

# 919 IC Autosampler plus



Manual  
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# **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)	<b>Cross-reference to figure legend</b> The first number refers to the figure number, the second to the instrument part in the figure.
<b>1</b>	<b>Instruction step</b> Carry out these steps in the sequence shown.
<b>Method</b>	<b>Dialog text, parameter</b> in the software
<b>File ▶ New</b>	Menu or menu item
<b>[Next]</b>	<b>Button</b> or <b>key</b>
	<b>WARNING</b> This symbol draws attention to a possible life-threatening hazard or risk of injury.
	<b>WARNING</b> 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**

This instrument may only be operated in accordance with the specifications in this documentation.

This instrument has 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.

**Mains voltage****WARNING**

An incorrect mains voltage can damage the instrument.

Only operate this instrument with a mains 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 mains cable out of the mains connection 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 2002/96/EC, WEEE – Waste from Electrical and Electronic Equipment.

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

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

## 2 Overview of the instrument

### 2.1 Front

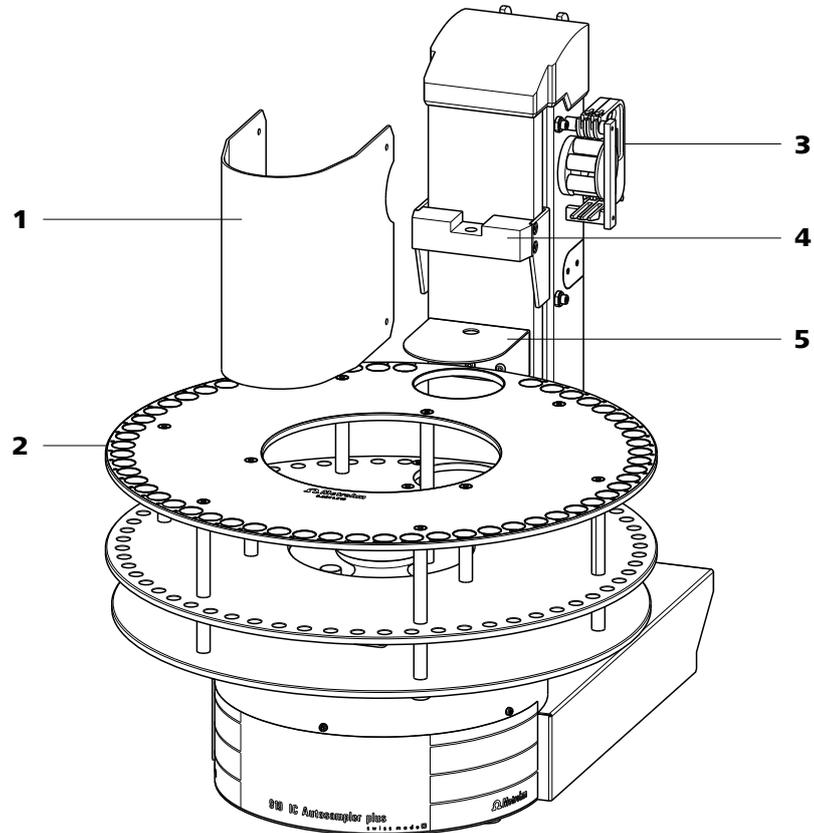


Figure 1 Front 919 IC Autosampler plus

**1** Safety shield

**3** Peristaltic pump

**5** Retaining plate

**2** Sample rack (6.2041.510)

**4** Lift with needle adapter



## 2.2 Rear

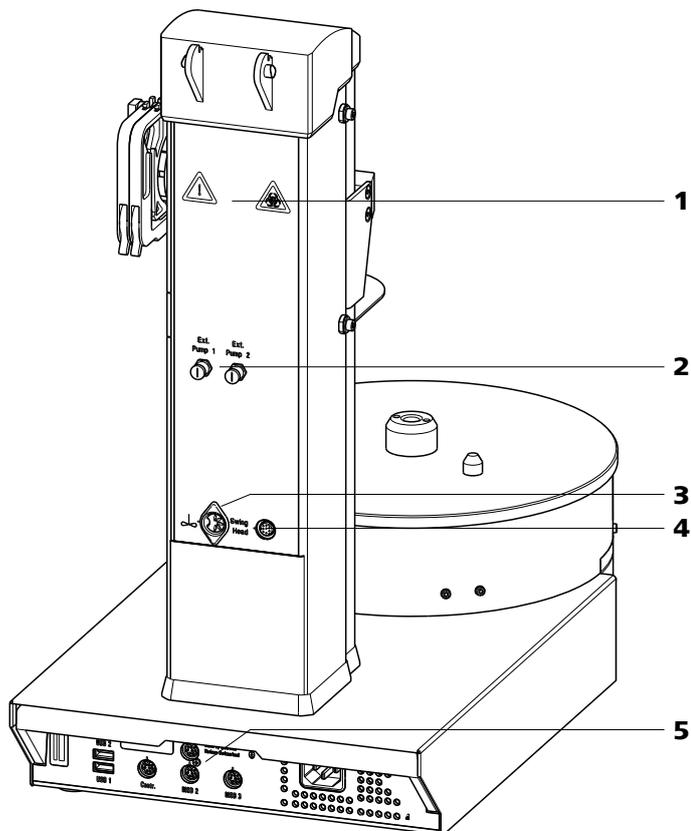


Figure 2 Rear 919 IC Autosampler plus

**1 Warning symbols**

(see Chapter 1.5.4, page 5)

**3 Stirrer connector**

For propeller stirrer (802 Stirrer) and magnetic stirrer (741 Magnetic Stirrer)

**5 Connector strip**

Details (see Chapter 2.3, page 9)

**2 Pump connectors**

M8 connector for external pumps

**4 786 Swing Head connector**

## 2.3 Connector strip

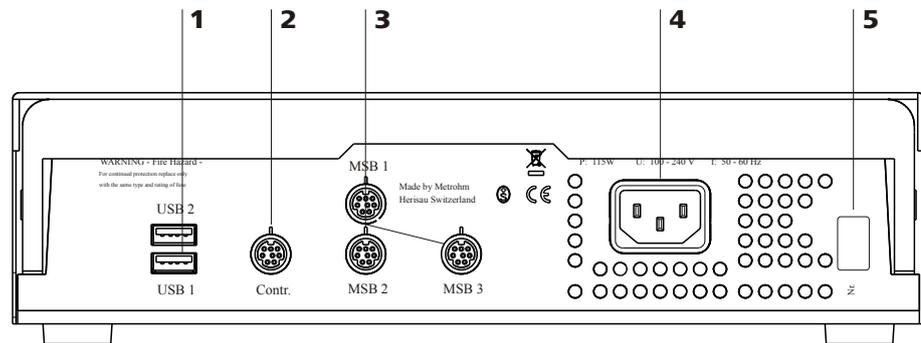


Figure 3 Connector strip 919 IC Autosampler plus

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

## 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.

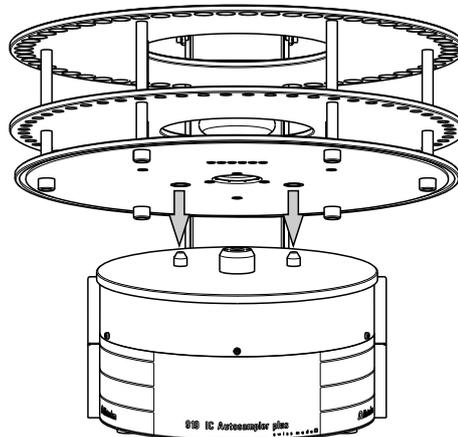


Figure 4 Attaching a sample rack

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.

**NOTE**

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.

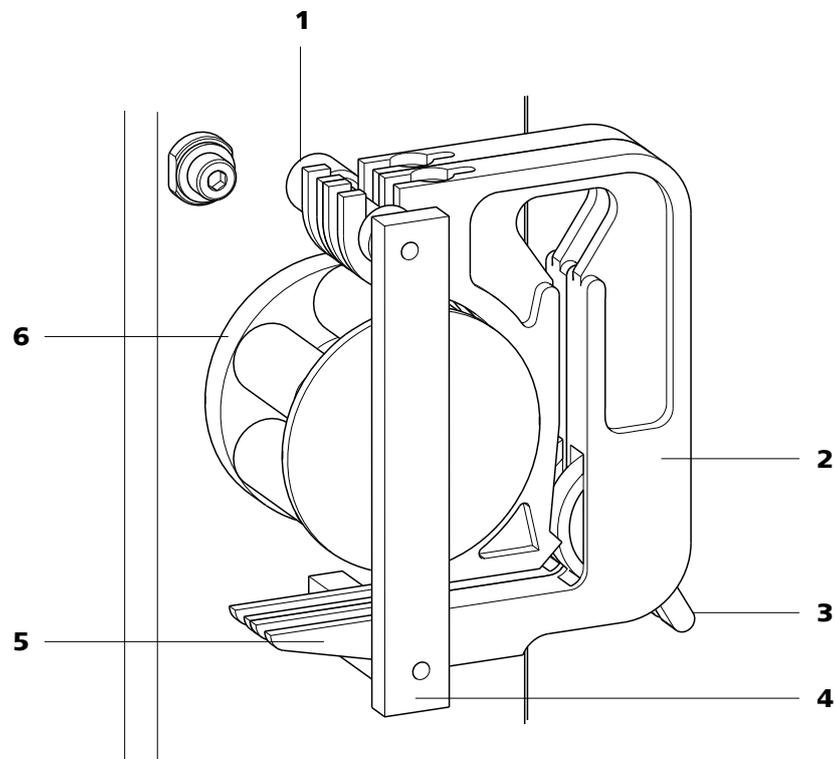


Figure 5 Peristaltic pump

**1 Mounting bolt**

For engaging the tubing cartridge

**3 Contact pressure lever**

For regulating the contact pressure

**5 Snap-action lever**

For loosening the tubing cartridge

**2 6.2755.000 tubing cartridge**

For 6.1826.XX0 pump tubings

**4 Retaining bracket**
**6 Pump drive**

Roller head with contact pressure rollers

## 3 Installation

### 3.1 Setting up the instrument

#### 3.1.1 Packaging

The instrument is supplied in highly protective special 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, free of vibrations, protected from corrosive atmosphere, and contamination by chemicals.

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

### 3.2 Connecting the power supply cable



#### WARNING

This instrument may only be operated with the supply voltages specified (see rear of the instrument).

Protect the connection sockets against moisture.

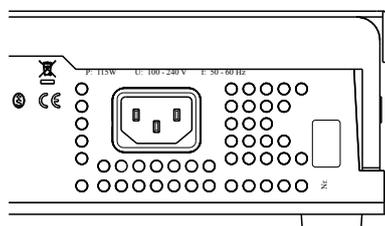


Figure 6 Connecting the power supply cable



### 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.

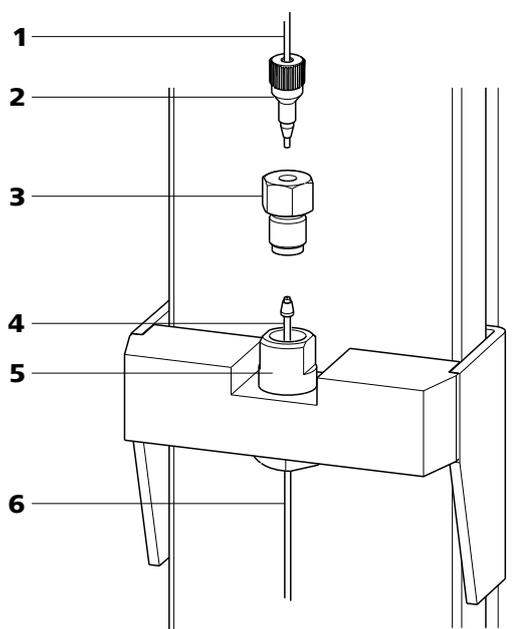


Figure 7 Installing the needle

**1 PTFE capillary or PEEK capillary**  
6.1803.070 or 6.1831.050 / 6.1831.060 /  
6.1831.080.

**3 Pressure screw**  
4.766.4320 (part of 6.2833.030).

**5 Needle holder (6.2833.030)**

**2 PEEK pressure screw**  
6.2744.070

**4 Ferrule**

**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 (7-3) screwed onto the needle holder.

### **2 Inserting the needle**

- Insert the needle from above partway into the opening of the needle holder (7-5).
- Slide the PEEK ferrule (7-4) over the needle from above. The narrow side of the seal must face upwards.

### **3 Fastening the needle**

- Screw the pressure screw (7-3) 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 (7-2) 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

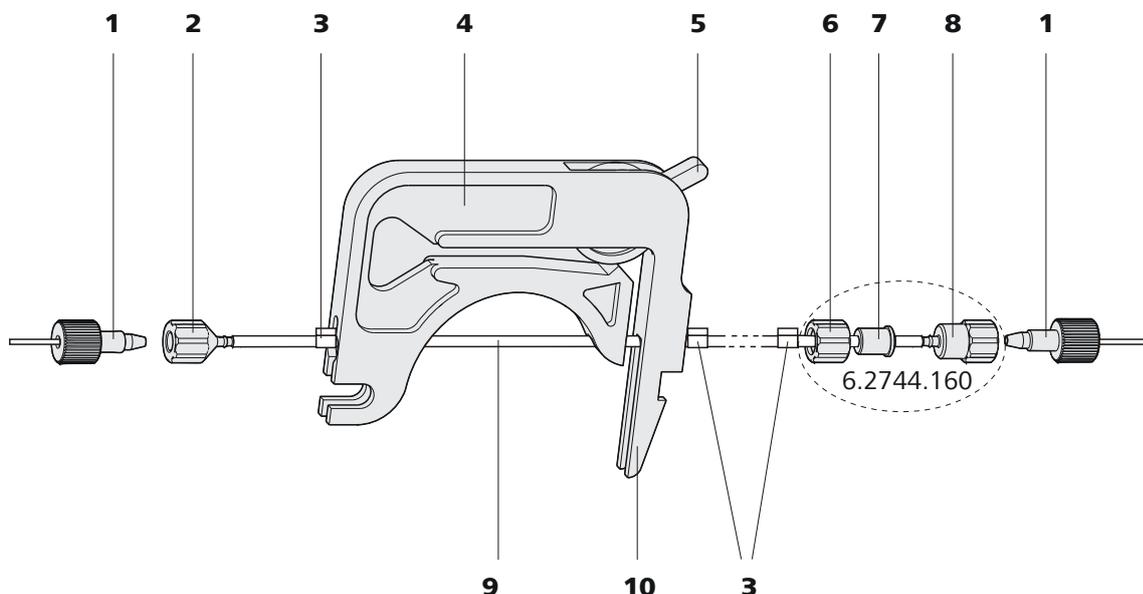


Figure 8 Installing the pump tubing

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

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 (8-3) must snap into the corresponding holder of the tubing cartridge.

### 3 Connect the aspiration side

Place a 6.2744.030 tubing olive (8-2) on the aspiration side of the pump tubing.

### 4 Connect the pressure side

- Slide the union nut (8-6) of the 6.2744.160 pump tubing connection (without filter) onto the pump tubing.
- Select a suitable adapter (8-7) (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 (8-8) onto the pump tubing.
- Screw the union nut (8-6) tight on the tubing olive (8-8).

### 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.

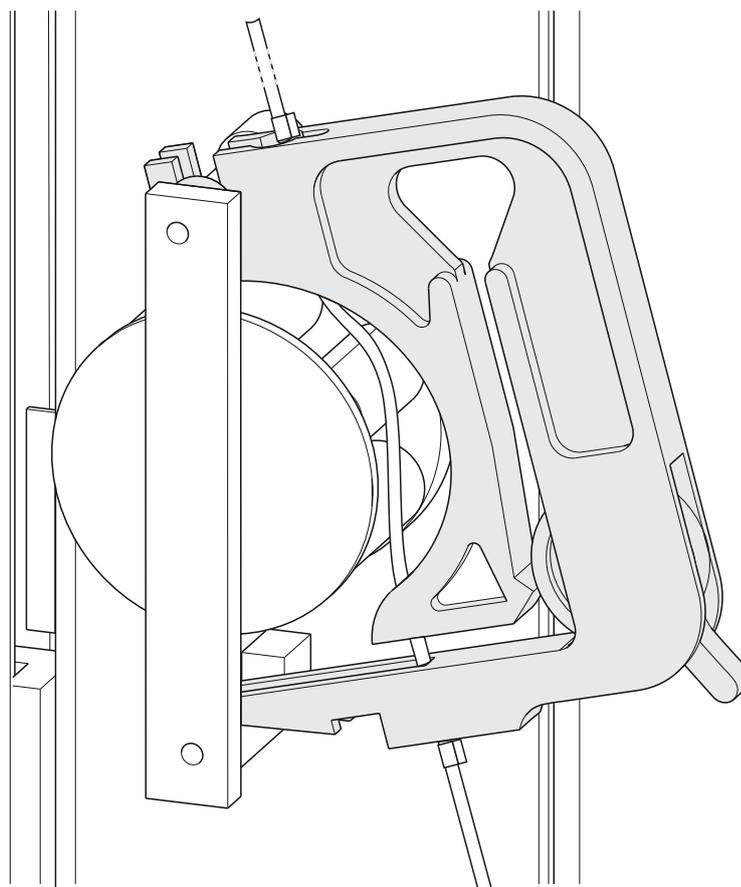


Figure 9 Inserting the tubing cartridge



## 6 Connect the capillaries

- Screw the respective capillaries tightly to the two tubing olives with PEEK pressure screws (8-1).

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)	
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 (8-5), 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.

**NOTE**

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

### 3.5 Filtration cell holder

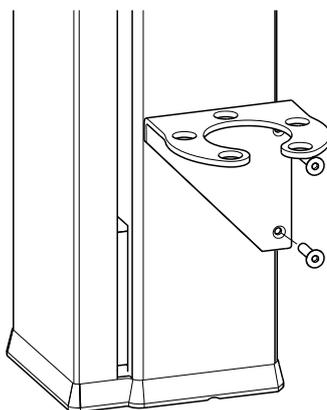


Figure 10 Installing the filtration cell holder

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.

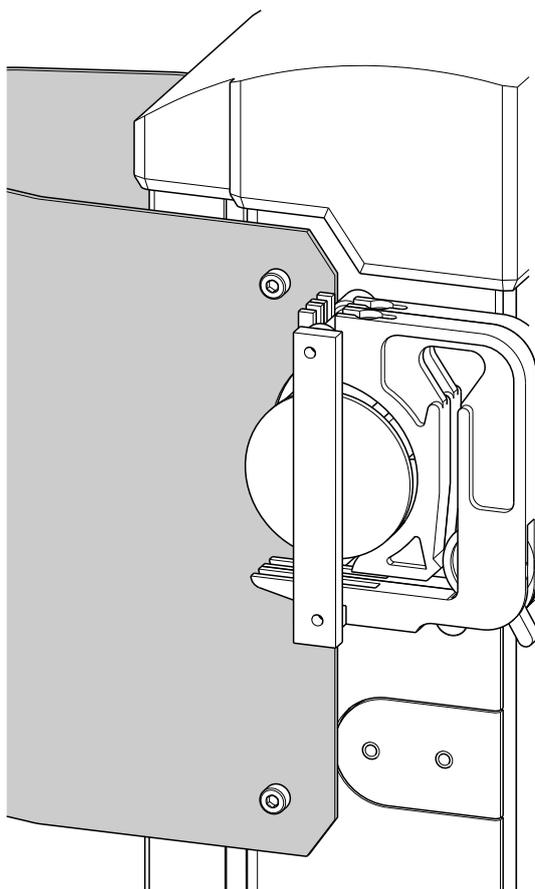


Figure 11 Mounting the safety shield

### 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 PC 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 device.

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 Auto-sampler plus is recognized by the PC software. To accomplish this, you must comply with the procedures specified. The following steps are necessary:

### 1 Installing the software

- Insert the PC 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 20* and .
- Connect the instrument to the power supply if you have not already done this.
- 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.

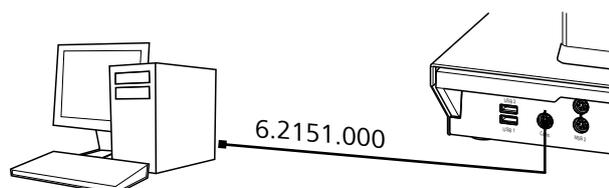


Figure 12 Connecting the computer

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.

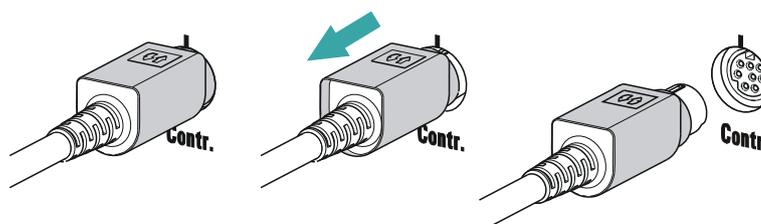
### 3 Follow the instructions of the installation wizard.

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



#### NOTE

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 will first need to pull back the outer plug sleeve marked with arrows.



### Registering and configuring the instrument in the PC software

The instrument must be registered in the configuration of your PC 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 PC 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 PC 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.

The control instrument determines which peripheral devices are supported.

**NOTE**

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.

**CAUTION**

Exit the control software before you plug in MSB instruments. 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.

**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 Chapter "Technical data".

Proceed as follows:

**1 Mounting the ferrite core**

Fasten a T.2400.102 ferrite core to the Dosino connection cable near 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 instrument.
- Start the control software.

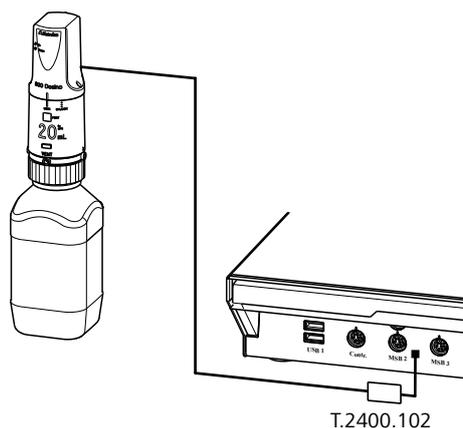


Figure 13 Connecting a dosing device

### 3.8.2 Connecting a stirrer or titration stand

You can use the following instruments:

- With built-in magnetic stirrer (stirring "from below"):
  - 801 Stirrer
  - 803 Ti Stand
- Without built-in magnetic stirrer (stirring "from above"):
  - 804 Ti Stand with propeller 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 propeller stirrer to the stirrer connector (socket with stirrer symbol) of the titration stand.
- Start the control software.

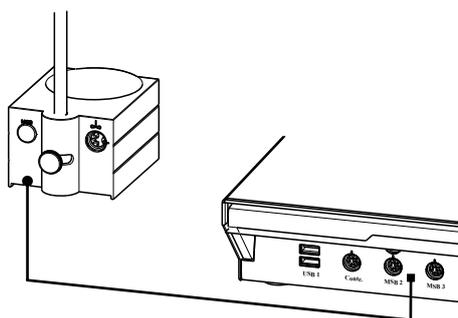


Figure 14 Connecting an MSB stirrer

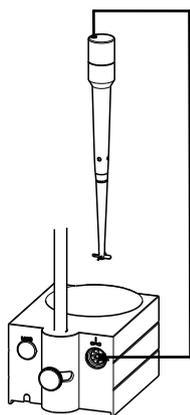


Figure 15 Connecting the propeller stirrer to the titration stand

### 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 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. No exchange of data is possible, however.

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.

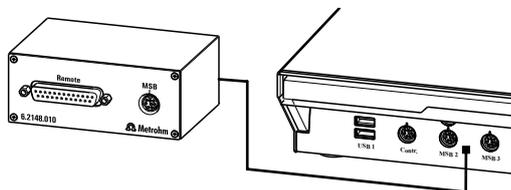


Figure 16 Connecting the Remote Box

You can, for example, connect an 849 Level Control (fill level monitoring in a canister) or a 731 Relay Box (switch box for 230/110 volt alternating current sockets and low-voltage direct current outlets). 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 Filter

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

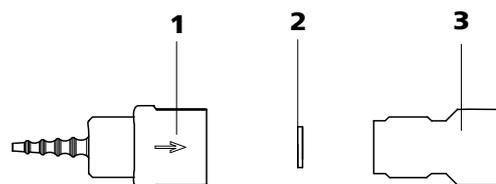


Figure 17 Pump tubing connection – Replacing the filter

**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.



## 4.3 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.

## 4.4 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.



## 4.5 Quality Management and qualification with Metrohm

### Quality management

Metrohm offers you comprehensive support in implementing quality management measures for instruments and software. Further information on this can be found in the brochure "**Metrohm Quality Management**" available from your local Metrohm representative.

### Qualification

Please contact your local Metrohm representative for support in qualification of instruments and software. The **Installation Qualification (IQ)** and **Operational Qualification (OQ)** are offered by Metrohm representatives as a service. They are carried out by trained employees using standardized qualification documents and in accordance with the currently applicable requirements of the regulated industry. Further information on this can be found in the brochure "**Analytical Instrument Qualification – Confidence in quality with IQ/OQ**".

### Maintenance

The electronic and mechanical functional groups of Metrohm instruments can and should be checked by specialist personnel from Metrohm as part of a regular preventive maintenance schedule. Please ask your local Metrohm representative regarding the precise terms and conditions involved in concluding a corresponding maintenance agreement. Further information on this can be found in the brochure "**Metrohm Care Contracts – Protect your investment the smart way**" available from your local Metrohm representative.

## 5 Troubleshooting

### 5.1 Problems and their solutions

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



## 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.

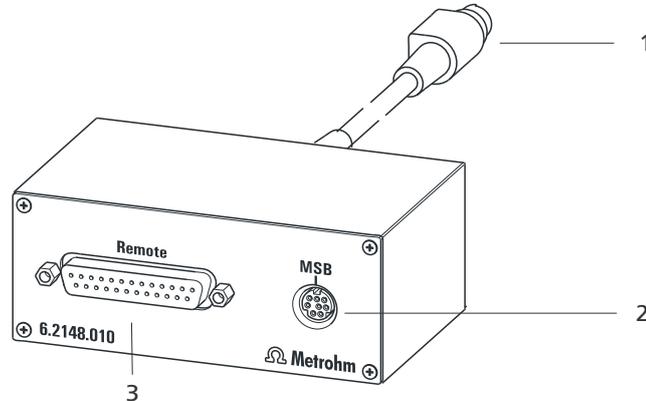


Figure 19 Connectors of the remote box

### 1 Cable

For connecting the Autosampler.

### 2 MSB connector

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

### 3 Remote connector

For connecting devices with a remote interface.

### 6.2.1 Pin assignment of the remote interface

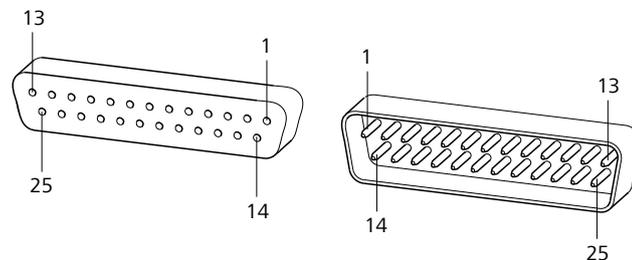
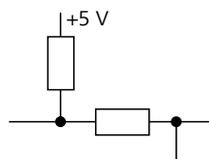


Figure 20 Pin assignment of the remote socket and plug

The above presentation of the pin assignment of a Metrohm remote interface applies not only for the remote box, but also for all Metrohm devices with 25-pin D-Sub remote connection.

#### Inputs



approx. 50 k $\Omega$  Pull-up

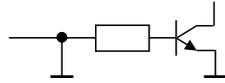
$t_p > 20$  ms

active = low, inactive = high



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

### Outputs



Open Collector

$t_p$   $t_p > 200$  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 **CONTROL** 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 volts	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
<i>Lift rate</i>	adjustable, 5...25 mm/s
<i>Turntable speed</i>	adjustable, 3...20 angle degrees/s

### 7.2 Two-channel peristaltic pump

<i>Pump rate</i>	6...90 rpm, adjustable in 15 steps each in both directions of rotation
<i>Typical flow rate</i>	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.
<i>Maximum pressure</i>	4 bar (0.4 MPa)
<i>Conveyable liquids</i>	Clear liquids without solids
<i>Tubing materials</i>	PVC (Tygon® ST), PVC (Tygon® LFL), PP

### 7.3 Interfaces and connectors

<i>Controller connector</i>	USB Upstream port (9-pin Mini DIN socket) for connecting a computer for controlling the 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 Metrohm instruments or USB peripheral devices of other manufacturers.
<i>Stirrer connector</i>	DIN socket
<i>Stirring rate</i>	722/802 propeller stirrer: 180...3000 rpm 741 magnetic stirrer: 180...2600 rpm adjustable in 15 steps each in both directions of rotation
<i>Pump connectors</i>	Two M8 sockets 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 Mains connection

<i>Voltage</i>	100...240 V ( $\pm 10\%$ )
<i>Frequency</i>	50...60 Hz
<i>Power consumption</i>	115 W
<i>Fuse</i>	2.0 ATH

## 7.5 Safety specifications

This device fulfills the following electrical safety requirements:



CE designation in accordance with the EU directives:

- 2006/95/EC (Low Voltage Directive, LVD)
- 2004/108/EC (EMC Directive, EMC)



Federal Inspectorate for Heavy Current Installations ESTI (Accreditation Number SCEsp 033)

- Safety mark for certification type 2 in accordance with NEV (type testing with market monitoring, EMC conformity)

*Design and testing*

According to EN/IEC/UL 61010-1, CSA-C22.2 No. 61010-1, EN/IEC 61010-2-081, degree of protection IP20, protection class I.

*Safety instructions*

This document contains safety instructions which have to be followed by the user in order to ensure safe operation of the instrument.

## 7.6 Electromagnetic compatibility (EMC)

<i>Standards fulfilled</i>	<b>Emission</b>
	▪ EN/IEC 61326-1
	▪ EN/IEC 61000-6-3
	▪ EN 55022 / CISPR 11
	▪ EN/IEC 61000-3-2

<i>Standards fulfilled</i>	<b>Immunity</b>
	▪ EN/IEC 61326-1
	▪ EN/IEC 61000-6-2
	▪ EN/IEC 61000-4-2
	▪ EN/IEC 61000-4-3
	▪ EN/IEC 61000-4-4
	▪ EN/IEC 61000-4-5
	▪ EN/IEC 61000-4-6
	▪ EN/IEC 61000-4-8
	▪ EN/IEC 61000-4-11

- EN/IEC 61000-4-14
- EN/IEC 61000-4-28
- NAMUR

## 7.7 Ambient temperature

<i>Nominal function range</i>	5...45 °C Humidity < 80% (at temperatures under 30 °C) Humidity < 50% (at temperatures under 45 °C)
<i>Storage</i>	-20...60 °C Humidity < 95% (at temperatures under 40 °C) Humidity < 85% (at temperatures under 50 °C) Humidity < 50% (at temperatures under 60 °C)
<i>Transport</i>	-40...60 °C Humidity < 95% (at temperatures under 40 °C) Humidity < 85% (at temperatures under 50 °C) Humidity < 50% (at temperatures under 60 °C)

## 7.8 Reference conditions

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

## 7.9 Dimensions

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



The same warranty periods that are specified for a corresponding new part apply to parts that are replaced or repaired within the above-mentioned warranty periods. However, replacement or repair of a part does not extend the warranty period of the entire system.

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.

Metrohm also offers a 120-month spare parts availability guarantee and a 60-month PC software support warranty, calculated from the date on which the product is withdrawn from the market. The content of this warranty is the ability of the customer to obtain functioning spare parts or appropriate software support at market prices during the time of the warranty period. This does not apply for software products sold under the Metrohm NIRSystems brand.

If Metrohm AG is unable to meet this obligation due to circumstances beyond the control of Metrohm AG, then the ordering party shall be offered alternative solutions at preferential conditions.



The **Partslists** webpage will be displayed.

**7** Select the desired output language.

**8** With the article number entered, click on the command **Generate PDF**.

The PDF file with the accessories data will be created in the language selected.

### **Direct access for all instruments**

If you are unable to find your instrument using the search as described above, this may be due to the instrument not being sold anymore. Using the article number, you can download accessories lists for all instruments as follows:

#### **Downloading the accessories list**

**1** Type <http://partslists.metrohm.com> into your Internet browser.

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The PDF file with the accessories data will be created in the language selected.



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