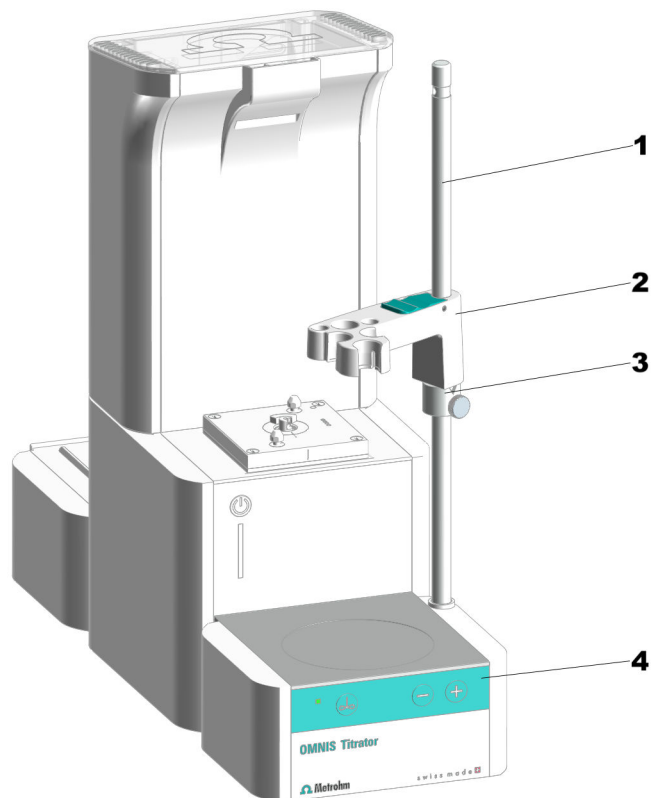


Figure 7 Magnetic stirrer with accessories – Overview

1	Support rod	2	Electrode holder
3	Clamping ring	4	Control bar

i The support rod is grounded. The OMNIS Titrator and OMNIS Titration Module have a hole in the support rod that serves as earth contact for a banana plug (4 mm).



3.3.3 Dosing unit – Overview

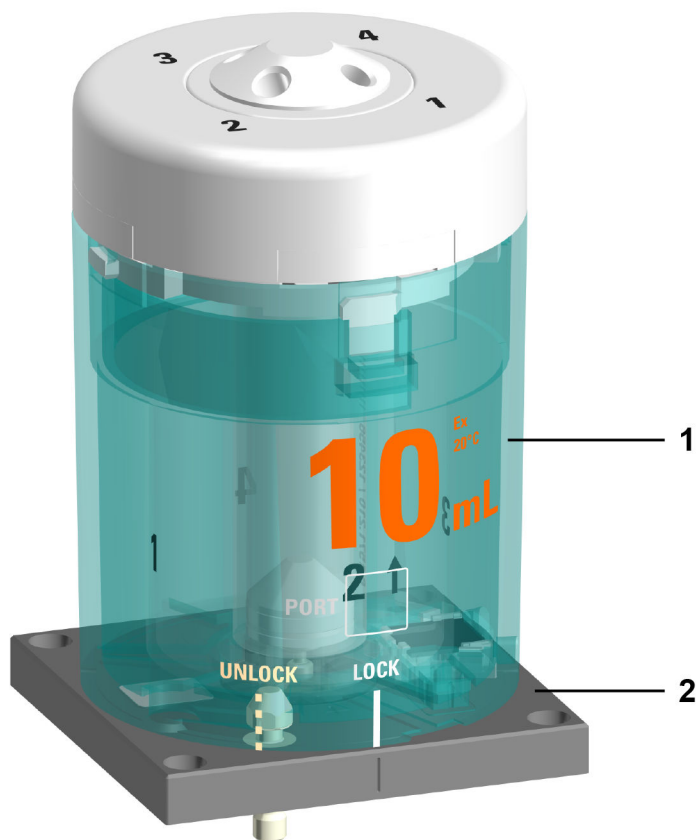


Figure 8 Dosing unit – Overview

1 Cylinder unit

Available with various volumes

2 Dosing drive

Not in scope of delivery

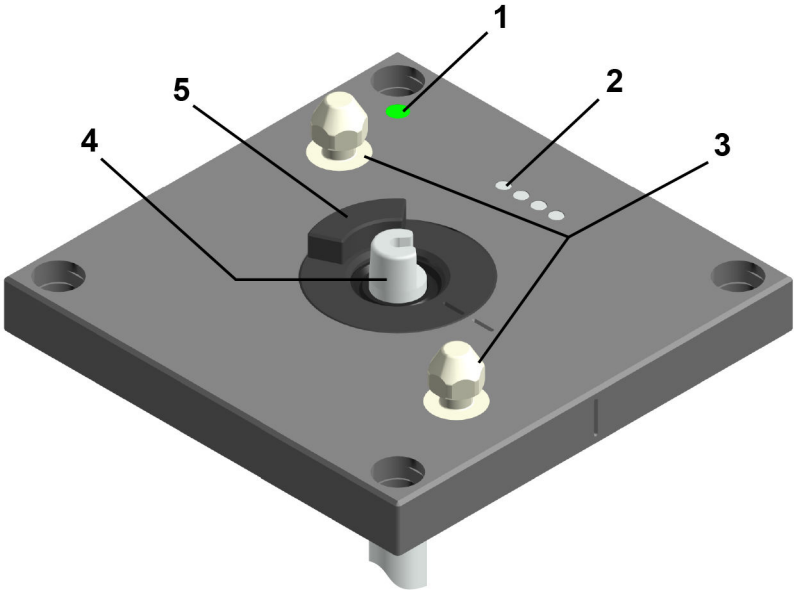


Figure 9 Dosing drive – Overview

- | | |
|--|---|
| 1 Status display
LED. Multi-colored | 2 Contact pins
For communicating with the cylinder unit |
| 3 Twistlocks
For locking the cylinder unit | 4 Piston rod
For moving the dosing piston |
| 5 Valve coupling | |



3.3.3.1 Cylinder unit OMNIS – Overview

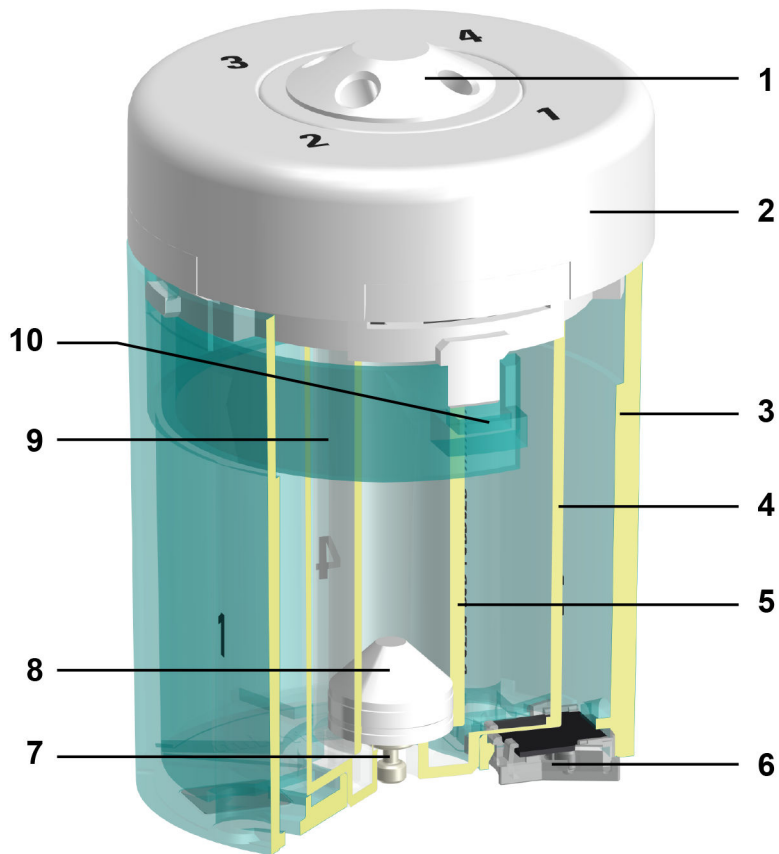


Figure 10 Cylinder unit – Overview

1	Distributor with 4 ports	2	Cylinder top piece
3	Cylinder housing	4	Centering tube
5	Cylinder	6	Data chip
7	Piston stopper	8	Dosing piston
9	Spring clip	10	Unlocking button

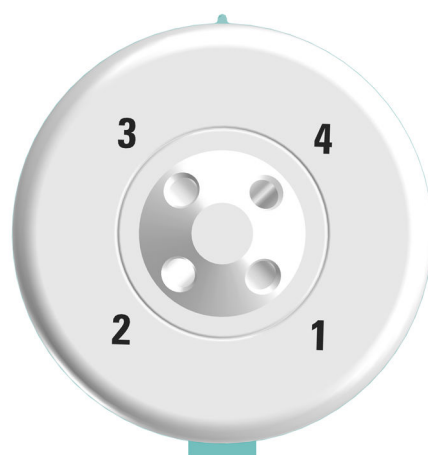


Figure 11 Cylinder unit – Overview from above

The following table shows the standard use of the 4 ports. The use of the ports can be changed in the OMNIS Software.

Port	Use	Connecting or sealing with
1	Dosing	Dosing tip
2	Filling the cylinder	Chemical bottle
3	Not used	Stopper
4	Not used	Stopper



3.3.4 Bottle unit – Overview

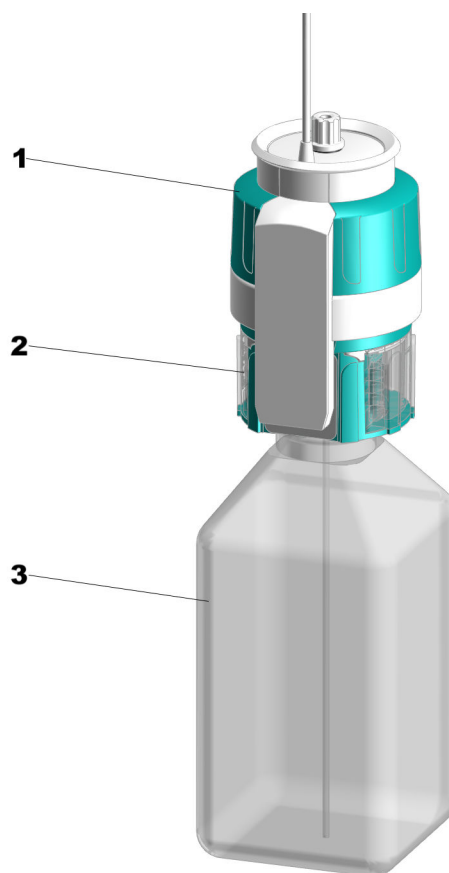


Figure 12 Bottle unit

1 OMNIS Liquid Adapter

2 Bottle cap multi-use

3 Chemical bottle



3.3.4.1 OMNIS Liquid Adapter – Overview

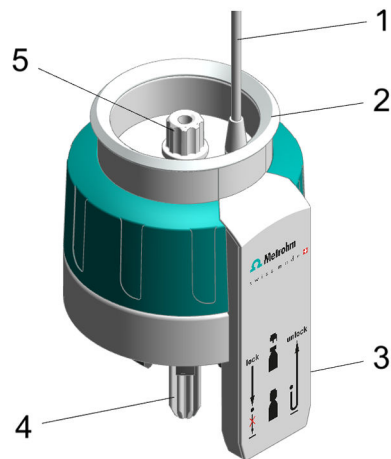


Figure 13 OMNIS Liquid Adapter – Parts

1 Cable

2 Status display

3 RFID reader

4 Aspiration tube
Part of 6.01600.xxx

5 Tubing adapter
Part of 6.01600.xxx



3.3.4.2 Bottle cap multi-use – Overview

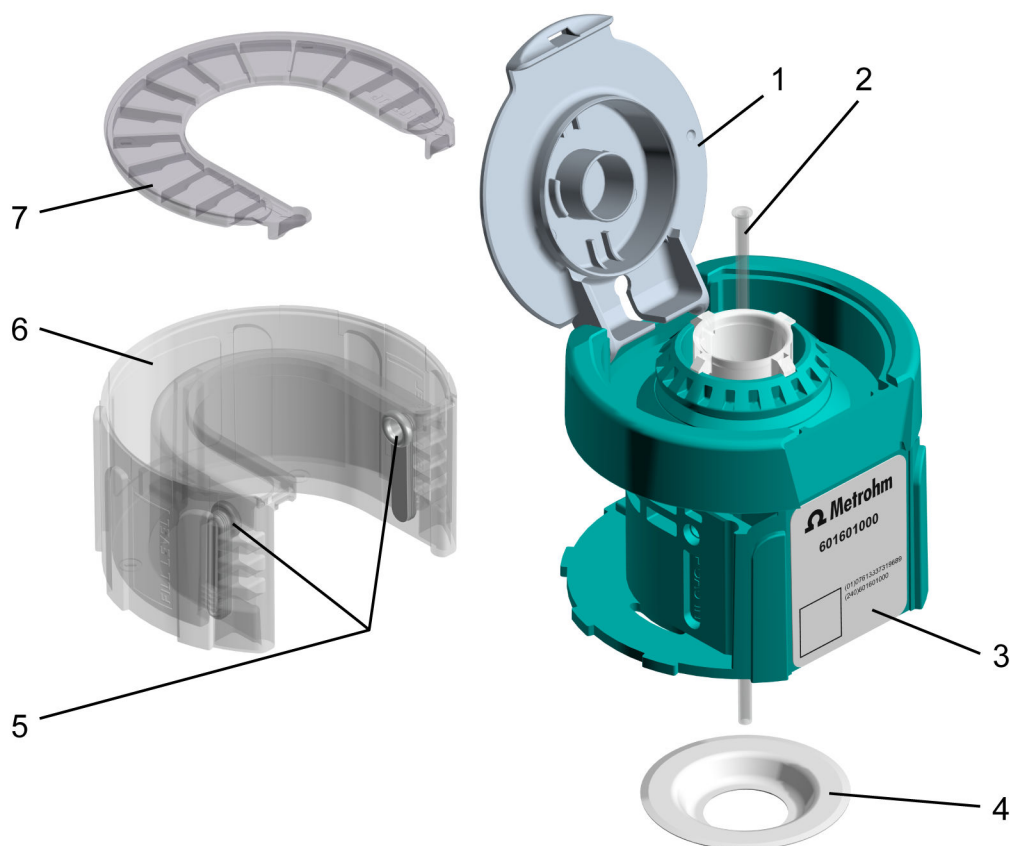


Figure 14 Bottle cap multi-use, complete (6.01601.000)

1	Flip-top lid	2	Aspiration tubing Aspiration tubing (6.1819.020)
3	RFID tag RFID chip for contact-free data transmission.	4	PTFE sealing ring PTFE sealing ring (6.02701.010)
5	Absorption cartridge insert (2 pieces)	6	Absorption cartridge housing
7	Absorption cartridge lid	5–7	Absorption cartridge, complete Absorption cartridge, complete (6.02701.000)

3.3.5 Measuring Module Analog – Overview

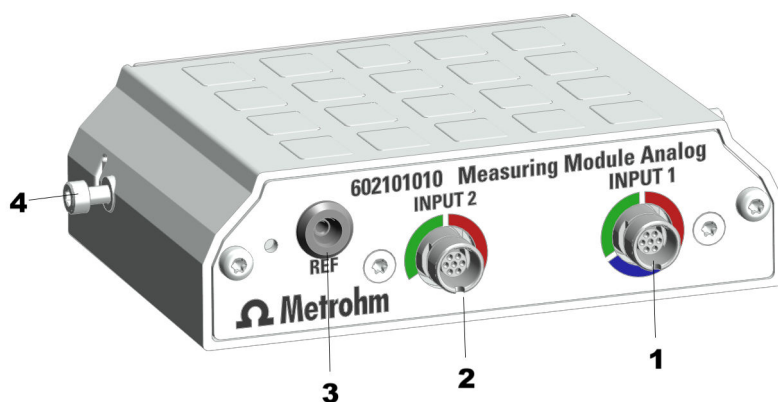


Figure 15 Measuring Module Analog – Overview

1 INPUT 1

Connection socket for potentiometric sensors (green coding), temperature sensors (red coding) and polarizable sensors (blue coding)

2 INPUT 2

Connection socket for potentiometric sensors (green coding) and temperature sensors (red coding)

3 REF

Connection socket for reference electrodes

4 Fastening screws

Fastening screws, left and right. These fasten the measuring module in the housing and ground the electronics.



3.3.6 Measuring Module Digital – Overview

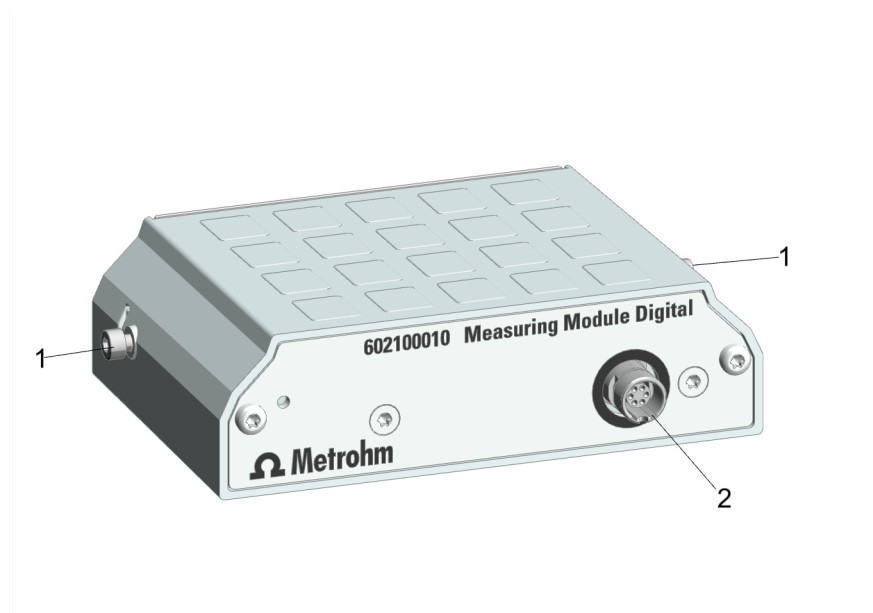


Figure 16 Measuring Module Digital – Overview

1 Fastening screws

Fastening screws, left and right. These fasten the measuring module in the housing and ground the electronics.

2 Connection socket

For dTodes

3.3.7 Measuring Module Conductivity – Overview

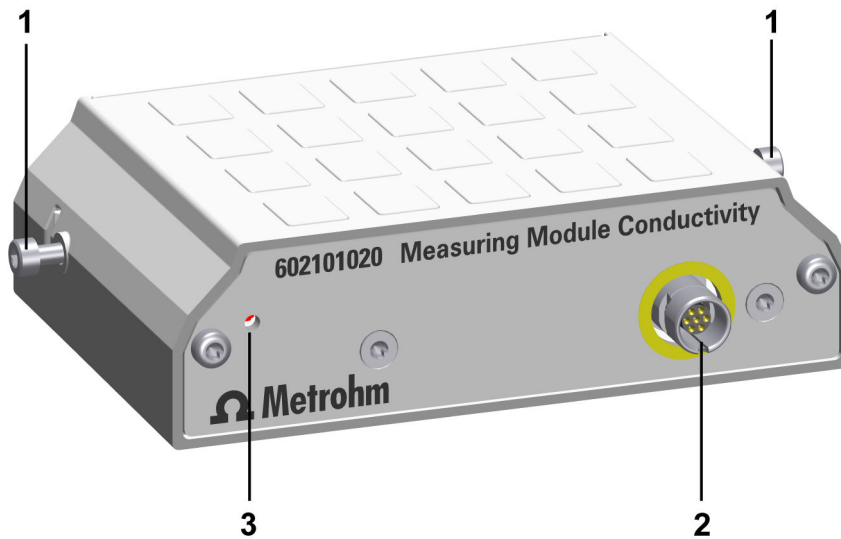


Figure 17 Measuring Module Conductivity – Overview

1 Fastening screws

2 Measuring input

For conductivity measuring cell (*see Measuring Module Conductivity – Connector specifications, page 90*)

3 Status display
LED (green-red)

Various conductivity measuring cells with integrated temperature sensor can be connected to the measuring input of the Measuring Module Conductivity, see *Electrode finder*. Conductivity measuring cells with banana plugs can be connected via the adapter box (6.2103.160).



3.3.8 Volumetric Karl Fischer titration cell – Overview

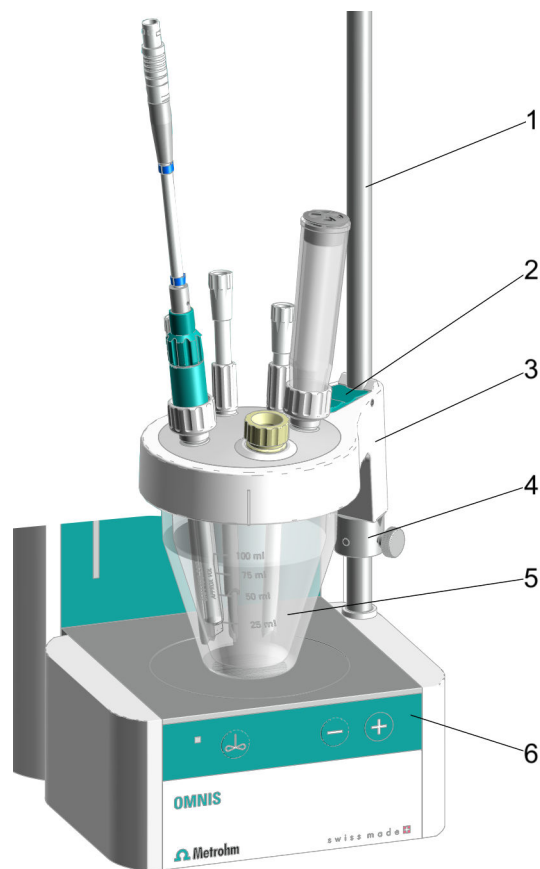


Figure 18 Installed volumetric Karl Fischer titration cell – Overview

1	Support rod	2	Locking lever
3	Titration vessel lid	4	Clamping ring
5	Titration vessel	6	Control bar for magnetic stirrer



3.4 OMNIS Titrator – Function

The OMNIS Titrator is connected to the energy supply and the Ethernet network. All of the other modules of the titration system are connected with the OMNIS Titrator.

The OMNIS Titrator is equipped with the following functional units:

- Connectors to the energy supply and the Ethernet network
- Interfaces for connecting additional modules
- Slots for a maximum of 2 measuring modules:
 - The Measuring Module Analog is used for connecting analog electrodes.
 - The Measuring Module Digital is used for connecting digital electrodes (dTrodes).
 - The Measuring Module Conductivity is used for connecting conductivity measuring cells.
- Dosing unit with 1 interchangeable cylinder unit
- 1 magnetic stirrer, depending on the product version
- Bottle unit with reagent detection
- Cable guides:

Cable guides are located at the rear and on the base of the titrator. The OMNIS Liquid Adapter cable can be guided to the connection socket in the cable guide on the right-hand side. The cable of a rod stirrer can be guided in the lateral and bottom cable guides on the left-hand side to the connection socket at the rear of the instrument.

The OMNIS Titrator with magnetic stirrer can also be used as a stand-alone instrument with manual sample change.

3.4.1 Magnetic stirrer – Functional description

The magnetic stirrer ensures that the sample is well mixed. The stirring rate can be adjusted depending on the amount and viscosity of the sample. The magnetic stirrer is operated via the instrument control bar or via the OMNIS Software.

3.4.2 Dosing unit – Function

Software control of the dosing unit can be used for accurate dosing of liquid volumes.

The dosing unit is comprised of the following units:

- Dosing drive
- Cylinder unit

The dosing drive is permanently installed in the housing of the instrument. The dosing drive is controlled via the OMNIS Software and is responsible for the accurate dosing of the solution.



If the cylinder unit is placed on top of the dosing drive, the dosing drive assumes responsibility for the following functions:

- **Raising and lowering the dosing piston:**
Solution is aspirated if the dosing piston is lowered. The cylinder fills up.
Solution is dosed if the dosing piston is raised. The cylinder empties.
- **Rotating the cylinder:**
The rotation of the cylinder controls which of the 4 ports the solution flows through.
The valve disk with an opening is located in the middle of the cylinder base.
The distributor disk with 4 openings corresponding to the 4 ports of the distributor is located at the bottom in the cylinder top piece.
The dosing drive rotates the cylinder by 90° stages so that the opening of the valve disk fits with an opening on the distributor disk. This results in a passage for the solution to the corresponding port of the distributor.

3.4.2.1 Cylinder unit OMNIS – Function

The cylinder unit is an accessory set for the dosing unit in OMNIS instruments with dosing function. The cylinder unit provides the liquid volume required for the analysis and can be equipped with different volumes. A distributor with 4 ports enables the filling and emptying of the cylinder.

The cylinder units 2 mL to 20 mL are used for dosing as well as titrating. The cylinder unit 50 mL is particularly suited for dosing (Liquid Transfer).

See also

[Cylinder unit OMNIS – Overview \(chapter 3.3.3.1, page 18\)](#)

3.4.3 Bottle unit – Function

The bottle unit contains the chemicals that are required for the analysis. The bottle unit in an OMNIS system is comprised of the following elements:

- Chemical bottle
- OMNIS bottle cap
The OMNIS bottle cap fits on a chemical bottle with GL 45 thread. Suitable adapters are available for chemical bottles with other threads.
The green bottle cap multi-use is equipped with a writeable RFID tag. The RFID tag can be inscribed with information regarding the solution.
The red bottle cap single-use is equipped with an RFID tag. The RFID tag contains manufacturer's information regarding the composition and concentration of the solution.
- OMNIS Liquid Adapter
The OMNIS Liquid Adapter has an RFID tag reader that transfers the data between the RFID tag of the bottle cap and the OMNIS Software.

3.4.3.1 OMNIS Liquid Adapter – Functions

The basic principle

There is no fixed connection between the OMNIS Liquid Adapter and the chemical bottle that must be loosened when changing bottles. This means that you can transfer the OMNIS Liquid Adapter without difficulty from one bottle to another.

Liquid transfer

The liquid transfer is the responsibility of an aspiration tube installed in the OMNIS Liquid Adapter. When you place the OMNIS Liquid Adapter on the bottle, the aspiration tube presses on the aspiration tubing in the chemical bottle. A tightly sealed connection is made.

Contact-free data transmission

Information regarding the content of the chemical bottle is stored on an RFID tag on the bottle cap. The OMNIS Liquid Adapter has an RFID tag reader that reads this data.

The data cable fastened to the OMNIS Liquid Adapter transfers the information to the analyzer and to the software.

3.4.4 Measuring Module Analog – Functional description

The Measuring Module Analog contains the electronics necessary for the use of analog sensors. Analog electrodes and analog reference electrodes can be plugged into its connection sockets.

3.4.5 Measuring Module Digital – Functional description

The Measuring Module Digital is used as an interface for digital electrodes on an OMNIS Titrator or an OMNIS Titration Module.

The digital electrodes, the dTrodes, can be plugged into its connection socket.

3.4.6 Volumetric Karl Fischer titration cell – Function

The volumetric Karl Fischer titration cell (KF titration cell) is a closed vessel for water content determination according to Karl Fischer that is fastened to the support rod of the magnetic stirrer.

The KF titration cell consists of:

- A titration vessel (different variants are available)
- A titration vessel lid (different variants are available, with and without homogenizer (Polytron PT 1300 D))

Seepage of moisture into the KF titration cell is prevented with seals and with the adsorber tube, which is filled with molecular sieve.



3.5 OMNIS main instrument – Indicators and controls

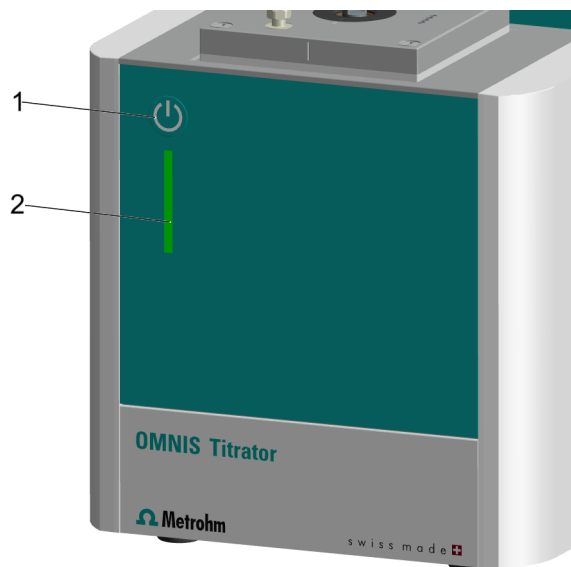


Figure 19 OMNIS main instrument – Indicators and controls

1 On/off switch

2 Status display
Multi-colored

Indicators

The status of the main instrument is displayed with the status display (19-2) using different colors (see "System – Signals", chapter 3.6, page 31).

Controls







The on/off switch (19-1) is used for the hardware-side operation of the OMNIS main instrument.

Table 3 Behavior of the on/off switch

Pressure duration	Acoustic signal	Function on the OMNIS main instrument
Short pressing (1 to 5 s)	Beep after 1 s	Switch on the instrument.
		Shut down the instrument.
Very long pressing (> 10 s)	Continuous beep after 8 s	Force a shutdown.

3.6 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.



3.7 OMNIS Titrator – Interfaces

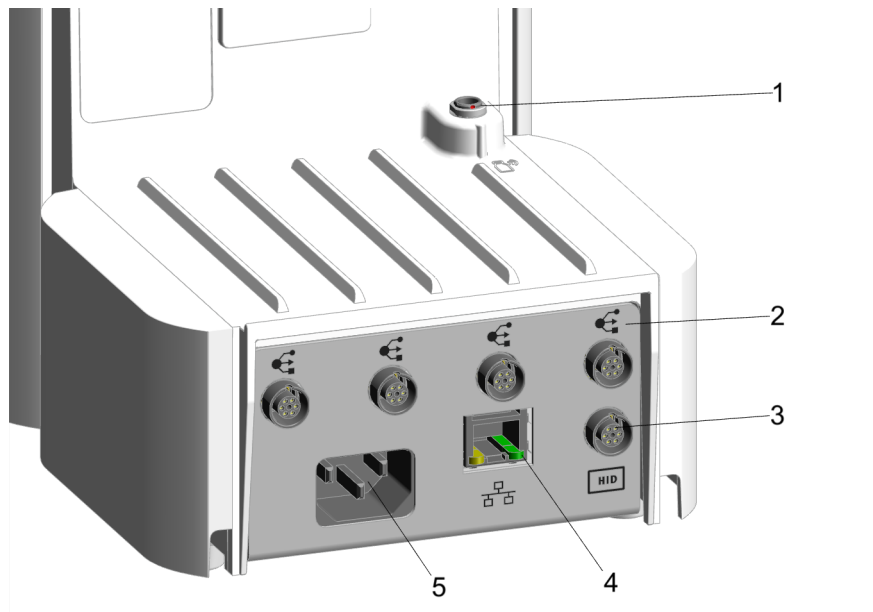


Figure 20 OMNIS Titrator – Interfaces and connectors

1 MSI connector

MSI = Metrohm Solution Identification. Connection socket for Liquid Adapter cable

2 MDL connectors

MDL = Metrohm Device Link. Connection socket for connecting cable between OMNIS products

3 HID connector

HID = Human Interactive Device. Connection socket for external operating units

4 LAN connector

LAN = Local Area Network. Connection socket for a connecting cable to the local network

5 Power socket

Connection socket for the energy supply

3.8 Measuring Module Analog – Interfaces

The Measuring Module Analog has 3 measuring inputs for analog electrodes.

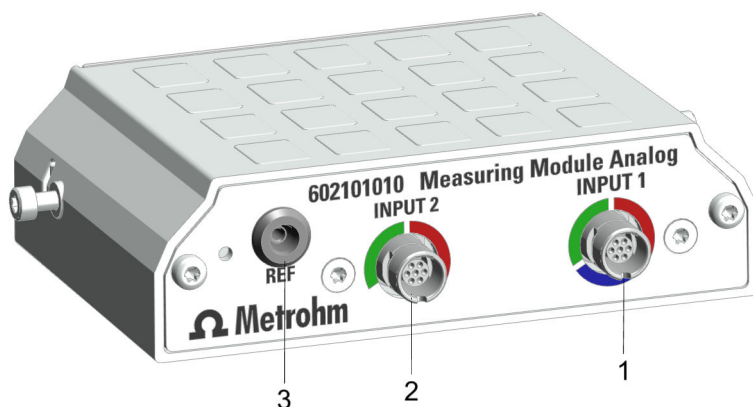


Figure 21 Measuring Module Analog – Measuring inputs

1 INPUT 1
3 REF

2 INPUT 2

Measuring inputs INPUT 1 and INPUT 2

The measuring inputs **INPUT 1** and **INPUT 2** are marked with colored circle segments. The markings indicate that only certain types of electrode cables may be plugged into the connection socket:

Table 4 Meaning of the colors

Red	The connector supports temperature sensors.
Blue	The connector supports polarized sensors.
Green	The connector supports potentiometric sensors.

REF measuring input

Reference electrodes can be plugged into the **REF** measuring input.



3.9 Measuring Module Digital – Interfaces

The Measuring Module Digital has 1 connection socket for a digital electrode.

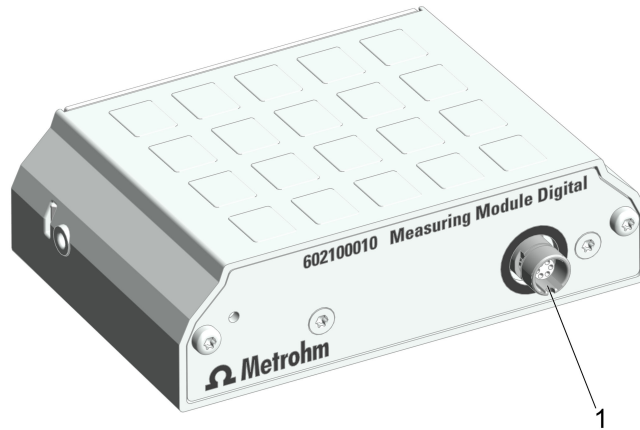


Figure 22 Measuring Module Digital – Interfaces and connectors

1 Connection socket for digital electrodes

Connection socket

The black marking around the connection socket indicates that only a cable of a digital electrode may be plugged in here.

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 After 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.

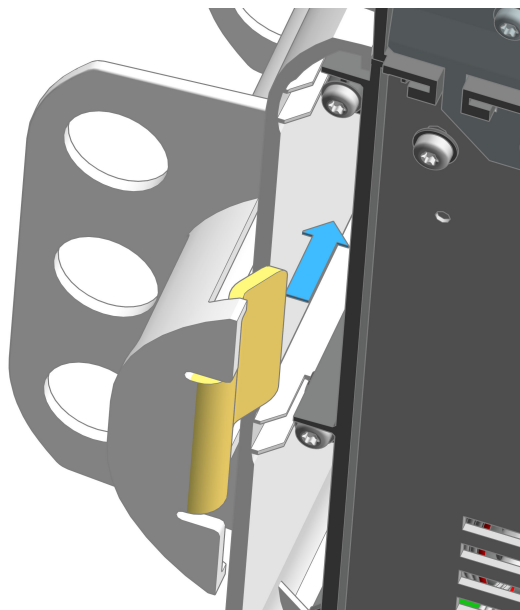
5.3 Mounting the electrode parking station

Electrodes or storage vessels of electrodes can be placed in the electrode parking station. The electrode parking station can be mounted to either side of the instrument.

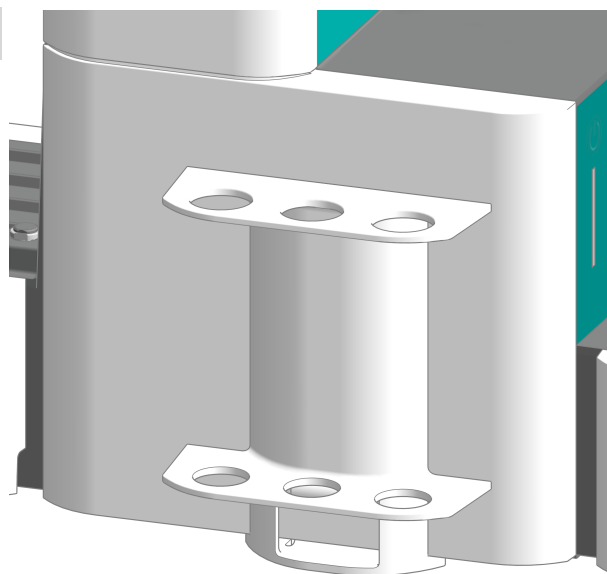
Required accessories:



Electrode parking station (6.02005.010)

1

Tilt the OMNIS product to the side. Insert the stand of the electrode parking station into the side panel.

2

Place the OMNIS product in an upright position. Push the electrode parking station as far as it will go in the direction of the instrument's back panel.

Make sure that nothing is canted and that the corners of the electrode parking station do not protrude the side panel.

5.4 Attaching the cylinder unit OMNIS

i Default settings for the ports 1 and 2

Port 1 is defined as dosing port and port 2 as fill port in the data chip default settings of the cylinder unit. The following instructions describe the default setting.

If the ports should be used differently from the default setting, adjust the ports in the OMNIS Software in **Properties** ► **Specific data**.

Preparing for attaching

- 1 Open the **Manual control** of the dosing unit in the OMNIS Software, see *software help*.
- 2 Start the **Exchange position** function.

Attaching the cylinder unit

i These instructions describe the default installation as defined in the OMNIS Software.

Prerequisite:

- Dosing drive: Valve coupling and piston rod are in the exchange position (port 2 is set).
- Cylinder unit: The piston stopper is flush with the base of the cylinder housing. The centering tube is in the correct position.

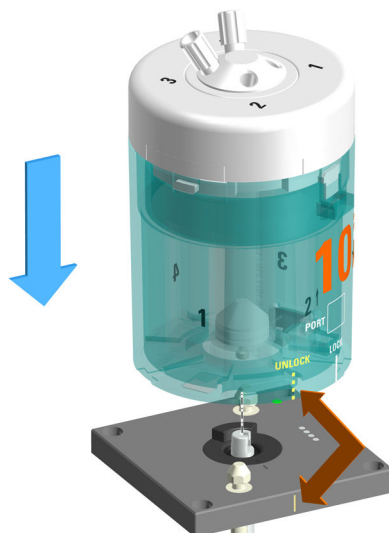
Required accessories:

- Wrench (6.2739.000)
- 2 FEP tubings (6.1805.100)
- Titration tip (6.1543.200)

1 Aligning the cylinder unit

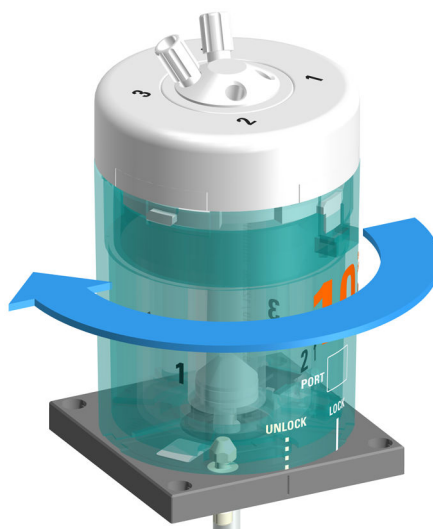
Rotate the cylinder unit until the marking with the label **UNLOCK** is in line with the marking on the dosing drive.

2



Set the cylinder unit down onto the two twistlocks straight from above.

3 Locking the cylinder unit



Rotate the cylinder unit to the left until it stops.
Use the marking with the label **LOCK** as a guide.

4 Mounting the tubings

Tighten an FEP tubing (6.1805.100) into port 1.

This FEP tubing is used as dosing tubing. Tighten the other end to the titration tip (6.1543.200).

5 Tighten the other FEP tubing (6.1805.100) into port 2.

This FEP tubing is used as filling tubing. Tighten the other end to the OMNIS Liquid Adapter.

6 Firmly tighten the tubing with the wrench (6.2739.000).**See also**

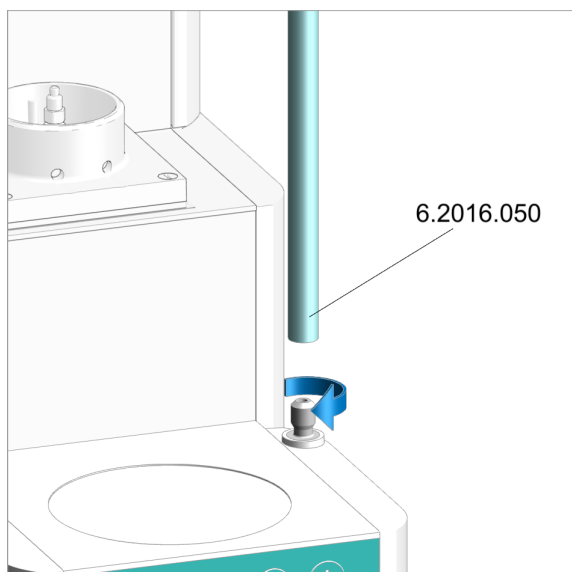
Cylinder unit OMNIS – Overview (chapter 3.3.3.1, page 18)

5.5 Magnetic stirrer – Installing the accessories

Mounting the electrode holder

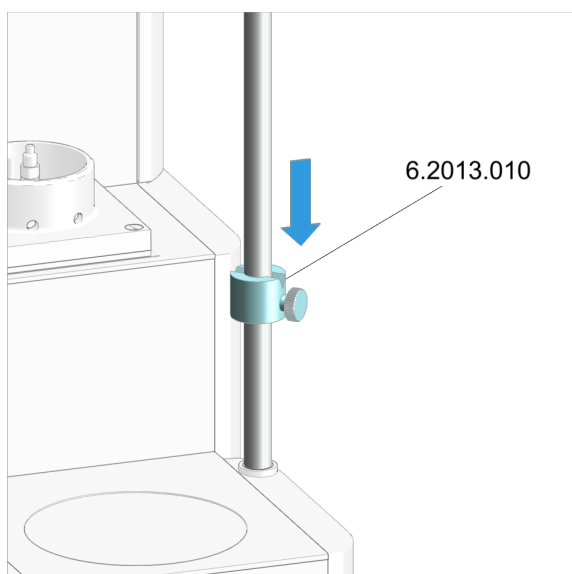
Accessories

- Support rod, 30 cm (6.2016.050)
- Clamping ring, 10 mm (6.2013.010)
- Electrode holder (6.02005.000)



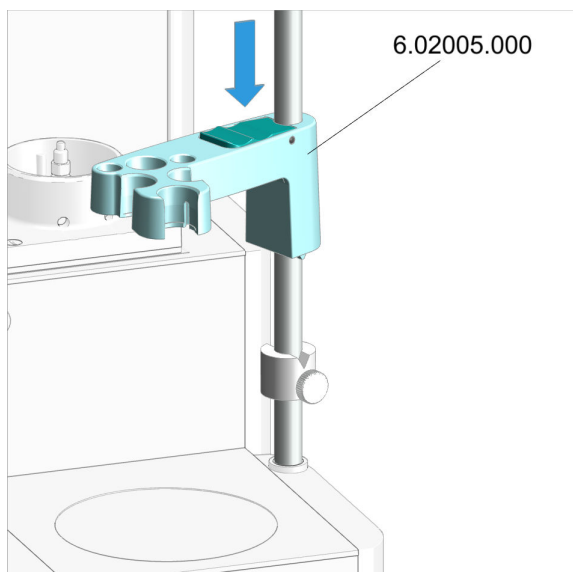
Mounting the support rod

Screw the support rod onto the stand attachment .



Mounting the clamping ring

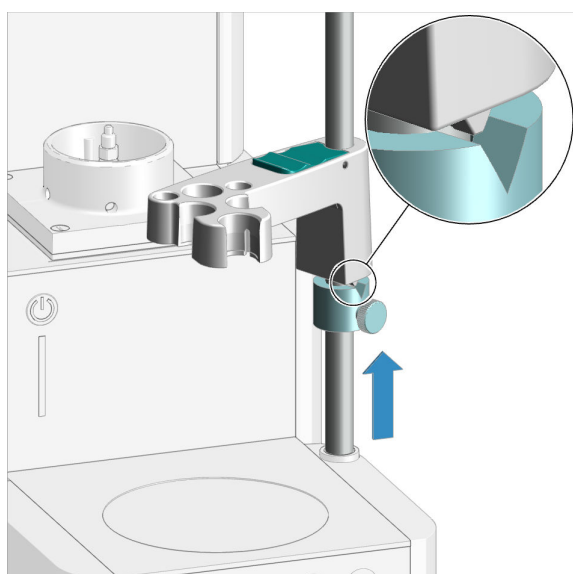
Push the clamping ring over the support rod with the indent facing upward.



Mounting the electrode holder

1. Press the green locking lever on the electrode holder.
2. Push the electrode holder over the support rod.
3. To fix in place, release the green locking lever at the desired height.

The electrode holder is fixed in place.

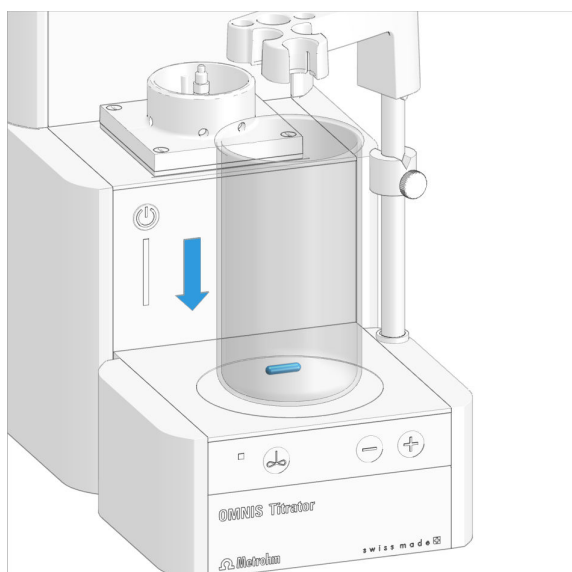


i The clamping ring is used as the lower stop for the electrode holder. The clamping ring prevents the electrode holder with the mounted electrode from being lowered too far.

1. Push the clamping ring under the electrode holder.
2. Rotate the clamping ring in such a way that the wedge on the electrode holder fits in the indent in the clamping ring.
3. Fix the clamping ring with the knurled screw in place at the desired height.

Preparing the magnetic stirrer for operation

Placing beaker and stirring bar



1. Place a 16 mm (6.1903.020) or 25 mm (6.1903.030) PTFE stirring bar in the sample beaker.
2. Place the sample beaker on the contact surface of the magnetic stirrer.

5.6 OMNIS Karl Fischer products – Replacing the adsorber material

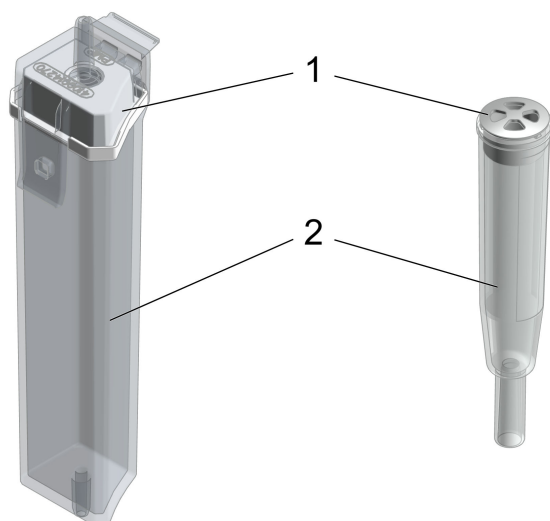


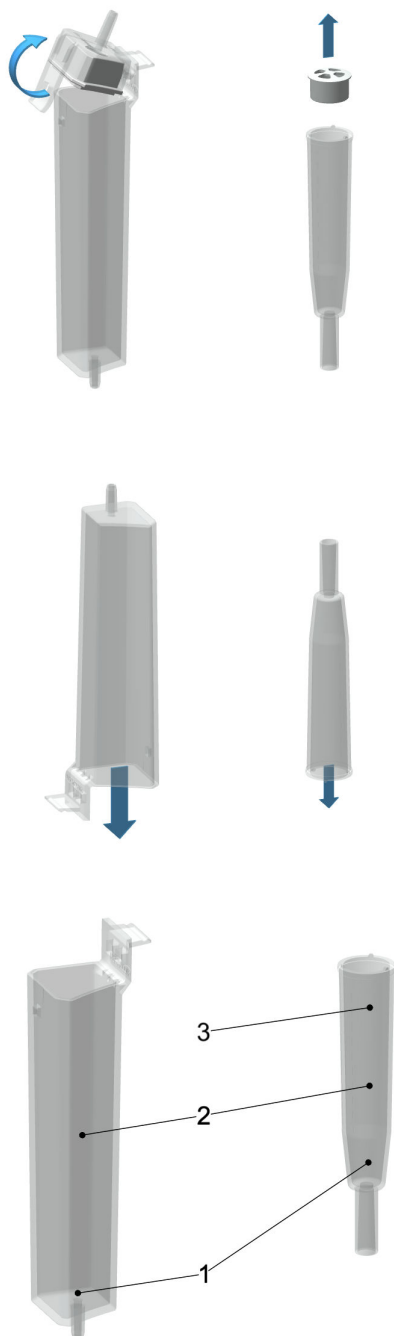
Figure 23 Adsorption cartridge of the OMNIS Solvent Module and adsorber tube for the KF titration cell

1 Lid

2 Housing



Replacing the adsorber material of the adsorption cartridge or adsorber tube



1. Removing the lid


Adsorption cartridge: Unlatch and remove the lid including the seal from the housing.

Adsorber tube: Remove the lid by pulling it out of the housing.

2. Removing the adsorber material

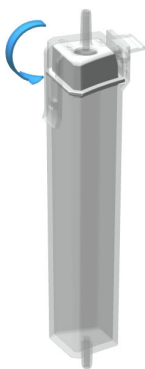
Remove the entire content.

This step is not necessary if the housing is empty.

 The molecular sieve can be regenerated at 300 °C in the drying oven, see <https://www.metrohm.com/en/support-und-service/faq-kft/>.

3. Filling the housing with adsorber material

1. Place a cotton plug loosely at the base of the housing. Do not pack the cotton too tightly as sufficient gas flow has to be possible.
2. Fill the housing with molecular sieve to approx. 1 cm under the housing edge.
3. **Adsorber tube:** Place a small cotton plug on the molecular sieve. Do not pack the cotton too tightly as sufficient gas flow has to be possible.



4. Sealing the housing with the lid

i Make sure that the sealing surface between the housing and the lid is clean and dry and that there are no residuals of filling material!

Adsorption cartridge: Hook the lid including the seal into the housing side and close it by clicking it into place.

Adsorber tube: Seal the housing with the lid.

i At average humidity, we recommend replacing the adsorber material approx. every 6 weeks.

An increase in drift indicates that the leak-tightness of the KF titration cell should be inspected and that the molecular sieve should possibly be replaced.

Hint:

Write the date on the adsorption cartridge when you replace the molecular sieve. With this, you always know when it was last filled or replaced.

5.7 Mounting the electrode

CAUTION

Damaged glass parts and pieces of broken glass

Damaged glass parts and pieces of broken glass may cause cut injuries.

- Handle glass parts (e.g. electrodes, bottles) with care.
- Only use undamaged glass parts.
- Dispose of damaged glass parts immediately.



1



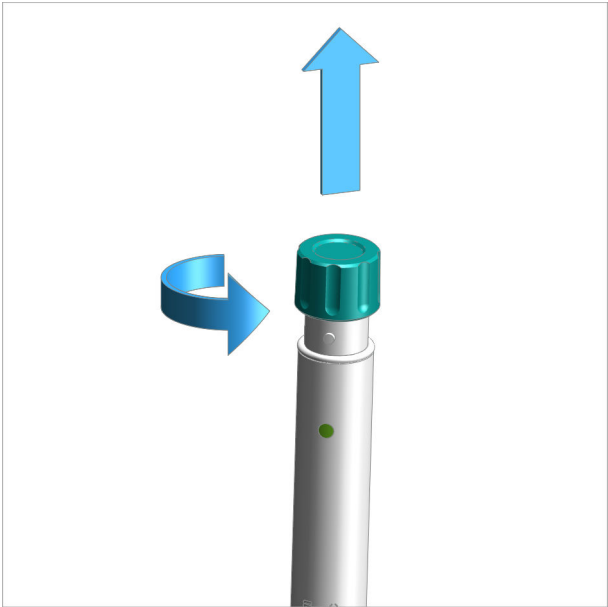
Insert the electrode from above into the front opening of the electrode holder.

2



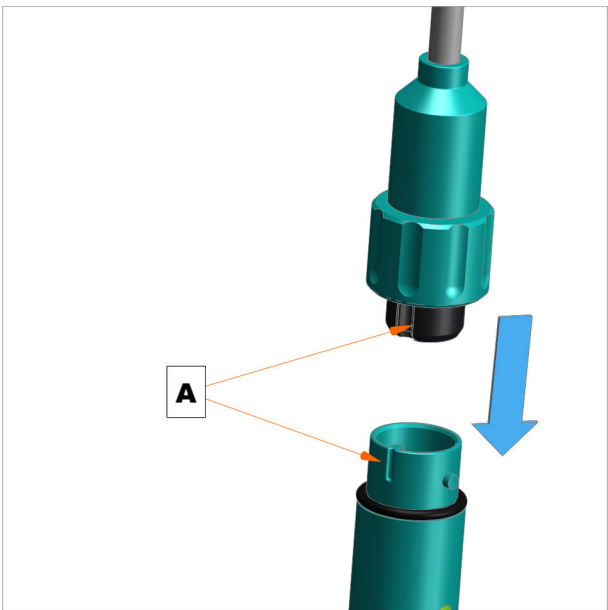
Push the green upper part of the electrode downwards until it stops. The green part of the electrode is flush with the lower edge of the electrode holder.

3



Unscrew and remove the protective cap from the electrode.

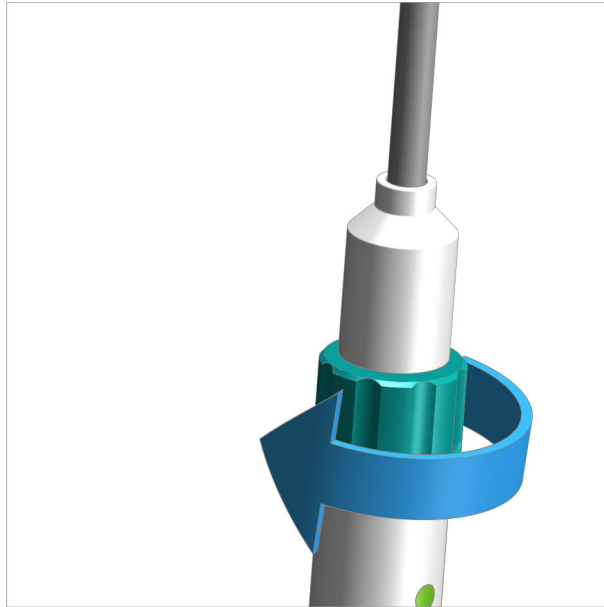
4



Plug in the plug of the electrode cable. Observe the orientation (A).



5

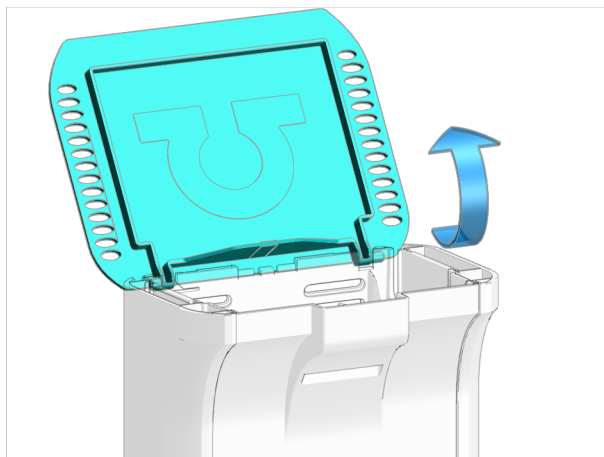


Screw the electrode cable tight.

5.8 Mounting the measuring module

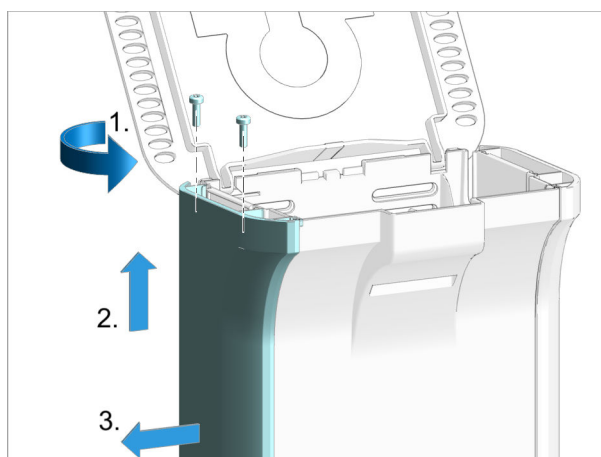
The measuring module is supplied with mounted fastening screws. These fastening screws are used to secure the measuring module in the instrument to ensure trouble-free operation.

1 Opening the lid



- Open the lid.

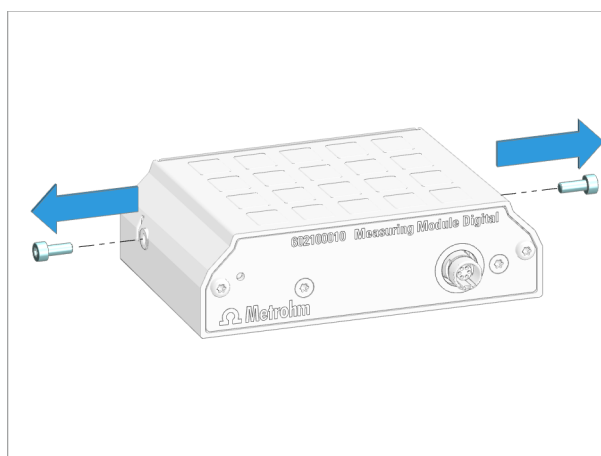
2 Removing the side parts



Carry out the following steps on **both sides** of the instrument.

- Remove the 2 screws from above using the hex key.
- Push the side covering upwards until it can be removed from the side.
- Remove the side covering to the side.

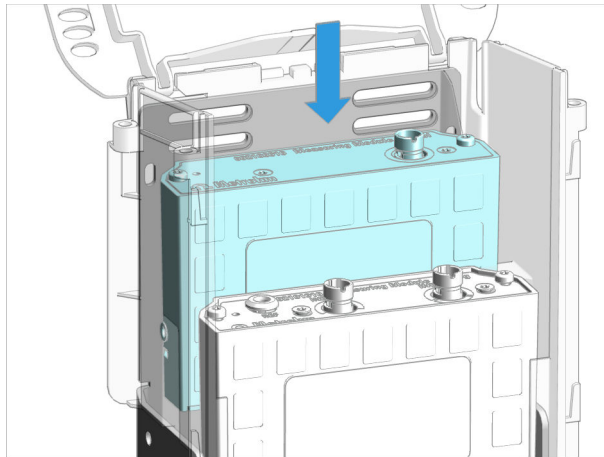
3 Removing the fastening screws



- Remove the 2 fastening screws from the measuring module using the hex key.

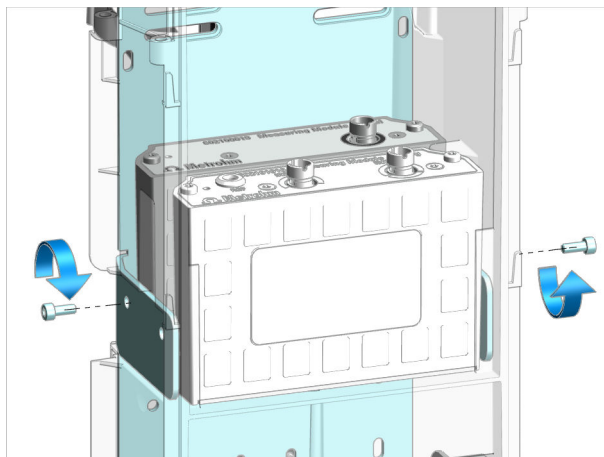


4 Inserting the measuring module



- Insert the measuring module into an empty slot. The slots are designated with 1 (rear) and 2 (front).

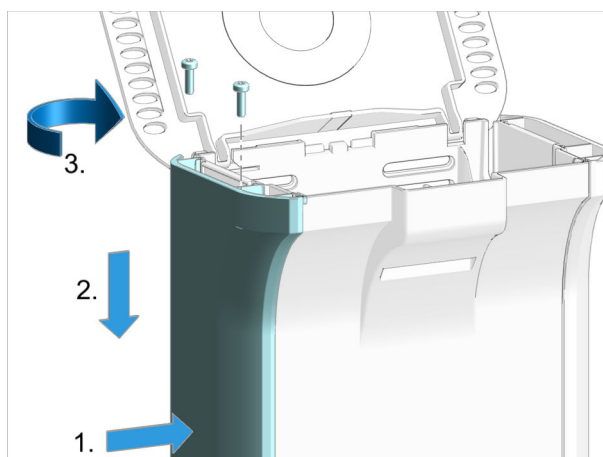
5 Attaching the measuring module



- Insert the fastening screws. Tighten the measuring module to the housing from **both sides** using the hex key.



6 Mounting the side parts



Carry out the following steps on **both sides** of the instrument.

- Position the side covering from the side in an elevated position.
- Insert the side covering into the guide rail and push it downwards.
- Insert the 2 screws and tighten them from above using the hex key.

5.9 Mounting the volumetric Karl Fischer titration cell

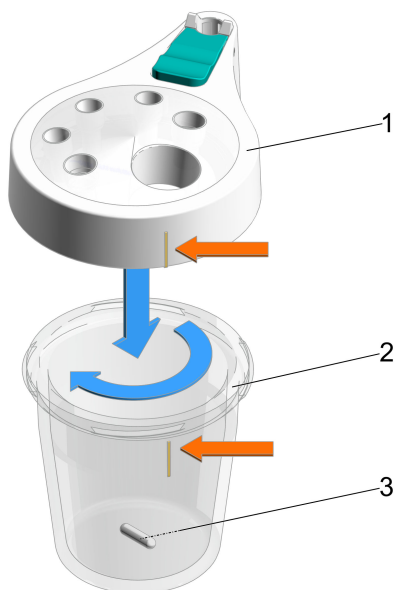


Figure 24 Volumetric Karl Fischer titration cell

1 Titration vessel lid (6.01405.010)

Titration vessel lid (6.01405.040) for homogenizer

2 Titration vessel

20–90 mL (6.01406.220) or
50–150 mL (6.01406.250)

3 Stirring bar

16 mm (6.1903.020) or
25 mm (6.1903.030)

Assembling the volumetric Karl Fischer titration cell

- 1 Select the titration vessel (24-2) of the required size and place a suitable stirring bar (24-3) inside.
- 2 Tighten the corresponding titration vessel lid (24-1) to the titration vessel.

When doing so, ensure that the color marking on the titration vessel aligns with the raised marking on the titration vessel lid. The scale of the volumetric Karl Fischer titration cell can thus be read from the front.

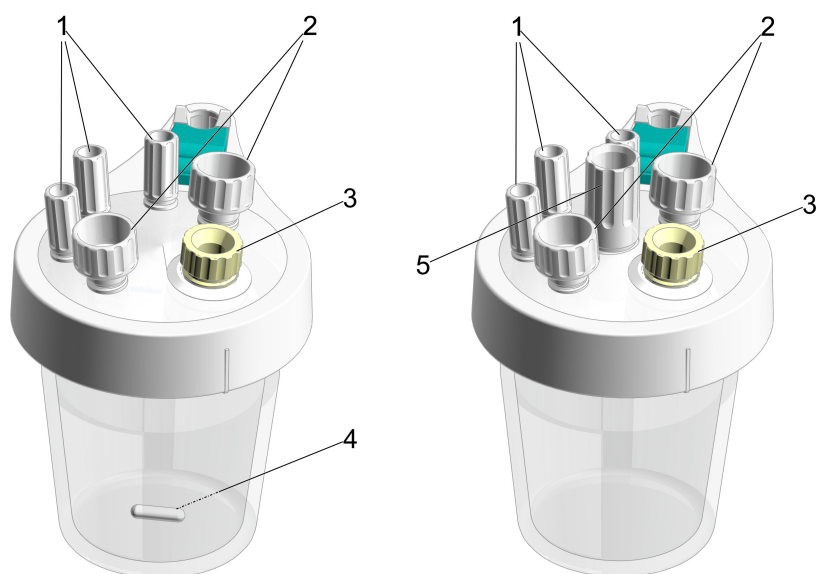


Figure 25 Volumetric Karl Fischer titration cell for the use with and without homogenizer

1	M10 screw nipple (6.02709.010)	2	M12 screw nipple (6.02709.030)
3	Septum stopper (or spoon for paste)	4	Stirring bar 16 mm (6.1903.020) or 25 mm (6.1903.030)
5	Guide sleeve (6.02709.050) for Polytron PT 1300 D		

i For the use of the Karl Fischer titration cell with homogenizer *see page 60.*

Preparing the volumetric Karl Fischer titration cell

- 1** Insert the 3 screw nipples (25-1) in the M10 openings of the titration vessel lid.
- 2** Insert the 2 screw nipples (25-2) in the M12 openings of the titration vessel lid.

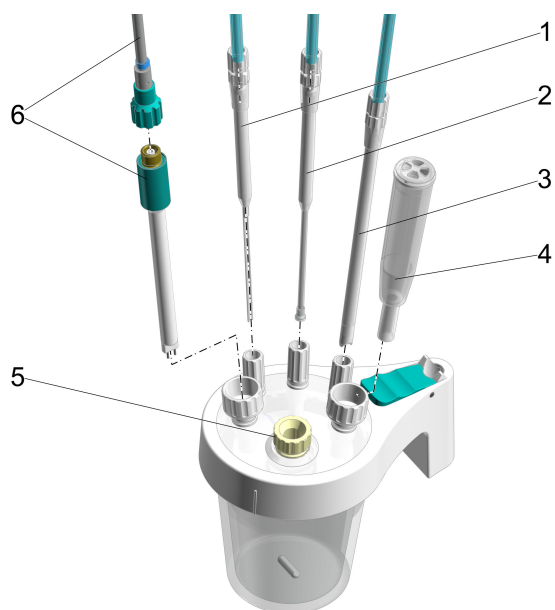


Figure 26 Equipping the volumetric Karl Fischer titration cell

<p>1 Dosing tip (6.1543.110) with M8 tubing (6.1805.200)</p>	<p>2 Buret tip (6.01543.120) with M6 tubing (6.1805.100)</p>
<p>3 Aspiration tip (6.01543.000) with M8 tubing (6.1805.200)</p>	<p>4 Adsorber tube (6.01406.010)</p>
<p>5 Septum stopper with septum (6.02709.020), stopper (6.02709.010) or spoon for paste (6.02711.000)</p>	<p>6 Double Pt electrode (6.0338.100) with cable (6.02104.040)</p>

Equipping the volumetric Karl Fischer titration cell

Prerequisite:

- The adsorber tube with lid (26-4) is filled with fresh molecular sieve (see "OMNIS Karl Fischer products – Replacing the adsorber material", chapter 5.6, page 43).

- 1** Insert the dosing tip (26-1) in the M10 screw nipple on the left (25-1) and screw it tight.

The dosing tip should be located just above the stirring bar, but should not impede it.

- 2** Insert an M8 tubing in the M8 connector of the dosing tip (26-1) and screw it tight.

- 3** Insert the buret tip (26-2) of the cylinder unit in the M10 screw nipple in the middle (25-1) and screw it tight.

.....

The antidiffusion valve of the buret tip should be located just above the stirring bar, but should not impede it.

4 Insert the M6 tubing in the M6 connector of the buret tip (26-2) and screw it tight.

5 Insert the aspiration tip (26-3) in the M10 screw nipple on the right (25-1) and screw it tight.

When solvent is aspirated, the end of the aspiration tip must touch the vessel base, but it must not inhibit the action of the stirring bar.

The aspiration tip can, if needed, be pulled out of the solvent.

6 Insert an M8 tubing in the M8 connector of the aspiration tip (26-3) and screw it tight.

7 Insert the double Pt electrode (26-6) in the M12 screw nipple on the left (25-2) and then tighten the screw nipple until it seals.

8 Screw an electrode cable with blue coding tightly onto the electrode (26-6).

9 Insert the adsorber tube (26-4) in the M12 screw nipple on the right (25-2) and then tighten the screw nipple until it seals.

10 Introduce the septum stopper (with septum inserted) into the front opening (25-3) of the titration vessel lid.

Select a different insert if required:

- Stopper
- Spoon for paste

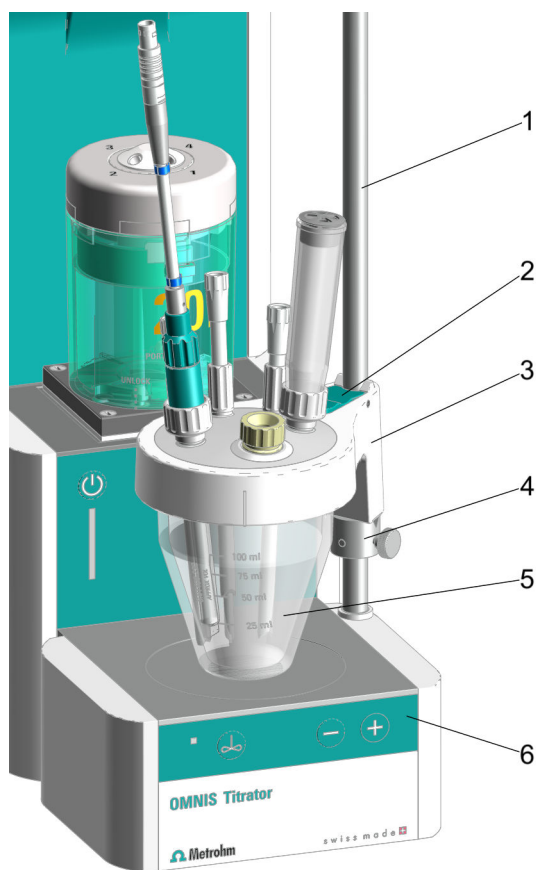


Figure 27 Assembly of the volumetric Karl Fischer titration cell

1	Support rod	2	Locking lever at titration vessel lid
3	Titration vessel lid (6.01405.010)	4	Clamping ring
5	Titration vessel 20–90 mL (6.01406.220) or 50–150 mL (6.01406.250)	6	Magnetic stirrer

Attaching the volumetric Karl Fischer titration cell

Prerequisite:

- The support rod with the clamping ring is mounted on the OMNIS product (see *"Magnetic stirrer – Installing the accessories"*, chapter 5.5, page 40).

- 1** Press the green locking lever (27-2) on the titration vessel lid (27-3).
- 2** Push the Karl Fischer titration cell, comprising of (27-3) and (27-5), over the support rod (27-1).

- 3 Push the Karl Fischer titration cell down so that it is positioned approx. 1 mm above the magnetic stirrer (27-6) and position it in the center of the magnetic stirrer.

To fix in place, release the green locking lever.

- 4 Push the clamping ring (27-4) under the titration vessel lid. Rotate the clamping ring in such a way that the wedge on the titration vessel lid fits in the indent in the clamping ring.

The clamping ring is used as the lower stop for the titration vessel lid. Thus, the clamping ring ensures that the Karl Fischer titration cell is always positioned at the same height and exactly in the center on the magnetic stirrer.

- 5 Fix the clamping ring in place at the desired position with the knurled screw.

The position of the Karl Fischer titration cell is now fixed by the clamping ring.

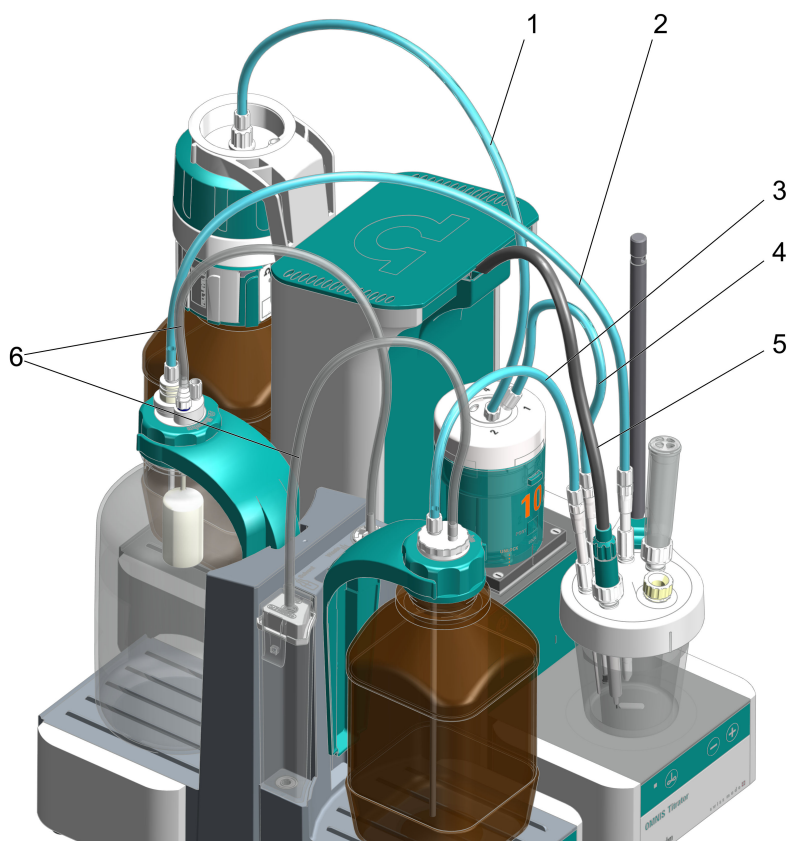


Figure 28 Connecting the Karl Fischer titration cell with an OMNIS product and the OMNIS Solvent Module

1 M6 FEP tubing (6.1805.100) from the fill port of the cylinder unit to the titrant bottle

2 M8 PTFE tubing between aspiration tip and waste bottle (Waste)
Aspiration tip (6.01543.000) with M8 PTFE tubing (6.1805.200) leading to waste bottle (Waste)

3 M8 PTFE tubing between dosing tip and reagent bottle (Solvent)
Dosing tip (6.1543.110) with M8 PTFE tubing (6.1805.200) leading to the reagent bottle (Solvent)

4 M6 FEP tubing between buret tip and dosing port 1 of cylinder unit
for adding the titrant via the buret tip (6.1543.200) with M6 FEP tubing (6.1805.100) into the Karl Fischer titration cell

5 Electrode cable leading to measuring module

6 PVC tubings (6.01804.210) from the bottles to the OMNIS Solvent Module

Connecting the volumetric Karl Fischer titration cell

Prerequisite:

- The adsorber cartridge is filled with molecular sieve, sealed tightly and mounted to the OMNIS Solvent Module .

- The Siphon Breaker and the bottle cap are fully equipped and connected to the OMNIS Solvent Module (see "OMNIS titration system – Mounting the bottle unit", chapter 5.10, page 62).

1 Connecting the volumetric Karl Fischer titration cell with the titrant

Insert the M6 FEP tubing from the buret tip (28-4) into the corresponding connector of the cylinder unit and screw it tight (see "Attaching the cylinder unit OMNIS", chapter 5.4, page 38).

2 Connecting the volumetric Karl Fischer titration cell with the bottles

Plug the M8 PTFE tubing from the dosing tip (28-3) onto the M8 connector of the Siphon Breaker of the reagent bottle (Solvent) and screw it tight.

- 3** Plug the M8 PTFE tubing from the aspiration tip (28-2) onto the olive of the ground-joint stopper SGJ 14/M8 on the GL 45 bottle cap of the waste bottle (Waste) and screw it tight.

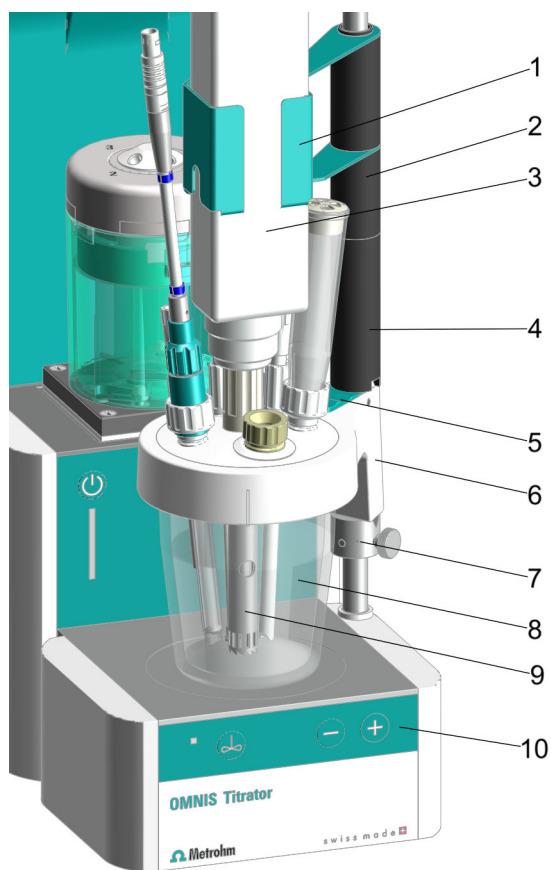



Figure 29 Assembly of the volumetric Karl Fischer titration cell with homogenizer

1	Holder for homogenizer (6.02008.010) for Polytron PT 1300 D homogenizer	2	Spacer (35 mm)
3	Polytron PT 1300 D (2.1360.100) with dispersing aggregate	4	Spacer (65 mm)
5	Locking lever at titration vessel lid	6	Titration vessel lid (6.01405.040) for the use with homogenizer
7	Support rod with mounted clamping ring	8	Titration vessel 20–90 mL (6.01406.220) or 50–150 mL (6.01406.250)
9	Dispersing aggregate 125 mm (6.1912.000) or 157 mm (6.1912.010)	10	Magnetic stirrer

Mounting the homogenizer (optional)

Prerequisite:

- The volumetric Karl Fischer titration cell with titration vessel lid for the homogenizer is prepared (see page 53) and equipped (see page 54). The guide sleeve (25-5) is present, but has not been tightened yet.
- The volumetric Karl Fischer titration cell is attached to the OMNIS product (see page 56).

1  Make sure that no stirring bar is present.

Push the spacer 65 cm (29-4) over the support rod with the indent facing downward.

While doing so, make sure that the wedge on the titration vessel lid fits in the indent on the spacer.

2 If you want to use the dispersing aggregate 157 mm (29-9), also push the spacer 35 cm (29-2) over the support rod.

3 Push the holder for the homogenizer (29-1) over the support rod.

4 Insert the homogenizer (29-3) with mounted dispersing aggregate (29-9) in the holder and at the same time insert it in the guide sleeve (25-5) for homogenizer in the titration vessel lid (29-6).

If the dispersing aggregate cannot be inserted into the guide sleeve easily, loosen the guide sleeve again.

5 Tighten the guide sleeve for homogenizer (25-5) until it seals.

6 Connect the homogenizer handset (29-3) to the control instrument of the homogenizer.

7 Connect the homogenizer (29-3) with the RS-232 cable to the computer.

Hint:

Metrohm recommends using the dispersing aggregates as follows:

- **Dispersing aggregate 125 mm**
 - Applications with viscous samples
 - Samples with a diameter that is smaller than the diameter of the aggregate
 - Powders and salts that are difficult to dissolve
- **Dispersing aggregate 157 mm**
 - Applications with solid samples
 - Samples with a diameter that is bigger than the diameter of the aggregate



5.10 OMNIS titration system – Mounting the bottle unit

The bottle unit in an OMNIS system is comprised of the following elements:

- Chemical bottle
- OMNIS bottle cap
- OMNIS Liquid Adapter

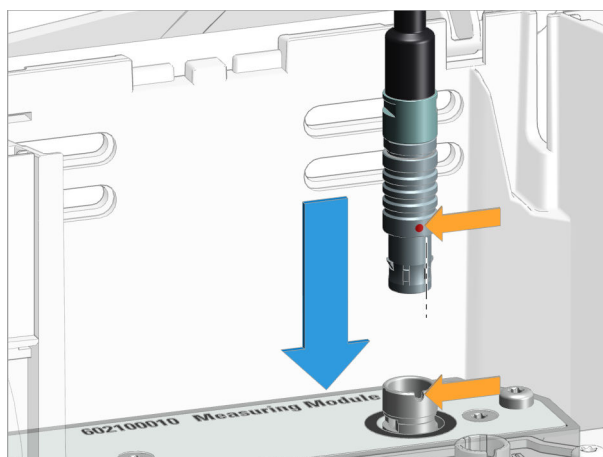
Several chemical manufacturers offer chemical bottles with an OMNIS bottle cap single-use. An OMNIS bottle cap multi-use is available for other commercially available chemical bottles. If the chemical bottle does not feature a red OMNIS bottle cap, replace the original lid of the chemical bottle with a bottle cap multi-use.

Mounting the bottle unit

- 1** Assemble the OMNIS Liquid Adapter.
- 2** Mount and connect the OMNIS Liquid Adapter.
- 3** If the chemical bottle is not sealed with a red OMNIS bottle cap single-use,
 - prepare an OMNIS bottle cap multi-use.
 - Remove the original lid from the chemical bottle.
 - Screw the OMNIS bottle cap multi-use onto the bottle.
- 4**
 - Lock the OMNIS Liquid Adapter with the chemical bottle.
 - Place the chemical bottle on the platform.

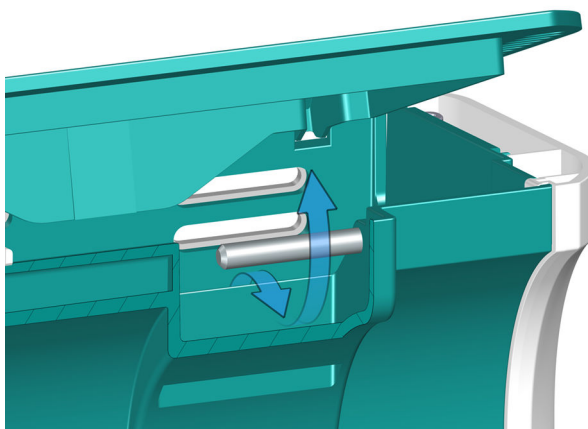
5.11 Connecting the sensor

- 1 Plugging in the electrode cable**
 - Open the lid of the instrument.
 - Align the red dot on the plug with the groove on the connection socket.
 - Plug in the plug of the electrode cable until you can feel it snap in.



i If the plug cannot be inserted easily, rotate the plug to the right or left using light pressure until it latches in the socket.

2 Guiding out the cable



- Guide the cable out under the bar.
- Close the lid.

5.12 Plugging in the power cord

WARNING

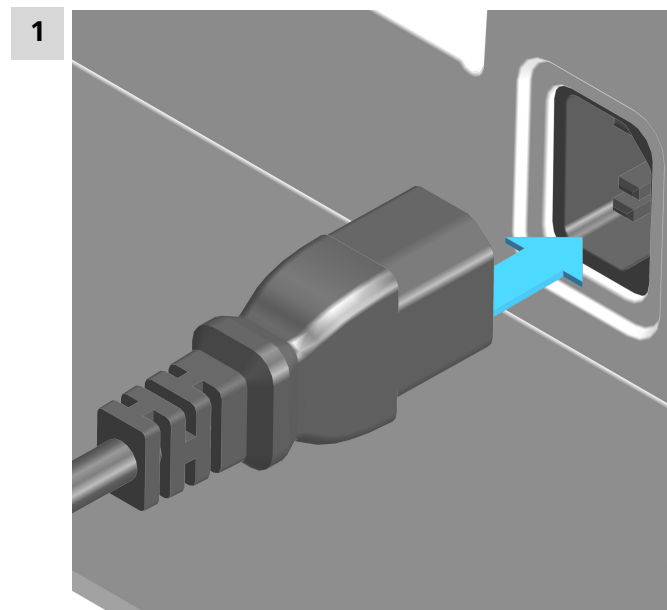
Electrical potential

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.

Required accessories:

- Power cord:
 - Length: max. 2 m
 - Number of conductors: 3, with protective ground
 - Conductor cross-section: 3x min. 1.0 mm² / 18 AWG
- Instrument plug:
 - IEC 60320, type C13, 10 A
- Power plug:
 - 6.2122.XX0 (according to customer requirement), min. 10 A



- Plug the power cord into the product's power socket. Only use permitted power cords.
- Connect the power cord to the energy supply.

- To power down the product, unplug the power cord from the energy supply.



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.

7 Operation and control

7.1 Operation


The product can be operated via the OMNIS Software. Further information on the OMNIS Software under [OMNIS Help](#).

7.1.1 Switching on and off

CAUTION

Data loss

Disconnecting OMNIS instruments from the power grid (e.g. with a connector strip) may lead to irreversible data loss. In this case, the instrument cannot be used anymore.


- Press the on/off switch  for 1 second to safely shut down the instrument.
- Wait until the status display goes out and only then disconnect the electricity.

1 Switching on an OMNIS main instrument

Press the on/off switch  for 1 second.

- The status display lights up in yellow.
- The status display lights up in green once the OMNIS main instrument is ready for operation.

2 Switching off the OMNIS main instrument


Press the on/off switch  for 1 second until the single acoustic signal is heard.

- The status display goes out and the OMNIS main instrument is switched off.

See also

[OMNIS main instrument – Indicators and controls \(chapter 3.5, page 30\)](#)

7.2 Cylinder unit OMNIS – Operation

-  The product can be operated via the OMNIS Software. Additional information is available in the [software help](#).

Notes on handling

CAUTION

Piston wear

Solutions of solids (e.g. salts or hydroxides) increase the wear of the dosing piston, which may lead to leakage.

- Fill the cylinder with solution and move to the exchange position after each titration/dosing.

If no continuous sample throughput is ensured, fill the cylinder with solution and move to the exchange position, especially when using:

- concentrated solutions that tend to crystallize
- EDTA solutions, ultrapure solvents and ultrapure water
- organic solvents
- alkaline (e.g. KOH or isopropyl alcohol), corrosive or high-concentration reagents

The cylinder unit does not automatically move into the exchange position. In order to automatically move into exchange position after each titration/dosing, insert the **FILL** and **VALVE POS** commands in the method, see [software help](#).

For storing the cylinder unit over an extended period of time ([see "Storing the cylinder unit OMNIS", chapter 8.3, page 77](#)).

Usage of dosing tubing with antidiffusion valve


If using an antidiffusion valve, the maximum dosing rate is 150 mL/min.

The dosing rate can be saved on the memory chip of the cylinder unit: Enter the dosing rate in the OMNIS Software in **Properties ► Specific data**.

Usage of dosing tubing without antidiffusion valve

For usage without antidiffusion valve, do not immerse the dosing tubing in the sample solution.

There is a risk of back diffusion of the sample solution from the vessel into the tubing due to open tubing ends.

-  The cylinder unit and its parts cannot be autoclaved. The sterility of a germ-free solution cannot be guaranteed.

7.2.1 Attaching the cylinder unit OMNIS

i Default settings for the ports 1 and 2

Port 1 is defined as dosing port and port 2 as fill port in the data chip default settings of the cylinder unit. The following instructions describe the default setting.

If the ports should be used differently from the default setting, adjust the ports in the OMNIS Software in **Properties** ► **Specific data**.

Preparing for attaching

- 1 Open the **Manual control** of the dosing unit in the OMNIS Software, see [software help](#).
- 2 Start the **Exchange position** function.

Attaching the cylinder unit

i These instructions describe the default installation as defined in the OMNIS Software.

Prerequisite:

- Dosing drive: Valve coupling and piston rod are in the exchange position (port 2 is set).
- Cylinder unit: The piston stopper is flush with the base of the cylinder housing. The centering tube is in the correct position.

Required accessories:

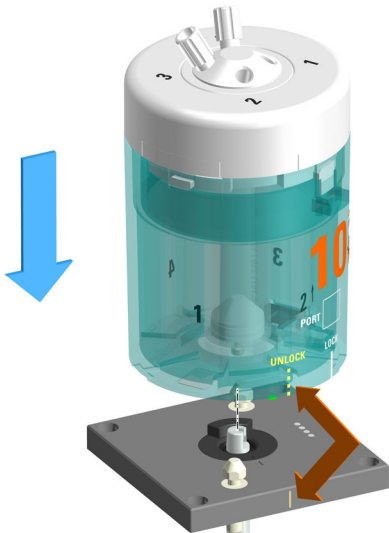
- Wrench (6.2739.000)
- 2 FEP tubings (6.1805.100)
- Titration tip (6.1543.200)

1 Aligning the cylinder unit

Rotate the cylinder unit until the marking with the label **UNLOCK** is in line with the marking on the dosing drive.

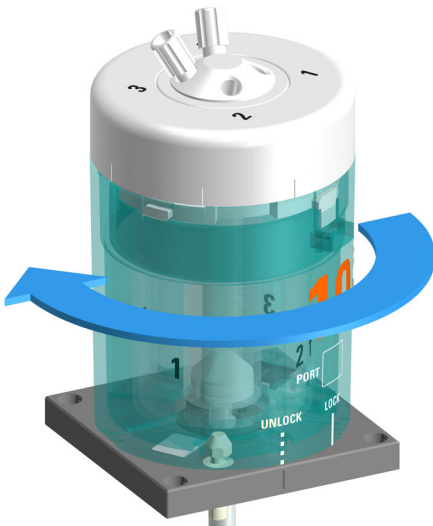


2



Set the cylinder unit down onto the two twistlocks straight from above.

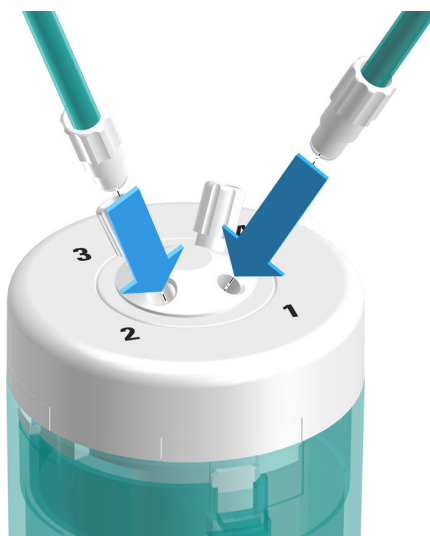
3 Locking the cylinder unit



Rotate the cylinder unit to the left until it stops.
Use the marking with the label **LOCK** as a guide.



4 Mounting the tubings



Tighten an FEP tubing (6.1805.100) into port 1.

This FEP tubing is used as dosing tubing. Tighten the other end to the titration tip (6.1543.200).

5 Tighten the other FEP tubing (6.1805.100) into port 2.

This FEP tubing is used as filling tubing. Tighten the other end to the OMNIS Liquid Adapter.

6 Firmly tighten the tubing with the wrench (6.2739.000).

See also

Cylinder unit OMNIS – Overview (chapter 3.3.3.1, page 18)

7.2.2 Removing the cylinder unit OMNIS

Preparing the removal

- 1 Open the **Manual control** of the dosing unit in the OMNIS Software, see [software help](#).
- 2 Start the **Empty** function.
- 3 Start the **Exchange position** function.

Removing the cylinder unit

Prerequisite:

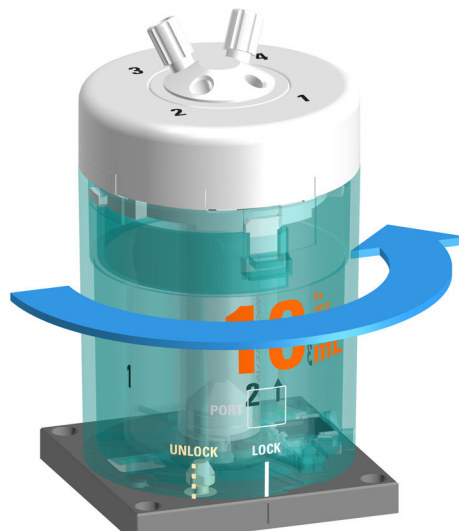
- Dosing drive: Valve coupling and piston rod are in the exchange position (port 2 is set).
- Cylinder unit: The piston stopper is flush with the base of the cylinder housing. The centering tube is in the correct position.

1 Removing the tubing



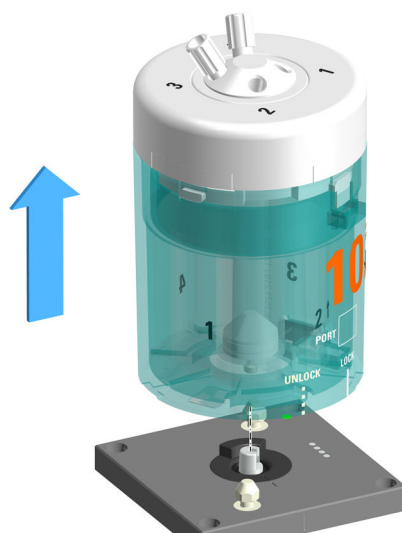
Unscrew the dosing tubing and the filling tubing.

2 Unlocking the cylinder unit



Rotate the cylinder unit to the right as far as the **UNLOCK** position.

3 Raising the cylinder unit



Raise the cylinder unit straight upwards.

See also

Cylinder unit OMNIS – Overview (chapter 3.3.3.1, page 18)

7.3 Magnetic stirrer – Operation

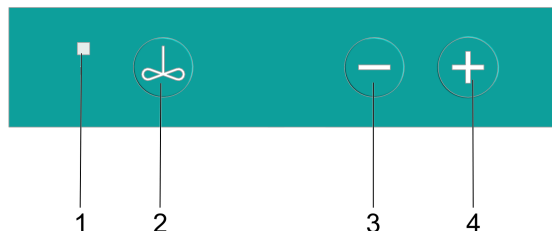


Figure 30 Magnetic stirrer – Control bar

1 Status display Multi-colored	2 On/Off <i>(see "Switching the magnetic stirrer on and off", chapter 7.3.1, page 74)</i>
3 Reduce stirring rate <i>(see "Setting the magnetic stirrer", chapter 7.3.2, page 75)</i>	4 Increase stirring rate <i>(see "Setting the magnetic stirrer", chapter 7.3.2, page 75)</i>

Other functions in the software

The following functions can be executed only with the OMNIS Software (see [OMNIS Help](#)):

- **Deactivate keys**
The magnetic stirrer can be operated only via the software.
- **Switch over the keys for the rod stirrer**
The keys on the magnetic stirrer operate the rod stirrer.
- **Set the stirring direction**

7.3.1 Switching the magnetic stirrer on and off

1 Switching the magnetic stirrer on

Press the  key.

The magnetic stirrer stirs with the most recently used stirring rate.

2 Switching the magnetic stirrer off

Press the  key once again.

The magnetic stirrer stops.

 If the magnetic stirrer is running at a high stirring rate, reduce the stirring rate before switching it off.

As an alternative, switch the magnetic stirrer on and off in the OMNIS Software under *Manual control*.

7.3.2 Setting the magnetic stirrer

The stirring rate can be adjusted in 15 steps.

Prerequisite:

The magnetic stirrer is switched on.

1 Increasing the stirring rate in steps

Press the  key.


Each pressing of the key increases the stirring rate by 1 step. The current stirring rate appears in the OMNIS Software under **Manual control**.

2 Reducing the stirring rate

Press the  key.

Each pressing of the key reduces the stirring rate by 1 step. The current stirring rate appears in the OMNIS Software under **Manual control**.

Alternatively, the stirring rate can also be set in the OMNIS Software under *Manual control*.

 The stirring direction can be exclusively set in the OMNIS Software under **Manual control**.



8 Maintenance

8.1 Maintenance

Regularly perform maintenance work on the product to prevent malfunctions and to ensure a long service life.

- Metrohm recommends having the products maintained by specialist personnel of Metrohm AG as part of an annual service. Shorter maintenance intervals may be necessary if you frequently work with caustic and corrosive chemicals.
- Only perform maintenance work that is described in this instruction. Contact your regional Metrohm service representative for further maintenance work and repairs. The regional Metrohm service representative offers every form of technical advice for maintenance and service of all Metrohm products.
- Only use spare parts that meet the technical requirements of the manufacturer. Original spare parts always meet these requirements.

8.2 Cleaning the product surface

Regularly clean the product to prevent malfunctions and to ensure a long service life.

- Remove spilled chemicals immediately.
- Protect plug connections against contamination.



WARNING

Chemical hazardous substances

Contact with aggressive chemical substances may cause poisoning or chemical burns.

- Wear personal protective equipment (e.g. protective glasses, gloves).
- Use exhaust equipment when working with vaporizing hazardous substances.
- Clean contaminated surfaces.
- Only use detergents that do not cause any unwanted side reactions with the materials to be cleaned.
- Dispose of chemically contaminated materials (e.g. cleaning material) in accordance with regulations.



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.

8.3 Storing the cylinder unit OMNIS

-  If the cylinder unit will not be used for a prolonged period of time, rinse and fill the cylinder with deionized water to prevent the valve disk and distributor disk from sticking together, especially when using:
 - concentrated solutions that tend to crystallize
 - EDTA solutions, ultrapure solvents and ultrapure water
 - organic solvents
 - alkaline (e.g. KOH in isopropanol), corrosive or high-concentration reagents

-  If you are using water sensitive reagents, rinse the cylinder with solvent and then store it empty.

- 1** Soak the filling tubing in a bottle with rinsing liquid.
- 2** Open the **Manual control** of the dosing unit in the OMNIS Software, see [software help](#).
- 3** Execute the **Preparing** function 2 to 3 times with rinsing solution.

- 4 If the cylinder unit is to be stored empty,
 - remove the filling tubing from the bottle with rinsing solution and
 - start the **Empty** function.
- 5 Start the **Exchange position** function.
- 6 Store the cylinder unit at ambient temperature and protect it from direct sunlight.

i **Rinsing the cylinder unit automatically**

To automatically rinse the cylinder unit, download the method for automatically rinsing the cylinder unit as a template or create it yourself .

8.4 Cleaning the cylinder unit OMNIS



WARNING

Chemical hazardous substances

Contact with aggressive chemical substances may cause poisoning or chemical burns.

- Wear personal protective equipment (e.g. protective glasses, gloves).
- Use exhaust equipment when working with vaporizing hazardous substances.
- Clean contaminated surfaces.
- Only use detergents that do not cause any unwanted side reactions with the materials to be cleaned.
- Dispose of chemically contaminated materials (e.g. cleaning material) in accordance with regulations.

i The cylinder unit requires appropriate care. Excess contamination of the cylinder unit results in malfunctions and a reduction in the service life.

Prerequisite:

The cylinder unit has been removed from the dosing drive. (*see "Removing the cylinder unit OMNIS", chapter 7.2.2, page 71*)

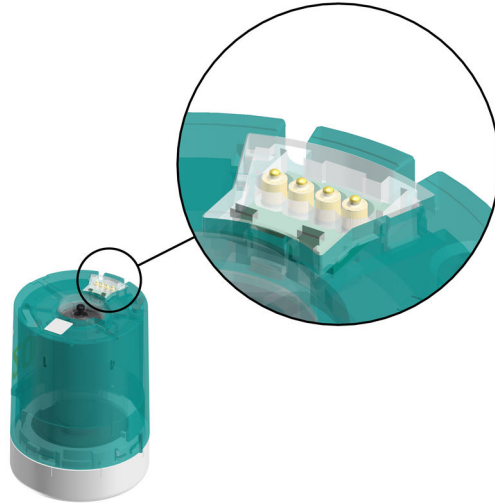
1 Cleaning the cylinder housing

i The cylinder housing is not dishwasher proof.

Clean the cylinder housing with lukewarm water and dishwashing detergent.

- 2 If the cylinder top piece is stuck, place the cylinder unit with the cylinder top piece facing down in warm water (possibly with a little dishwashing detergent) for at least 30 minutes.

3 Cleaning the electrical contacts of the cylinder unit



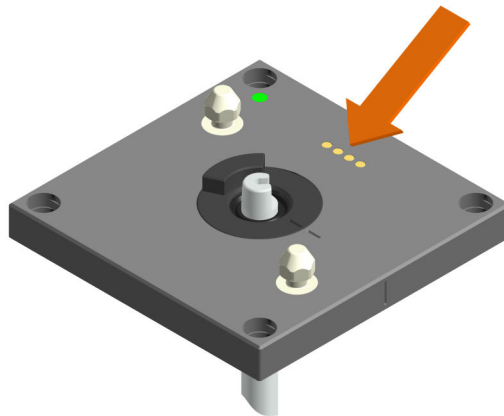
If the electrical contacts are only lightly contaminated, clean the electrical contacts with a cloth moistened with water.

- 4 If the electrical contacts are heavily contaminated,
- add dishwashing detergent or ethanol to the moist cloth and clean the electrical contacts or
 - clean the electrical contacts in an ultrasonic bath with a little dishwashing detergent or ethanol.

Do not exceed 50 °C when drying. Use compressed air if necessary.



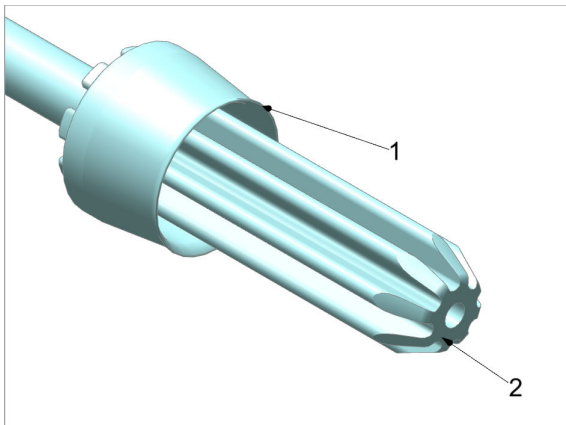
5 Cleaning the electrical contacts of the dosing drive



- If the electrical contacts are only lightly contaminated, clean the electrical contacts with a cloth moistened with water.
- If the electrical contacts are heavily contaminated, add dishwashing detergent or ethanol to the moist cloth and clean the electrical contacts.

8.5 Cleaning the OMNIS Liquid Adapter

Cleaning the aspiration tube



1. Rinse the aspiration tube thoroughly under running water.
Rub dry with a lint-free, damp cloth.
2. Check whether the sealing lip (**1**) and the sealing surface (**2**) are clean and intact.

If the sealing lip or the sealing surface of the aspiration tube can no longer be cleaned, mount a new aspiration tube.

Cleaning the OMNIS Liquid Adapter

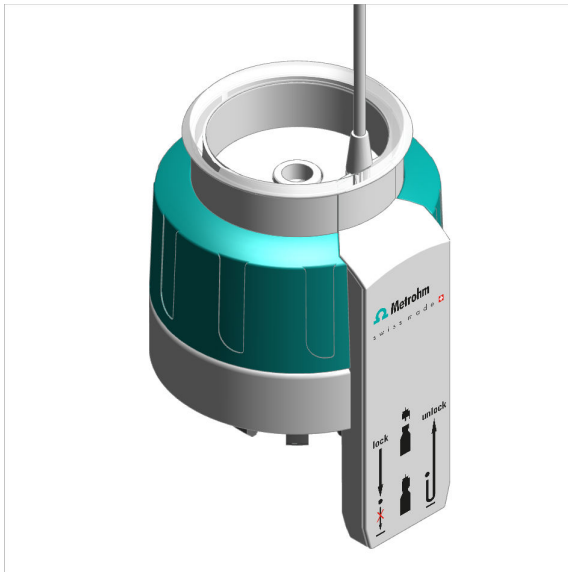
CAUTION

Instrument damage through inward seepage of liquid

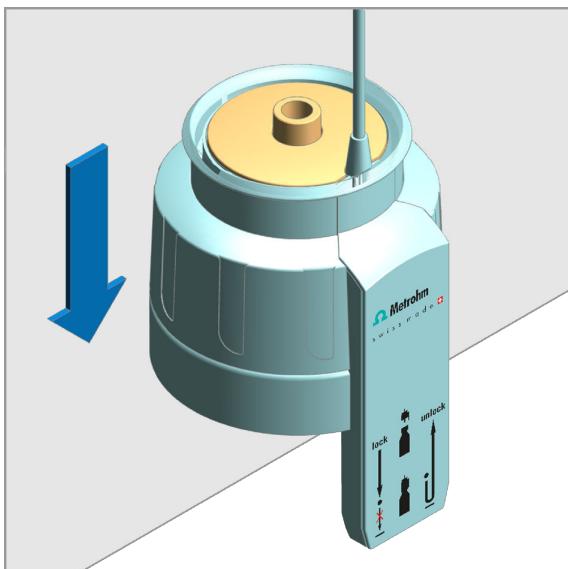
Property damage to the instrument or malfunction through the inward seepage of liquids (e.g. when cleaning).

The instrument is not resistant to splash water. Water can seep into the interior during cleaning and cause damage (e.g. to the electronics).

- Do not clean the instrument under running water.
- Do not use a wash bottle to clean the instrument.
- Only wipe the instrument thoroughly with a damp cloth.



Wipe the OMNIS Liquid Adapter thoroughly from the outside with a damp cloth.




1. In order to access the lowered part better, set the OMNIS Liquid Adapter on a table edge. Push the OMNIS Liquid Adapter down and keep it pushed down. The lowered part rises.
2. Thoroughly wipe the surface and the slot for the aspiration tube with a damp cloth.
3. If the interior of the slot is contaminated, wipe it with a moistened cotton bud.
4. Release the housing of the OMNIS Liquid Adapter.



Contamination with organic substances

If the OMNIS Liquid Adapter is contaminated with organic substances, clean it with ethanol, methanol and/or isopropanol.

-  Do not use solvents that contain acetone to clean the OMNIS Liquid Adapter. Acetone will corrode the labels on the OMNIS Liquid Adapter.

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 3.6, page 31)

9.1 Forcing a shutdown

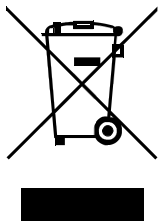
Prerequisite:

The OMNIS main instrument cannot be switched off.

- 1 Press the on/off switch  for 8 seconds until the acoustic signal is heard in short intervals.

The acoustic signal sounds for 2 seconds. The status display goes out and the OMNIS main instrument is switched off.

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
Storage	+5 to +45 °C	

11.2 OMNIS Titrator – Energy supply

Nominal voltage range	100 VAC - 240 VAC	
Nominal frequency range	50 Hz - 60 Hz	
Power consumption	max. 100 W	
Fuse protection		
<i>Internal fuse</i>	4 ATH	cannot be replaced by the user

11.3 Magnetic stirrer – Energy supply

Nominal voltage	24 VDC	internal
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11.4 Measuring module – Energy supply

Power consumption	max. 0.6 W	-
Energy transmission	-	inductive coupling

11.5 OMNIS Titrator – Dimensions

Measurements

<i>Width</i>	142 mm
<i>Height</i>	358 mm
<i>Depth</i>	
Without magnetic stirrer	284 mm
With magnetic stirrer	400 mm

Weight

<i>Type</i>	
Without magnetic stirrer	4.4 kg
With magnetic stirrer	5.1 kg

11.6 Magnetic stirrer – Dimensions

Measurements

<i>Width</i>	142 mm
<i>Height</i>	70 mm
<i>Depth</i>	116 mm

Weight	700 g
---------------	-------

11.7 Measuring module – Dimensions

Measurements

<i>Width</i>	105 mm
<i>Height</i>	31 mm
<i>Depth</i>	72 mm

Weight approx. 420 g

11.8 Housing

Materials

<i>Cover</i>	PET	poly(ethylene terephthalate)
<i>Back panel</i>	AW-5754 H12 / H22	aluminum, coated
<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 40

11.9 Magnetic stirrer – Housing

Materials

<i>Cover</i>	PBT	poly(butylene terephthalate)
<i>Base</i>		chromium steel
<i>Enclosure</i>	PBT	poly(butylene terephthalate)
<i>Front foils</i>	PET	poly(butylene terephthalate), mat

IP degree of protection IP 40



11.10 Measuring module – Housing

Materials

<i>Lid</i>	AW-5754 H12 / H22	aluminum, coated
<i>Back panel</i>	PBT	poly(butylene terephthalate)
<i>Enclosure</i>	GD-ZnAl4Cu1	zinc die cast, nickel-plated

IP degree of protection IP 40

11.11 OMNIS Titrator – Connectors specifications

Energy supply

<i>Socket</i>		via power connection IEC 60320, type C14, 10 A
Power cord		
Length	max. 2 m	
Number of conductors	3	with protective ground
Conductor cross-section	min. 0.75 mm ² / 18 AWG	
Plug		
Instrument side		IEC 60320, type C13, 10 A
Building side		country-specific

MDL Metrohm Device Link 4 connectors

HID Human Interactive Device

MSI Metrohm Solution Identification

LAN Local Area Network

<i>Type</i>	Ethernet CAT 6	
<i>Socket</i>	RJ-45	shielded



<i>Cable type</i>	(min. FFTP)	shielded
<i>Cable length</i>	max. 10 m	from Metrohm accessories (link)
Measuring module		2 slots
<i>Power output</i>	max. 0.6 W	per measuring module
<i>Energy transmission</i>		inductive coupling
<i>Data transmission</i>		optical
Contacts	4	contact surfaces for cylinder unit

11.12 Measuring Module Analog – Connectors specifications

Measuring inputs

INPUT 1

Socket		round plug 7-pin, size 0, 45°
Potentiometric	pH, ISE, Redox	measuring input for potentiometric electrodes
Temperature	Temp.	measuring input for temperature sensors of the Pt1000 or NTC type for automatic temperature compensation
Polarizer	Pol.	measuring input for polarizable electrodes

INPUT 2

Socket		round plug 7-pin, size 0, 45°
Potentiometric	pH, ISE, Redox	measuring input for potentiometric electrodes



Temperature	Temp.	measuring input for temperature sensors of the Pt1000 or NTC type for automatic temperature compensation
<i>REF</i>		reference potential
Type (INPUT 1 - INPUT 2)	2 mm pH, ISE, Redox	potentiometric differential measurement, with respect to REF

11.13 Measuring Module Digital – Connector specifications

Connection socket for a digital electrode

<i>Type</i>	round plug 6-pin, size 0, 60°
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11.14 Measuring Module Conductivity – Connector specifications

Conductivity socket

<i>Socket</i>	round plug 7-pin, size 0, 0°
<i>Conductivity</i>	Cond. measuring input for conductivity measuring cell
<i>Temperature</i>	Temp. measuring input for the temperature sensor of the Pt1000 type for automatic temperature compensation

11.15 Display specifications

Status display LED multi-colored

11.16 Measuring Module Analog – Display specifications

Status display LED green-red

11.17 Measuring Module Digital – Display specifications

Status display LED green

11.18 Measuring Module Conductivity – Display specifications

Status display LED green-red

11.19 Measuring Module Analog – Measuring specifications

Potentiometric

<i>Measuring range</i>	-2,400 to +2,400 mV	
<i>Resolution</i>	1.56 μ V	
<i>Measuring accuracy</i>	± 0.5 mV	in the measuring range -2,000 mV to +2,000 mV
<i>Input resistance</i>	$\geq 1 \cdot 10^{12} \Omega$	
<i>Offset current</i>	$\leq \pm 1 \cdot 10^{-12}$ A	

Temperature

<i>Pt1000</i>		
Measuring range	-150 to +250 °C	
Resolution	approx. 0.002 °C	
Measuring accuracy	± 0.4 °C	in the measuring range -20.0 to +150.0 °C



Polarizer

I_{pol} DC

Polarization current	-200.0 to +200.0 μ A	adjustable in 0.5 μ A steps
Measuring range	-2,400 to +2,400 mV	
Measuring resolution	0.1 mV	

Potentiometric differential measurement

<i>Measuring range</i>	-2,400 to +2,400 mV	
<i>Measuring resolution</i>	1.56 μ V	
<i>Measuring accuracy</i>	\pm 1.0 mV	in the measuring range -2,000 mV to +2,000 mV

Reference conditions

<i>Relative humidity</i>	\leq 60%	
<i>Ambient temperature</i>	+25 °C (\pm 3 °C)	
<i>Instrument status</i>		min. 30 minutes in operation

Measuring accuracy

applies for all measuring ranges without sensor error, under reference conditions, measuring interval 100 ms

11.20 Measuring Module Conductivity – Measurement specifications

Conductivity

<i>Measuring range</i>	0.1 μ S–1,000 mS	
<i>Resolution</i>	4	significant digits



<i>Measuring accuracy</i> ¹⁾	±0.5% ±1 digit	in the measuring range 0.1 µS–16 µS
	±0.5% ±1 digit	in the measuring range 16 µS–1,000 µS
	±1% ±1 digit	in the measuring range 1,000 µS–1,000 mS

Temperature

Pt1000

Measuring range	–150 to +250 °C	
Resolution	0.002 °C	
Measuring accuracy ¹⁾	±0.2 °C	in the measuring range –20.0 to +150.0 °C

Reference conditions

<i>Relative humidity</i>	≤ 60%	
<i>Ambient temperature</i>	+25 °C (±3 °C)	
<i>Instrument status</i>		min. 30 minutes in operation

¹⁾±1 digit, for all measuring ranges, without sensor error, under reference conditions, measuring interval 100 ms

11.21 OMNIS Titrator – Liquid Handling specifications

Dosing drive

<i>Dosing resolution</i>	100,000	steps per cylinder vol- ume
<i>Dosing accuracy</i>	0.01%	typically, of the dosed volume with respect to the cylinder volume



11.22 Magnetic stirrer – Specifications

OMNIS product version

with attached magnetic stirrer

Adjustment range for rotational speed

+1 to +15

Rotation in counter-clockwise direction (seen from above)

-1 to -15

Rotation in clockwise direction (seen from above)

Rotational speed change per step

120 rpm

Maximum rotational speed

1,800 rpm

Stirring bar lengths

8, 12, 16, 25, 30 mm