919 IC Autosampler plus

Ω Metrohm

919 IC Autosampler plus

Manual

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1 Introduction

1.1 Area of application

The 919 IC Autosampler plus is an autosampler with a wide variety of applications. It offers the option of fully automated sample series processing. In addition to this capability, the 919 IC Autosampler plus can be supplemented to include the functionality for Inline Ultrafiltration or Inline Dialysis.

Thanks to its proven USB interface, the 919 IC Autosampler plus can be integrated into Metrohm instrument systems in a flexible manner. The instrument is always controlled by means of a high-performance PC software, e.g. MagIC Net™ from Metrohm.

1.2 Instrument description

The 919 IC Autosampler plus has the following features:

- Turntable with interchangeable sample rack. A single-row sample rack is included in the scope of delivery.
- Tower with a robust lift. The lift is equipped with a working head to which a needle holder can be attached.
- Two-channel peristaltic pump.
- Three MSB connectors (Metrohm Serial Bus), each for controlling an 800 Dosino, an 801 Stirrer or a Remote Box, etc.
- Two USB connectors, with which e.g. printers, keyboards, barcode readers or additional devices, such as Dosing Interfaces, etc., can be directly connected.
- Two connectors for a peristaltic or a membrane pump.
- Stirrer connector on the tower, for propeller stirrer or magnetic stirrer.

1.3 Intended use

The 919 IC Autosampler plus is designed for usage as an automation system in analytical laboratories. It is **not** suitable for usage in biochemical, biological or medical environments in its basic equipment version.

The present instrument is suitable for processing chemicals and flammable samples. Usage of the 919 IC Autosampler plus therefore requires the user to have basic knowledge and experience in handling toxic and caustic substances. Knowledge with respect to the application of the fire prevention measures prescribed for laboratories is also mandatory.

1.4 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.

1.4.1 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** 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.

1.5 Safety instructions

1.5.1 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.

1.5.2 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.

1.5.3 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.

1.5.4 Personnel safety

⚠️ **WARNING**

Wear protective goggles and working clothes suitable for laboratory work while operating the 919 IC Autosampler plus. 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 919 IC Autosampler plus 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 mains 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 919 IC Autosampler plus 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.

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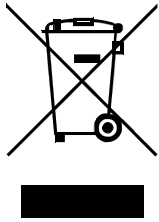
This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

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
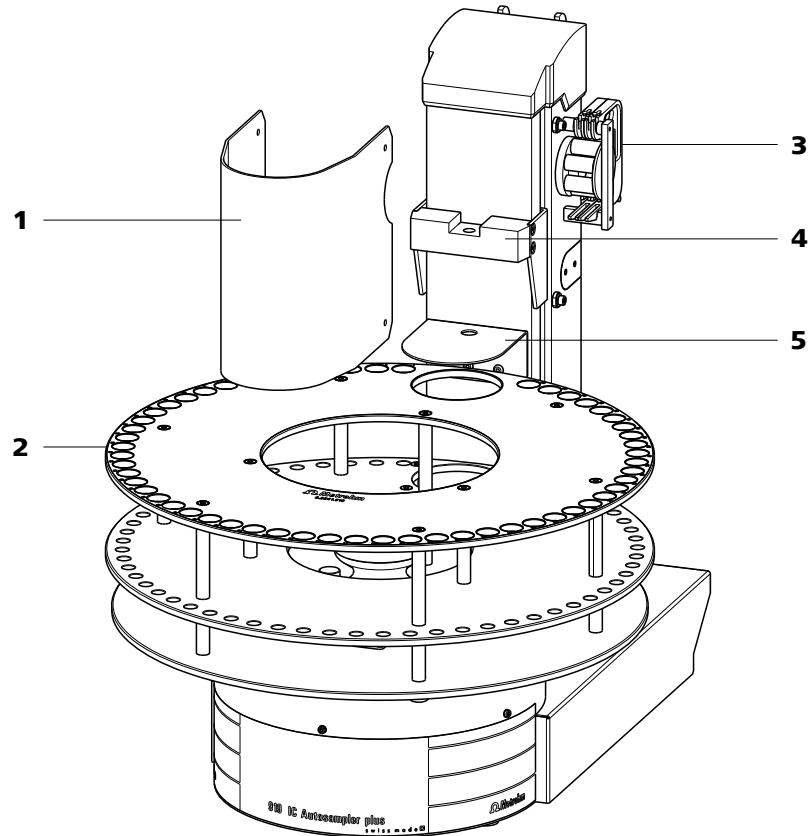
Figure 1   Front 919 IC Autosampler plus

1	**Safety shield**	**2**	**Sample rack (6.2041.510)**
3	**Peristaltic pump**	**4**	**Lift with needle adapter**
5	**Retaining plate**		
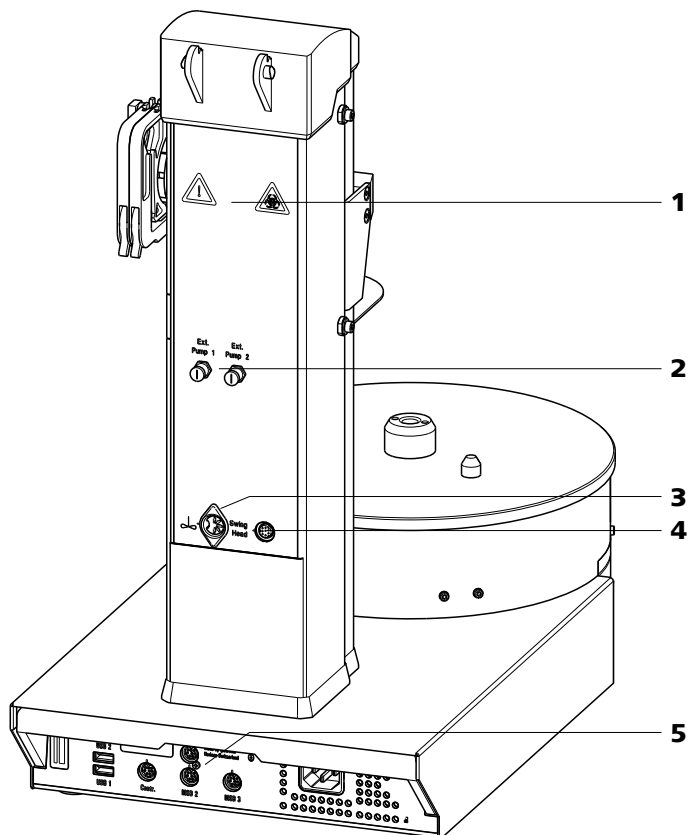
2.2   Rear

Figure 2   Rear 919 IC Autosampler plus

1	**Warning symbols** *(see chapter 1.5.4, page 5)*	**2**	**Pump connectors** M8 connector for external pumps
3	**Stirrer connector** For propeller stirrer (802 Stirrer) and magnetic stirrer (741 Magnetic Stirrer)	**4**	**786 Swing Head connector**
5	**Connector strip** Details *(see chapter 2.3, page 9)*		

2.3 Connector strip
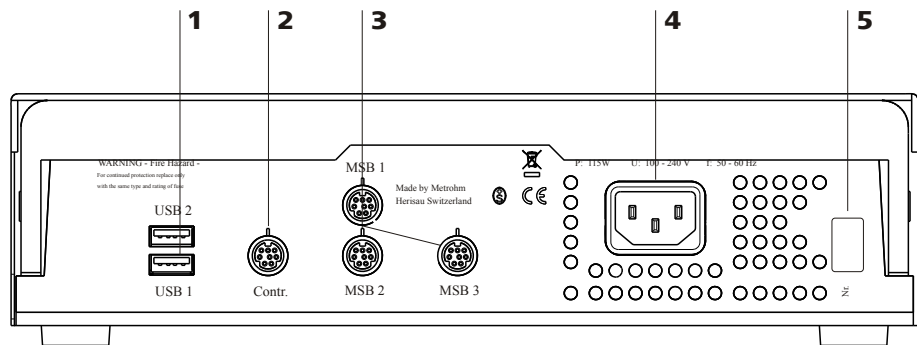
Figure 3   Connector strip 919 IC Autosampler plus

1	**USB connectors**	**2**	**Controller connector** For the connection to the PC
3	**MSB connectors** For stirrers, dosing devices, etc.	**4**	**Mains connection**
5	**Type plate**		

2.4 Sample rack

Attaching a rack

Attach the sample rack in such a way that the guide pins of the turntable engage through the guide openings in the base of the rack.

Figure 4   Attaching a sample rack

The sample rack has a handle with a clamping screw. With this, the rack can be fixed on the turntable by rotating in clockwise direction.

> **NOTICE**
>
> After the sample rack has been attached, the rack must be initialized with the **Rack initialization** function in the control software ("Manual Operation"), so that the magnet code of the rack can be recognized. Automatic recognition of the rack type is only possible when the rack is rotated into the starting position.
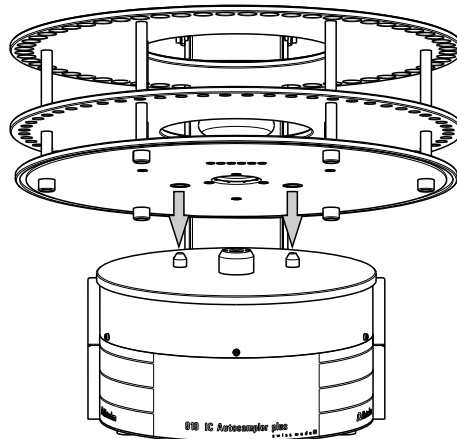
2.5 Peristaltic pump

The peristaltic pump can be used as a 1-channel or 2-channel pump. One or two 6.2755.000 tubing cartridges can be mounted.
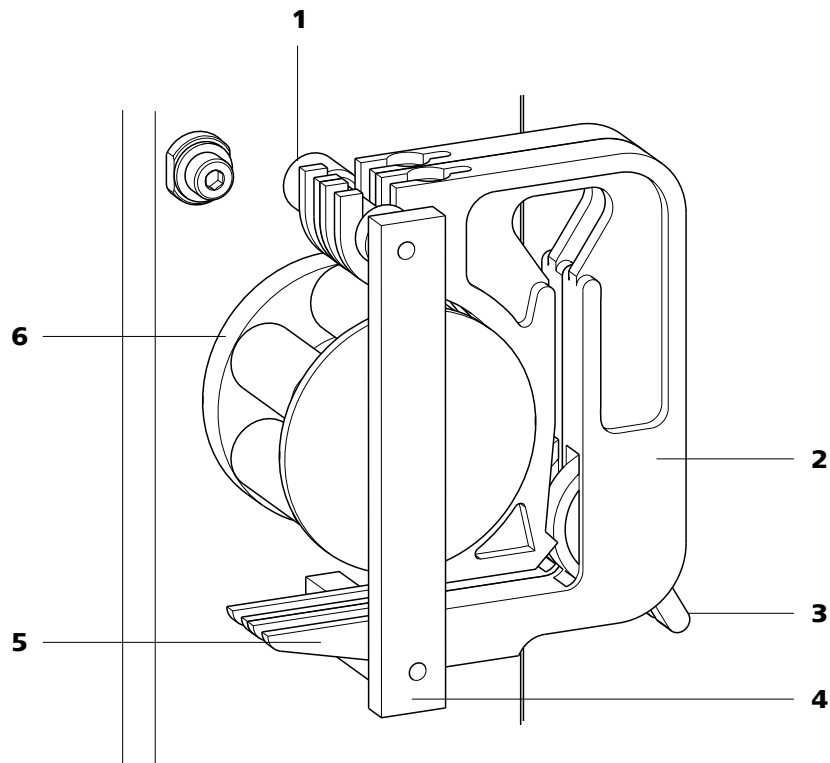
Figure 5   Peristaltic pump

1	**Mounting bolt**	**2**	**6.2755.000 tubing cartridge**
	For engaging the tubing cartridge		For 6.1826.XX0 pump tubings
3	**Contact pressure lever**	**4**	**Retaining bracket**
	For regulating the contact pressure		
5	**Snap-action lever**	**6**	**Pump drive**
	For loosening the tubing cartridge		Roller head with contact pressure rollers

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

> **ℹ️ 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   Installing the sample needle

Needles made of zirconium oxide or PEEK can be used for aspirating samples.

> **⚠️ WARNING**
>
> When a 6.1835.050 sample needle or a blunt PEEK needle is used, **no stoppers** are permitted to be used on the sample vessels. These stoppers cannot be penetrated by such needles. The needle can become damaged if this is attempted! **Perforated stoppers** can be used with double-bevel needles.
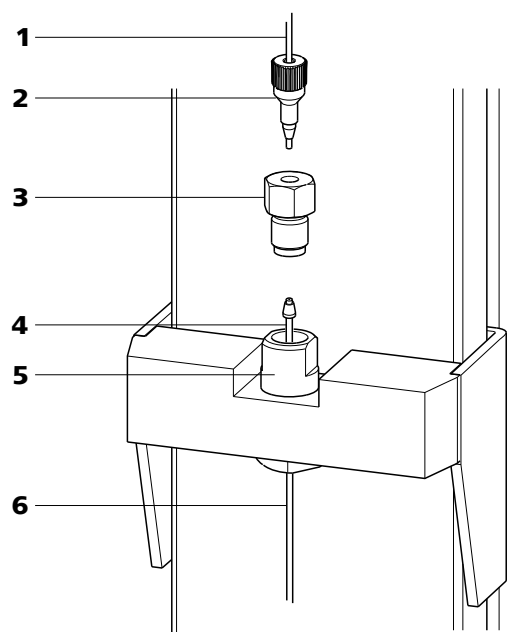
Figure 6   Installing the needle

1	**PTFE capillary or PEEK capillary** 6.1803.070 or 6.1831.050 / 6.1831.060 / 6.1831.080.	2	**PEEK pressure screw** 6.2744.070
3	**Pressure screw** 4.766.4320 (part of 6.2833.030).	4	**Ferrule**
5	**Needle holder (6.2833.030)**	6	**Sample needle** 6.2846.010 (made of zirconium oxide) or 6.1835.020 / 6.1835.040 / 6.1835.050 (made of PEEK).

This is how you install the needle and the capillary:

1   Removing the pressure screw

Loosen and remove the pressure screw *(6-3)* screwed onto the needle holder.

2   Inserting the needle

- Insert the needle from above partway into the opening of the needle holder *(6-5)*.
- Slide the PEEK ferrule *(6-4)* over the needle from above. The narrow side of the seal must face upwards.

3   Fastening the needle

- Screw the pressure screw *(6-3)* into the needle holder. Lightly push the needle upwards from below during the process.

- Tighten the pressure screw in the needle holder by hand (do not use tools!).

4 **Connecting the capillary**

- Slide the 6.2744.070 PEEK pressure screw *(6-2)* over the end of the capillary.
- Manually tighten the PEEK pressure screw with the capillary to the pressure screw of the needle holder. The capillary must be pushed in while doing so.
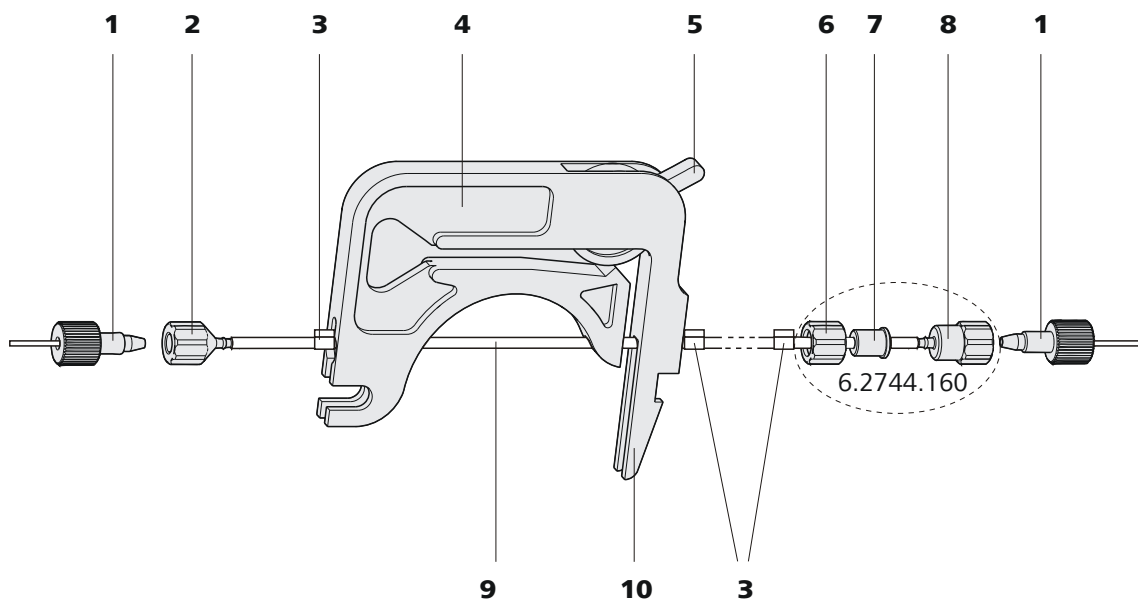
3.4 Installing the peristaltic pump

Figure 7   Installing the pump tubing

1	PEEK pressure screws, short (6.2744.070)	2	Tubing olive (6.2744.030)
3	Stopper The colors of the stoppers indicate the inner diameter of the pump tubing.	4	Tubing cartridge (6.2755.000)
5	Contact pressure lever	6	Union nut
7	Adapter	8	Tubing olive
9	Pump tubing	10	Snap-action lever

Mount the pump tubing as follows:

1 **Remove the tubing cartridge**

Release the tubing cartridge from the cartridge holder by pressing the snap-action lever and unhooking it from the mounting bolts *(5-**1**)*.

2 **Insert the pump tubing**

- Press the contact pressure lever all the way down.
- Place the pump tubing in the tubing cartridge. The stoppers *(7-**3**)* must snap into the corresponding holder of the tubing cartridge.

3 **Connect the aspiration side**

Place a 6.2744.030 tubing olive *(7-**2**)* on the aspiration side of the pump tubing.

4 **Connect the pressure side**

- Slide the union nut *(7-**6**)* of the 6.2744.160 pump tubing connection (without filter) onto the pump tubing.
- Select a suitable adapter *(7-**7**)* (depends on the outer diameter of the pump tubing) and slide it onto the pump tubing *(see table 1, page 16)*.
- Place the tubing olive *(7-**8**)* onto the pump tubing.
- Screw the union nut *(7-**6**)* tight on the tubing olive *(7-**8**)*.

5 **Insert the tubing cartridge**

- Hang the tubing cartridge in the mounting bolt and press it underneath in the cartridge holder until the snap-action lever snaps in.
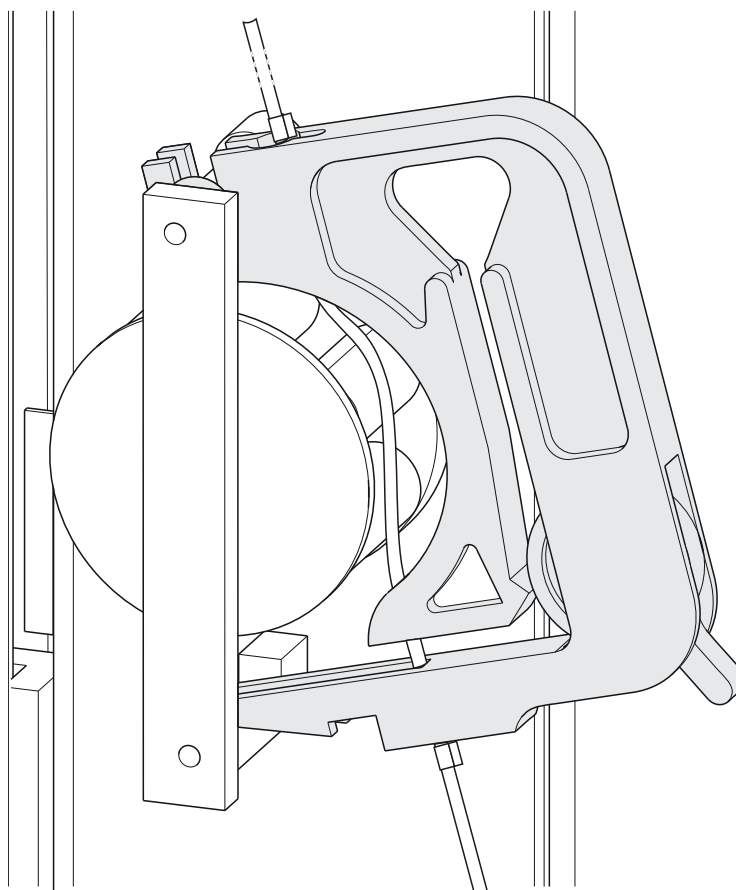
Figure 8   Inserting the tubing cartridge

6 **Connect the capillaries**

- Screw the respective capillaries tightly to the two tubing olives with PEEK pressure screws *(7-**1**)*.

Table 1   Pump tubings and suitable adapters

Pump tubing	Adapter
6.1826.020 (blue/blue)	
6.1826.310 (orange/green)	
6.1826.320 (orange/yellow)	
6.1826.330 (orange/white)	
6.1826.340 (black/black)	

Pump tubing	Adapter
6.1826.360 (white/white)	
6.1826.380 (gray/gray)	
6.1826.390 (yellow/yellow)	

Setting the flow rate

The contact pressure of the tubing cartridge must be adjusted in order to regulate the flow rate. Proceed as follows:

1 Set the contact pressure

- Fully loosen the contact pressure lever *(7-**5**)*, i.e. press it all the way down.
- Switch on the drive of the peristaltic pump.
- Raise the contact pressure lever one step at a time until liquid flows.
- When liquid starts flowing, raise the contact pressure lever by an additional 2 ratchet increments.

The contact pressure is now set optimally.

The flow rate depends not only on the correct contact pressure but also on the inner diameter of the pump tubing and the rotational speed of the drive.

NOTICE

Pump tubings are consumables. The service life of the pump tubings depends on the contact pressure, among other factors.

3.5 Filtration cell holder
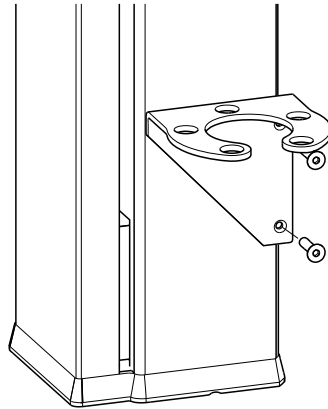
Figure 9   Installing the filtration cell holder

The filtration cell holder (6.2057.030) can be mounted on the side wall of the tower, see above.

First remove the second and third screws from the bottom on the side wall. Then fix the filtration cell holder in place with the two screws supplied.

3.6 Mounting the safety shield

For reasons of safety, it is indispensable that you install the safety shield (6.2751.110) supplied. A serious risk of injury exists if anyone reaches into the working area of the instrument.

> **CAUTION**
> ___
>
> The 919 IC Autosampler plus may not be operated without a safety shield.

Use the accompanying hex screws and the hex key to mount the safety shield according to the following figure.
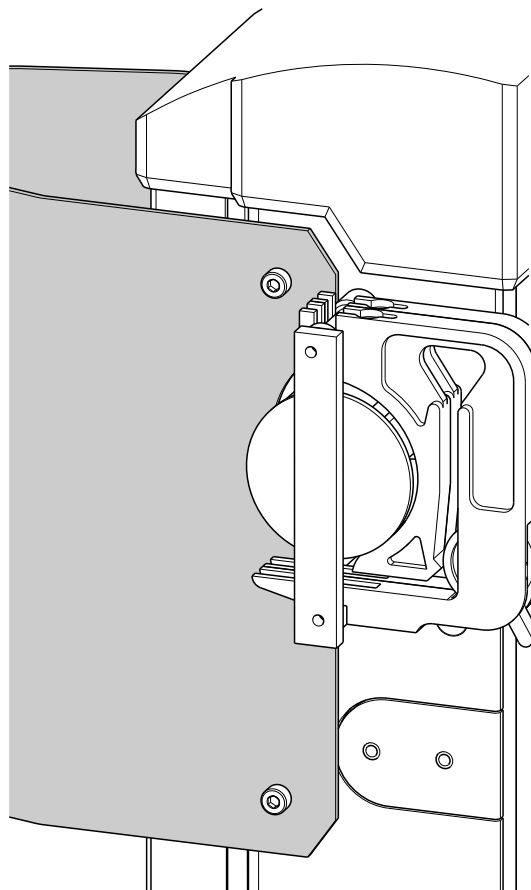
Figure 10   Mounting the safety shield

3.7   Connecting a computer

The 919 IC Autosampler plus requires a USB connection to a computer in order to be able to be controlled by a computer software. Using a 6.2151.000 controller cable, the instrument can be connected directly, either to a USB socket on a computer, to a connected USB hub or to a different Metrohm control instrument.

You need administrator rights for the installation of driver software and control software on your computer.

Cable connection and driver installation

A driver installation is required in order to ensure that the 919 IC Autosampler plus is recognized by the computer software. To accomplish this,

you must comply with the procedures specified. The following steps are necessary:

1 **Install the software**

- Insert the computer software installation CD and carry out the installation program directions.
- Exit the program if you have started it after the installation.

2 **Establishing the cable connections**

- Connect all peripheral devices to the instrument, *see chapter 3.8, page 21*.
- Connect the instrument to the power grid if you have not already done this *(see chapter 3.2, page 11)*.
- Connect the instrument to a USB connector (type A) of your computer (see manual of your computer). The 6.2151.000 cable is used for this purpose.
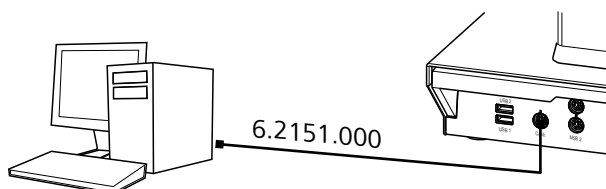
Figure 11   Connecting the computer

The instrument is recognized. Depending on the version of the Windows operating system used, the driver installation proceeds differently afterwards. Either the necessary driver software is installed automatically or an installation wizard is started.

3 Follow the instructions of the installation wizard.

If problems should occur during installation, contact your company's IT support team.

NOTICE

The plug on the instrument end of the 6.2151.000 controller cable is protected against accidental disconnection by means of a pull-out protection feature. If you wish to pull out the plug, you first need to pull back the outer plug sleeve marked with arrows.

Registering and configuring the instrument in the computer software

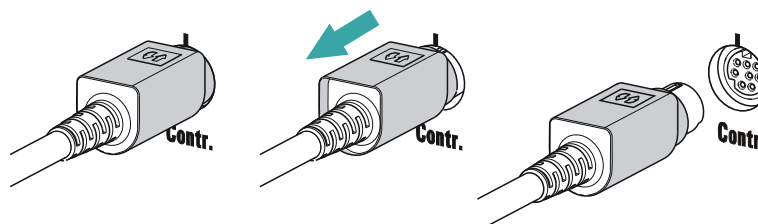The instrument must be registered in the configuration of your computer software. Once that has been done, you can then configure it according to your requirements. Proceed as follows:

1 Setting up the instrument

- Start the computer software.
  The instrument is automatically recognized. The configuration dialog for the instrument is displayed.
- Make configuration settings for the instrument and its connectors.

More detailed information concerning the configuration of the instrument can be found in the documentation for the respective computer software.

3.8   Connecting MSB devices

In order to connect MSB devices, e.g. stirrers or dosing devices, Metrohm instruments are equipped with up to a maximum of four connectors on what is referred to as the *Metrohm Serial Bus* (MSB). Various kinds of peripheral devices can be connected in sequence (in series, as a "Daisy Chain") at a single MSB connector (8-pin Mini DIN socket) and controlled simultaneously by the respective control instrument. In addition to the connection cable, stirrers and the Remote Box are each equipped with their own MSB socket for this purpose.

The following figure provides an overview of the instruments that can be connected to an MSB socket, along with a number of different cabling variations.
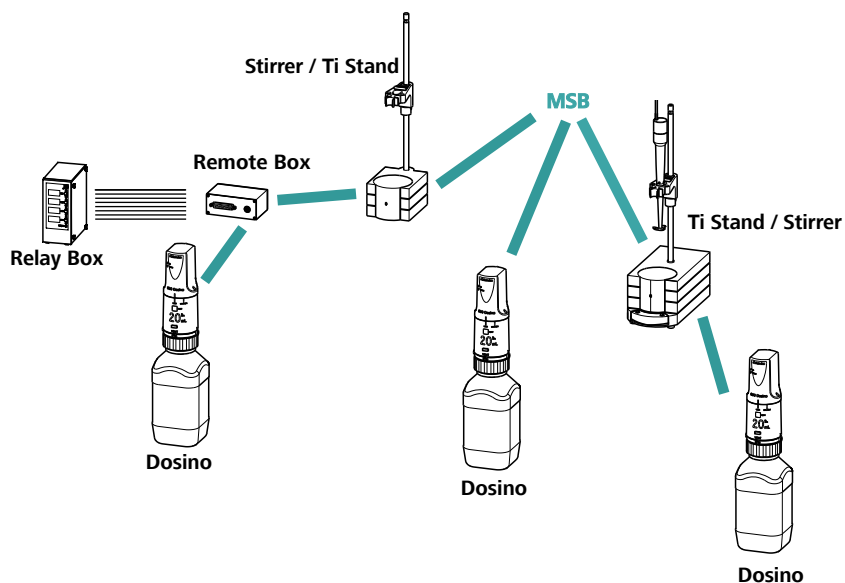
Figure 12   MSB connections

The control instrument determines which peripheral devices are supported.

> **NOTICE**
>
> When connecting MSB devices together, the following must be observed:
>
> - Only one device of the same type can be used at a single MSB connector at one time.
> - The *MagIC Net* software supports only dosing devices of the 800 Dosino type.

> **CAUTION**
>
> Exit the control software before you plug in MSB devices. When it is switched on, the control instrument automatically recognizes which device is connected to which MSB connector. The operating unit or the control software enters the connected MSB devices into the system configuration (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 MagIC Net control software supports only the 800 Dosino as a dosing device.

- 800 Dosino

> ⚠️ **WARNING**
>
> If a Dosino is connected to the 919 IC Autosampler plus, 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

- Exit the control software.
- Connect the connection cable of the dosing device to one of the sockets marked with **MSB** on the rear of the control device.
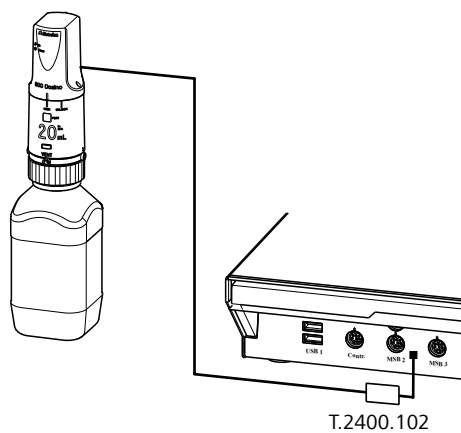- Start the control software.

Figure 13   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

- Exit the control software.
- 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.
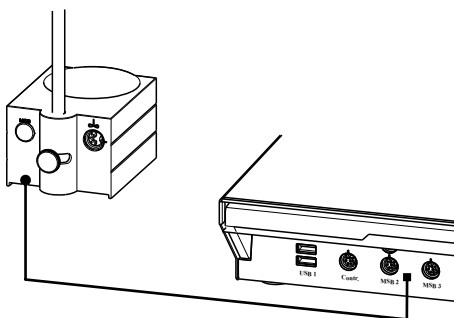- Start the control software.
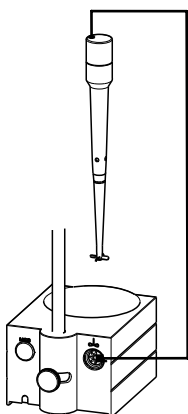

Figure 14   Connecting an MSB stirrer

Figure 15   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**
- Exit the control software.
- Connect the Remote Box connection cable to one of the sockets marked with **MSB** on the rear of the control instrument.
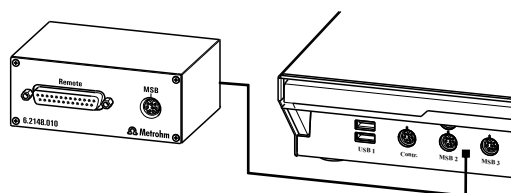- Start the control software.

Figure 16   *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*.

4 Operation and maintenance

4.1 General

Just like highly sensitive measuring instruments, Sample Processors require proper care as well. Excess contamination of the instrument may result in functional disruptions and a reduction in the lifetime of the otherwise sturdy mechanics and electronics of the instrument.

Severe contamination can also have an influence on the measured results. Regular cleaning of exposed parts can prevent this to a large extent.

Spilled chemicals and solvents must be removed immediately. In particular, the connector strip (especially the power plug) should be protected from contamination.

4.2 Injection valve

If the injection valve is blocked, then the channels of the valve can be rinsed with water in the opposite direction. If this is not successful, then the injection valve must be cleaned by a Metrohm service technician.

4.3 Filter

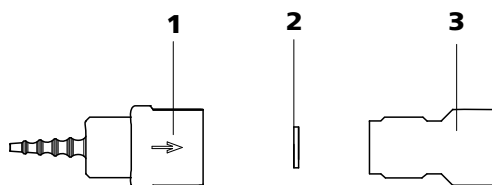The 6.2821.130 filters (*17*-*2*) should be replaced every three months and more frequently with higher backpressure.

Figure 17   Pump tubing connection – Replacing the filter

1	Tubing olive	2	Filter (6.2821.130) Pack contains 10 pieces.
3	Filter screw		

Replacing the filter

1 Unscrewing the filter screw
  ▪ Unscrew the filter screw from the tubing olive.

2 **Inserting the filter**

- Place the filter in the tubing olive and **press it flat**.

3 **Installing the filter screw**

- Screw the filter screw back into the tubing olive.

4.4   Peristaltic pump

The flow rate of the peristaltic pump depends on the drive speed, the contact pressure and, above all, the inner diameter of the pump tubing. Depending on the application, different pump tubing is used.

> **CAUTION**
>
> The lifetime of the pump tubings also depends on the contact pressure. Therefore, lift the tubing cartridges by loosening the snap-action lever if the peristaltic pump is to be switched off for a longer period. This ensures that the contact pressure will be maintained once it has been set.

> **CAUTION**
>
> The 6.1826.xxx pump tubings are made of PVC or PP and therefore must not be used for rinsing with solutions containing acetone. In this case, use different pump tubing or use another pump for rinsing.

4.5   Pump tubings

Pump tubings used for the peristaltic pump are consumables with a limited lifetime.

LFL pump tubings with three stoppers are inserted into the tubing cartridge in such a way that the cartridge is located between two stoppers. This results in two possible positions for the tubing cartridge. If the pump tubing was to show pronounced signs of wear, you can insert it a second time in the other position.

Replace the pump tubings periodically, approx. every four weeks if used continuously.

Pump tubing selection

Pump tubing can differ in terms of material, diameter and thus flow rate. Different pump tubing is used depending on the application.

The following table shows the properties and areas of application of the pump tubings:

Table 2   Pump tubings

Order number	Name	Material	Inner diameter	Use
6.1826.020	Pump tubing (blue/blue), 2 stoppers	PVC (Tygon® ST)	1.65 mm	Pump tubing for online IC instruments and automation in voltammetry.
6.1826.310	Pump tubing LFL (orange/green), 3 stoppers	PVC (Tygon®)	0.38 mm	Pump tubing for bromate determination using the triiodide method.
6.1826.320	Pump tubing LFL (orange/yellow), 3 stoppers	PVC (Tygon®)	0.48 mm	For acceptor solutions for Inline Dialysis and for Inline Ultrafiltration.
6.1826.330	Pump tubing LFL (orange/white), 3 stoppers	PVC (Tygon®)	0.64 mm	No special applications.
6.1826.340	Pump tubing LFL (black/black), 3 stoppers	PVC (Tygon®)	0.76 mm	For sample solution in Inline Dialysis.
6.1826.360	Pump tubing LFL (white/white), 3 stoppers	PVC (Tygon®)	1.02 mm	For sample transfer.
6.1826.380	Pump tubing LFL (gray/gray), 3 stoppers	PVC (Tygon®)	1.25 mm	For Inline Dilution.
6.1826.390	Pump tubing LFL (yellow/yellow), 3 stoppers	PVC (Tygon®)	1.37 mm	For sample solution in Inline Ultrafiltration.

5 Troubleshooting

5.1 Problems and their solutions

Problem	Cause	Remedy
The peristaltic pump is pumping too little.	*Peristaltic pump – Contact pressure too weak.*	Correctly set the contact pressure.
	Peristaltic pump – Pump tubing defective.	Replace the pump tubing.

6 Appendix

6.1 Lift settings

Adjusting the needle position

First move the lift to working height.

1 Open the safety shield

Loosen the lower two fastening screws of the safety shield using the hexagon key provided, and tip up the safety shield.

2 Loosen the nut

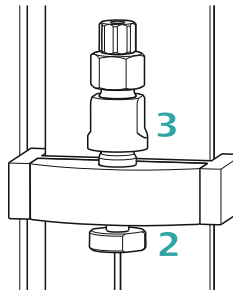Slightly loosen the nut below the lift head using a wrench.

Figure 18   Adjusting the needle

3 Adjust the needle holder

Turn the needle holder a few millimeters out of the lift head (turn counterclockwise).

Now you can redefine the working height of the lift and precisely set the needle position by turning the needle holder.

4 Tighten the nut

Using the wrench, fasten the nut again.

5 Close the safety shield

Tip down the safety shield and fix it with the fastening screws.

6.2 Remote interface

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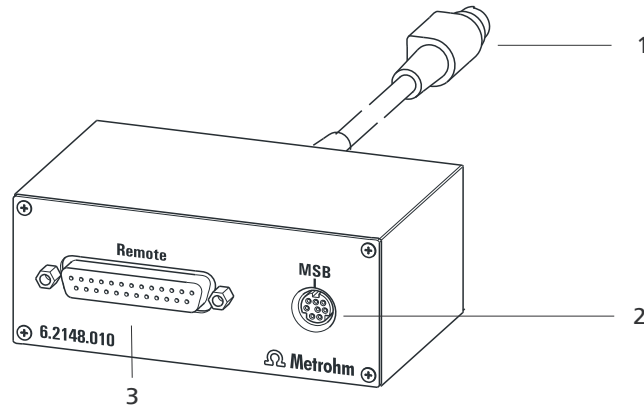

Figure 19   Connectors of the Remote Box

| **1** | **Cables** |
| | For connecting to an MSB connector of the Autosampler. |

| **2** | **MSB connector** |
| | Metrohm Serial Bus. For connecting external dosing devices or stirrers. |

| **3** | **Remote connector** |
| | For connecting instruments with a remote interface. |

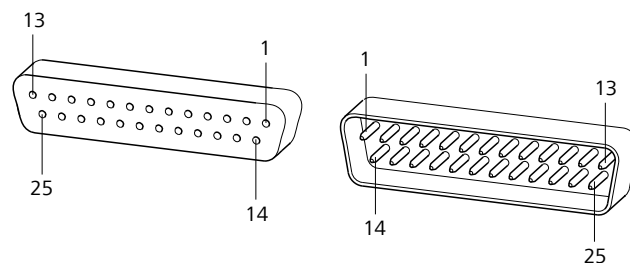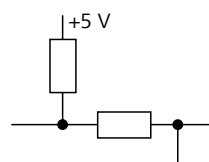## 6.2.1 Pin assignment of the remote interfaces

Figure 20   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.
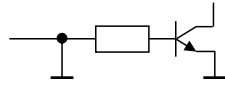
Inputs

approx. 50 kΩ 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, $V_{CEO} = 40$ V

+5 V: maximum load = 20 mA

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

Table 3   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
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

Stroke path	235 mm
Maximum lift load	approx. 30 N
Lift rate	adjustable, 5…25 mm/s
Turntable speed	adjustable, 3...20 angle degrees/s

7.2 Two-channel peristaltic pump

Pump rate	6…90 rpm, adjustable in 15 steps each in both directions of rotation
Typical flow rate	0.3 mL/min at 18 rpm; with standard 6.1826.320 pump tubing The effective flow rate is dependent on the contact pressure and type of tubing.
Maximum pressure	4 bar (0.4 MPa)
Conveyable liquids	Clear liquids without solids
Tubing materials	PVC (Tygon® ST), PVC (Tygon® LFL), PP

7.3 Interfaces and connectors

Controller connector	USB Upstream port (9-pin Mini DIN socket) for connecting a computer for controlling the instrument.
MSB connectors MSB1…MSB3	Three 9-pin Mini DIN sockets for connecting dosing devices (Dosino/Dosimat), stirrers, etc.
USB connectors 1/2	Two USB Downstream Ports (Type A sockets), each 500 mA, for connecting Metrohm instruments or USB peripheral devices of other manufacturers.
Stirrer connector	DIN socket
Stirring rate	722/802 propeller stirrer: 180…3000 rpm 741 magnetic stirrer: 180...2600 rpm adjustable in 15 steps each in both directions of rotation
Pump connectors	Two M8 sockets for 772 Pump Unit or 823 Membrane Pump Unit $U = 16 \pm 1$ V, $I = \leq 0.8$ A
Swing Head connector	9-pin Mini DIN socket

7.4   Mains connection

Voltage	100…240 V (±10%)
Frequency	50…60 Hz
Power consumption	115 W
Fuse	2.0 ATH

7.5   Ambient temperature

Nominal function range	5…45 °C Humidity < 80% (at temperatures under 30 °C) Humidity < 50% (at temperatures under 45 °C)
Storage	−20…60 °C Humidity < 95% (at temperatures under 40 °C) Humidity < 85% (at temperatures under 50 °C) Humidity < 50% (at temperatures under 60 °C)
Transport	−40…60 °C Humidity < 95% (at temperatures under 40 °C) Humidity < 85% (at temperatures under 50 °C) Humidity < 50% (at temperatures under 60 °C)

7.6   Reference conditions

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

7.7   Dimensions

Width	0.28 m
Height	0.53 m
Depth	0.50 m
Material	
Housing	Metal housing, surface-treated
Weight (without accessories)	1.919.0020: 14.00 kg

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. **919**) 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.

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i   **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.

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