Cylinder unit OMNIS UNF

6.01506.120 / 6.01506.150 / 6.01506.210

Manual

8.0108.8050EN / v2 / 2026-06-01

Metrohm

Metrohm AG
Ionenstrasse
CH-9100 Herisau
Switzerland
+41 71 353 85 85
info@metrohm.com
www.metrohm.com

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Technical Communication
Metrohm AG
CH-9100 Herisau

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1 Overview

1.1 Cylinder unit OMNIS UNF – Product description

The cylinder unit OMNIS UNF is a versatile piston buret and is suitable for precise liquid handling applications in ion chromatography.

The cylinder unit OMNIS UNF can be used with the following dosing drive:

- OMNIS Dosing Drive Unit
- OMNIS Dosing Module
- OMNIS Titrator
- OMNIS Titration Module

The 4 inputs and outputs (ports) can be used flexibly with a suitable control instrument.

Thanks to the transparent housing of the cylinder unit OMNIS UNF, the piston movement and movement of the centering tube are visible inside. This means that even complex liquid handling applications are easy to monitor. The unobstructed view into the cylinder also ensures that solutions can be monitored with respect to the absence of bubbles and the leak-tightness of the cylinder element.

Information on the cylinder unit OMNIS UNF and the reagent can be stored in the integrated memory chip and read out by a suitable control instrument.

The 3 versions of the cylinder unit OMNIS UNF with an internal volume of 2, 5, and 10 mL are all equipped with 2 UNF 10/32 connectors (Ports I and III), making these cylinder units the perfect tool for handling liquids in ion chromatography. Capillaries can be connected directly, thanks to the UNF connectors. The other connectors (Ports II and IIII) are M6 connectors for connecting ultrapure water or other solutions that can be aspirated and dosed with higher flows.

The cylinder unit OMNIS 2 mL, UNF 10/32 is used as standard for direct injection or for Metrohm intelligent Partial Loop injection Technique with MiPT. The cylinder unit OMNIS 2 mL, UNF 10/32 can also be used for suppressor regeneration, for ultrafiltration, and for ultrafiltration in combination with MiPT. The cylinder unit OMNIS 5 mL, UNF 10/32 is used for various sample preparation techniques such as dilution, dilution ultrafiltration, and preconcentration techniques.

1.2 Cylinder unit OMNIS UNF – Product versions

The variants are differentiated according to their volume. The various cylinder units are equipped with 6.2803.010 grease (2 g) as standard. The product is available in the following versions:

Table 1 Product versions

Article number	Designation	Version feature
6.01506.120	Cylinder unit OMNIS 2 mL, UNF 10/32	Volume 2 mL
6.01506.150	Cylinder unit OMNIS 5 mL, UNF 10/32	Volume 5 mL
6.01506.210	Cylinder unit OMNIS 10 mL, UNF 10/32	Volume 10 mL

1.3 About the documentation

Possible depictions in the documentation:

Depiction	Meaning
*(5-**12**)*	Cross-reference to figure legend (Figure number - ***Element in the figure***)
1	Instruction step
Method	Parameters, menu items, tabs, and dialogs
File ▶ New	Menu path
[Continue]	Button or key
	Supplementary information to the descriptive text
	Note In graphics, orange arrows or frames indicate the reference to the descriptive text. The relevant elements may also be colored orange.
	Movement In graphics, blue arrows indicate the movement direction. The elements to be moved may also be colored blue.

1.4 Further information

Additional information on the product is available on the following pages:

- Metrohm website *https://www.metrohm.com* – Overview of product family, documents as PDF, details of accessories, and information on applications.
- Help for the OMNIS Software *https://guide.metrohm.com* – Thematically filtered information on OMNIS Software.

1.5 Displaying the accessories

Up-to-date information on the scope of delivery and on optional accessories can be found on the Metrohm website.

1 Searching for a product on the website

- Go to *https://www.metrohm.com*.
- Click on 🔍.
- Enter the article number of the product into the search field and press **[Enter]**.
  - Article number: *Product versions, chapter 1, page 2*
- In the result list, click on the desired product.

Detailed information regarding the product is displayed.

2 Displaying the accessories

- Scroll down (accessories subject to availability):
  - Included parts
  - Optional parts

3 Downloading the accessories list (included and optional parts)

- Click on ⬇ to download the accessories list as a PDF.

ℹ Metrohm recommends keeping the downloaded PDF for reference purposes.

2 Safety

2.1 Cylinder unit OMNIS UNF – Intended use

The cylinder unit OMNIS UNF 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 4 inputs and outputs (ports) can be used flexibly with a suitable control instrument.

The cylinder unit OMNIS UNF can be used with the following dosing drives:

- OMNIS Dosing Drive Unit
- OMNIS Dosing Module
- OMNIS Titrator
- OMNIS Titration Module

The cylinder unit OMNIS UNF is used in particular for dosing the following:

- Ultrapure water
- Eluents
- Regenerants
- PCR reagents

Information on the cylinder unit OMNIS UNF and the reagent can be stored in the integrated memory chip and read out by a suitable control instrument.

2.2 Responsibility of the operator

The operator must ensure that basic regulations on occupational safety and accident prevention in chemical laboratories are observed. The operator has the following responsibilities:

- Instruct personnel in the safe handling of the product.
- Train personnel in the use of the product according to the user documentation (e.g. install, operate, clean, eliminate faults).
- Train staff on basic occupational safety and accident prevention regulations.
- Provide personal protective equipment (e.g. protective glasses, gloves).
- Provide suitable tools and equipment to carry out the work safely.

The product may be used only when it is in perfect condition. The following measures are required to ensure the safe operation of the product:

- Check the condition of the product before use.

- Remedy defects and malfunctions immediately.
- Maintain and clean the product regularly.

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.
- Use the product only with the coverings mounted. 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.

To disconnect the product from the energy supply, pull the power plug.

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 components and connecting elements without delay.
- Only use stirring bars that are the right length for the vessel size.
- Tighten loose connecting elements.
- Do not loosen tubing connections under pressure.
- Do not remove aspiration tubing under pressure.
- Carefully pull the tubing ends out of the vessels.
- Carefully allow liquids from the tubing to drain into suitable vessels.
- Insert the tubing tips completely into the vessels.

- Remove and dispose of escaping 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

The present documentation uses warning messages as follows.

Structure

1. Severity of the danger (signal word)
2. Type and source of danger
3. Consequences of disregarding the danger
4. Measures for averting the danger

Hazard levels

Signal color and signal word designate the hazard level.

DANGER

Indicates an immediate danger. It will result in serious injuries or death if not avoided.

WARNING

Indicates a potential danger. Failure to avoid the danger may result in death or serious injury.

CAUTION

Indicates a potential danger. If not avoided, it may result in light or minor injuries.

NOTICE

Indicates a potentially damaging situation. If not avoided, the product or something in the surrounding area could be damaged.

2.6 Meaning of warning signs

Warning signs on the product or in the documentation indicate potential dangers or draw attention to certain behaviors in order to avoid accidents or damage.

Depending on the application purpose, the operating company attaches additional warning signs to the product. The corresponding instructions of the operator must be followed.

Table 2 Warning signs according to ISO 7010 (examples)

Warning signs / meaning		Warning signs / meaning	
	General warning sign		Warning of hot surface
	Warning of sharp object (cut/ puncture)		Warning of hand injuries (crushing)
	Warning of electrical voltage		Warning of corrosive substances
	Warning of optical radiation		Warning of a laser beam
	Warning of flammable materials		Warning of biological hazard
	Warning of toxic materials		

3 Functional description

3.1 Cylinder unit OMNIS UNF and dosing drive – Overview

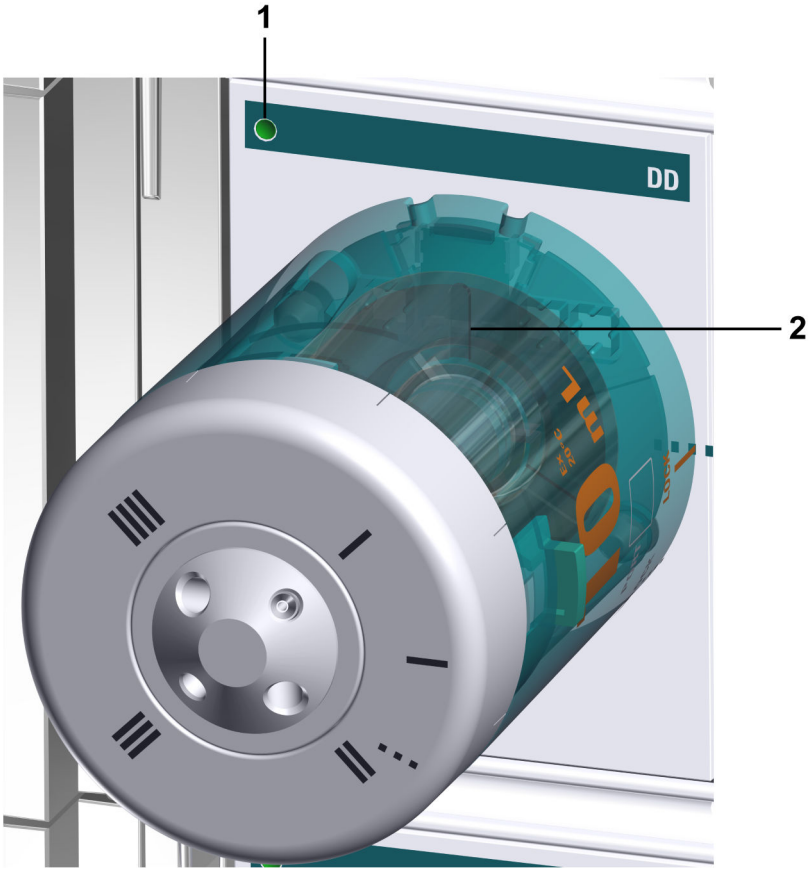


Figure 1 Cylinder unit OMNIS UNF on OMNIS Dosing Drive Unit – Overview

1 **OMNIS Dosing Drive Unit** Not included in the scope of delivery	**2** **Cylinder unit OMNIS UNF**

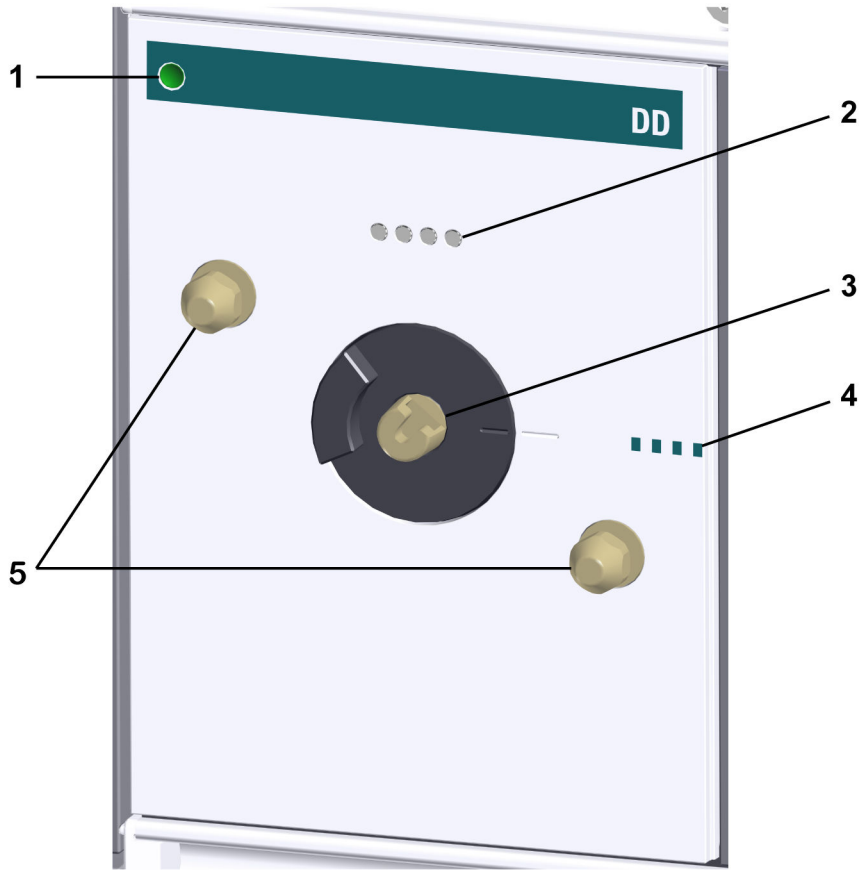


Figure 2 OMNIS Dosing Drive Unit – Overview

1	**Status display** LED. Multi-colored	**2**	**Contact pins** For communicating with the cylinder unit OMNIS UNF
3	**Push rod** For piston movement	**4**	**Positioning aid** For mounting the cylinder unit OMNIS
5	**Twistlocks** For locking the cylinder unit OMNIS		

3.1.1 Cylinder unit OMNIS UNF and dosing drive – Function

With the OMNIS Dosing Drive Unit with connected cylinder unit OMNIS UNF, liquid volumes can be precisely dosed and aspirated with software control. This ensures a continuous flow of liquid.

The OMNIS Dosing Drive Unit is used as a dosing drive in the OMNIS IC system. The cylinder unit OMNIS provides the required liquid volume. The cylinder unit OMNIS is equipped with a distributor with 4 ports. The various cylinder units differ in terms of their volumes.

If the cylinder unit OMNIS UNF *(1-**1**)* is attached to the dosing drive *(1-**2**)*, then the dosing drive assumes the following functions:

- **Move the piston forward and backward:**
  The solution is aspirated as soon as the piston *(3-**9**)* is moved backward. The cylinder *(3-**8**)* fills up.
  The solution is dosed as soon as the piston is moved forward. The cylinder empties.
- **Rotate the cylinder element:**
  The rotating movement of the cylinder element *(3-**14**)* controls which of the 4 ports the solution flows through.
  In the center of the cylinder base is the valve disk *(3-**6**)* with an opening.
  The distributor disk *(3-**5**)* with 4 openings corresponding to the 4 ports of the distributor *(3-**1**)* is located at the bottom in the cylinder top piece.
  The dosing drive rotates the cylinder by 90° stages so that the valve disk opening fits with an opening on the distributor disk. This results in a passage for the solution to the corresponding port of the distributor.

3.1.2 Cylinder unit OMNIS UNF and dosing drive – Dosing accuracy

The dosing drive is equipped with a resolution of 250,000 steps per stroke.

If the cylinder is entirely filled, then these 250,000 steps will allow the following typical whole-number volumes to be precisely aspirated and dosed.

Cylinder volume	Examples for volumes that can be dosed with microliter precision	Theoretically smallest volume step
2 mL	1 µL, 2 µL, 5 µL, …	8 nL
5 mL	4 µL, 10 µL, 20 µL, …	20 nL
10 mL	10 µL, 20 µL, 50 µL, …	40 nL

If a volume is dosed or aspirated that is not a multiple of the theoretically smallest volume step, then it will be rounded to the previous volume step.

The maximum deviation from the required volume thus equals the smallest volume step.

3.2 Cylinder unit OMNIS UNF – Overview

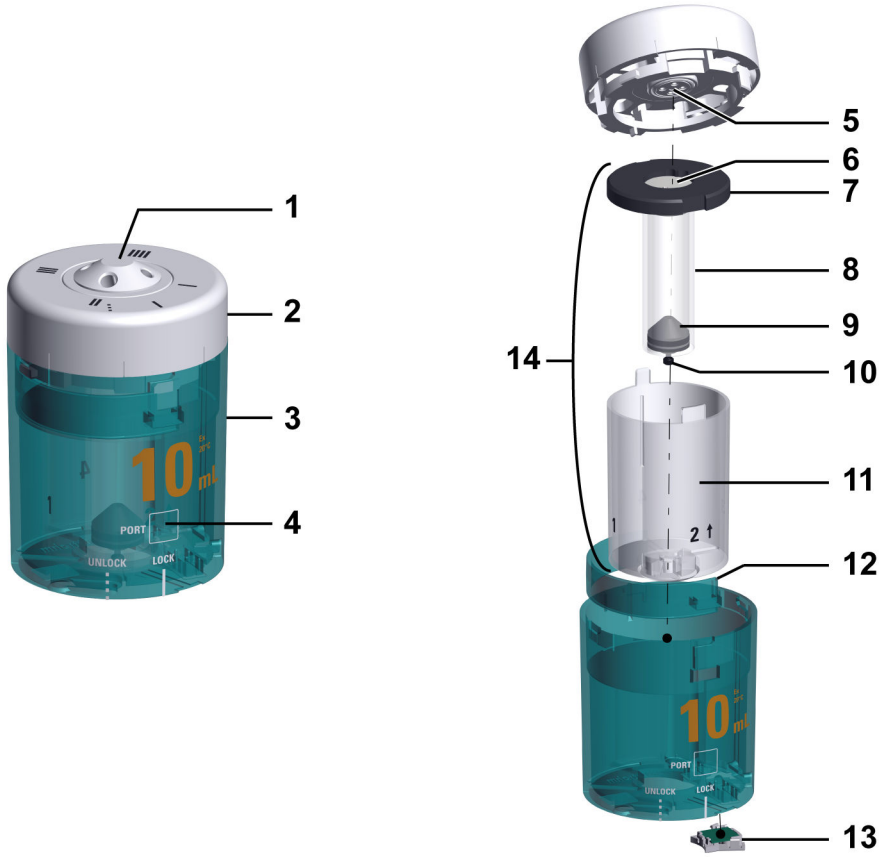


Figure 3 Cylinder unit OMNIS UNF – Overview

1	**Distributor with 4 ports**	**2**	**Cylinder top piece**
3	**Housing**	**4**	**Port display**
5	**Distributor disk**	**6**	**Valve disk**
7	**Cylinder base**	**8**	**Cylinder**
9	**Piston**	**10**	**Piston stopper**
11	**Centering tube**	**12**	**Spring clip with unlocking button**
13	**Memory chip**	**14**	**Cylinder element** Cylinder, cylinder base with valve disk, piston with piston stopper, and centering tube

3.2.1 Cylinder unit OMNIS UNF – Overview of ports

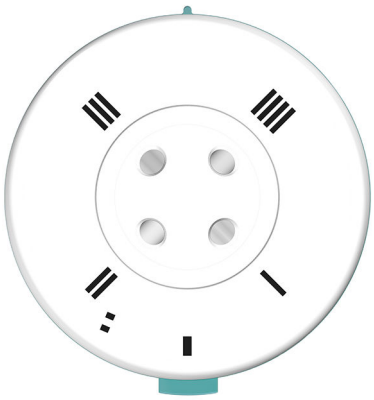


Figure 4 Cylinder unit OMNIS UNF – Overview of ports

The following table shows the standard use of the 4 ports. The use of the ports can be changed in the OMNIS Software. To do this, select **Dosing Drive Unit** ▶ **Properties** ▶ **Specific data** in the overview of the instrument and define the ports as desired, *see OMNIS help*.

Table 3 Standard assignment of the ports

Port	Use	Connector
I	Sample port	UNF 10/32 connector or M6 connector *(see "Cylinder unit OMNIS UNF and dosing drive – Function", chapter 3.1.1, page 10)*
II	Ultrapure water port	M6 connector
III	Other	UNF 10/32 connector or M6 connector *(see "Cylinder unit OMNIS UNF and dosing drive – Function", chapter 3.1.1, page 10)*
IIII	Waste port	M6 connector

Selecting the dosing rate

The maximum dosing rate depends on the cylinder volume:

Table 4 Select dosing rate

Cylinder volume	Dosing rate
2 mL	12 mL/min
5 mL	30 mL/min
10 mL	60 mL/min
20 mL	120 mL/min
50 mL	300 mL/min

Notes on handling

Solutions of solids, e.g., salts or hydroxides, cause higher piston wear. This can lead to leakage.

At the end of a measurement series before an instrument standstill, fill the cylinder unit OMNIS with ultrapure water.

3.2.2 Cylinder unit OMNIS UNF – Function

The cylinder unit OMNIS UNF 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 unit OMNIS UNF enables the most accurate dosing or aspiration of various liquids:

- Aqueous alkali solutions
- Ultrapure water
- Regeneration solutions
- Eluents
- PCR solutions

Due to its high degree of precision, the cylinder unit OMNIS UNF is particularly suitable for applications in ion chromatography.

3.2.3 Cylinder unit OMNIS UNF – Resistance to chemicals

Conventional reagents and media can be dosed with the cylinder unit OMNIS UNF. The materials of the single parts that come into contact with the liquid being dosed have been selected for maximum resistance to chemicals and functionality.

In a large part of the applications in ion chromatography, the methods are programmed in such a way that only ultrapure water enters the interior of the cylinder unit OMNIS UNF. This prevents aggressive or highly concentrated samples from causing damage or cross-contamination in the interior of the cylinder unit OMNIS UNF .

However, not all types of aggressive or high-concentration reagents can be conveyed without difficulty. It is the user's own responsibility to determine the resistance of the various single parts to specific, aggressive media.

Observe the following notes to ensure the functionality of the cylinder unit OMNIS UNF:

- When using strong inorganic alkalis or concentrated solutions that could nucleate, adhere to the specifications concerning the housing *(see "Cylinder unit OMNIS UNF – Housing resistance to chemicals", chapter 3.2.3.1, page 15)*.
- The temperature of the media must not exceed 50 °C.

- Clean and inspect the cylinder unit OMNIS UNF at regular intervals to avoid problems with aggressive media. *(see "Performing maintenance on the cylinder unit OMNIS UNF", chapter 6.1, page 22)*

Replace cylinder elements of the cylinder unit OMNIS UNF annually.

See also

Notes on handling, page 17

3.2.3.1 Cylinder unit OMNIS UNF – Housing resistance to chemicals

In contrast to the other components of the cylinder unit OMNIS UNF, the housing has only limited resistance to chemicals.

Good resistance	▪ Aqueous solutions ▪ Diluted acids ▪ Alcohols ▪ Hydrocarbons ▪ IC anion eluents ▪ IC cation eluents ▪ Regeneration solutions (H_2SO_4, H_3PO_4)
Limited resistance	▪ Concentrated organic acids ▪ Diluted aqueous alkalis (cold cracking) ▪ acetone ▪ Isopropanol ▪ Tetrahydrofuran ▪ Hot water (> 50 °C)
Non-resistant	▪ Concentrated inorganic acids and bases ▪ Chlorinated solvents ▪ Bromine (Br_2) ▪ Phenol ▪ Water vapor (> 100 °C)

See also

Cylinder unit OMNIS UNF – Overview (chapter 3.2, page 12)

4 Delivery and transport

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 Operation and control

5.1 Operation of the cylinder unit OMNIS UNF

The product can be operated via the OMNIS Software.
Additional information can be found in the *OMNIS help*.

Notes on handling

If no continuous solution throughput is guaranteed, then rinse the cylinder with ultrapure water and move it into the fill position. Particularly when using:

- PCR solution
- KOH solution
- NaOH solution

NOTICE

Piston wear due to solutions and solids

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

- Within the same sample series, fill the cylinder with solution and move it to fill position.

Metrohm recommends rinsing the cylinder unit OMNIS UNF with cleaning solution according to "Best Practice" and storing it filled in the exchange position before shorter downtimes (e.g., overnight).

For storage of the cylinder unit OMNIS UNF over an extended time period:

Use of capillaries

The dosing rate and the aspiration rate of the dosing unit are limited to a specific connector of the OMNIS UNF distributor due to the configuration, the length, and the inner diameter of the capillaries, tubings, needles, and switching valves. The recommended dosing rate and aspiration rates are listed in the IC example methods.

5.2 Attaching the cylinder unit OMNIS UNF

Default settings for Ports 1 and 2

Port 1 is defined as the dosing port and Port 2 as the fill port in the memory chip default settings of the cylinder unit OMNIS UNF. 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 attachment

1 Open the **Manual control** in the OMNIS Software.

2 Start the **Init.** function.

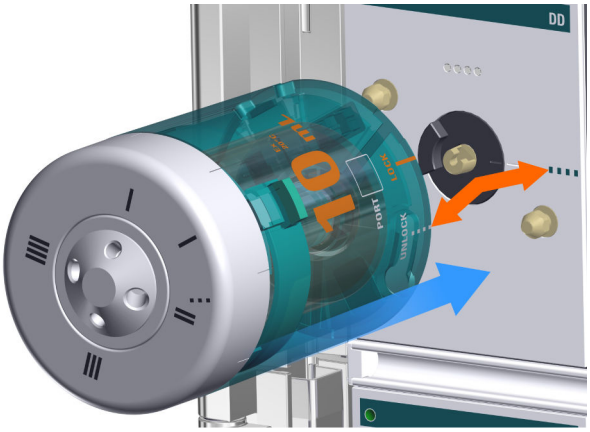
Attaching the cylinder unit OMNIS UNF

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

Prerequisite:

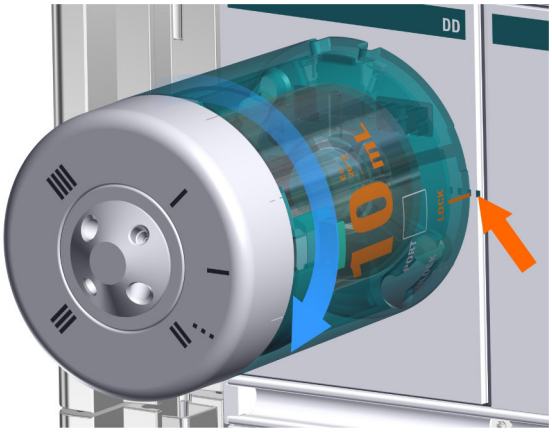
- Dosing drive: Is initialized.
- Cylinder unit OMNIS UNF: The piston stopper is flush with the base of the housing. The centering tube is in the correct position: Port 2 is visible in the port display *(3-**4**)*.

1 Attaching the cylinder unit OMNIS UNF



- Rotate the cylinder unit OMNIS UNF from a horizontal position in such a way that the line with the **UNLOCK** label matches the marking on the dosing drive.
- Attach the cylinder unit OMNIS UNF down onto the two twist-locks straight from the front.

2 Locking the cylinder unit OMNIS UNF



- Rotate the cylinder unit OMNIS UNF clockwise until it stops.
- Use the marking with the label **LOCK** as guidance.

See also

Cylinder unit OMNIS UNF – Overview (chapter 3.2, page 12)

5.3 Removing the cylinder unit OMNIS UNF

Preparing the removal

1 Open the **Manual control** in the OMNIS Software.

2 Start the **Init.** function.

Removing the cylinder unit OMNIS UNF

Prerequisite:

- Dosing drive: Valve coupling and push rod are in initialization position (Port 2 is set).
- Cylinder unit OMNIS UNF: The piston stopper is flush with the base of the housing. The centering tube is in the correct position.

CAUTION

Health hazards due to contact with chemicals

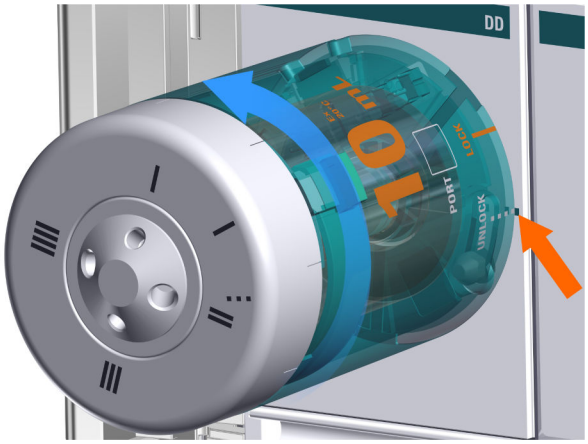
Chemicals in the cylinder unit OMNIS UNF may cause chemical burns.

- Before removing the cylinder unit OMNIS UNF special, empty and rinse the cylinder.
- Wear protective equipment, especially gloves.

1 Removing the connectors

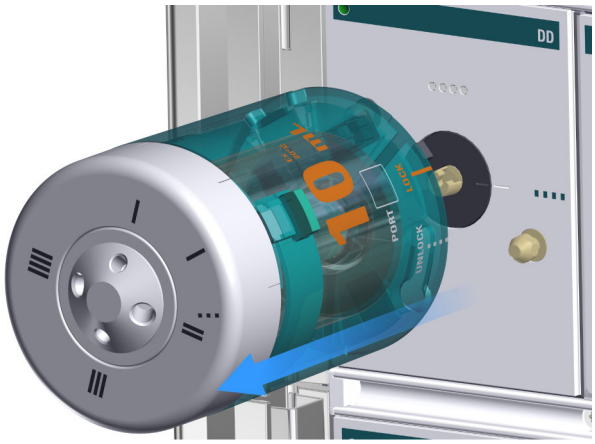
- Remove all connections and check whether all tubings and capillaries are provided with stoppers. This prevents leakage.

2 Unlocking the cylinder unit OMNIS UNF



- Rotate the cylinder unit OMNIS UNF counterclockwise as far as the **UNLOCK** position.

3 Raising the cylinder unit OMNIS UNF



- Lift the cylinder unit OMNIS UNF forward from a horizontal direction.

See also

Cylinder unit OMNIS UNF – Overview (chapter 3.2, page 12)

5.4 Refitting the cylinder unit OMNIS UNF

The cylinder units OMNIS UNF are available in various versions *(see "Cylinder unit OMNIS UNF – Product versions", chapter 1.2, page 2)*.

For fitting the instrument with a different cylinder unit:

- Order the cylinder unit OMNIS UNF with the required volume *(see "Cylinder unit OMNIS UNF – Product versions", chapter 1.2, page 2)*.
- Remove the current cylinder unit OMNIS UNF *(see "Removing the cylinder unit OMNIS UNF", chapter 5.3, page 19)*.
- Attach the new cylinder unit OMNIS UNF *(see "Attaching the cylinder unit OMNIS UNF", chapter 5.2, page 18)*.

6 Maintenance

6.1 Performing maintenance on the cylinder unit OMNIS UNF

NOTICE

Damage due to aggressive chemicals

Chemicals may escape through leaks. Aggressive chemicals damage the memory chip and the dosing drive.

- Regularly check the cylinder unit OMNIS UNF for leaking liquid (on the base of either the centering tube or the cylinder unit OMNIS UNF).
- Check the cylinder and the piston for wear at regular intervals. *(see "Checking and replacing the cylinder unit OMNIS UNF", chapter 6.5, page 31)*
- Replace a defective cylinder unit OMNIS UNF immediately. Do not continue using it.

Some applications may lead to uncritical nucleation under the cylinder unit. In such cases, the drip collector prevents contamination of other units.

Depending on the application, cylinders and pistons are subject to different mechanical strain. A cylinder unit OMNIS UNF, for example, that is often used for alkaline, high-concentration or nucleating reagents will be subject to higher wear. This results in shorter maintenance intervals. The cylinder unit OMNIS UNF must furthermore be replaced more often.

After prolonged decommissioning, the function of the cylinder unit OMNIS UNF may be impaired; do not use manual control commands to return it to operation. Metrohm recommends regular maintenance of the cylinder unit OMNIS UNF as a precautionary measure.

Maintenance work	Maintenance interval
Check the housing for contamination and clean it *(see "Cleaning the cylinder unit OMNIS UNF", chapter 6.2, page 24)*.	Daily

Maintenance work	Maintenance interval
Check the cylinder inside and outside for crystallization and clean it *(see "Cleaning the cylinder unit OMNIS UNF", chapter 6.2, page 24)*. Remove the cylinder unit OMNIS UNF from the dosing drive, check the instrument for crystallization and clean it *(see "Cleaning the cylinder unit OMNIS UNF", chapter 6.2, page 24)*. Rinse the cylinder with suitable cleaning solution *(see "Cleaning the cylinder unit OMNIS UNF", chapter 6.2, page 24)*. Fill the cylinder with cleaning solution for inactive time slots (e.g., overnight). Rinse the cylinder unit OMNIS UNF in accordance with "Best Practice" with cleaning solution automatically (min. 6 cleaning cycles). Leave the cylinder unit OMNIS UNF in the cleaning solution and in the fill position overnight.	Daily when using corrosive or crystallizing reagents
Check electrical contacts for contamination and clean them *(see "Cleaning the cylinder unit OMNIS UNF", chapter 6.2, page 24)*. Clean the cylinder top piece and the valve disk. Grease the centering tube and the valve disk *(see "Cleaning and greasing the cylinder unit OMNIS UNF", chapter 6.4, page 28)*.	Weekly if using: ▪ Concentrated solutions that tend to nucleate ▪ High-purity solvents and ultrapure water ▪ Organic solvents ▪ Alkaline (e.g. KOH or isopropyl alcohol), corrosive or high-concentration reagents
Check the cylinder and piston *(see "Checking and replacing the cylinder unit OMNIS UNF", chapter 6.5, page 31)*.	Every 6 months if using unproblematic reagents.
Check and clean capillaries and tubings.	Regularly
Clean the centering tube and the valve disk. Grease the centering tube and the valve disk *(see "Cleaning and greasing the cylinder unit OMNIS UNF", chapter 6.4, page 28)*.	Regularly
Recommended maintenance and calibration certification by a regional Metrohm service representative.	Annually

Metrohm recommends rinsing with ultrapure water for aqueous solutions.

6.2 Cleaning the cylinder unit OMNIS UNF

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.

The cylinder unit OMNIS UNF requires appropriate care. Excessive contamination of the cylinder unit OMNIS UNF leads to malfunctions and a shorter service life.

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

Prerequisite:

- The cylinder unit OMNIS UNF has been removed from the dosing drive. *(see "Removing the cylinder unit OMNIS UNF", chapter 5.3, page 19)*

Required accessories:

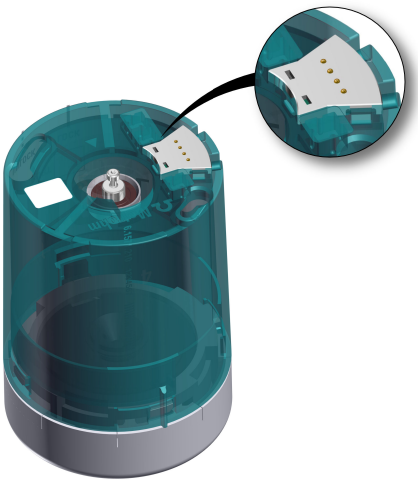
- Lint-free cloth
- Dishwashing detergent

1 Cleaning the housing

- Clean the housing with lukewarm water and dishwashing detergent.
  If the distributor is jammed, place the cylinder unit with the distributor upside down in lukewarm water for 30 minutes (optionally with a little dishwashing detergent).

The housing is **not** dishwasher proof.

2 Cleaning the electrical contacts of the cylinder unit OMNIS UNF

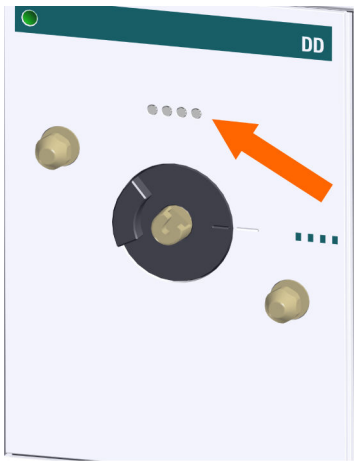


- If the electrical contacts are only lightly contaminated, then clean the electrical contacts with a cloth moistened with water.
- If the electrical contacts are heavily contaminated:
  - Add dishwashing detergent or ethanol to the moist cloth and clean the electrical contacts.
  - Or clean the electrical contacts in an ultrasonic bath with a little dishwashing detergent or ethanol.

To clean in an ultrasonic bath, first disassemble the cylinder unit OMNIS UNF.

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

3 Cleaning the electrical contacts of the dosing drive



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

6.3 Disassembling the cylinder unit OMNIS UNF

Prerequisite:

- The cylinder is empty.
- The cylinder unit OMNIS UNF has been removed from the dosing drive. *(see "Removing the cylinder unit OMNIS UNF", chapter 5.3, page 19)*

1 Loosening the cylinder top piece

NOTICE

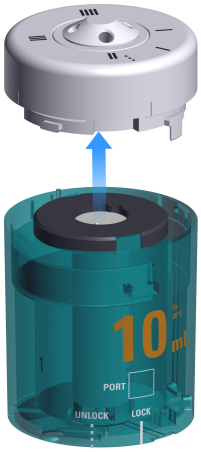
Damage due to improper handling

Improper handling leads to damage to the cylinder unit OMNIS UNF or to the piston.

- Do not use force to rotate the cylinder top piece. Instead, place the cylinder unit OMNIS UNF in water. *(see "Cylinder unit OMNIS UNF – Clearing the jamming", chapter 7.3, page 41)*
- Follow the instructions for disassembling the cylinder unit OMNIS UNF.
- Do not disconnect the cylinder from the cylinder base.
- Do not remove the piston from the cylinder.

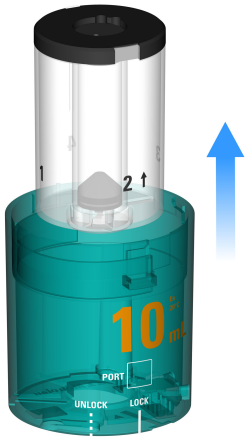
- Press the unlocking button and hold it down.
- Rotate the cylinder top piece counterclockwise until it stops.

2 Removing the cylinder top piece



- Remove the distributor.

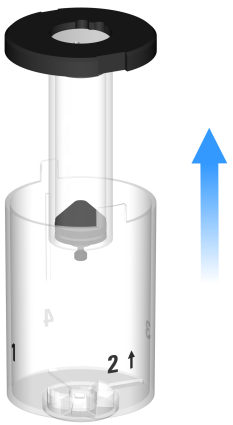
3 Removing the cylinder element



- Remove the cylinder element (centering tube incl. cylinder).

4 Removing the cylinder

Do not disconnect the cylinder from the cylinder base.
Do not remove the piston from the cylinder.



- Hold the black cylinder base.
- Pull the cylinder together with the piston out of the centering tube.
- Turn the cylinder around and place the cylinder base on a flat surface.

6.4 Cleaning and greasing the cylinder unit OMNIS UNF

Cleaning the components

Prerequisite:

- The distributor and the cylinder element have been removed. *(see "Disassembling the cylinder unit OMNIS UNF", chapter 6.3, page 26)*

1 Cleaning the distributor

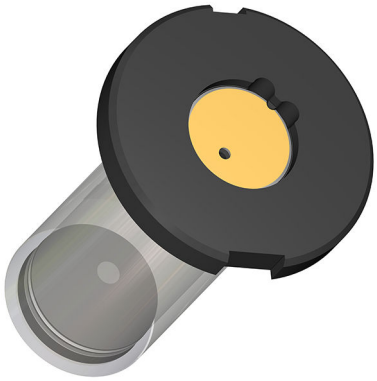
- Clean the distributor with ultrapure water.

Do not remove the distributor disk from the distributor.

2 Cleaning the centering tube and cylinder

Do not disconnect the cylinder from the cylinder base.

- Rinse the centering tube with ultrapure water and wipe it off with ethanol.
- Clean the contact surface of the valve disk with ethanol:



3 Cleaning the housing

Rinse the housing with water and wipe it with ethanol.

Checking the components

1 *(see "Checking and replacing the cylinder unit OMNIS UNF", chapter 6.5, page 31)*

Greasing the components

Required accessories:

- Grease (6.2803.010 or 6.2803.000)

- Lint-free cloth

1 Greasing the centering tube

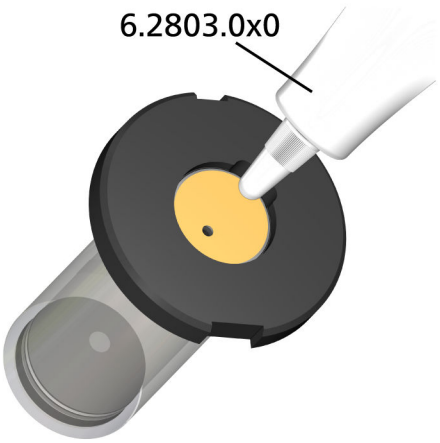
- Grease the centering tube on the surface shown.

2 Greasing the valve disk

Metrohm recommends that PTFE paste (6.2803.050) be used for the valve disk.

Make sure that new disposable gloves are used when attaching the PTFE paste to avoid contamination during this step.

Make sure that no grease gets into the hole.



- Apply a very thin layer of grease to the surface shown on the valve disk.
- Wipe off excess grease with a cloth.

Assembling the cylinder unit OMNIS UNF

1 *(see "Assembling the cylinder unit OMNIS UNF", chapter 6.6, page 31)*

6.5 Checking and replacing the cylinder unit OMNIS UNF

Prerequisite:

The cylinder unit OMNIS UNF has been disassembled. *(see "Disassembling the cylinder unit OMNIS UNF", chapter 6.3, page 26)*

1 **Checking the cylinder**

- Are rough areas or scratches visible on the cylinder?

2 **Checking the piston**

- Are scratches visible on the piston surface?
- Is any unevenness visible on the sealing lips of the piston?
- Are the cylinder and piston leakproof?

3 **Replacing the cylinder unit OMNIS UNF**

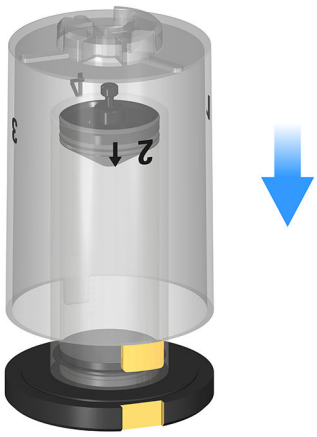
- If any of these defects is visible, then replace the entire cylinder unit OMNIS UNF.

6.6 Assembling the cylinder unit OMNIS UNF

Assembling the cylinder unit OMNIS UNF

1 **Assembling the cylinder element**

- Place the cylinder base with cylinder and piston on a flat surface.
- Place the centering tube over the cylinder and align it so that the protrusions of the centering tube fit into the recesses of the cylinder base:



- Attach the housing on the centering tube.
- Press the housing down evenly and straight (the piston stopper must fit through the small opening in the centering tube) as far as it will go:

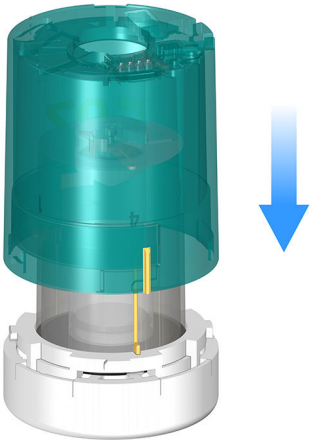
- Remove the housing again.

The centering tube now rests completely on the cylinder base and the piston is centered by the centering tube in the small opening.

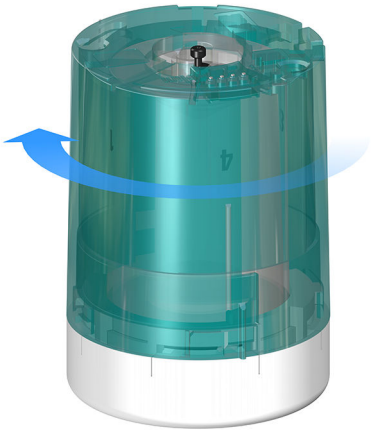
2 Placing the cylinder element on the distributor

- Place the distributor with the ports facing down on a flat surface.
- Place the cylinder element on the distributor.
- Rotate the cylinder element in such a way that the markings on the centering tube and on the distributor are positioned one above the other.

3 Attaching the housing



- Attach the housing.
- The markings of the housing, centering tube, and distributor must be positioned one above the other.



- Hold the distributor and rotate the housing clockwise until the spring clip snaps into place.
- Make sure that the cylinder element does not rotate.

4 Checking the position of the piston

- If necessary, check the position of the piston: *(see "Cylinder unit OMNIS UNF – Adjusting the position of the piston", chapter 7.2, page 38)*

See also

Attaching the cylinder unit OMNIS UNF (chapter 5.2, page 18)

Cylinder unit OMNIS UNF – Adjusting the position of the piston (chapter 7.2, page 38)

7 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).

7.1 Cylinder unit OMNIS UNF – Malfunctions

Problem	Cause	Remedy
The entire cylinder unit OMNIS UNF rotates during dosing.	The friction points have not been greased.	Grease the centering tube and the valve disk. *(see "Cleaning and greasing the cylinder unit OMNIS UNF", chapter 6.4, page 28)*
There is liquid under the piston, on the base of either the centering tube or the cylinder unit OMNIS UNF.	The piston is worn out or defective.	Replace the cylinder unit OMNIS UNF.
	The cylinder does not seal. In PCR applications, no harm is caused when crystallization is caused by just a few escaping drops.	Replace the cylinder unit OMNIS UNF.
	The distributor disk does not seal.	Clean valve disk and distributor disk. *(see "Cleaning and greasing the cylinder unit OMNIS UNF", chapter 6.4, page 28)*
The housing does not shut.	The spring clip is inserted incorrectly.	Remove the housing and insert the spring clip correctly.

Problem	Cause	Remedy
The cylinder unit OMNIS UNF can be removed from the dosing drive only with difficulty.	The friction points have not been greased.	Grease the centering tube and the valve disk. *(see "Cleaning and greasing the cylinder unit OMNIS UNF", chapter 6.4, page 28)*
	The coupling is contaminated.	Remove contamination on the coupling between the cylinder unit OMNIS UNF and the drive.
The cylinder unit OMNIS UNF cannot be removed from the dosing drive.	The cylinder unit OMNIS UNF is not in the initialization position.	Start the **Init.** function.
The cylinder top piece can be removed from the cylinder unit OMNIS UNF only with difficulty.	The cylinder unit OMNIS UNF is jammed because the valve disk and the distributor disk stick together.	▪ *(see "Cylinder unit OMNIS UNF – Clearing the jamming", chapter 7.3, page 41)*
The cylinder unit OMNIS UNF is recognized either not at all or incorrectly.	The cylinder unit OMNIS UNF was attached or assembled incorrectly.	▪ *(see "Removing the cylinder unit OMNIS UNF", chapter 5.3, page 19)* ▪ *(see "Attaching the cylinder unit OMNIS UNF", chapter 5.2, page 18)* ▪ Check the correct placement of the cylinder unit OMNIS UNF. ▪ Switch the control instrument off and then back on again. ▪ If the problem persists, then contact your regional Metrohm representative.
	The memory chip is mechanically damaged or impaired by chemicals.	▪ *(see "Cleaning the cylinder unit OMNIS UNF", chapter 6.2, page 24)* ▪ If the problem persists, then contact your regional Metrohm representative.
Air bubbles are in the cylinder or in the capillaries or tubings.	Air intrusion through leaky connection.	▪ Check the tubing ends, in particular the tubing end of the aspiration tubing. ▪ Tighten the capillaries or tubings to the connection port with the wrench (6.2739.000).

Problem	Cause	Remedy
		▪ Metrohm recommends adjusting the aspiration time and the waiting time after the aspiration step.
	The reagent degasses excessively; the released air forms bubbles.	▪ Reduce the filling rate. ▪ Degas the reagent with the degasser, the ultrasound, nitrogen, or in a vacuum.
	The piston is worn out.	▪ Replace the cylinder unit OMNIS UNF.
The cylinder unit OMNIS UNF doses an incorrect volume.	The cylinder unit OMNIS UNF is incorrectly assembled or there are problems with the dosing unit. The values used may also have been calculated incorrectly.	Check whether the nominal volume on the housing and the cylinder volume match one another, and use a housing with the corresponding volume.
The cylinder unit OMNIS UNF does not dose.	The tubing connections and/or valve openings are jammed.	▪ Check whether the ports are closed by stoppers. ▪ Check whether the valve openings are blocked. Clean the valve openings if necessary.
	The push rod of the dosing drive does not reach the piston.	Remove the cylinder unit OMNIS UNF and check the position of the piston. If the piston stopper is not flush with the underside of the housing, then adjust the position of the piston using the piston tongs. *(see "Cylinder unit OMNIS UNF – Adjusting the position of the piston", chapter 7.2, page 38)*
The valve disk is jammed.	Utilization of corrosive or crystallizing reagents	▪ Remove the tubing. Carefully remove the housing. ▪ Place the cylinder unit OMNIS UNF in warm water for at least 30 minutes. ▪ Carefully loosen the distributor disk from the valve disk, placing the cylinder unit OMNIS UNF once again in warm water in the event of problems.

Problem	Cause	Remedy
		▪ Rinse all parts with ultrapure water and take care while doing so not to remove the piston or to disconnect the cylinder from the base plate. ▪ Dry the parts (e.g., with nitrogen). ▪ Grease the parts.*(see "Cleaning and greasing the cylinder unit OMNIS UNF", chapter 6.4, page 28)* ▪ Assemble the cylinder unit OMNIS UNF and attach it to the dosing drive. ▪ Initialize the dosing drive.

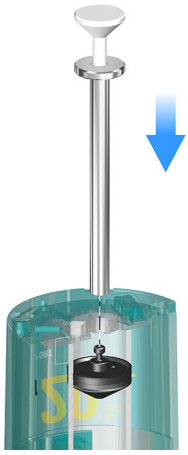
7.2 Cylinder unit OMNIS UNF – Adjusting the position of the piston

If the piston stopper is not flush with the base of the housing, then the push rod of the dosing drive cannot reach the piston.

Required accessories:

- Piston tongs (6.1546.030)

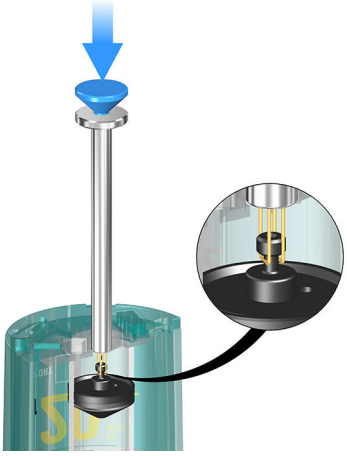
1 Inserting the piston tongs



- Insert the piston tongs into the opening of the cylinder.

The image shows a random position of the piston. The piston can, however, be in a different position.

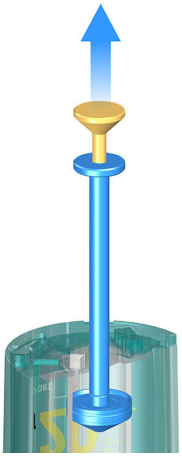
2 Grasping the piston



- Press the plunger of the piston tongs (blue) and hold it down.
- Position the piston tongs in such a way that the wire loops grasp the piston stopper (see zoomed in view).
- Release the plunger of the piston tongs.

The piston tongs clasp the piston.

3 Positioning the piston



- Check whether the piston tongs rest entirely on the piston.
- Hold on to the cylinder unit OMNIS UNF.
- Hold on to the plunger (orange) of the piston tongs and carefully pull up the piston until it stops.

4 Removing the piston tongs

- Press the plunger of the piston tongs (blue) and hold it down.
- The wire loops spread apart (orange arrows) and the piston tongs can be removed.

5 Checking the position of the piston stopper

If the piston stopper protrudes beyond the housing (see zoomed in view), then perform the following steps:

- Place the cylinder unit OMNIS UNF on a flat surface (e.g., laboratory table).
- Carefully push the cylinder unit OMNIS UNF vertically downwards onto the support surface.

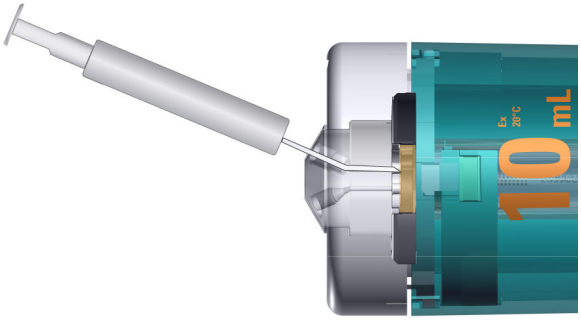
The piston stopper is positioned flush with the housing. The cylinder unit OMNIS UNF can now be attached.

7.3 Cylinder unit OMNIS UNF – Clearing the jamming

If it is difficult or impossible to rotate the cylinder top piece, the valve disk and the distributor disk stick to one another. The software displays an error message.

Clearing the jamming of the attached cylinder unit OMNIS UNF

1. Remove the tubings.
2. Remove the liquid from all ports with a syringe.
3. Fill each port with ultrapure water or a suitable solvent using a syringe (with a needle). Make sure that the needle reaches the valve disk (remains stuck in the port).



4. Allow the cylinder unit OMNIS UNF to stand for 2 hours.
5. Initialize the dosing drive in the OMNIS UNF Software or force a flat stopcock switching.

   Do not force flat stopcock switching multiple times.

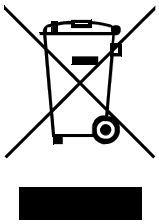
6. If the cylinder unit OMNIS UNF remains jammed, then repeat steps 2 to 5.

Clearing the jamming of the unattached cylinder unit OMNIS UNF

1. Place the jammed cylinder unit OMNIS UNF with the distributor facing down in warm water for at least 30 minutes.
2. Remove the cylinder unit OMNIS UNF from the water and dry it thoroughly.
3. If the cylinder unit OMNIS UNF remains jammed, then repeat the steps.

If the error persists, then contact the regional Metrohm service representative or replace the entire cylinder unit OMNIS UNF.

8 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.

9 Technical specifications

9.1 Ambient conditions

Nominal function range	+5 to +45 °C	at max. 80% relative humidity, non-condensing
Storage	+5 to +45 °C	at max. 80% relative humidity, non-condensing

9.2 Cylinder unit OMNIS UNF – Measurements and weight

Measurements	
Diameter	68 mm
Height	100 mm
Weight	
Type	
2 mL	180 g
5 mL	190 g
10 mL	200 g

9.3 Cylinder unit OMNIS UNF – Housing

Materials

Housing	PCT-G	Polycyclohexylenedimethylene terephthalate, glycol-modified
Centering tube	PCT-G	Polycyclohexylenedimethylene terephthalate, glycol-modified
Piston	PTFE with 25% carbon	Polytetrafluoroethylene with 25% carbon
Cylinder	Borosilicate 3.3	
Valve disk	Silicone carbide	
Distributor disk	Al_2O_3 ceramic	
Distributor	PCTFE	Polychlorotrifluorethylene

Degree of protection IP 40

9.4 Cylinder unit OMNIS UNF – Connectors specifications

Electrical contacts 4 Spring contacts

9.5 Cylinder unit OMNIS UNF – Liquid handling specifications

Cylinder volume 2, 5, 10 mL