

810 Sample Processor



Manual

8.810.8001EN / 2020-02-29



Metrohm AG

CH-9100 Herisau

Switzerland

Phone +41 71 353 85 85

Fax +41 71 353 89 01

info@metrohm.com

www.metrohm.com

810 Sample Processor

Manual

Technical Communication
Metrohm AG
CH-9100 Herisau
techcom@metrohm.com

This documentation is protected by copyright. All rights reserved.

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.

Table of contents

1	Introduction	1
1.1	The 810 Sample Processor with operating instruments	1
1.2	Instrument description	2
1.2.1	Instrument components	3
1.2.2	Intended use	3
1.3	About the documentation	3
1.3.1	Symbols and conventions	4
1.4	Safety instructions	5
1.4.1	General notes on safety	5
1.4.2	Electrical safety	5
1.4.3	Tubing and capillary connections	6
1.4.4	Personnel safety	6
1.4.5	Flammable solvents and chemicals	7
1.4.6	Recycling and disposal	7
2	Overview of the instrument	9
2.1	Front and rear	9
2.2	Back panel	11
2.3	Sample racks	11
3	Installation	13
3.1	Setting up the instrument	13
3.1.1	Packaging	13
3.1.2	Checks	13
3.1.3	Location	13
3.2	Connecting the instrument to the power grid	13
3.3	Connecting an operating instrument	14
3.4	Installing the rinsing and aspiration equipment	15
3.5	Placing tubing and cables in the guide chain	16
3.6	Installing the titration head	18
3.7	Connecting an external pump	23
3.8	Connecting MSB devices	24
3.8.1	Connecting a dosing device	25
3.8.2	Connecting a stirrer or titration stand	26
3.8.3	Connecting a Remote Box	27
3.9	Connecting USB devices	28
3.9.1	Connecting a barcode reader	28



3.10	Mounting the drip pan	29
3.11	Attaching a sample rack	30
3.12	Mounting the safety shield	30
4	Maintenance	32
5	Troubleshooting	33
5.1	Sample Processor	33
5.2	Robotic arm	33
5.3	Pump	34
6	Appendix	35
6.1	Beaker sensor	35
6.2	Rinsing nozzles	35
6.3	Remote interface	36
6.3.1	Pin assignment of the remote interfaces	37
7	Technical specifications	39
7.1	Lift and turntable	39
7.2	Membrane pump with valve	39
7.3	Interfaces and connectors	39
7.4	Power connection	40
7.5	Ambient temperature	40
7.6	Reference conditions	40
7.7	Dimensions	40
8	Accessories	41
	Index	42

Table of figures

Figure 1	A complete system consisting of operating instrument with 810 Sample Processor	1
Figure 2	810 Sample Processor Front	9
Figure 3	810 Sample Processor rear	10
Figure 4	Connector strip	11
Figure 5	Sample rack 6.2041.470	11
Figure 6	Mounting the rinsing and aspiration tubings	15
Figure 7	Mounting the titration head	18
Figure 8	Installing accessories for the titration	19
Figure 9	Connecting the tubings	20
Figure 10	Rod stirrer 802 Stirrer	21
Figure 11	Magnetic stirrer 741 Stirrer	21
Figure 12	Connecting a stirrer to the tower	21
Figure 13	Inserting the rod stirrer	22
Figure 14	Connecting a pump	23
Figure 15	MSB connections	24
Figure 16	Connecting a dosing device	26
Figure 17	Connecting an MSB stirrer	26
Figure 18	Connecting the rod stirrer to the titration stand	27
Figure 19	Connecting the Remote Box	27
Figure 20	USB connectors	28
Figure 21	Installing the drip pan	29
Figure 22	Mounting the safety shield	31
Figure 23	Beaker sensor on the tower	35
Figure 24	Spray nozzles - Mode of operation	36
Figure 25	Connectors of the Remote Box	36
Figure 26	Pin assignment of remote socket and remote plug	37

1 Introduction

1.1 The 810 Sample Processor with operating instruments

The 810 Sample Processor is a sample changer for the following operating instruments :

- 915 KF Ti-Touch
- 916 Ti-Touch

Operation is carried out by an operating instrument with a corresponding software.

A complete system consisting of one of the above mentioned operating instruments with the 810 Sample Processor can contain numerous, different kinds of instruments. The following figure provides an overview of the peripheral devices you can connect to the 810 Sample Processor.

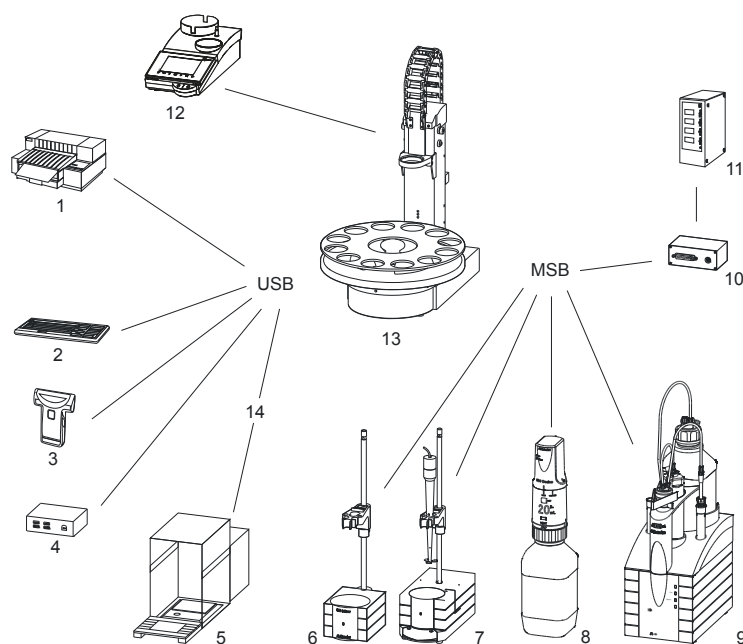


Figure 1 A complete system consisting of operating instrument with 810 Sample Processor

1	Printer	2	PC keyboard
3	Barcode reader	4	USB hub
5	Balance	6	Stirrer
7	Ti Stand	8	Dosino



9 Dosimat	10 Remote Box
11 Relay Box	12 Operating instrument
13 810 Sample Processor	14 USB RS adapter (6.2148.050)



NOTICE

It is possible to connect one 810 Sample Processor per operating instrument.

Updating the device software is described in the manual of the operating instrument.

1.2 Instrument description

The 810 Sample Processor is a versatile instrument. It has been designed exclusively for usage in factories and laboratories and it covers a wide range of applications.

The versatile communication options of the complete system (Remote Box, USB or LAN link etc.) can thus all be used. Thanks to these abilities, the 810 Sample Processor is predetermined for all kinds of automation tasks in a modern laboratory, especially for highly integrated laboratory data systems.

The user interface of the operating instrument guarantees comfortable operation and programming of the 810 Sample Processor. In this way, the comprehensive range of commands and the various configuration possibilities can be used comfortably and efficiently. The integration into the entire system also guarantees a 100% conformity of the complete automation system with the FDA regulations (Food and Drug Administration), especially with the regulation 21 CFR part 11, electronic records and signatures.

There are exchangeable standard sample racks available for many vessel dimensions. Freely selectable special beaker positions can be defined for e.g. rinsing or conditioning beakers on every rack.

Customer-specific special racks for individual requirements can be fabricated upon request.

1.2.1 Instrument components

The 810 Sample Processor has the following components:

- **Turntable**
For sample racks with a diameter of up to 42 cm.
- **One tower with lift**
With titration head holder.
- **One membrane pump on the tower and an external pump connector**
- **One stirrer connector on the tower**
For connecting a rod stirrer (802 Stirrer) or a magnetic stirrer (741 Stirrer).
- **Controller connector**
For connecting the operating instrument.
- **Two USB connectors**
For connecting a printer, barcode reader, keyboard, USB flash drive etc.
- **Three MSB connectors (Metrohm Serial Bus)**
For connecting dosing devices (Dosimat with exchange unit or Dosino with dosing unit), stirrers or Remote Boxes.

1.2.2 Intended use

The 810 Sample Processor is designed for usage as a sample changer in analytical laboratories. It is **not** suitable for usage in biochemical, biological or medical environments in its basic equipment version.

This instrument is suitable for processing chemicals and flammable samples. Therefore, the use of the 810 Sample Processor requires the user to have basic knowledge and experience in handling toxic and caustic substances. Knowledge regarding the application of fire prevention measures prescribed for laboratories is also mandatory.

1.3 About the documentation









CAUTION

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



1.3.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

<i>(5-12)</i>	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 Carry out these steps in the sequence shown.
Method	Dialog text, parameter in the software
File ▶ New	Menu or menu item
[Next]	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.
	CAUTION This symbol draws attention to possible damage to instruments or instrument parts.
	NOTE This symbol highlights additional information and tips.

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 Tubing and capillary connections



CAUTION

Leaks in tubing and capillary connections are a safety risk. Tighten all connections well by hand. Avoid applying excessive force to tubing connections. Damaged tubing ends lead to leakage. Appropriate tools can be used to loosen connections.

Check the connections regularly for leakage. If the instrument is used mainly in unattended operation, then weekly inspections are mandatory.

1.4.4 Personnel safety



WARNING

Wear protective goggles and working clothes suitable for laboratory work while operating the 810 Sample Processor. It is also advisable to wear gloves when caustic liquids are used or in situations where glass vessels could break.



WARNING

Always install the safety shield supplied with the equipment before using the instrument for the first time. Pre-installed safety shields are not allowed to be removed.

The 810 Sample Processor may not be operated without a safety shield!

**WARNING**

Personnel are not permitted to reach into the working area of the instrument while operations are running!

A **considerable risk of injury** exists for the user.

**WARNING**

In the event of a possible blockage of a drive, the power plug must be pulled out of the socket immediately. Do not attempt to free jammed sample vessels or other parts while the device is switched on. Blockages can only be cleared when the instrument is in a voltage-free status; this action generally involves a **considerable risk of injury**.

**WARNING**

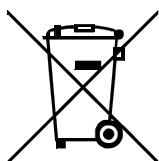
The 810 Sample Processor is **not** suitable for utilization in biochemical, biological or medical environments in its basic equipment version.

Appropriate protective measures must be implemented in the event that potentially infectious samples or reagents are being processed.

1.4.5 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.
- Keep all sources of flame far from the workplace.
- Clean up spilled liquids and solids immediately.
- Follow the safety instructions of the chemical manufacturer.

1.4.6 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

2.1 Front and rear

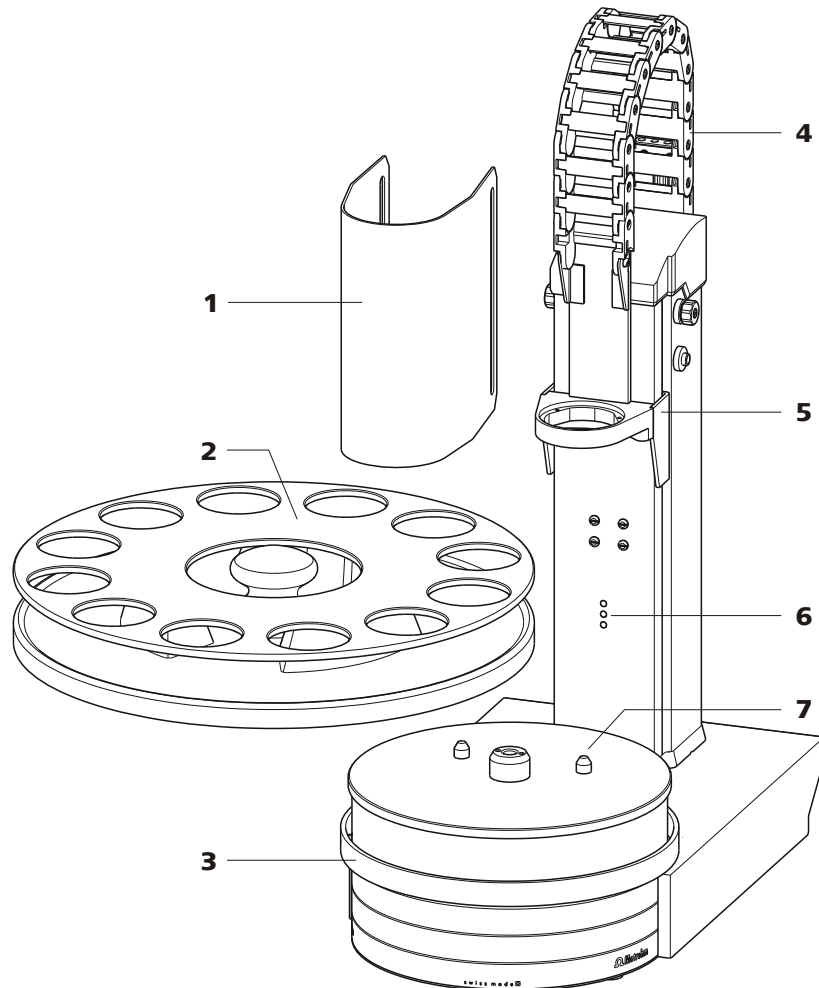


Figure 2 810 Sample Processor Front

1 Safety shield (6.2751.080)
Other models, *see chap. Accessories.*

3 Assembly rail
For magnetic stirrer (741 Stirrer).

5 Lift
With titration head holder.

7 Turntable
With guide bolts.

2 Sample rack (6.2041.310)
Other models, *see chap. Accessories.*

4 Guide chain
For cables and tubing.

6 Beaker sensor

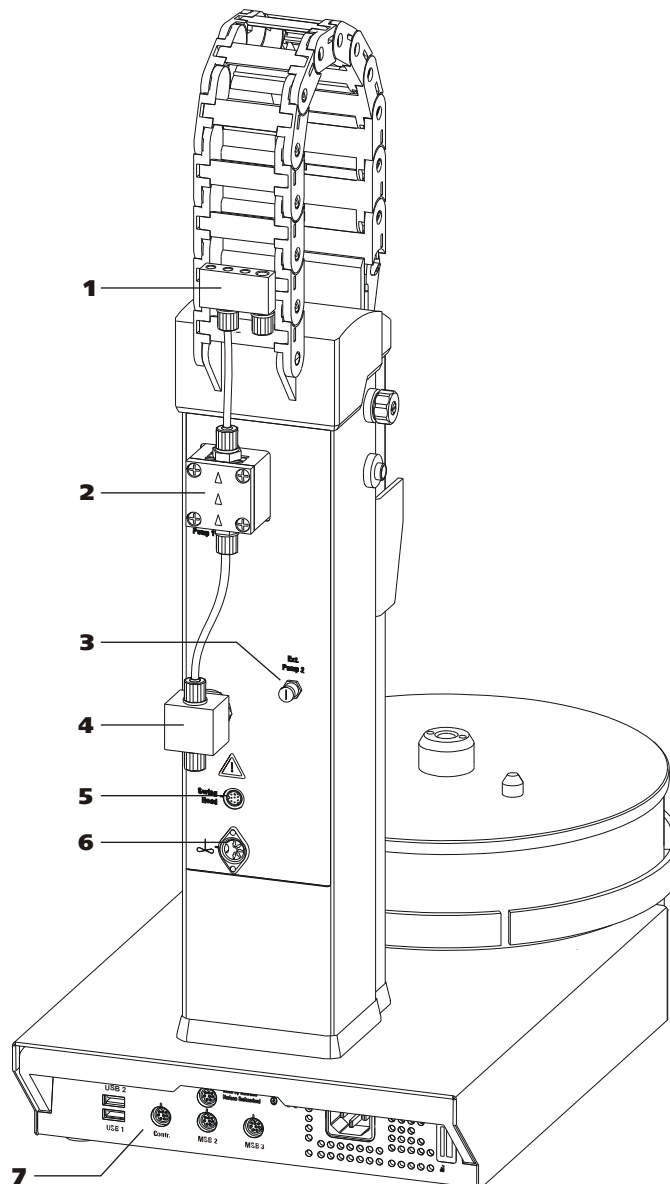


Figure 3 810 Sample Processor rear

<p>1 Distributor For rinsing equipment.</p>	<p>2 Membrane pump Pump 1.</p>
<p>3 Pump connector Pump 2. For the external pump.</p>	<p>4 Pump valve</p>
<p>5 Swing Head connector (optional) Mini DIN socket (9-pin).</p>	<p>6 Stirrer connector DIN socket. For rod stirrer (802 Stirrer) or magnetic stirrer (741 Stirrer).</p>
<p>7 Back panel with connectors</p>	

2.2 Back panel

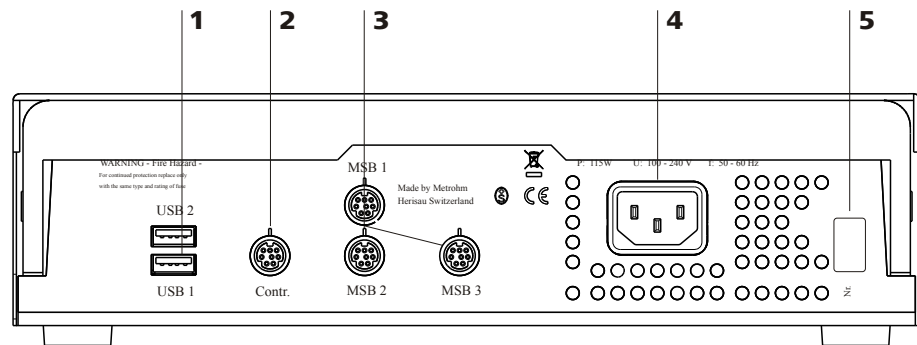


Figure 4 Connector strip

<p>1 USB connector (USB 1 and USB 2)</p>	<p>2 Connector (Controller) For the connection to the operating instrument.</p>
<p>3 MSB connector (MSB 1 to MSB 3) For stirrers, dosing devices, Remote Box.</p>	<p>4 Power socket</p>
<p>5 Type plate Contains specifications concerning supply voltage and serial number.</p>	

2.3 Sample racks

A sample rack is a turntable that acts as a receptacle for sample vessels. Various types of sample racks are available for different numbers and types of sample vessels.

The 810 Sample Processor requires sample racks with up to a maximum of **42 cm diameter**.

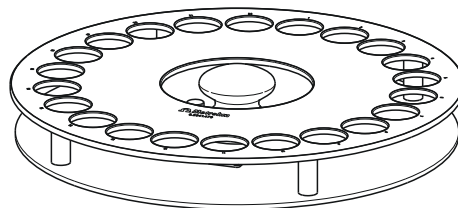


Figure 5 Sample rack 6.2041.470

Other user-defined sample racks can be supplied upon request and the required rack data can be loaded and configured in the operating instrument. Any arrangement of rack positions is possible.



Magnet codes

Every single sample rack can be unambiguously identified by means of a magnet code. The Sample Processor can thus recognize automatically which rack is attached.

When replacing a sample rack, this should first be returned to starting position using the **[Reset rack]** function (see "Manual Operation" in the operating instrument).

This will enable an unambiguous recognition of the rack and thus the correct positioning of the beaker. A positioning table is assigned to each rack type in which each rack position is defined.

3 Installation

3.1 Setting up the instrument

3.1.1 Packaging

The instrument is supplied in protective packaging together with the separately packed accessories. Keep this packaging, as only this ensures safe transportation of the instrument.

3.1.2 Checks

Immediately after receipt, check whether the shipment has arrived complete and without damage by comparing it with the delivery note.

3.1.3 Location

The instrument has been developed for operation indoors and may not be used in explosive environments.

Place the instrument in a location of the laboratory which is suitable for operation and free of vibrations and which provides protection against corrosive atmosphere and contamination by chemicals.

The instrument should be protected against excessive temperature fluctuations and direct sunlight.

3.2 Connecting the instrument to the power grid



WARNING

Electric shock from electrical potential

Risk of injury by touching live components or through moisture on live parts.

- Never open the housing of the instrument while the power cord is still connected.
- Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
- Unplug the power plug immediately if you suspect that moisture has gotten inside the instrument.
- Only personnel who have been issued Metrohm qualifications may perform service and repair work on electrical and electronic parts.



Connecting the power cord

Accessories

Power cord with the following specifications:

- Length: max. 2 m
- Number of cores: 3, with protective conductor
- Instrument plug: IEC 60320 type C13
- Conductor cross-section 3x min. 0.75 mm² / 18 AWG
- Power plug:
 - according to customer requirement (6.2122.XX0)
 - min. 10 A



NOTICE

Do not use a not permitted power cord!

1 Plugging in the power cord

- Plug the power cord into the instrument's power socket.
- Connect the power cord to the power grid.

3.3 Connecting an operating instrument

The 810 Sample Processor requires a USB connection to the operating instrument in order for it to be controlled. Using a 6.2151.000 controller cable, the instrument can be connected directly, either to a USB socket on the operating instrument or to a connected USB hub.

The 810 Sample Processor is automatically recognized by the operating instrument and it is displayed in the device manager dialog of the operating instrument.

3.4 Installing the rinsing and aspiration equipment

Various tubings are necessary for rinsing the electrode and the dosing tips as well as for aspirating the sample solution after the titration. First, mount the tubings on the distributor.

Mounting the rinsing and aspiration tubings

Install the tubings as follows:

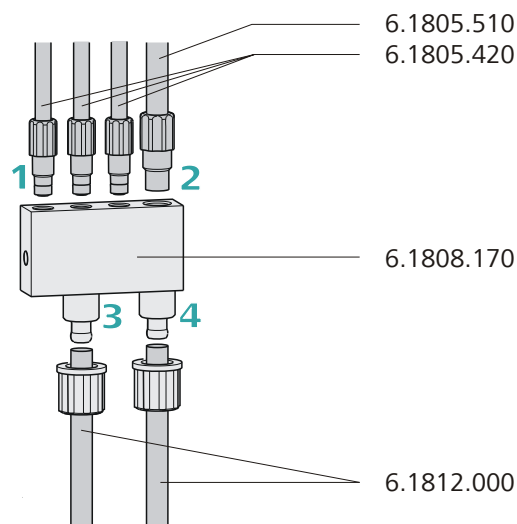


Figure 6 Mounting the rinsing and aspiration tubings

1 Mounting the rinsing tubing

- Manually tighten the three **6.1805.420 FEP tubings** (48 cm) in the M6 bore holes of the distributor. Place the tubings into the guide chain (see chapter 3.5, page 16). These are the feed lines for the spray nozzles.

2 Mounting the aspiration tubing

- Manually tighten the **6.1805.510 FEP aspiration tubing** (60 cm) in the M8 bore hole of the distributor.



3 Mounting the feed line for the rinsing liquid

- Remove the lower union nut of the pump valve and guide it over the end of a **6.1812.000 PTFE tubing**. You may have to widen the tubing end in order to be able to better mount the tubing, see note below. Pull the end of the tubing over the connection nipple of the pump valve and fasten in place with the union nut. The tubing leads to the canister of the rinsing solution and can be cut to the correct length.



NOTICE

The opening of the tubing may need to be widened with a pointed object (e.g. with a Phillips screwdriver).

A piece of sandpaper may be used to get a better grip on the tubing.

Do not widen the tubing end before having slid the union nut onto the tubing.

4 Mounting the outlet tubing

- Remove the union nut of the right-hand connector of the distributor and guide it over the end of the **6.1812.000 PTFE tubing**. Pull the end of the tubing over the connection nipple of the distributor and fasten in place with the union nut. The tubing leads to the aspiration pump (**Pump 2**) and can be cut to the correct length.

3.5 Placing tubing and cables in the guide chain

Tubing and cables can be placed in the guide chain.

The guide chain contains a firmly installed clip on each chain link.



CAUTION

When mounting tubing and cables, make sure that there is no traction on the drives while moving the lift or swinging the robotic arm. Traction on the drive can overload and damage the drive.

If a robotic arm is used, we recommend placing the tubing and cables only above the third chain link in the guide chain to prevent traction on the drives.

Do **not** or only partially place rigid tubings, as for example aspiration tubings made of PTFE, into the guide chain.



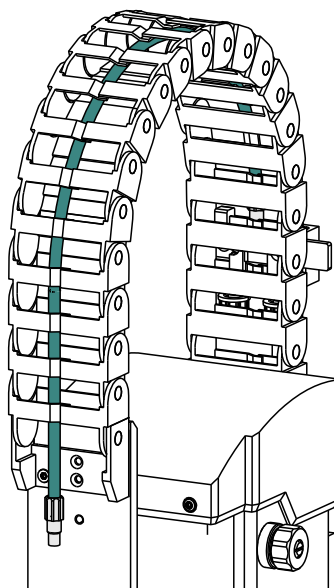
NOTICE

Make sure that tubing and cables do not kink.

Inserting and removing the tubing and cables requires no tools.

1 Placing tubing and cables

- Press one side of the clip downwards and place tubing or cables in the guide chain.



2 Removing tubing and cables

- Press one side of the clip downwards and remove tubing or cables from the guide chain.



3.6 Installing the titration head

Mounting the titration head

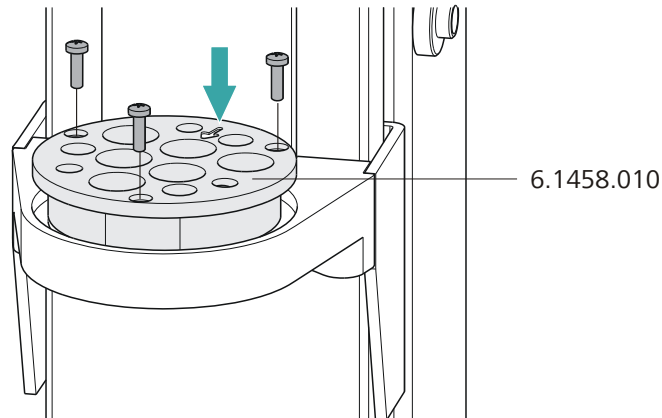


Figure 7 Mounting the titration head

- 1 Place the **titration head** (e.g. 6.1458.010) into the opening of the titration head holder and screw tight with the enclosed screws.

Note the orientation of the titration head. The arrow on the titration head marks the opening for the rod stirrer and has to point to the front, see figure.

Installing accessories for the titration

The following figure shows the installation of the accessories in case rinsing and aspirating of sample beakers with the aid of integrated and external pumps is used. Proceed as follows:

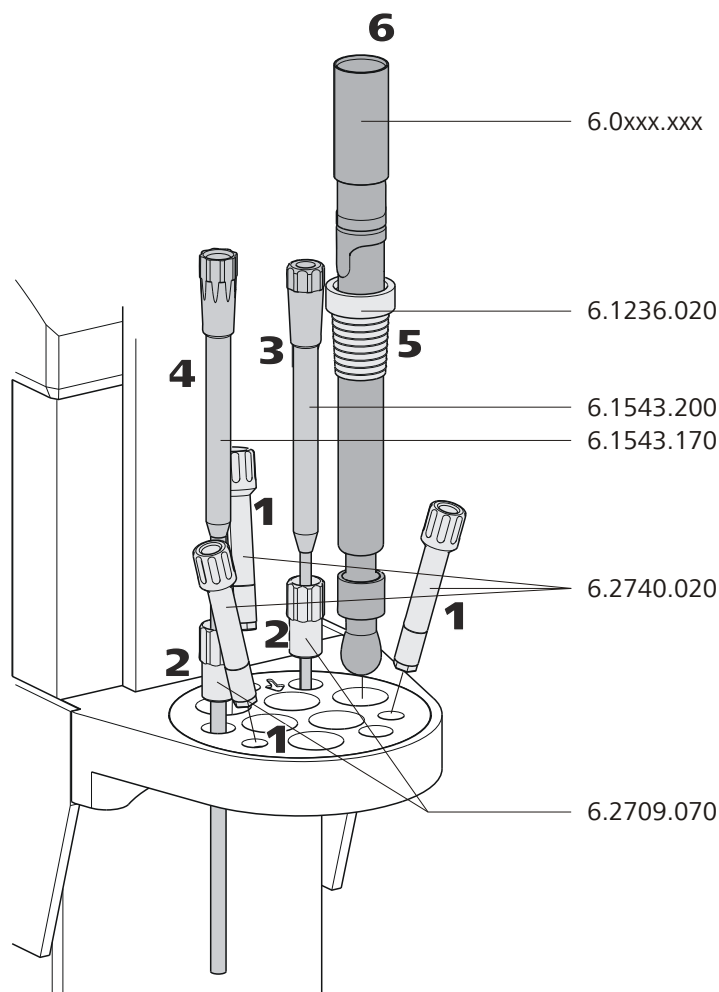


Figure 8 Installing accessories for the titration

- 1** Insert three **spray nozzles** (6.2740.020) or **rinsing nozzles** (6.2740.030) into the oblique bore holes of the titration head, see figure.
- 2** Insert two **6.2709.070 guide sleeves** into the titration head, see figure.
- 3** Insert a **6.1543.200 titration tip** (with antidiffusion valve) into a guide sleeve.
- 4** Insert a **6.1543.170 aspiration tip** into a guide sleeve.
- 5** Slide a **6.1236.020 SGJ sleeve** with standard ground-joint onto the electrode to be used. Insert the electrode into the titration head, see figure.



- 6** Connect an **electrode cable** to the electrode.

Connecting the tubings

In the following, the fastening of the necessary tubings is described in case rinsing and aspirating of sample beakers with the aid of an integrated and an external pump is used. Proceed as follows:

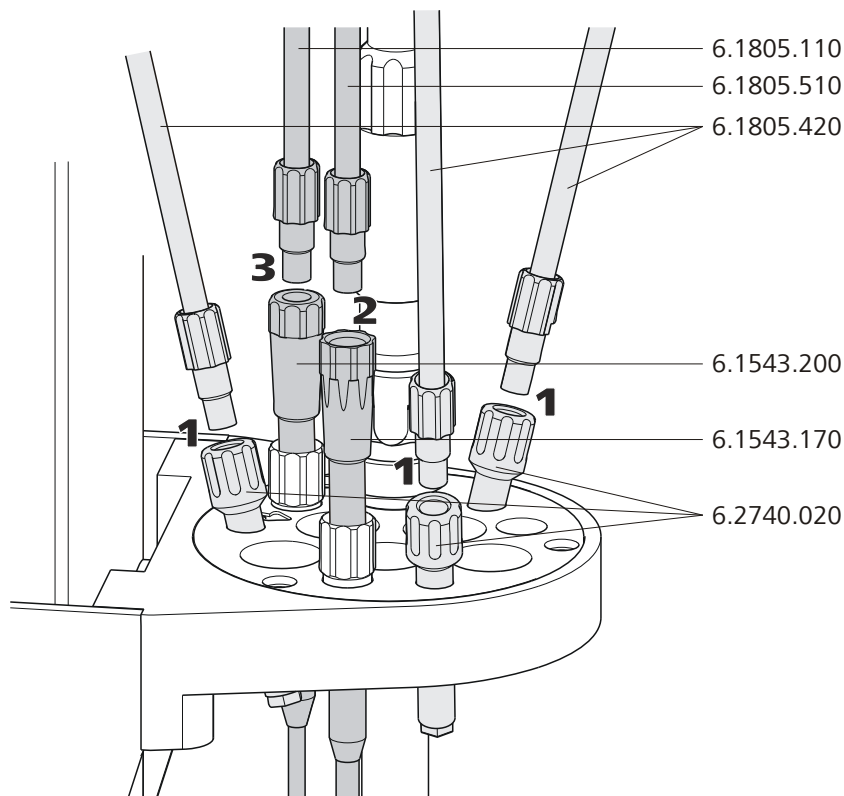


Figure 9 Connecting the tubings

- 1** Tighten the **6.1805.420 rinsing tubings** which have been fastened to the distributor on the rear of the tower to the **spray or rinsing nozzles** (6.2740.020 or 6.2740.030).
- 2** Tighten the **6.1805.510 aspiration tubing** (with M8 screw nipple) which has been fastened to the distributor on the rear of the tower to the **6.1543.170 aspiration tip**.
- 3** Tighten a **6.1805.120 FEP tubing** to the **6.1543.200 titration tip**. Connect the other end of the tubing to the exchange or dosing unit of the operating instrument.

Connecting a stirrer to a tower

A DIN socket for connecting a rod stirrer (**802 Stirrer**) or a magnetic stirrer (**741 Stirrer**) is located on the rear of the tower.

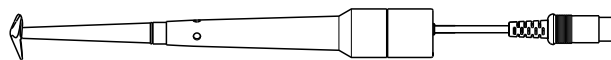


Figure 10 Rod stirrer 802 Stirrer

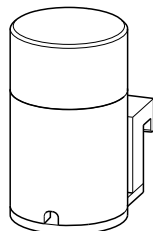


Figure 11 Magnetic stirrer 741 Stirrer

Take care to observe correct orientation of the contact pins when plugging in the stirrer connection cable. The rib on the outside of the plug must match the reference mark (on the left) on the socket.

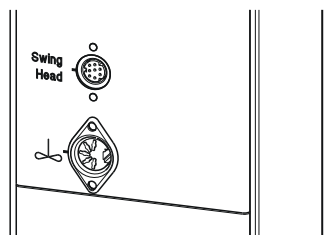


Figure 12 Connecting a stirrer to the tower



NOTICE

If an MSB stirrer is connected to the **MSB1** socket, then the stirrer connector on tower 1 cannot be used, because both sockets are controlled internally via MSB1.



Inserting the rod stirrer

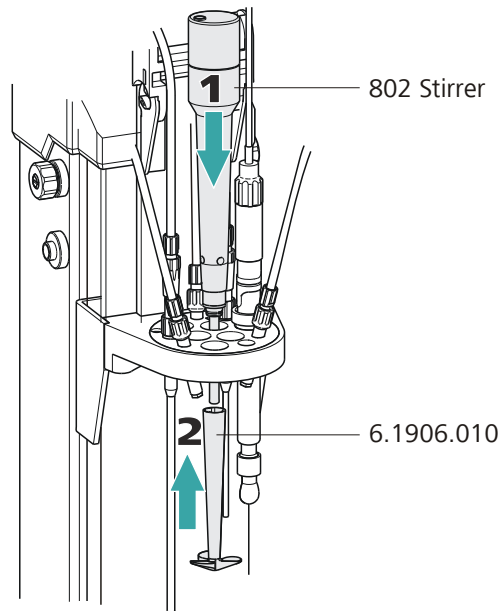
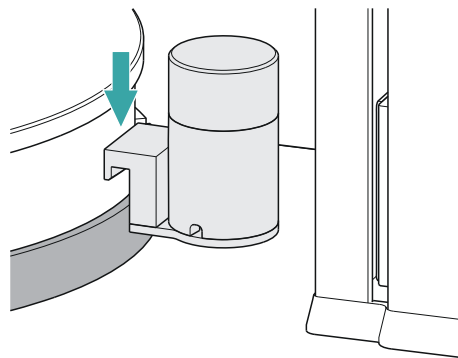


Figure 13 Inserting the rod stirrer

- 1 Insert a **802 Stirrer** rod stirrer from above into the opening marked with an arrow.
- 2 Place a **stirring propeller (e.g. 6.1906.010)** from below over the drive shaft of the rod stirrer and press firmly.

Installing the 741 Stirrer

A magnetic stirrer (**741 Stirrer**) can be used as an alternative to a rod stirrer.



- 1 Hang the magnetic stirrer to the assembly rail between the tower and the turntable.

The magnetic stirrer can be moved sideways as needed.

3.7 Connecting an external pump

The **772 Pump Unit** (peristaltic pump) and the **823 Membrane Pump Unit** (membrane pump) have a firmly mounted connection cable with a plug.

Connecting a pump

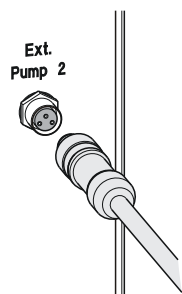
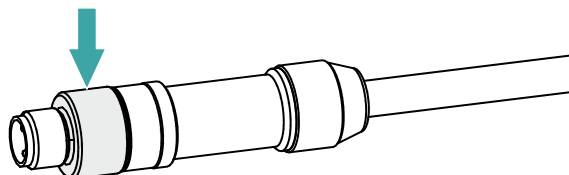


Figure 14 Connecting a pump

Connect the external pump as follows:

- 1 ■ Plug the threaded plug of the connection cable into the connection socket **Ext. Pump 2** on the rear of the tower. Pay attention to the orientation of the three contact pins.
- Tighten the knurled screw at the front end of the plug by hand in clockwise direction.



This secures the plug.



CAUTION

Switch off the operating instrument before you plug in MSB devices. When it is switched on, the operating instrument automatically recognizes which device is connected to which MSB connector. The operating instrument enters the connected MSB devices into the device manager.

MSB connections can be extended with the 6.2151.010 cable. The maximum connection length permitted is 15 m.

3.8.1 Connecting a dosing device

Three dosing devices can be connected to the instrument.

The types of dosing devices that are supported are:

- 800 Dosino
- 805 Dosimat



WARNING

If a Dosino is connected to the 810 Sample Processor, then the connection cable must be equipped with a T.2400.102 ferrite core. The ferrite core diminishes any interference voltages and thus ensures compliance with the strict EMC standards in accordance with the applicable technical standards, see EU declaration of conformity of the instrument.

Proceed as follows:

1 Mounting the ferrite core

- Fasten a T.2400.102 ferrite core to the Dosino connection cable close to the plug.

2 Connecting a dosing device

- Switch off the operating instrument.
- Connect the connection cable of the dosing device to one of the sockets marked with **MSB** on the rear of the control device.
- Switch on the operating instrument.

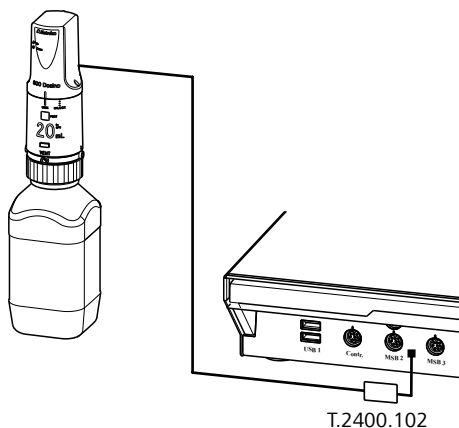


Figure 16 Connecting a dosing device

3.8.2 Connecting a stirrer or titration stand

You can use the following instruments:

These devices have a built-in magnetic stirrer (stirring "from below"):

- 801 Stirrer
- 803 Ti Stand

This device has no built-in magnetic stirrer (stirring "from above"):

- 804 Ti Stand with rod stirrer 802 Stirrer

Connect a stirrer or a titration stand as follows:

1 Connecting the stirrer or titration stand

- Switch off the operating instrument.
- Connect the connection cable of the magnetic stirrer or of the titration stand to one of the sockets marked with **MSB** on the rear of the control instrument.
- 804 Ti Stand only: Connect the rod stirrer to the stirrer connector (socket with stirrer symbol) of the titration stand.
- Switch on the operating instrument.

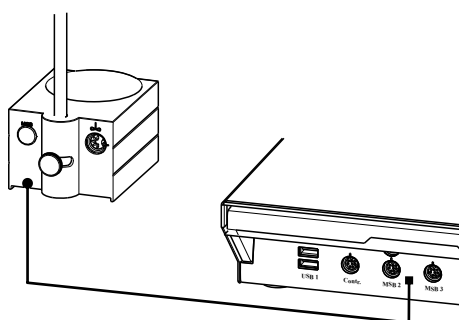


Figure 17 Connecting an MSB stirrer

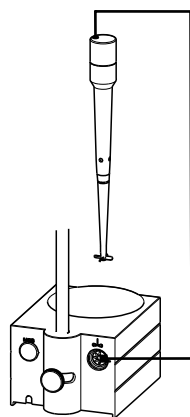


Figure 18 Connecting the rod stirrer to the titration stand

3.8.3 Connecting a Remote Box

Instruments that are controlled via remote lines and/or that send control signals via remote lines can be connected via the 6.2148.010 Remote Box. In addition to Metrohm, other instrument manufacturers also use similar connectors that make it possible to connect different instruments together. These interfaces are also frequently given the designations "TTL Logic", "I/O Control" or "Relay Control" and they generally have a signal level of 5 volts.

Control signals are understood to be electrical line statuses or electrical pulses (> 200 ms) which display the operating status of an instrument or which trigger or report an event. Sequences on a variety of instruments can thus be coordinated in a single complex automation system. However, no exchange of data is possible.

Proceed as follows:

1 Connecting the Remote Box

- Switch off the operating instrument.
- Connect the Remote Box connection cable to one of the sockets marked with **MSB** on the rear of the control instrument.
- Switch off the operating instrument.

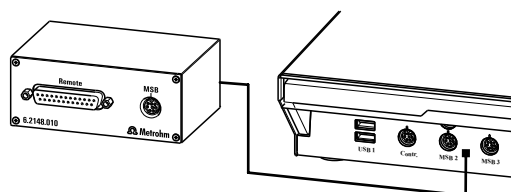


Figure 19 Connecting the Remote Box

You can connect the following instruments to the remote connector, among others:

- 849 Level Control (fill level monitoring in a canister)



- 731 Relay Box (switch box for 230/110 volt alternating current sockets and low-voltage direct current outlets)
- 843 Pump Station (for complex sample preparations or for rinsing external titration vessels)

The Remote Box also has an MSB socket at which a further MSB device, e.g. a dosing device or a stirrer, can be connected.

You will find precise information concerning the pin assignment of the interface on the Remote Box in the *appendix*.

3.9 Connecting USB devices

Two USB connectors (type A sockets) are available for connecting instruments with an USB interface. The 810 Sample Processor then functions as USB hub (distributor). If you wish to connect more than two USB devices, you can also use an additional, commercially available USB hub.

3.9.1 Connecting a barcode reader

A barcode reader is used as an aid for text and numerical input. You can connect a barcode reader with USB interface.

Connect the barcode reader as follows:

1 Connecting the cables

- Insert the USB plug (type A) of the barcode reader into one of the USB sockets on the rear of the instrument.

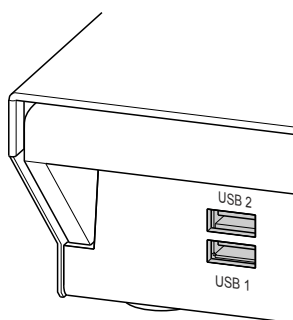


Figure 20 USB connectors

2 Configuring the barcode reader in the operating instrument

- Configure the barcode reader in the device manager of the operating instrument as described in the manual of the connected operating instrument.

Setting the barcode reader

The barcode reader requires certain basic settings. You can find instructions on how to program the barcode reader in the manual for the barcode reader. Set the barcode reader into program mode and configure the following settings:

- 1 ■ Specify the keyboard layout for the desired country (USA, Germany, France, Spain, German-speaking Switzerland). This setting must match the setting in the operating instrument.
 - Make sure that the Ctrl characters (ASCII 00 to 31) can be sent.
 - Set the "Preamble" (introduction) or "Prefix Code" for the ASCII character 02 (STX or Ctrl B) to be sent as the first character.
 - Set the "Postamble", "Record Suffix" or "Postfix Code" for the ASCII character 04 (EOT or Ctrl D) to be sent as the last character.
 - Close programming mode.

3.10 Mounting the drip pan

Serious damage to the instrument or a danger to the user can occur if chemicals or liquid samples are spilled.

The use of a suitable **drip pan** (6.2711.060) is recommended in order to avoid such incidents.

Mounting the drip pan

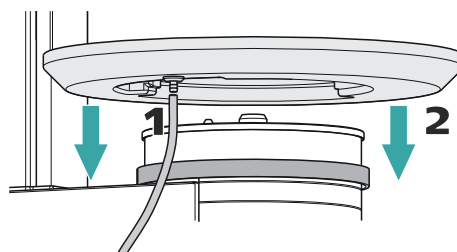


Figure 21 Installing the drip pan

Install the drip pan as follows:

- 1 Fasten the enclosed tubing to the drainage nipple on the drip pan and then guide the free end of the tubing into a waste container.
- 2 Place the drip pan on the assembly rail of the turntable as shown in the figure.



3.11 Attaching a sample rack

Put the rack into place as follows:

- 1 Carefully center the rack on the turntable. The guide bolts on the turntable must engage with the openings in the bottom of the rack.



NOTICE

Hold the rack in such a way that the printed Metrohm logo is legible horizontally.

- 2 Carry out the **[Rack reset]** or **[Initialize rack]** function in the manual control of the control software.

The rack is moved into starting position. The magnet code of the rack is read out by the instrument during this process. The white arrow in Figure indicates the position of the magnet holder. The six-digit magnet code is used to identify the rack type. The sample positions and any special positions on the rack are defined along with the rack type.

3.12 Mounting the safety shield



WARNING

It is imperative that the safety shield be installed before the first time the 810 Sample Processor is used. The device may not be operated without a safety shield.

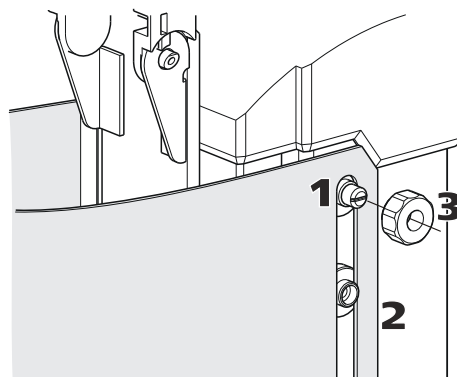


Figure 22 Mounting the safety shield

Proceed as follows.

- 1 Loosen the knurled screws on both sides of the tower.
- 2 Move the **safety shield** into position, starting from the top. Observe the corresponding illustration at the top.
- 3 Fix the safety shield in place with the knurled screws.



NOTICE

You can adjust the vertical position of the safety shield at any time by loosening the screws.

The optimum vertical position meets the following criteria:

- The rack can rotate freely.
- Nobody can access the working area of the lift while the instrument is in operation.

5 Troubleshooting

5.1 Sample Processor

Problem	Cause	Remedy
The instrument is not recognized.	<i>Sample Processor – No USB connection.</i>	<ol style="list-style-type: none"> 1. Correctly plug in the USB connecting cable on both ends. 2. Switch the operating instrument off and back on again.
	<i>Sample Processor – Power supply of the instrument is missing.</i>	<ol style="list-style-type: none"> 1. Plug in the power cord on the instrument. 2. Switch the operating instrument off and back on again.

5.2 Robotic arm

Problem	Cause	Remedy
The robotic arm moves all the way outward and buzzes.	<i>Sample Processor – The Swing Head is not correctly configured.</i>	Enter the correct value for the swing offset on the operating instrument under "System / Device manager / Sample Processor / Swing Head / Robotic arm".
	<i>Sample Processor – Robotic arm is mounted incorrectly.</i>	Disconnect the power plug and dismount the robotic arm. Check the configuration of the robotic arm and mount it correctly if necessary (left-swinging ↔ right-swinging).
The Swing Head either misses the rack positions totally or is inaccurate	<i>Sample Processor – The Swing Head is not correctly configured.</i>	Enter the correct value for the swing radius , swing offset etc. on the operating instrument under "System / Device manager / Sample Processor / Swing Head / Robotic arm".
	<i>Sample Processor – The axial distance is not correctly configured.</i>	Enter the correct value for the axial distance on the operating instrument under "System / Device manager / Sample Processor / Swing Head / Robotic arm".
	<i>Sample Processor – The wrong rack table is being used.</i>	Initialize the rack using the function [Reset rack] in the "Manual control".



Problem	Cause	Remedy
	<i>Swing Head – The Swing Head drive is defective.</i>	Contact Metrohm Service.

5.3 Pump

Problem	Cause	Remedy
The pump is leaking.	<i>Sample Processor – A tubing connection is leaking.</i>	Check the tubing connections especially between the distributor and the pump and seal tightly.
	<i>Canister – There is too much pressure on the pump valve.</i>	<ul style="list-style-type: none"> ▪ Make sure that the canisters are not placed on a higher level than the pump. ▪ Check the fill level of the canisters. ▪ Make sure that the canisters are not completely sealed (overpressure).

6 Appendix

6.1 Beaker sensor

The tower of the Sample Processors is equipped with a beaker sensor detecting the availability of a sample vessel in front of the tower. An infrared sensor identifies devices of various materials if they are located in a correct position in front of the tower. In the rack configuration of the operating instrument, **Tower** must be selected for the setting 'Beaker sensor'. This beaker test is carried out whenever a rack position is approached in a method run.

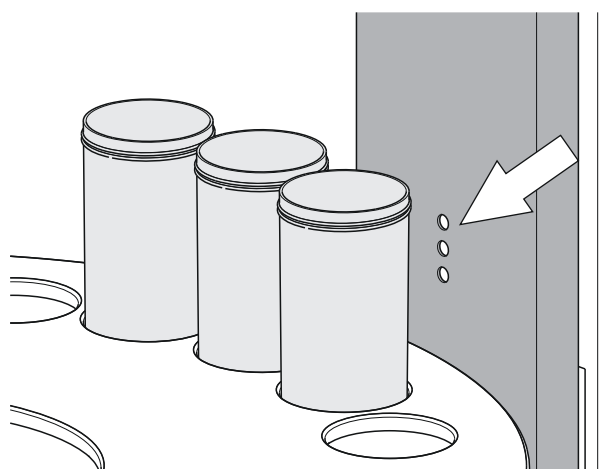


Figure 23 Beaker sensor on the tower

The beaker sensor on the tower can only be used with single-row sample racks.

6.2 Rinsing nozzles

Using rinsing nozzles is very effective in order to rinse sample vessels (with sensors and buret tips) efficiently. Rinsing nozzles are available in two model versions:

- **6.2740.020 spray nozzle**
For the fine-spraying of the rinsing solution. The nozzle has a small ball at the opening. The distribution (but also the backpressure) of the rinsing liquid is clearly higher than the one of a rinsing nozzle.
- **6.2740.030 rinsing nozzle** (optionally available)
The rinsing liquid is applied as a fine jet for optimal removal of layers on electrodes and on titration accessories.

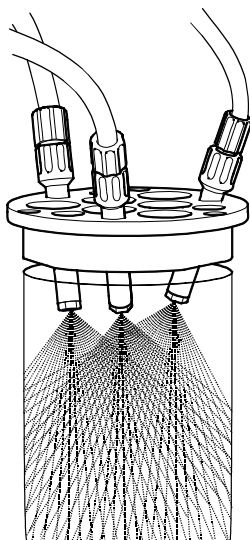


Figure 24 Spray nozzles - Mode of operation

The height of the nozzles can be adjusted in the titration head in order to reach an optimal rinsing effect.

6.3 Remote interface

The 6.2148.010 Remote Box allows devices to be controlled which cannot be connected directly to the MSB interface of the Sample Processor.

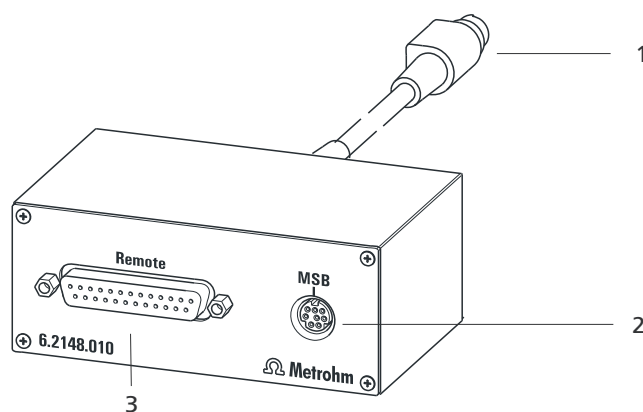


Figure 25 Connectors of the Remote Box

1 Cables

For connecting to an MSB connector of the Sample Processor.

2 MSB connector

Metrohm Serial Bus. For connecting external dosing devices or stirrers.

3 Remote connector

For connecting instruments with a remote interface.

6.3.1 Pin assignment of the remote interfaces

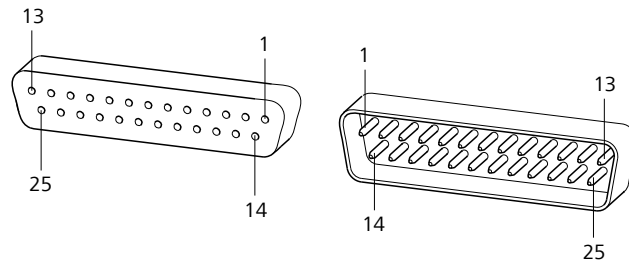
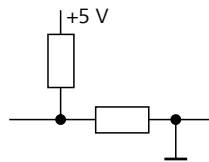


Figure 26 Pin assignment of remote socket and remote plug

The above figure of the pin assignment of a Metrohm remote interface does not only apply for the Remote Box, but also for all Metrohm devices with 25-pin D-Sub remote connectors.

Inputs



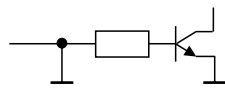
approx. 50 k Ω Pull-up

$t_p > 20$ ms

active = low, inactive = high

The input lines can be scanned with the **SCAN** command.

Outputs



Open Collector

$t_p > 200$ ms

active = low, inactive = high

$I_C = 20$ mA, $V_{CE0} = 40$ V

+5 V: maximum load = 20 mA

The output lines can be set with the **CTRL** command.

Table 1 Inputs and outputs of the remote interface

Assignment	Pin no.	Assignment	Pin no.
Input 0	21	Output 0	5
Input 1	9	Output 1	18
Input 2	22	Output 2	4
Input 3	10	Output 3	17
Input 4	23	Output 4	3
Input 5	11	Output 5	16



Assignment	Pin no.	Assignment	Pin no.
Input 6	24	Output 6	1
Input 7	12	Output 7	2
0 volts / GND	14	Output 8	6
+5 volt	15	Output 9	7
0 volts / GND	25	Output 10	8
		Output 11	13
		Output 12	19
		Output 13	20

7 Technical specifications

7.1 Lift and turntable

<i>Stroke path</i>	235 mm
<i>Maximum lift load</i>	approx. 30 N / 3 kg
<i>Lift rate</i>	adjustable, 5 - 25 mm/s
<i>Turntable speed</i>	adjustable, 3 - 20 angular degrees/s

7.2 Membrane pump with valve

<i>Flow rate</i>	> 450 mL/min
	Pressure head 2 m

7.3 Interfaces and connectors

<i>Controller connection</i>	USB upstream port (9-pin Mini DIN socket) for connecting an operating instrument.
<i>MSB connectors MSB1 - MSB3</i>	Three 9-pin Mini DIN sockets for connecting dosing devices (Dosino/ Dosimat), stirrers, etc.
<i>USB connectors 1/2</i>	Two USB downstream ports (type A sockets), each 500 mA, for connecting USB peripheral devices of other manufacturers.
<i>Stirrer connector</i>	DIN socket
<i>Stirring rate</i>	802 rod stirrer: 180 - 3000 rpm 741 magnetic stirrer: 180 - 2600 rpm adjustable in 15 steps each in both rotation directions.
<i>Pump connectors</i>	A socket with M8 thread for 772 Pump Unit or 823 Membrane Pump Unit. $U = 16 \pm 1 \text{ V}$, $I = \leq 0.8 \text{ A}$
<i>Swing Head connector</i>	9-pin Mini DIN socket



7.4 Power connection

<i>Potential</i>	100 - 240 VAC
<i>Frequency</i>	50 - 60 Hz
<i>Power consumption</i>	115 W
<i>Fuse</i>	2.0 ATH

7.5 Ambient temperature

<i>Nominal function range</i>	5 - 45 °C Humidity < 80%
<i>Storage</i>	-20 - 60 °C
<i>Transport</i>	-40 - 60 °C

7.6 Reference conditions

<i>Ambient temperature</i>	25 °C (±3 °C)
<i>Relative humidity</i>	≤ 60 %

7.7 Dimensions

<i>Width</i>	0.28 m
<i>Height</i>	0.73 m
<i>Depth</i>	0.50 m
<i>Weight (without accessories)</i>	14.52 kg
<i>Material</i>	
<i>Housing</i>	Metal housing, surface-treated

8 Accessories

Up-to-date information on the scope of delivery and optional accessories for your product can be found on the Internet. You can download this information using the article number as follows:

Downloading the accessories list

- 1** Enter <https://www.metrohm.com/> into your Internet browser.
- 2** Enter the article number (e.g. **810**) into the search field.
The search result is displayed.
- 3** Click on the product.
Detailed information regarding the product is shown on various tabs.
- 4** On the **Included parts** tab, click on **Download the PDF**.
The PDF file with the accessories data is created.



NOTICE

Once you have received your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.



Index

- 6.2151.000 controller cable 14
 741 Stirrer 21
 800 Dosino 25
 801 Stirrer 26
 802 Stirrer 21
 803 Ti Stand 26
 804 Ti Stand 26
 805 Dosimat 25
 915 KF Ti-Touch 1
 916 Ti-Touch 1
- A**
 Aspiration equipment 15
- B**
 Back panel 10, 11
 Barcode reader
 Connect 28
- C**
 Connect
 Barcode reader 28
 Dosing device 25
 MSB devices 24
 Operating instrument 14
 Power grid 13
 Remote Box 27
 Stirrer 26
 Stirrer on tower 21
 Titration stand 26
 USB devices 28
 Connector
 MSB 3
 Connectors 11
 Controller
 Connector 11
- D**
 Device software
 Update 2
 Dosing device
 Connect 25
- Drip pan 29
- E**
 Electrostatic charge 6
- F**
 Ferrite core
 Mount 25
- G**
 Guide chain 16
- I**
 Install
 Pump 23
 Titration head 18
- M**
 Magnet code 12
 Magnetic stirrer
 Mount 21
 Metrohm Serial Bus MSB, see also
 "MSB" 24
 Mount
 Aspiration equipment 15
 Drip pan 29
 Rinsing equipment 15
 Titration head 18
 MSB
 Connect devices 24
 Connector 11
 MSB connector 3
- O**
 Operating instrument 1
 Connect 14
- P**
 Pins 37
 Power connection 11, 13, 14
 Propeller stirrer 21
- Pump
 Install 23
- R**
 Rack 11
 Rack code 12
 Remote
 Input 37
 Interface 37
 Output 37
 Remote Box
 Connect 27
 Pin assignment 37
 Rinsing equipment 15
 Rod stirrer 21
- S**
 Safety instructions 5
 Sample rack 11
 Serial number 11
 Service 5
 Stirrer
 Connect 21, 26
 Stirrer on tower 21
 Connect 21
 Supply voltage 5
- T**
 Ti-Touch 1
 Titration head 18
 Install 18
 mount 18
 Titration stand
 Connect 26
- U**
 Update
 Device software 2
 USB
 Connector 11
 USB devices
 Connect 28