Peristaltic pump module

2.1016.0X10

Product information

8.1016.8002EN / 2024-01-31 / v7

Metrohm

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Product information

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Technical Communication
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This documentation is an original document.

This documentation has been prepared with great care. However, errors can never be entirely ruled out. Please send comments regarding possible errors to the address above.

Disclaimer

Deficiencies arising from circumstances that are not the responsibility of Metrohm, such as improper storage or improper use, etc., are expressly excluded from the warranty. Unauthorized modifications to the product (e.g., conversions or attachments) exclude any liability on the part of the manufacturer for resulting damage and its consequences. Instructions and notes in the Metrohm product documentation must be strictly followed. Otherwise, Metrohm's liability is excluded.

Table of contents

1 Overview

1.1 Peristaltic pump module – Product description

The peristaltic pump module is a component with 2 or 4 peristaltic pumps. 2 peristaltic pumps are assigned to each workstation in the OMNIS Sample Robot: 1 rinsing pump and 1 aspiration pump.

- The upper peristaltic pump is used for rinsing off the sensors with solvent after each use. The solvent is aspirated from the rinsing canister.
- The lower peristaltic pump is used for aspirating the solution from the sample beaker after titration. The aspirated solution is routed afterwards to the waste canister.

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

1.2 Peristaltic pump module – Product versions

The product is available in the following versions:

Table 1 Product versions

Article number	Designation	Version feature
2.1016.0010	Peristaltic pump module (2-channel)	2 installed peristaltic pumps
2.1016.0110	Peristaltic pump module (4-channel)	4 installed peristaltic pumps

1.3 Peristaltic pump module – Overview

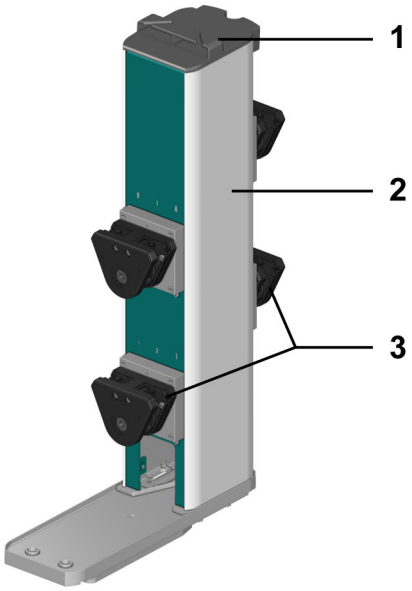

Figure 1 Front – Peristaltic pump module

1	**Tubing organizer**	**2**	**Housing**
3	**Peristaltic pumps**		

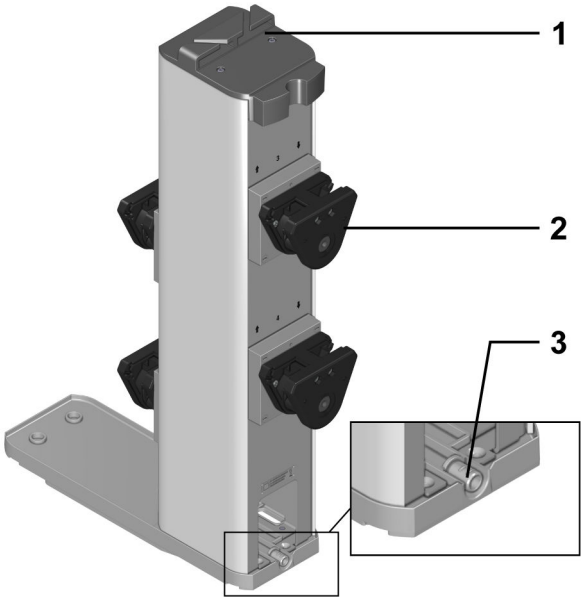

Figure 2 Rear – Peristaltic pump module

1	**Tubing organizer**	**2**	**Peristaltic pumps**
3	**Drain nozzle**		

2 or 4 peristaltic pumps *(2-**2**)* can be fitted on each peristaltic pump module:

- In the case of the two-way variant, the pumps are mounted on the front only and numbered 1 and 2.
- In the case of the four-way variant, 2 additional pumps are mounted on the rear and numbered 3 and 4.

Arrows indicating inlet and outlet are also to be found above each peristaltic pump next to the numbering. 2 peristaltic pumps each can be used to rinse and clean the sensors in a Pick&Place module.

A tubing organizer *(1-**1**)* is located on the top side of the peristaltic pump module to ensure orderly placement and secure fastening of the connected tubing.

A drain nozzle *(2-**3**)* to which a tubing is connected via a tubing adapter can be found at the rear of the peristaltic pump module. Any liquid that may escape will be routed through this tubing into the waste canister. In case of an error, this protects the pump module against damage.

Option for working with covered sample beakers

To protect samples, e.g. from environmental influences, Dis-Cover lids can be used to close the sample beakers. Lid trays can be mounted for storing the lids during analysis. Depending on the product version of the sample robot, the lid trays offer space for 2 to 4 lids.

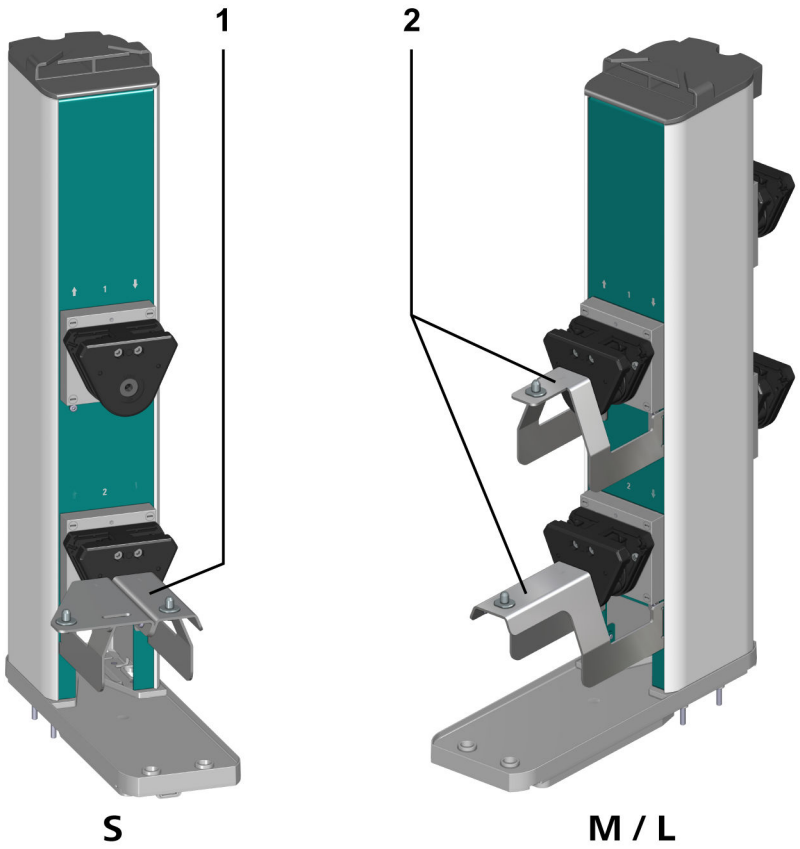

Figure 3 Front – Peristaltic pump module with lid trays

1	**Lid tray for OMNIS Sample Robot S Pick&Place**
2	**Lid tray for OMNIS Sample Robot M/L Pick&Place**

1.4 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

1.5 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.

1.6 Displaying 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 (e.g. **2.1001.0010**) into the search field and press **[Enter]**.

The search result is displayed.

2 Displaying product information

- To display the products matching the search term, click on **Product models**.
- Click on the desired product.

Detailed information regarding the product is displayed.

3 Displaying accessories and downloading the accessories list

- To display the accessories, scroll down to **Accessories and more**.
  - The **scope of delivery** is displayed.
  - Click on **[Optional parts]** for the optional accessories.
- To download the accessories list, click on **[Download accessories PDF]** under **Accessories and more**.

Metrohm recommends keeping the accessories list for reference purposes.

2 Safety

2.1 Intended use

Metrohm products are used for the analysis and handling of chemicals.

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

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

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

Specifications regarding the operating values and limit values of individual products are contained in the "Technical specifications" section, if relevant.

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

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

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.
- 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

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 Technical specifications

3.1 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

3.2 Peristaltic pump module – Energy supply

Nominal voltage	24 VDC	internal
Power consumption		
Peristaltic pump	max. 10 W	per pump
Protection		
Internal fuse	1.5 ATH	cannot be replaced by the user

3.3 Peristaltic pump module – Dimensions

Measurements	
Width	92 mm
Height	585 mm
Depth	
With 2 pumps	289 mm
With 4 pumps	320 mm
Weight	
Without lid tray	
With 2 pumps	4.3 kg

With 4 pumps	5.6 kg	
With lid tray		for working with covered sample beakers
With 2 pumps	4.8 kg	
With 4 pumps	6.0 kg	
With lid tray		for working with covered sample beakers
Dummy panel	4.0 kg	without pumps

3.4 Peristaltic pump module – Housing

Materials

Lid	PBT	poly(butylene terephthalate)
Back panel	AW-5754 H12 / H22	aluminum, coated
Base	PBT	poly(butylene terephthalate)
Enclosure	PP	polypropylene
Lid tray	AW-5754 H12 / H22	aluminum, coated

IP degree of protection IP 20

3.5 Peristaltic pump module – Liquid Handling specifications

Working Module Pump

Type		peristaltic
Number	2 / 4	

Pump

Add	150 mL/min
Aspirate	300 mL/min