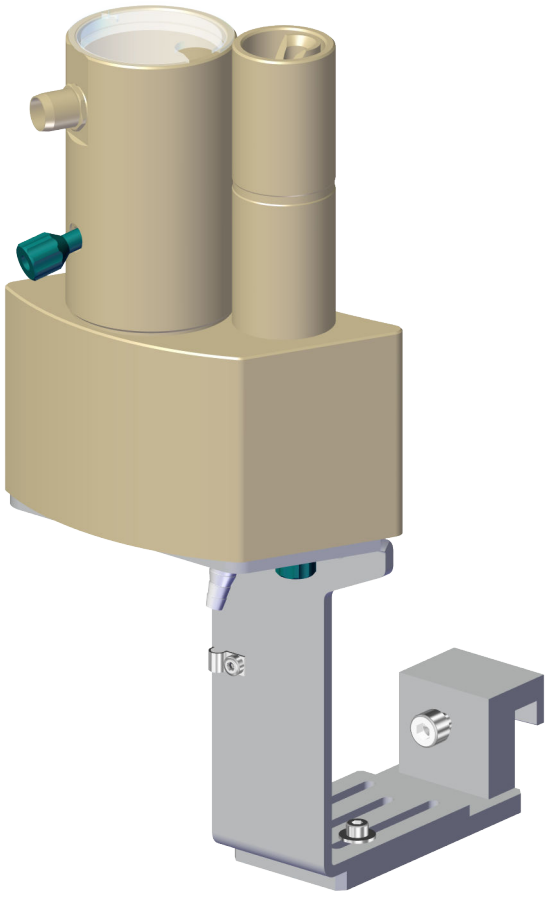
Liquid Handling Station



Manual

8.108.8011EN / v4 / 2024-05-30

Metrohm

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Manual

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Technical Communication
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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.

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1 Introduction

1.1 Description

The Liquid Handling Station can be combined with sample changers equipped with a robotic arm. Depending on the swing direction, either the left-handed (6.2841.120) or the right-handed (6.2841.130) version of the Liquid Handling Station is used.

The Liquid Handling Station consists of 2 function units:

Rinsing unit

The rinsing unit is equipped with a two-pipe system.

The interior pipe is for rinsing the sample needle.

The outer pipe is for the disposing of liquids and collecting the overflow from the interior tube.

Dilution unit

The dilution unit is used for the fully automated production of diluted solutions.

The Liquid Handling Station must be reconfigured for the sample dilution function. In order to obtain a homogeneous dilution, it is important that the concentrate be mixed with the dilution medium. A homogeneous dilution is achieved by installing the magnetic stirrer (2.741.0010) in the Liquid Handling Station.

1.2 About the documentation

CAUTION

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

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.

1.3 Accessories and additional information

Additional information is available on the Metrohm website (*https://www.metrohm.com*):

- Product family
- Product versions
- Accessories
- Documents about the product

Downloading the accessories list

NOTE

The accessories list is a part of the product documentation. Download the accessories list and store it as a reference.

1. Use the search function to search for the product.
2. Open the desired product version.
3. Download the accessories list.

1.4 Safety instructions

1.4.1 General notes on safety

WARNING

Operate this instrument only according to the information contained in this documentation.

This instrument left the factory in a flawless state in terms of technical safety. To maintain this state and ensure non-hazardous operation of the instrument, the following instructions must be observed carefully.

1.4.2 Electrical safety

The electrical safety when working with the instrument is ensured as part of the international standard IEC 61010.

WARNING

Only personnel qualified by Metrohm are authorized to carry out service work on electronic components.

WARNING

Never open the housing of the instrument. The instrument could be damaged by this. There is also a risk of serious injury if live components are touched.

There are no parts inside the housing which can be serviced or replaced by the user.

Supply voltage

WARNING

An incorrect supply voltage can damage the instrument.

Only operate this instrument with a supply voltage specified for it (see rear panel of the instrument).

Protection against electrostatic charges

WARNING

Electronic components are sensitive to electrostatic charges and can be destroyed by discharges.

Do not fail to pull the power cord out of the power socket before you set up or disconnect electrical plug connections at the rear of the instrument.

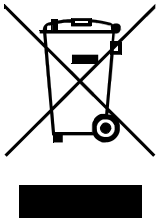
1.4.3 Flammable solvents and chemicals

WARNING

All relevant safety measures are to be observed when working with flammable solvents and chemicals.

- Set up the instrument in a well-ventilated location (e.g. fume cupboard).
- Keep all sources of flame far from the workplace.
- Clean up spilled liquids and solids immediately.
- Follow the safety instructions of the chemical manufacturer.

1.4.4 Recycling and disposal



This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old instrument will help to prevent negative effects on the environment and public health.

More details about the disposal of your old instrument can be obtained from your local authorities, from waste disposal companies or from your local dealer.

2 Overview of the instrument

Liquid Handling Station in the left-handed version, complete with attachment holder for assembly on a sample changer.

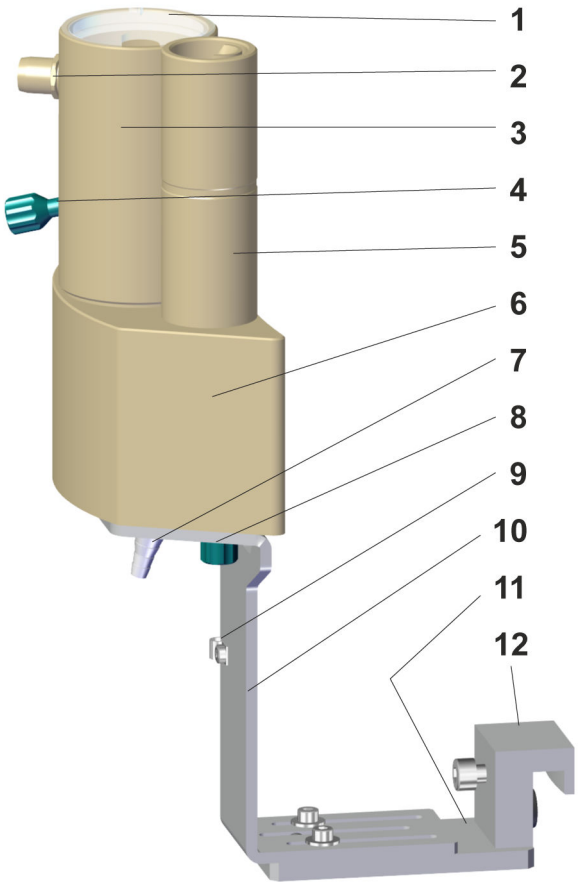


Figure 1 Overview of the instrument Liquid Handling Station (left-handed version)

1	**Cover 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 Liquid Handling Station** 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

3 Installation

The installation of the Liquid Handling Station is accomplished in 3 main steps.

1. Prepare the Liquid Handling Station.
2. Mounting and aligning the Liquid Handling Station on the sample changer.
3. Defining the work positions of the sample needle for the Liquid Handling Station.

3.1 Prepare the Liquid Handling Station

If the Liquid Handling Station is to be used for dilutions, then it must be converted.

The following instruments are required for this purpose:

- Liquid Handling Station
  - Left-handed version, 6.2841.120
    or
  - Right-handed version, 6.2841.130
- Magnetic stirrer, 2.741.0010

CAUTION

Use caution and do not apply excessive force when carrying out the following procedures.

The conversion is carried out through the following steps:

Removing the magnetic stirrer dummy

1 Remove the mixing vessel from the main body by hand.

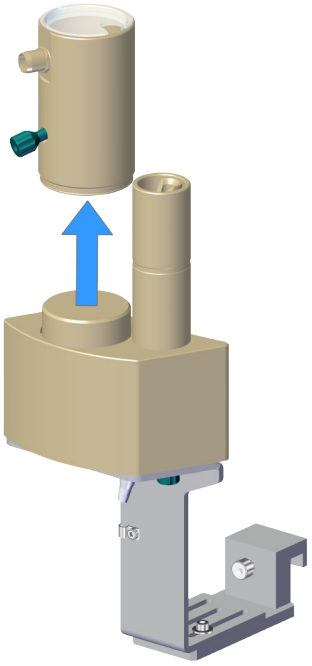


Figure 2 Removing the mixing vessel

2 Unscrew the 3 screws connecting the main body with the holder and remove the entire holder.

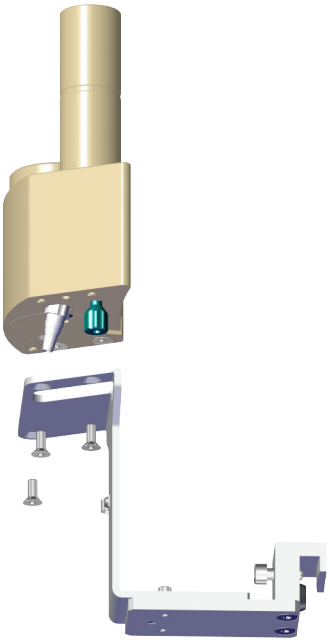


Figure 3 Removing the holder

3 Loosen the 2 screws on the underside of the main body and pull out the magnetic stirrer dummy.

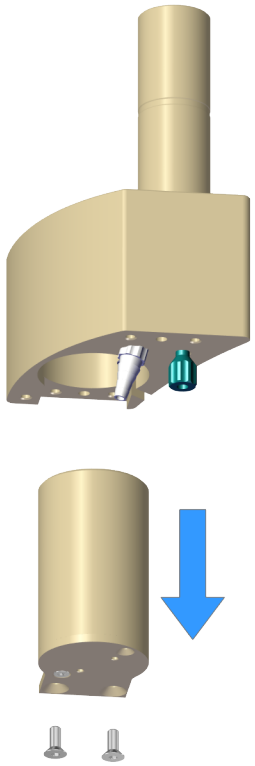


Figure 4 Removing the magnetic stirrer dummy

Preparing the magnetic stirrer

1 Unscrew the 2 screws of the magnetic stirrer (2.741.0010) and remove the clamping fastener. The clamping fastener is no longer used in this application.

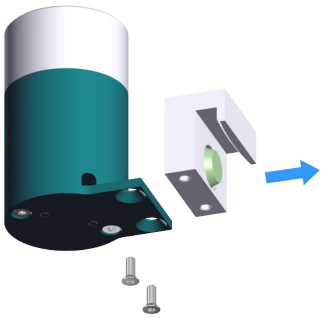


Figure 5 Removing the clamping fastener

Installing the magnetic stirrer

1 Insert the magnetic stirrer from below into the main body and place the connection cable in the corresponding recess.

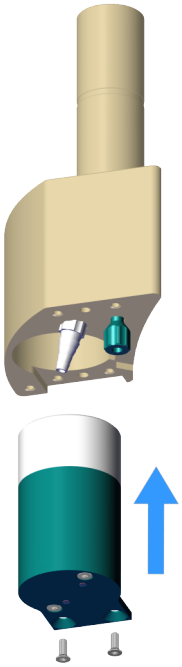


Figure 6 Inserting the magnetic stirrer

2 Insert the 2 screws and tighten them.

Figure 7 Tightening the magnetic stirrer

3 Place the previously removed holder against the main body and connect the two parts with the three screws.

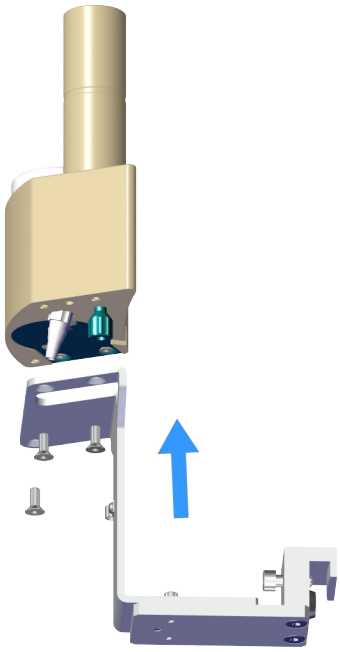


Figure 8 Screwing on the holder

4 Mount the mixing vessel and press it all the way down.

NOTE

Observe the recess on the bottom rim of the mixing vessel for positioning.

It must snap into the main body.

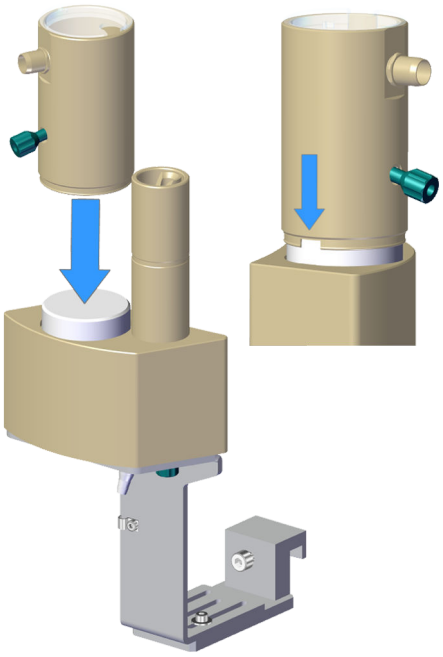


Figure 9 Attaching the mixing vessel

5 Fixing the connection cable in place with the cable clip.

NOTE

Ensure that the connection cable is not pinched and damaged.

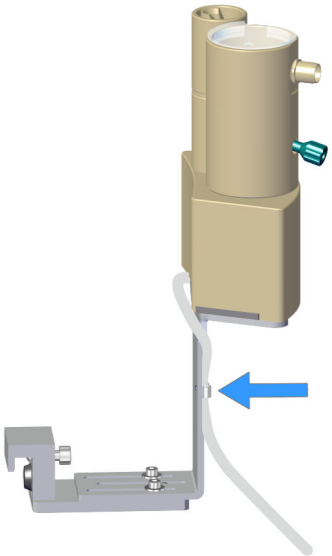


Figure 10 Fastening the connection cable in place

6 Connect the connection cable to the stirrer connector of the sample changer, see *Manual 858 Professional Sample Processor (8.858.8002)*.

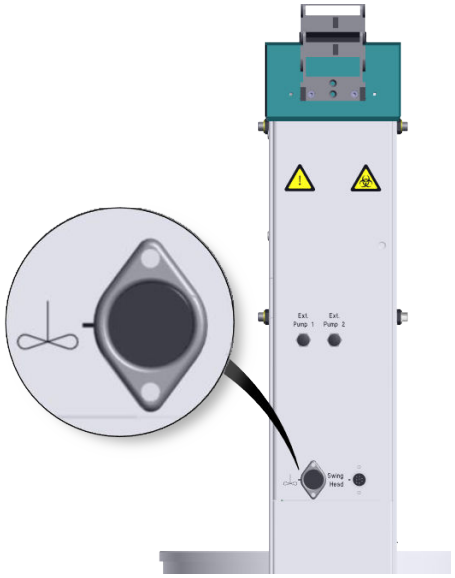


Figure 11 858 Professional Sample Processor – Stirrer connector

Mounting the rinsing station drainage tubing

Required accessories

- PVC tubing / 4 mm / 6 mm / 2 m (6.1801.120)

1 **Mounting the drainage tubing**

- Push one end of the PVC tubing over the waste connector *(1-**7**)* of the rinsing unit.
- Guide the other end of the PVC tubing to the waste container.

Mounting the dilution station drainage tubing

Required accessories

- Silicone tubing 8 mm internal diameter / 1 m (6.1816.070)
- Y tubing connector, PP, 3 x 7-8 mm (6.01808.010)

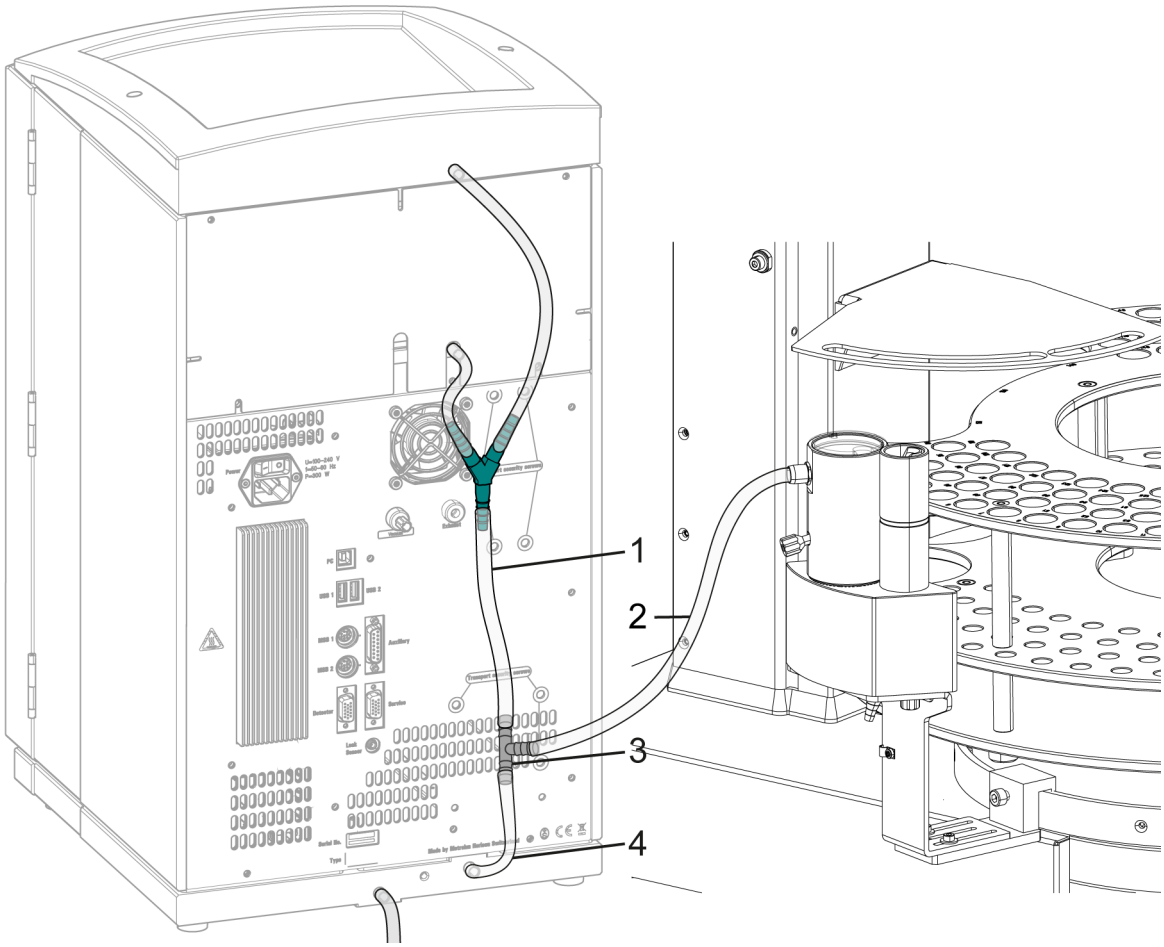


Figure 12 Drainage tubing

1 **Ion chromatograph drainage tubing** Bottle holder connection/detector chamber – Y connector	**2** **Silicone tubing 6.1816.070** long tubing piece Dilution station overflow connection – Y connector
3 **Y tubing connector, PP, 3 x 7-8 mm 6.01808.010**	**4** **Silicone tubing 6.1816.070** short tubing piece Y connector connection – base tray drainage tubing connection

1 Converting the drainage tubing on the ion chromatograph

- Loosen the drainage tubing on the ion chromatograph *(12-**1**)* from the drainage tubing connection on the base tray.
- Attach the drainage tubing to one end of the Y connector *(12-**3**)*.

2 Mounting the silicone tubing 6.1816.070

- Cut off an approx. 10 cm-long piece of the silicone tubing. Connect the Y connector and the drainage connection of the base tray with the short piece of tubing *(12-**4**)*.
- Cut off an approx. 40 to 80 cm-long piece of the silicone tubing. The length of the tubing depends on the placement of the sample changer and the ion chromatograph. Cut the piece of tubing as short as possible.
  Connect the overflow of the dilution station and the Y connector with the long piece of tubing *(12-**2**)*.

NOTE

If necessary, shorten the long piece of tubing until the liquid always flows downwards. A U-shaped bend in the tubing or a horizontal position of the tubing could cause liquid to back up.

3.2 Mounting the Liquid Handling Station

The Liquid Handling Station requires precise mounting and alignment in order to function properly with the entire system.

CAUTION

Faulty, imprecise assembly

The components could become damaged during operation if assembled in a faulty and imprecise manner.

- Observe the assembly sequence.
- Observe instrument movements during setup and stop in a timely fashion if necessary.

The following description refers to the assembly of a left-handed Liquid Handling Station. The right-handed version is assembled in the same way but mirror-reversed.

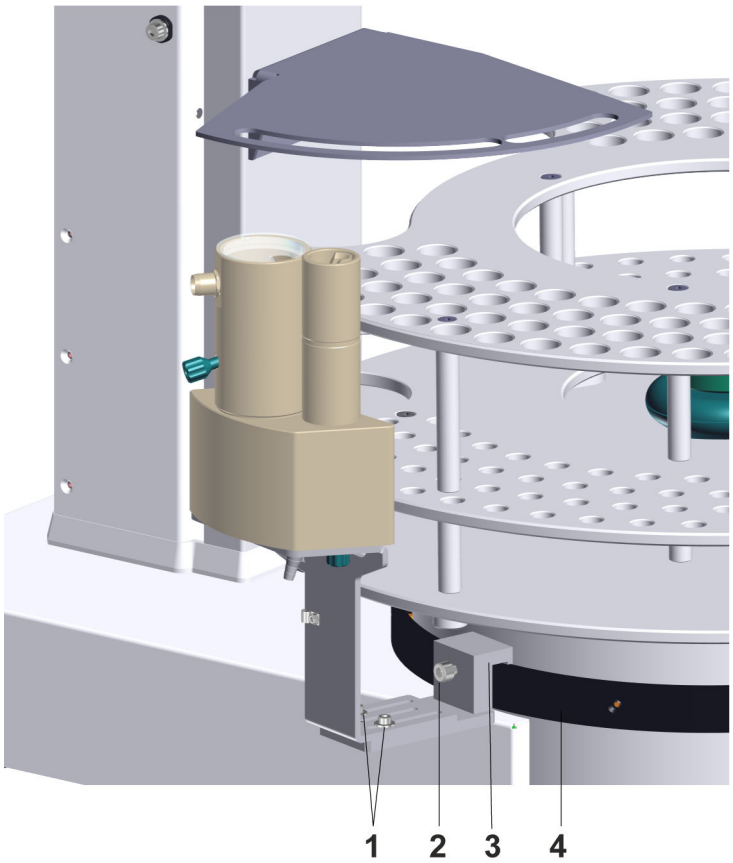


Figure 13 Placing the Liquid Handling Station on the assembly rail

1	**"Base plate" screws**	**2**	**"Clamping fastener" screw**
3	**Clamping fastener**	**4**	**Assembly rail**

Placing the Liquid Handling Station on the guide

1 Attach the Liquid Handling Station to the assembly rail *(13-**4**)* with the clamping fastener *(13-**3**)*.

2 Secure the Liquid Handling Station temporarily in place with the screw *(13-**2**)*.

Aligning the Liquid Handling Station with the rack

1 Loosen the screws *(13-**1**)* of the base plate until you can shift the Liquid Handling Station with the holding bracket.

2 Shift the Liquid Handling Station with the holding bracket until the main body is positioned at an even distance *(see figure 14, page 18)* of 0.5 to 1 mm from the edge of the sample rack.

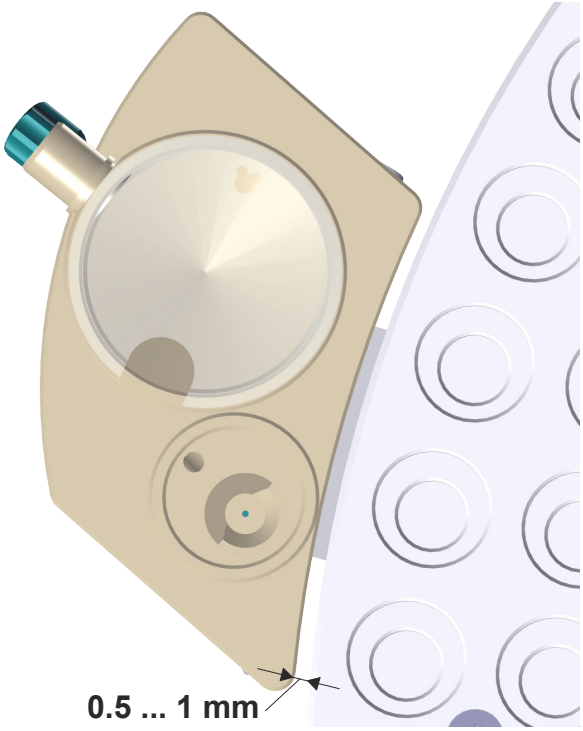


Figure 14 Distance to sample rack

3 Retighten the screws *(13-**1**)* to the base plate.

Aligning the Liquid Handling Station with the retaining plate

1 Loosen the screw *(13-**2**)* on the clamping fastener.

2 Slide the entire Liquid Handling Station that is on the assembly rail under the retaining plate in the direction of the arrow *(see figure 15, page 19) (16-**1**)*.

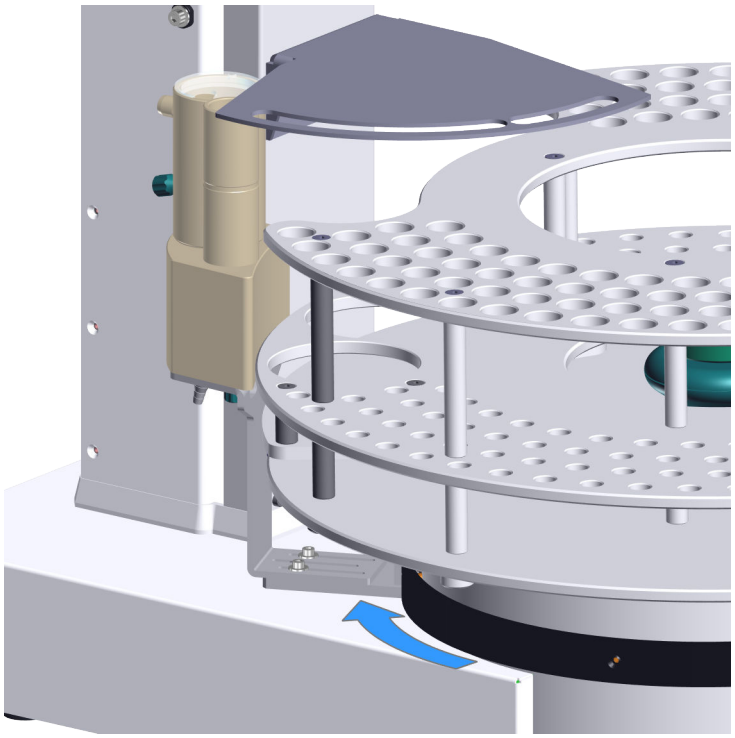


Figure 15 Positioning the Liquid Handling Station

The precise position is shown in the following figure.

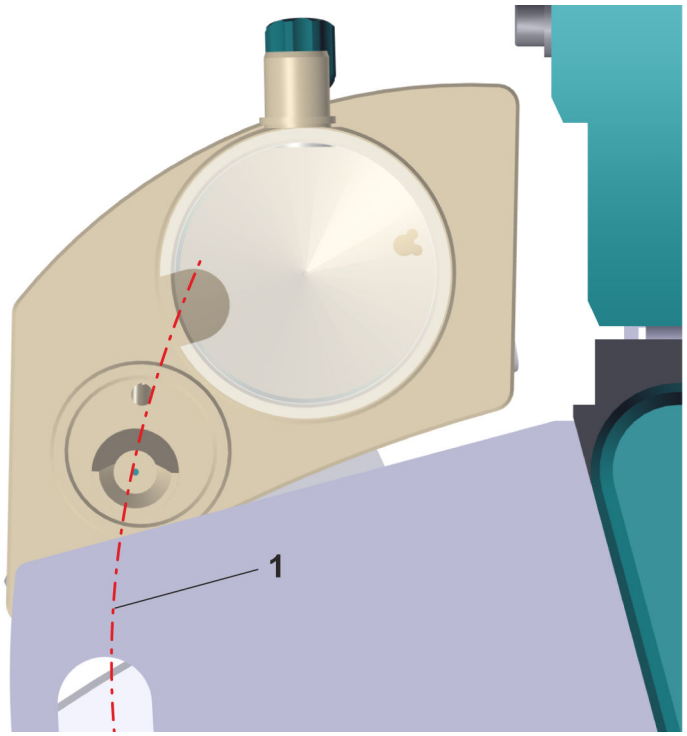


Figure 16 Alignment with the retaining plate

1 Sample needle swing range

3 Retighten the screw *(13-**2**)* on the clamping fastener.

4 Check whether the distance to the sample rack is consistent with *Figure 14* and whether the position in relation to the retaining plate *(see figure 16, page 19)* is suitable.

3.3 Defining work positions

The Liquid Handling Station has 3 positions. These work positions have to be defined in the software (e.g. **MagIC Net™**).

Defining the work positions for the sample needle

The work positions are defined in the software as **external positions**.

You can find the value settings under the following path:

Configuration ► Devices ► Properties ► Tower ► Swing Head ► External position

NOTE

Value settings of the bracket **External position**

These value settings are guidelines that may need to be corrected when the Liquid Handling Station is set up.

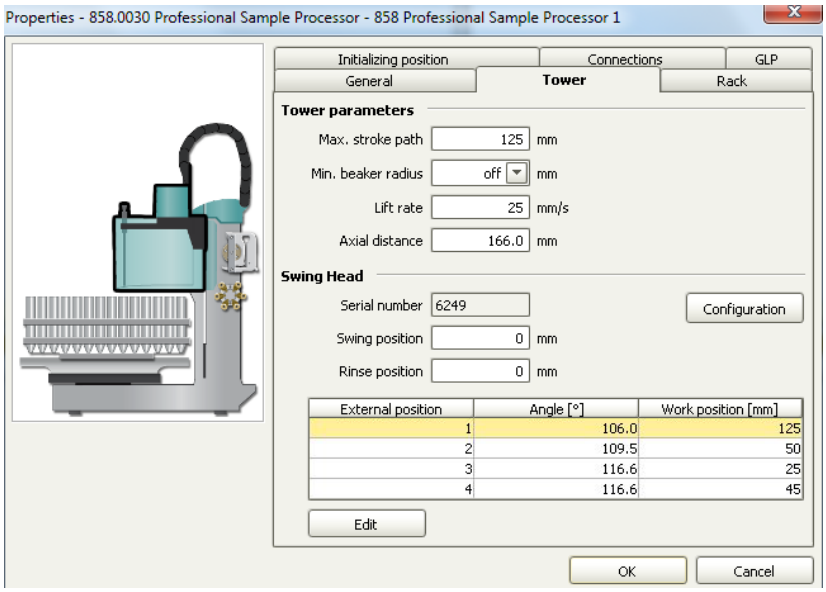


Figure 17 External position – Guide values

1	**External position 1**	**2**	**External position 2**
3	**External position 3**	**4**	**External position 4**

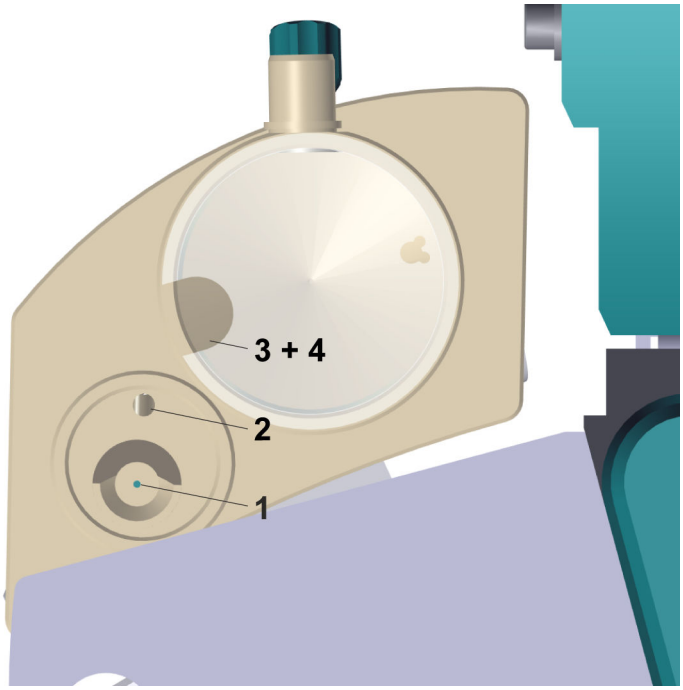


Figure 18 External positions

1	**Rinsing unit - Rinse**	**2**	**Rinsing unit - Disposal**
3	**Dilution unit**	**4**	**Dilution unit**

1 Move to **External position 1** *(18-**1**)*.

2 Check whether the sample needle is centered over the "Rinsing unit - Rinse" position.

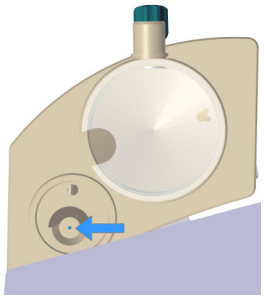


Figure 19 Working range – Rinse

3 If necessary, correct the angle value.

4 Move to **External position 2** *(18-**2**)*.

5 Check whether the sample needle is centered over the "Rinsing unit - Disposal" position.

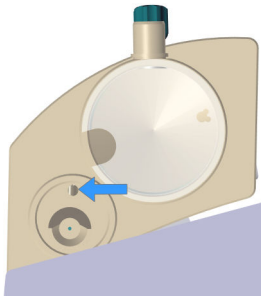


Figure 20 Working range – Disposal

6 If necessary, correct the angle value.

7 Move to **External position 3 + 4** *(18-**3**)*, *(18-**4**)*.

8 Check whether the sample needle is centered precisely over the opening of the dilution unit.

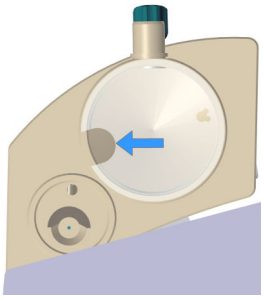


Figure 21 Working range – Dilution unit

9 If necessary, rotate the cover of the mixing vessel until the opening is centered under the sample needle.

10 If necessary, correct the angle value.

4 Operation and maintenance

4.1 General notes

4.1.1 Care

The Liquid Handling Station requires appropriate care. Excess contamination of the instrument may result in functional disruptions and a reduction in the service life of the otherwise sturdy mechanics and electronics.

Spilled chemicals and solvents should be removed immediately. Above all, the plug connections on the rear of the instrument (in particular the connection socket) should be protected against contamination.

CAUTION

Although this is largely prevented by design measures, the connection cable should be unplugged immediately to prevent massive damage to the instrument electronics if aggressive media has found its way into the interior of the instrument. In such cases, inform your regional Metrohm service representative.

4.1.2 Maintenance by Metrohm

Maintenance of the Liquid Handling Station is best carried out as part of annual service, which is performed by specialist personnel from Metrohm. A shorter maintenance interval may be necessary if you frequently work with caustic or corrosive chemicals.

Your regional Metrohm service representative provides technical advice at all times for maintenance and service of all Metrohm instruments.

5 Technical specifications

5.1 Magnetic stirrer

Rotation direction	Counterclockwise
Rotational speed	200 … 1900 rpm

5.2 Energy supply

Energy supply	5–12 V DC
Power consumption	≤ 4.0 W

5.3 Interfaces and connectors

The Liquid Handling Station does not have any control interfaces. It is operated and controlled via the energy supply.

5.4 Ambient temperature

Nominal function range	+5 to +45 °C
Storage and transport	–40 to +70 °C

5.5 Reference conditions

Ambient temperature	+25 °C (±3 °C)
Relative humidity	≤ 60%

5.6 Dimensions/material

Width	131 mm
Height	94 mm
Depth	224 mm
Weight	660 g (without accessories)
Material	
Mixing vessel/ rinsing unit	PP
Holder	Aluminum sheet, stove-enameled

5.7 Volume

Mixing vessel, total	15 mL
Mixing vessel dead volume	5 mL
Rinsing unit - Rinse	3.1 mL
Rinsing unit - Disposal	5.1 mL

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