IC equipment

IC equipment: MiPuT (6.5330.170)

Manual

8.110.8034EN / v2 / 2024-07-02

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1 Introduction

1.1 Description

The IC equipment: MiPuT expands your ion chromatography system to include the Metrohm intelligent Pick-up Injection Technique (MiPuT).

The Metrohm intelligent Pick-up Injection Technique (MiPuT) is the ideal sample injection technique for small sample amounts of a few µL. The sample volume can be as small as required by the application. Volumes between 4 µL and 60 µL can be selected. The user has the advantage that he can inject samples of different concentrations without carrying out a manual dilution.

In this process, the Dosino (800 Dosino with 807 Dosing unit 2 mL) ensures precise dosing increments. It doses the exact sample volume and quantitatively transfers the sample segment from the Liquid Handling Station into the sample loop with ultrapure water.

The Liquid Handling Station (6.2841.120) can be mounted on any Sample Processor equipped with a 786 Swing Head.

Systems with Pick-up Technique can be calibrated automatically. To do this, all you need is a multi-ion standard. The system injects this multi-ion standard with various injection volumes and thus creates a multi-point calibration. This automatic calibration saves working time and reduces errors.

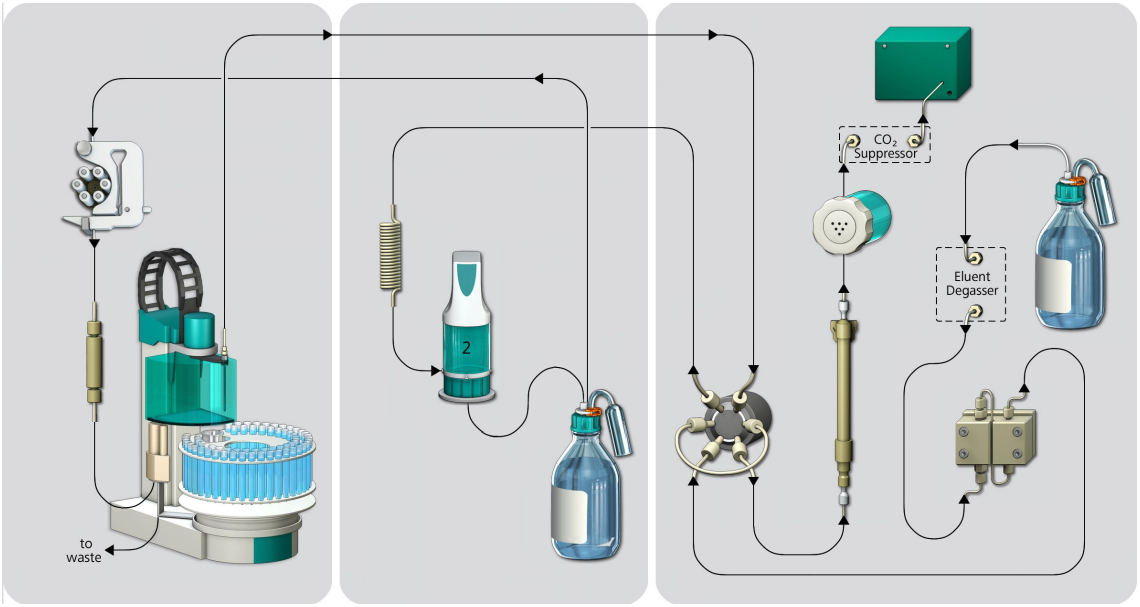


Figure 1 Overview MiPuT

1.2 About the documentation

This manual describes the installation of the IC equipment: MiPuT.

CAUTION

Please read through this documentation carefully before putting the IC equipment: MiPuT into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the IC equipment: MiPuT.

Additional documentation

Topic	Document
Mounting the Liquid Handling Station on the Sample Processor	Manual for the Liquid Handling Station
Installation of the Dosino	Manual for the Dosino
Care and maintenance of the 807 Dosing Unit	Manual for 807 Dosing Unit
Installing the peristaltic pump	Manual for the Sample Processor
Care and maintenance of the peristaltic pump	Manual for the Sample Processor
Inserting the needle	Manual for the Sample Processor

1.2.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

*(5-**12**)*	**Cross-reference to figure legend** The first number refers to the figure number, the second to the instrument part in the figure.
1	**Instruction step** Perform the steps one after the other.
Method	**Dialog text**, **parameter** in the software
File ▶ New	Menu or menu item
[Continue]	**Button** or **key**
	**WARNING** This symbol draws attention to a possible life-threatening hazard or risk of injury.

	**WARNING** This symbol draws attention to a possible hazard due to electrical current.
	**WARNING** This symbol draws attention to a possible hazard due to heat or hot instrument parts.
	**WARNING** This symbol draws attention to a possible biological hazard.
	**WARNING** Warning of optical radiation
	**CAUTION** This symbol draws attention to possible damage to instruments or instrument parts.
	**NOTICE** This symbol highlights additional information and tips.

2 Overview

2.1 Parts of the IC equipment: MiPuT

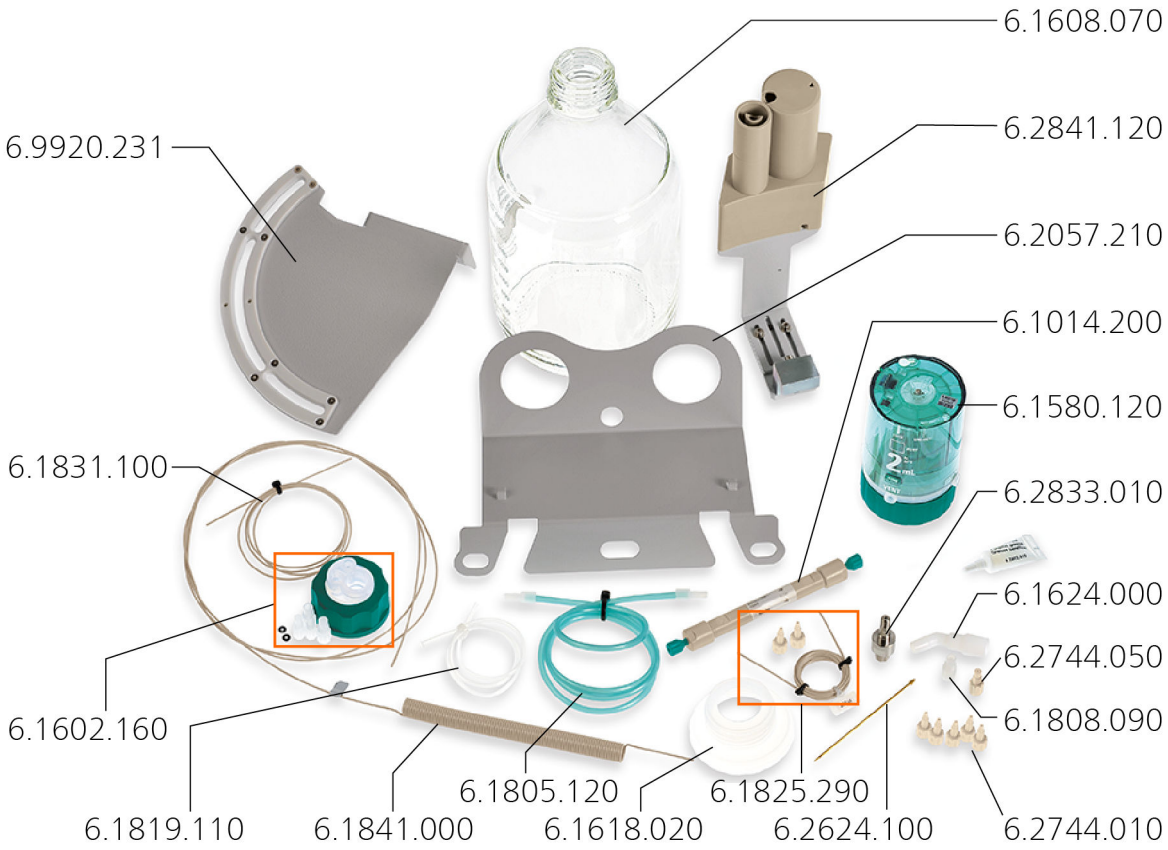


Figure 2 IC equipment: MiPuT – Parts

2.2 Parts of the Liquid Handling Station

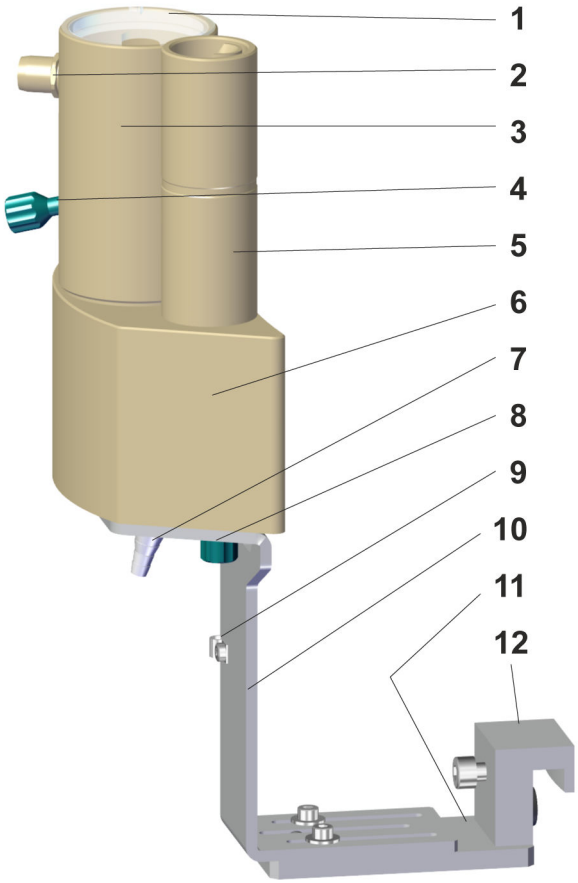


Figure 3 Overview of the device IC equipment (left-handed version)

1	**Lid for the mixing vessel**	**2**	**Overflow** with connector
3	**Mixing vessel**	**4**	**Mixing vessel connector - UNF 10/32** sealed with threaded stopper
5	**Rinsing unit**	**6**	**Main body of the IC equipment** with magnetic stirrer dummy
7	**Waste connector**	**8**	**Rinsing connector - UNF 10/32** sealed with threaded stopper
9	**Cable clip**	**10**	**Support bracket**
11	**Base plate**	**12**	**Clamping fastener**

2.3 Mode of operation of the intelligent Pick-up Injection Technique

1. At the beginning of the determination, the 807 Dosing Unit 2 mL of the Dosino is emptied.
2. Aspirating the sample
    a. The Dosino aspirates the exact sample volume (or the standard solution) into the connection capillary between the needle and the injection valve.
    b. The Sample Processor needle moves to the inner area of the rinsing unit.
    c. The peristaltic pump aspirates the transfer water from the storage container and pumps it to the Liquid Handling Station.
3. Filling the sample loop
    a. The injection valve is switched to the **Fill** position.
    b. The Dosino aspirates transfer water from the Liquid Handling Station and transfers it quantitatively into the 250 µL sample loop together with the sample segment.
4. Injecting and rinsing
    a. The injection valve is switched to the **Inject** position. The sample is injected into the separation column with the eluent.
    b. At the same time, the needle is rinsed with ultrapure water. The peristaltic pump conveys the water for rinsing the needle on the outside. The Dosino provides the water for rinsing the needle on the inside.

3 Installation

3.1 Adjustments to the Sample Processor

The following adjustments to the Sample Processor have to be carried out for the Pick-up Technique:

- Install the Liquid Handling Station on the Sample Processor.
- Prepare the peristaltic pump.
- Replace the needle and the needle holder.

3.1.1 Installing the Liquid Handling Station

The Liquid Handling Station forms part of the IC equipment: MiPuT.

1 Installing the Liquid Handling Station

Install the Liquid Handling Station on the left side of the Sample Processor (*see manual for the Liquid Handling Station*).

3.1.2 Installing the peristaltic pump

The peristaltic pump is part of the Sample Processor (2.858.0030).

1 Installing the peristaltic pump

- Prepare the pump tubing and insert it in the tubing cartridge (*see manual for the Sample Processor*).
- Fit the tubing cartridge onto the peristaltic pump on the Sample Processor (*see manual for Sample Processor*).

3.1.3 Replacing the needle

The needle installed on the Sample Processor needs to be replaced with the Pick-up needle (6.2624.100) for the Pick-up Technique. Use the needle holder (6.2833.010) to attach the Pick-up needle.

Replacing the needle and the needle holder

Required accessories

- Pick-up needle (6.2624.100)
- Needle holder (6.2833.010)

1 Remove the needle and the needle holder.

2 Install the needle holder (6.2833.010) and the Pick-up needle (*see manual for the Sample Processor).*

3.2 Adjustments to the ion chromatograph

The following adjustments to the ion chromatograph have to be carried out for the Pick-up Technique:

- mount the Dosino
- replace the sample loop

3.2.1 Mounting the Dosino

Attaching the Dosino to the 807 Dosing Unit

Required accessories

- 800 Dosino (2.800.0010)
- 807 Dosing Unit 2 mL without accessories (6.1580.120)

CAUTION

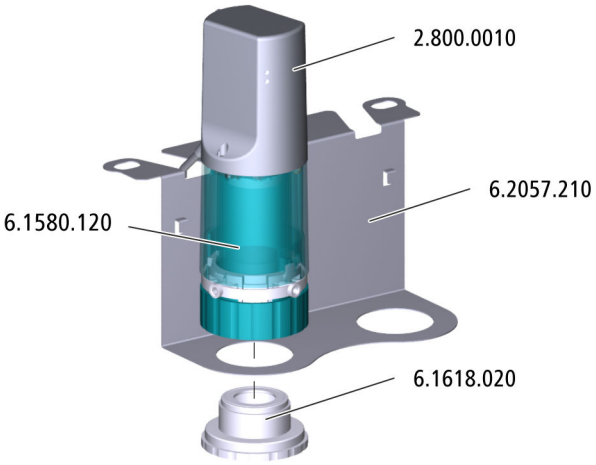
Please read through the correct procedure in the Manual for the 800 Dosino before you attach the Dosino to the 807 Dosing Unit.

1 Attach the Dosino to the 807 Dosing Unit, (*see Manual for the 800 Dosino*).

Fastening the Dosino to the ion chromatograph

Required accessories

- Dosino (2.800.010) with 807 Dosing Unit 2 mL without accessories (6.1580.120)
- Dosino holder (6.2057.210)
- Thread adapter (6.1618.020)



1 Fitting the Dosino holder onto the ion chromatograph

- Loosen the bottle holder on the ion chromatograph.
- Clamp the Dosino holder under it.
- Fasten the bottle holder again.

2 Attaching the Dosino to the holder

- Place the Dosino onto the Dosino holder.
- Fasten the Dosino to the Dosino holder by tightening the thread adapter from below.

3 Connecting the Dosino to the ion chromatograph

CAUTION

The ion chromatograph must be switched off when you plug the Dosino into the MSB connector.

- Check whether the ion chromatograph is switched on.
  If this is the case, switch off the ion chromatograph.
- Plug the Dosino cable into one of the ion chromatograph's MSB connectors.

Alternatively, the Dosino can also be mounted to the Sample Processor (see the manual for the Dosino).

3.2.2 Replacing the sample loop

Required accessories

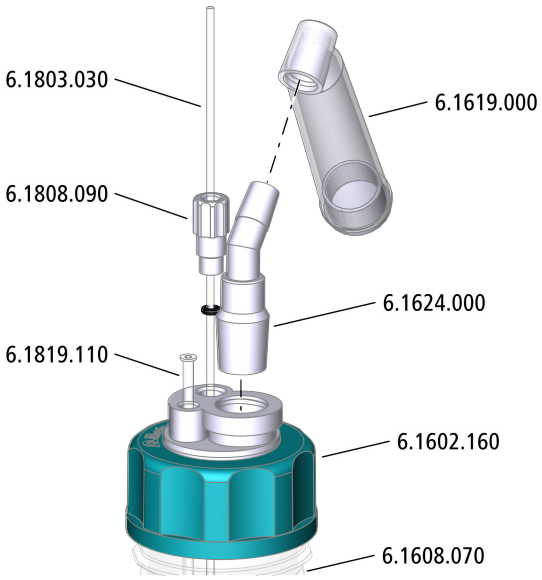
- Sample loop 250 µL (6.1825.290)

1 Replace the sample loop on the injection valve with the 250 µL sample loop (*see the manual for the ion chromatograph*).

3.3 Equipping the supply bottle

Required accessories

- Bottle (6.1608.070) filled with ultrapure water
- Eluent bottle cap (6.1602.160)
- Adsorber tube (6.1619.000)
- Adapter for adsorber tube (6.1624.000)
- FEP aspiration tubing (6.1819.110)
- PTFE capillary (6.1803.030), included in the accessories for the Sample Processor
- O-ring, included in the accessories for the bottle cap
- Thread adapter M8-M6 (6.1808.090)



1 Mounting the eluent bottle cap

- Screw the eluent bottle cap onto the bottle filled with ultrapure water.

2 Mounting the aspiration tubing

- Use the capillary cutter to cut the aspiration tubing to such a length that it touches the bottom of the bottle.

- Insert the aspiration tubing into the M6 opening of the eluent bottle cap.

3 Mounting the capillary

- Start by sliding the thread adapter M8-M6 and then the O-ring over one end of the PTFE capillary.
- Insert the PTFE capillary into the M8 opening of the eluent bottle cap.
- Push the PTFE capillary far enough into the bottle that its end touches the bottom of the bottle.
- Screw the thread adapter M8-M6 tight.

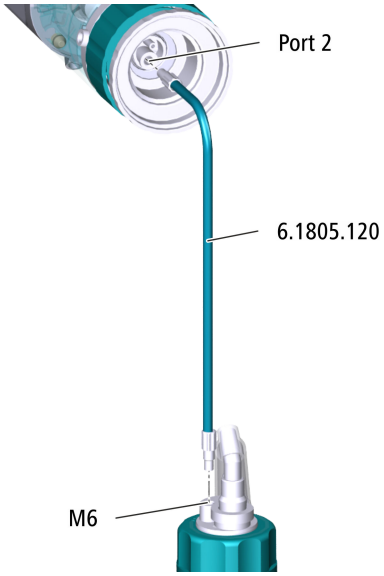
4 Mounting the adsorber tube

- Fill the adsorber tube with some cotton and adsorber material.
- Place the adsorber tube onto the adapter.
- Insert the adapter into the SGJ opening of the eluent bottle cap.

3.4 Mounting the FEP tubing

Required accessories

- FEP tubing (6.1805.120)



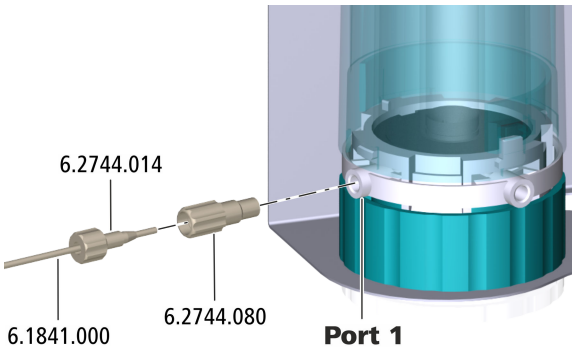
1

- Tighten one end of the FEP tubing in the M6 opening of the eluent bottle cap.
- Tighten the other end of the FEP tubing in port 2 of the Dosino.

3.5 Mounting the transfer capillary

Required accessories

- Transfer capillary (6.1841.000)
- Pressure screw (6.2744.014)
- Coupling M6 / UNF (6.2744.080)



1 ▪ Tighten the coupling to Port 1 of the Dosino.

2 ▪ Tighten one end of the transfer capillary to the coupling using a pressure screw.

3 ▪ Guide the free end of the transfer capillary through one of the ion chromatograph's capillary feed-throughs.
▪ Tighten the end of the transfer capillary to Port 2 of the injection valve.

3.6 Connecting the remaining capillaries

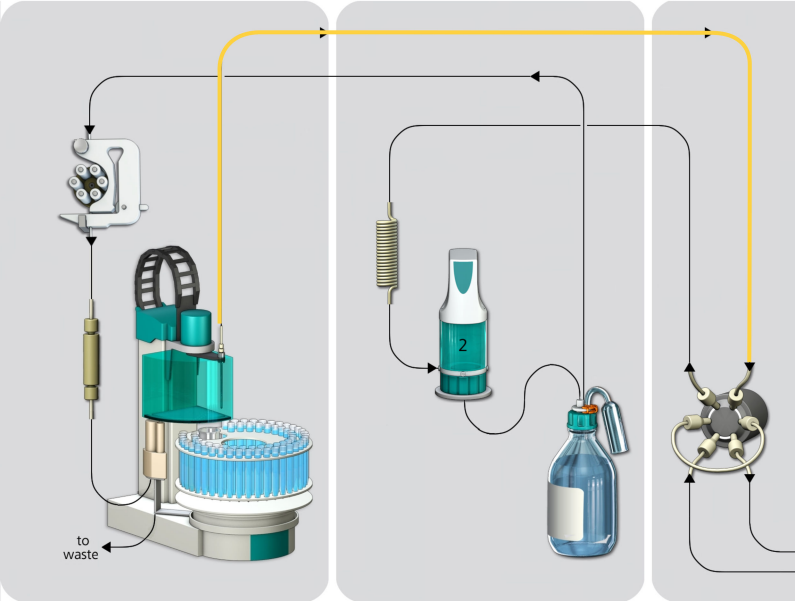
To complete the system, you need to establish two more capillary connections:

1. The capillary connection between the needle of the Sample Processor and the injection valve in the ion chromatograph.
2. The capillary connection from the supply bottle to the Liquid Handling Station via the peristaltic pump and trap column.

Establishing capillary connection needle ⇔ injection valve

Required accessories

- PEEK capillary, 0.25 mm ID / 1 m (6.1831.100)
- Pressure screw (6.2744.010)
- Capillary cutter (6.2621.080)



NOTE

The PEEK capillary 0.25 mm ID / 1 m (6.1831.100) may not be shortened or replaced with another capillary for this application. The ion chromatograph and the Sample Processor must be placed in such a way that the 1 m long capillary is sufficient.

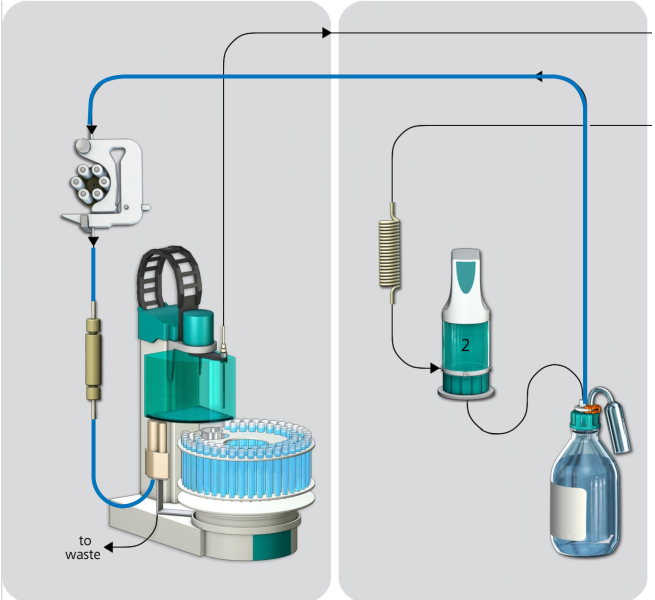
1 Tighten one end of the PEEK capillary 0.25 mm ID / 1 m (6.1831.100) to Port 1 of the injection valve using a pressure screw (6.2744.010).

2 Tighten the other end of the PEEK capillary 0.25 mm ID / 1 m (6.1831.100) to the needle of the Sample Processor *(see Manual for the Sample Processor)*.

Establishing capillary connection supply bottle ⇔ Liquid Handling Station

Required accessories

- PTFE capillary (6.1803.030), from the accessories for the Sample Processor
- Metrosep I Trap 1 - 100/4.0 (6.1014.200)
- Pressure screws (6.2744.010)
- Capillary cutter (6.2621.080)



1 Establishing connection supply bottle ⇔ peristaltic pump

- Shorten the PTFE capillary that is connected to the M 8 opening of the supply bottle using the capillary cutter in such a way that it can be easily connected to the peristaltic pump's inlet. Keep the dead volume to a minimum.
- Tighten the end of the capillary to the pump tubing inlet of the peristaltic pump using a pressure screw.

2 Establishing connection trap column ⇔ peristaltic pump

- Cut off a piece of the PTFE capillary that is approx. 15 cm long using the capillary cutter.
- Remove the stopper from the trap column's inlet.
- Tighten one end of the cut-off capillary to the pump tubing outlet of the peristaltic pump using a pressure screw.
- Tighten the other end of the cut-off capillary to the trap column inlet using a pressure screw.

3 Establishing connection Liquid Handling Station ⇔ trap column

- Cut off a piece of the PTFE capillary that is approx. 15 cm long using the capillary cutter.
- Remove the stopper from the trap column's outlet.
- Tighten one end of the cut-off capillary to the trap column outlet using a pressure screw.
- Tighten the other end of the cut-off capillary to the rinsing solution inlet of the Liquid Handling Station using a pressure screw.

4 Operation and maintenance

4.1 807 Dosing Unit 2 mL without accessories (6.1580.120)

Maintenance work on the 807 Dosing Unit must be performed regularly. Information on the care and maintenance of the 807 Dosing Unit can be found in the Manual for the 807 Dosing Unit.

4.2 Replacing the pump tubing

Pieces of pump tubing inserted into the peristaltic pump are consumables with a limited service life.

Pieces of pump tubing with 3 stoppers are tensioned in the tubing cartridge so that they end up positioned between two stoppers. This results in two possible positions for the tubing cartridge. Once the pump tubing exhibits significant signs of wear, it can be tensioned a second time in the other respective position.

Maintenance interval

Replace the pump tubing every 2 months.

Replace the pump tubing every 4 weeks if the peristaltic pump is being used continuously.

5 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**.

NOTE

Metrohm recommends keeping the accessories list for reference purposes.

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