

858 Professional Sample Processor



Manual

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1 Introduction

1.1 Area of application

The 858 Professional Sample Processor is an instrument with many applications that was conceived for preparing samples for ion chromatography. Inline filtration, dialysis, preparing dilutions, sample preconcentration, inline calibration, partial loopfill, etc. are techniques that can be used with the 858 Professional Sample Processor without any problem. The entire array of sample preparation techniques can be automated in time-saving manner.

Thanks to its proven USB interface, the 858 Professional Sample Processor 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.

The equipment with a Swing Head with a robotic arm makes it possible to approach any given point on a sample rack. As a result, the number (maximum 999 rack positions) and sequencing of the samples on the sample rack is almost completely unlimited. Customer-specific special racks for individual requirements can be fabricated upon request.

1.2 Instrument description

The 858 Professional Sample Processor has the following characteristics:

- Turntable with interchangeable sample rack. The prefabricated sample racks can hold various numbers of different vessel types and sizes. Any number of reserved special positions can be defined on the rack.
- Tower with a robust lift. The lift is equipped with a precision drive with robotic arm to which a needle holder or other working heads can be attached.
- Three MSB connectors (Metrohm Serial Bus), each for controlling an 800 Dosino, an 801 Magnetic 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.

Depending on the model:

- Two-channel peristaltic pump
- Returnable injection valve

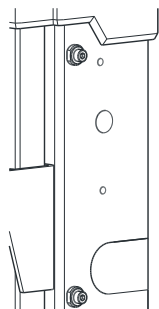


1.3 Model versions

The 858 Professional Sample Processor is available in various models with a number of different accessories.

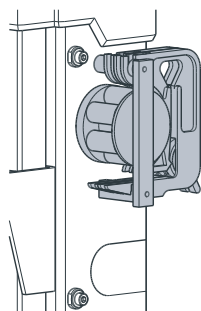
Table 1 Model versions of the 858 Professional Sample Processor

Model 2.858.0010



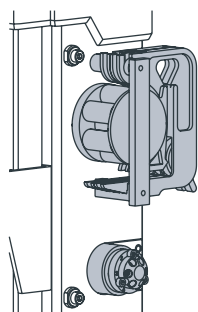
- Tower with 786 Swing Head and robotic arm
- 2 pump connectors
- 1 stirrer connector
- 3 connectors for dosing devices and/or stirrers
- 2 USB connectors
- Controller connection for connection to PC

Model 2.858.0020 with peristaltic pump



- Tower with 786 Swing Head and robotic arm
- Peristaltic pump
- 2 pump connectors
- 1 stirrer connector
- 3 connectors for dosing devices and/or stirrers
- 2 USB connectors
- Controller connection for connection to PC

Model 2.858.0030 with peristaltic pump and injection valve



- Tower with 786 Swing Head and robotic arm
 - Injection valve
 - Peristaltic pump
 - 2 pump connectors
 - 1 stirrer connector
 - 3 MSB connectors for dosing devices and/or stirrers
 - 2 USB connectors
 - Controller connection for connection to PC
-

1.4 Intended use

The 858 Professional Sample Processor 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.

This instrument is suitable for processing chemicals and flammable samples. Therefore, the use of the 858 Professional 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.

1.5 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.

1.5.1 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.

1.6 Safety instructions

1.6.1 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.

1.6.2 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.

1.6.3 Personnel safety**WARNING**

Wear protective goggles and working clothes suitable for laboratory work while operating the 858 Professional 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 858 Professional 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**

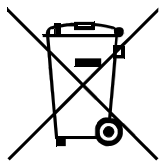
In the event of a possible blockage of a drive, the power plug must be pulled out of the socket immediately. Do not attempt to free jammed sample vessels or other parts while the device is switched on. Blockages can only be cleared when the instrument is in a voltage-free status; this action generally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

**WARNING**

The 858 Professional 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.

1.7 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

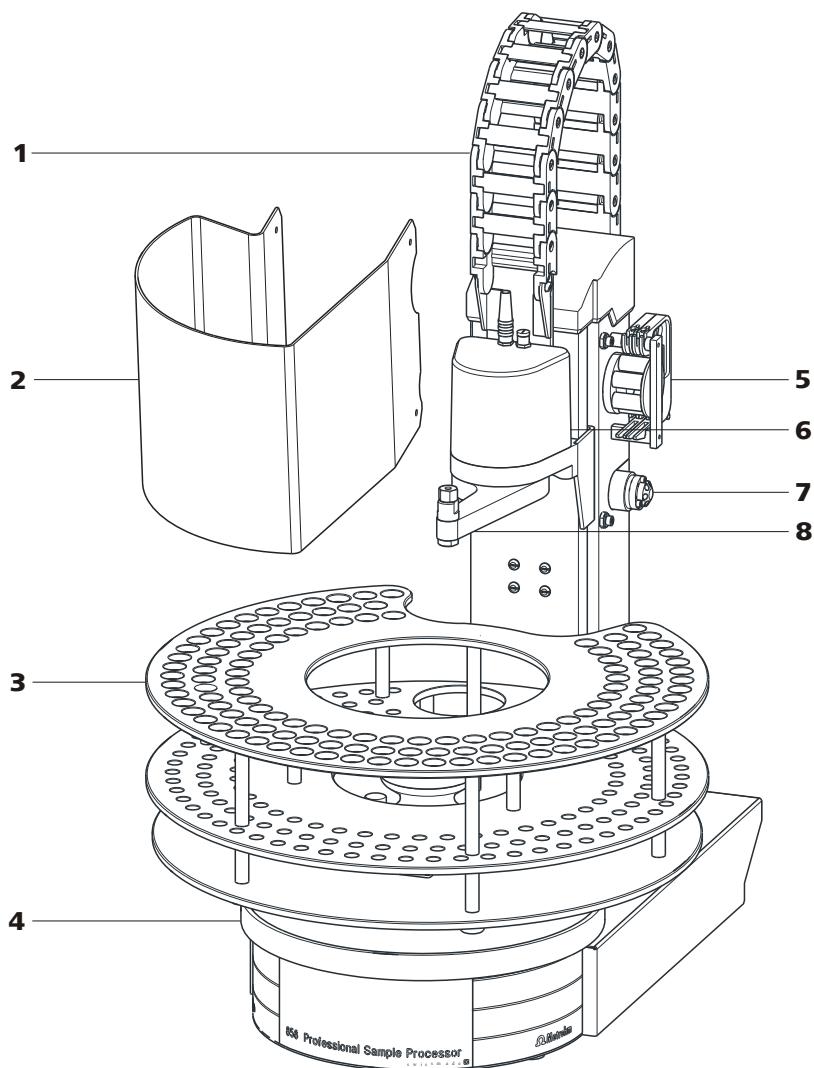


Figure 1 Front 858 Professional Sample Processor

1	Guide chain	2	Safety shield
3	Sample rack	4	Assembly rail
5	Peristaltic pump Depending on the model version	6	Swing Head
7	Injection valve Depending on the model version	8	Robotic arm with needle adapter (6.1462.030)

2.2 Rear

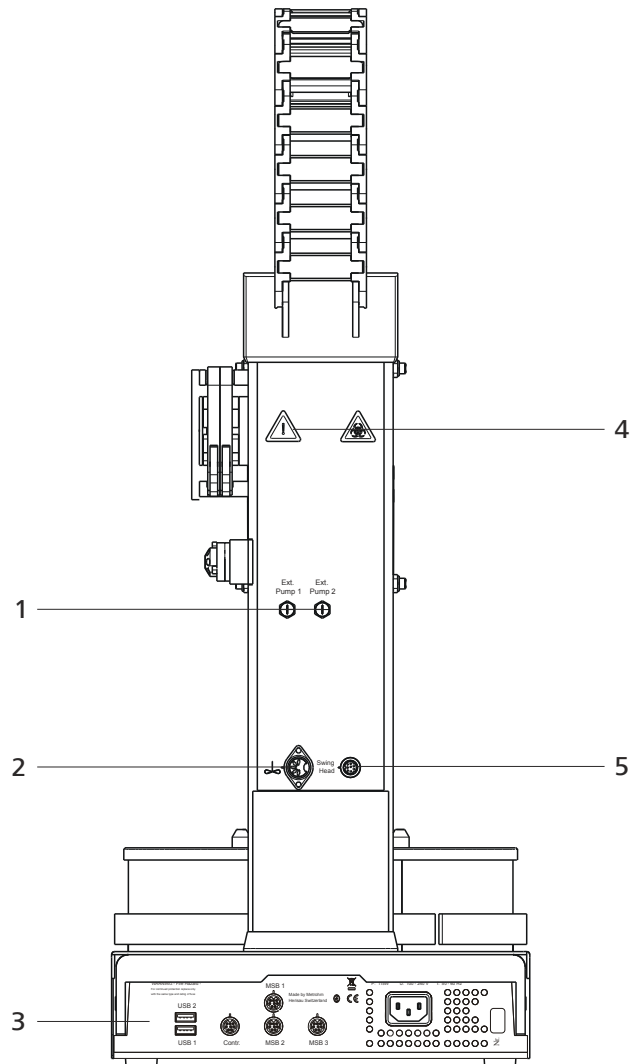


Figure 2 Rear 858 Professional Sample Processor

1 Pump connectors

M8 connector for external pumps

3 Connector strip

Details (see chapter 2.3, page 10)

5 786 Swing Head connector

2 Stirrer connector

For rod stirrer and 741 Magnetic Stirrer

4 Warning symbols

(see chapter 1.6.3, page 5)



2.3 Connector strip

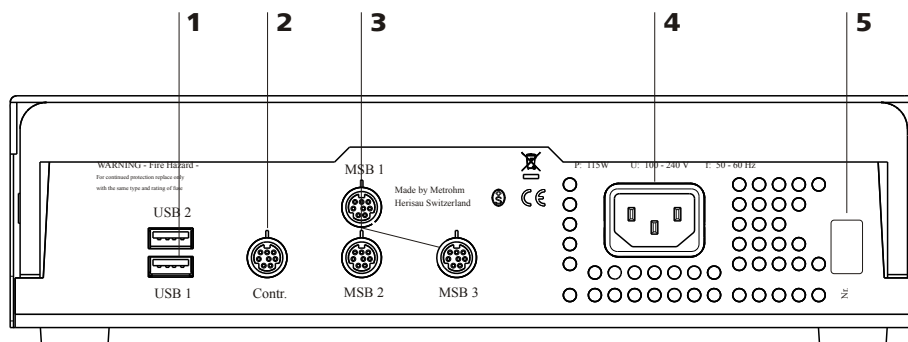


Figure 3 Connector strip 858 Professional Sample Processor

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

2.4 Sample racks

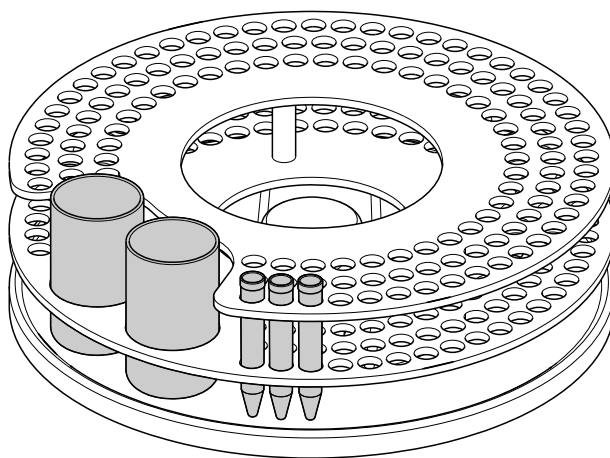


Figure 4 Sample rack with sample vessels

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 858 Professional Sample Processor requires sample racks with up to a maximum of **42 cm in diameter** or smaller.

Attaching a rack

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

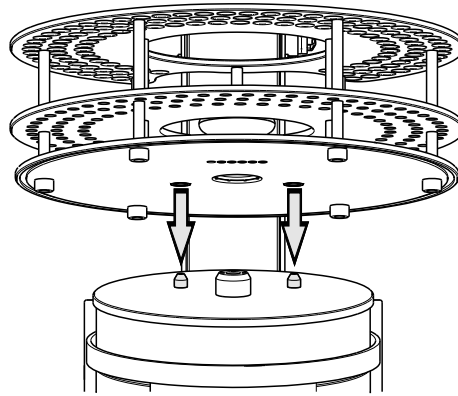


Figure 5 Attaching a sample rack

Certain sample racks have a handle with a fixing 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.

Recommended sample racks for the 858 Professional Sample Processor:

Qty.	Order no.	Description	
	6.2041.440	Sample rack 148 x 11 mL	
		Sample rack for 148 samples at 11 mL with 3 rinsing beakers	
		Outer diameter (mm): 420 Hole diameter (mm): 17 / 68	
	6.2041.760	Sample rack for IC Sample Processor, 54 x 11 mL + 1 x 300 mL	
		Sample rack with small diameter for 54 x 11 mL sample vessels in two rows and additionally 1 x 300 ml bottle	
		Outer diameter (mm): 270 Hole diameter (mm): 17 / 68	



Other user-defined racks can be supplied upon request and the required rack data can be defined in the control software. Any arrangement of rack positions is possible. The magnet code for user-defined racks is **110000**.

Magnet codes

Every single sample rack can be unambiguously identified by means of a magnet code. Magnetic pins in a holder attached on the underside of the rack can be combined to make a binary, six-digit code. The Sample Processor can thus recognize automatically which rack is in place.

When replacing a rack, this should first be returned to starting position using the **Rack initialization** function (see "Manual Operation" in the control software). 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 for each rack position the rotation angle and the distance to the middle of the rack is defined.

The standard racks supplied by Metrohm are already provided with a pre-defined magnet code for each type.

Format of the magnet code (example):

000001	only one magnet is inserted, Bit 0
000101	two magnets are inserted, Bit 0 and 2

2.5 The Swing Head

The 786 Swing Head is an auxiliary drive for the Metrohm Sample Processor series, e.g. the 858 Professional Sample Processor. It is a high-precision motor drive that makes it possible to move to any point position on a sample rack. Even positions outside of the sample rack are reachable when a suitable robotic arm is used.

The Swing Head with a robotic arm is already pre-installed on the 858 Professional Sample Processor.

Left-swinging or right-swinging models are available as different types of robotic arms. "Left-swinging" means swinging from the initial position (pointing towards the middle of the rack) outwards to the left.

The following diagram illustrates the most important configuration data that needs to be set in the control software to ensure correct usage of a robotic arm (left-swinging, here).

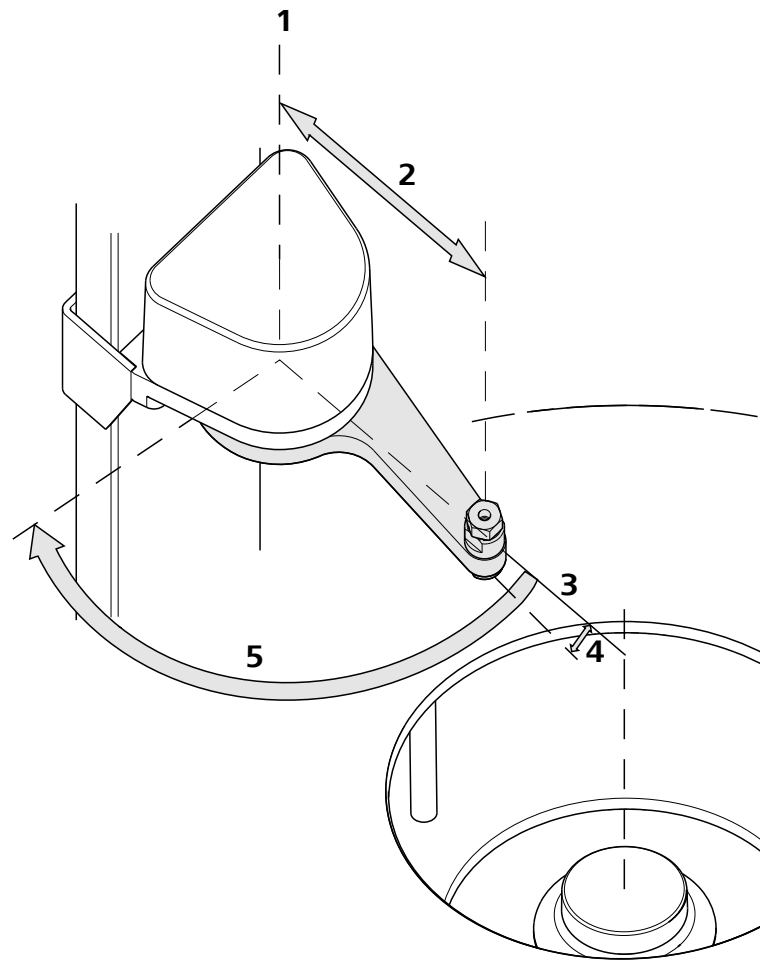


Figure 6 Swing Head - Configuration data

1 Swing axis

This runs through the middle of the Swing Head drive.

2 Swing radius

This is determined by the length of the robotic arm. The radius runs from the axis of rotation to the midpoint of the tip of the robotic arm.

3 Source axis

This runs from the swing axis to the midpoint of the sample rack and marks the initial position of the robotic arm.

4 Swing offset

This determines the 0° position of the robotic arm.

5 Max. swing angle

This stands for the swing range that the robotic arm can reach. The range runs from the source axis to the maximum possible robotic arm position.

The configuration data of a robotic arm can be read on its underside or can be found on an accompanying sheet. Before mounting a robotic arm, the configuration data must be set in the control software.



If a Swing Head drive is mounted with a **6.2058.020 adapter** in order to use racks smaller than intended, then the **axial distance** must be modified in the configuration of the control software. The corresponding data can be found on the accompanying sheet of the 6.2058.020. The axial distance refers to the distance of the swing axis (see figure) and of the axis of rotation (middle point) of the sample rack.

2.6 Peristaltic pump

The peristaltic pump (for the model versions 2.858.0020 and 2.858.0030) can be used as a 1-channel or 2-channel pump. One or two 6.2755.000 tubing cartridges can be mounted.

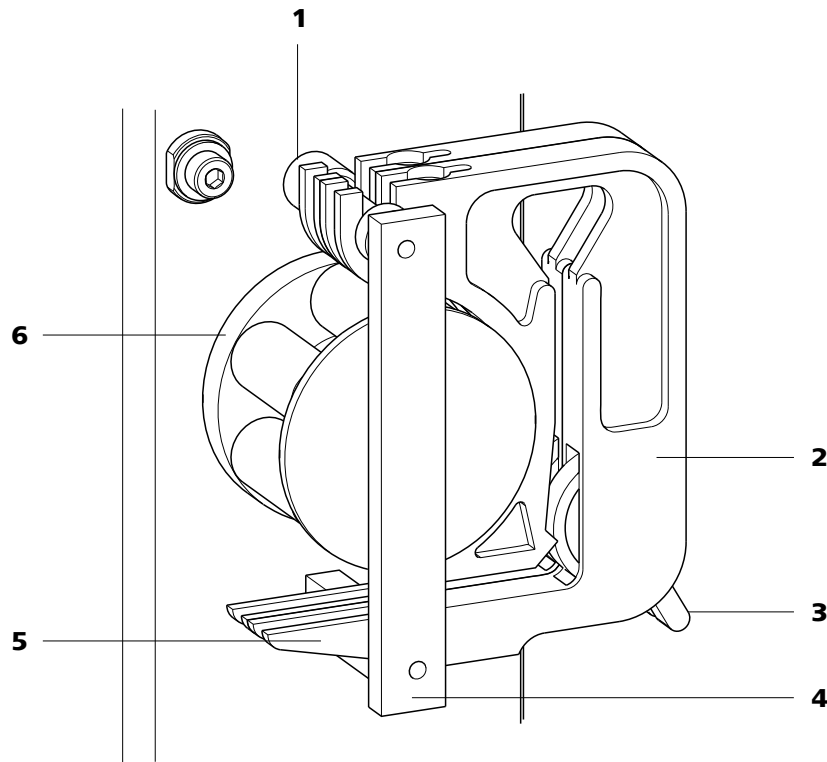


Figure 7 Peristaltic pump

<p>1 Mounting bolt For engaging the tubing cartridge</p>	<p>2 Tubing cartridge 6.2755.000 For 6.1826.0X0 pump tubings</p>
<p>3 Contact pressure lever For regulating the contact pressure</p>	<p>4 Retaining bracket</p>
<p>5 Snap-action lever For loosening the tubing cartridge</p>	<p>6 Pump drive Roller head with contact pressure rollers</p>

2.7 Injection valve

The injection valve (for the model version 2.858.0030) can be used with its connectors 1 to 6 (see figure) for complex sample preparation steps.

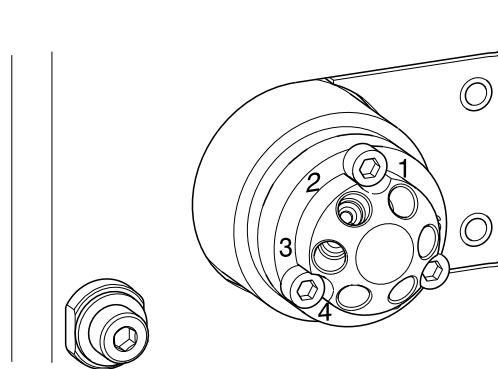


Figure 8 Injection valve

The connections of the connectors in the switching positions **FILL** and **INJECT** can be found in the schematics shown below.

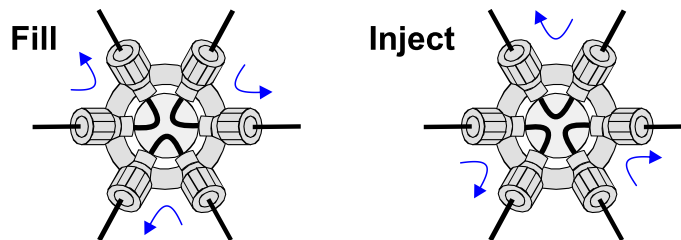


Figure 9 Fill / Inject

The injection valve must be covered with the red protective cap to protect it against dust contamination when not in use.

If the Swing Head is not connected, connect it as follows:

1 Plugging in the cable

Guide the Swing Head connection cable through the guide chain of the tower (see chapter 3.7, page 23) and plug the Mini DIN plug into the 'Swing Head' socket.

3.3 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.

3.4 Mounting the retaining plate

When removing samples from sealed vessels with the needle, the 6.2064.000 retaining plate is used for stripping vials while the lift is moving upward.

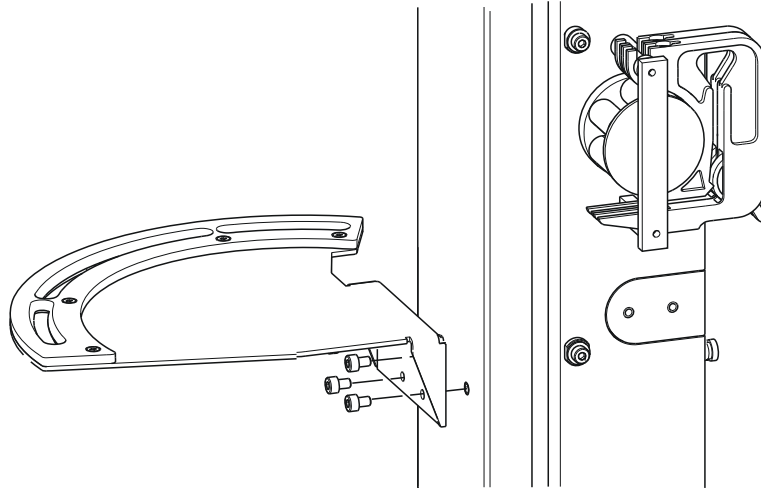


Figure 11 Mounting the retaining plate

1 Mounting the retaining plate

Fix the plate to the front of the tower with the four hex screws provided. The hex key required is part of the accessories.

3.5 Mounting a filtration cell holder or Dosino holder

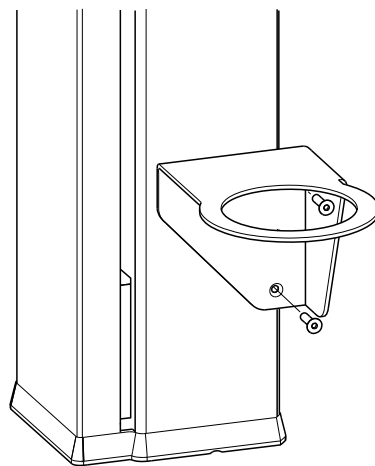


Figure 12 Installing the filtration cell holder / Dosino holder

The filtration cell holder (6.2057.030) or the Dosino holder (6.2057.040) 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 or Dosino holder in place with the two screws supplied.

Installing the Dosino

If a Dosino is required, then it can be installed in the 6.2057.040 Dosino holder.

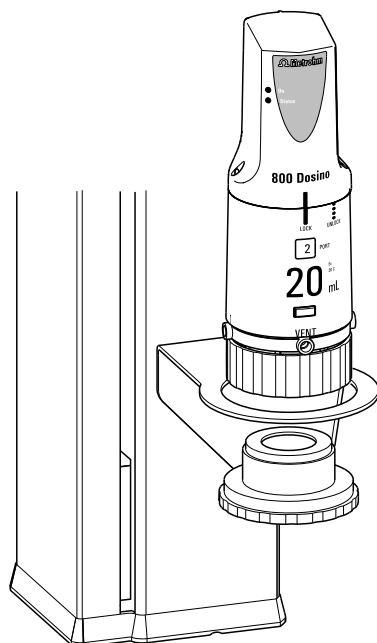


Figure 13 Mounting the Dosino

Mount the Dosino as follows:

1 Fixing the Dosino

- Guide the thread adapter GL 45 (6.1618.020) from below into the Dosino holder.
- Attach the dosing unit onto the Dosino holder and fasten the thread adapter.
- Connect the tubings.

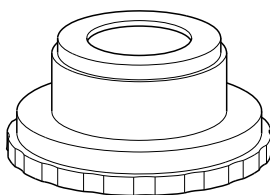


Figure 14 6.1618.020 Thread adapter



3.6 Mounting the stand plate

An external dilution or measuring cell can be mounted to the 858 Professional Sample Processor with the aid of a 6.2001.070 stand plate.

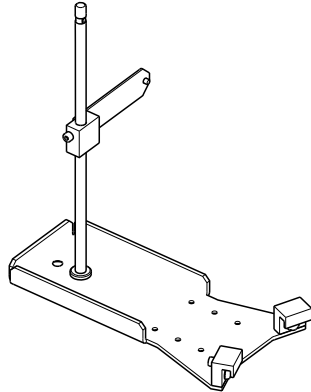


Figure 15 6.2001.070 Stand plate

Mount the stand plate as follows:

1 Mounting the support rod

- Plug together the cutting ring and the hex screw with the base plate (see below) and place it on a flat support surface.
- Place the support rod on the screw and screw tightly.
- Tighten the hex screw with a hex key of the proper size.

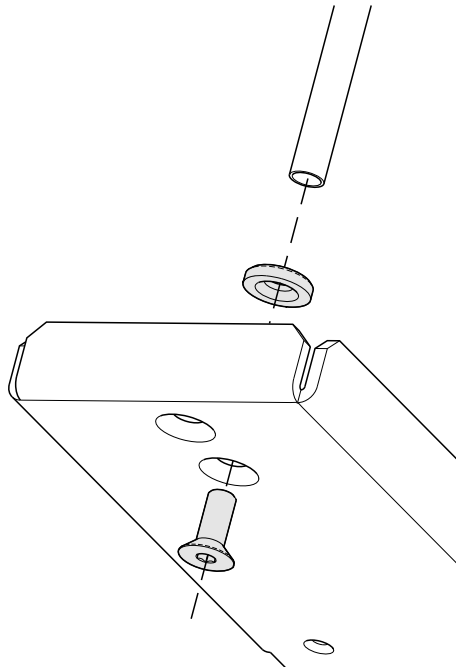


Figure 16 Mounting the support rod

2 Fastening the stand plate

- Hook the fixing clamps on the assembly rail.
- Tighten the hex screws of the fixing clamps.

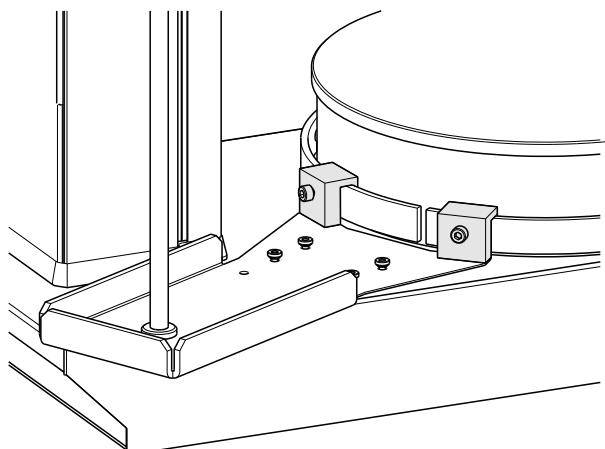


Figure 17 Mounting the stand plate

3 Mount the stirrer and dilution vessel

- Hang the magnetic stirrer (801 Stirrer) on the support rod and align it.
- Fix the orientation of the stirrer using the red knurled screw on the rear.
- Fasten the 6.2013.010 clamping ring, see the following figure.
- Fasten the dilution vessel lid to the support rod.

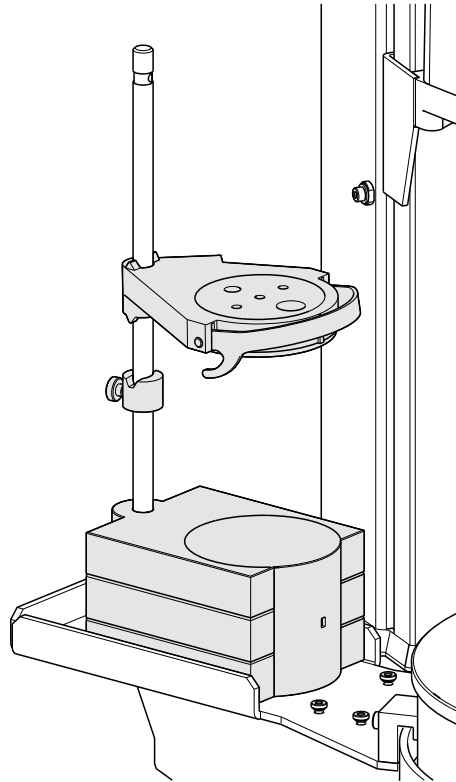


Figure 18 Mounting the stirrer and the dilution vessel

4 Mounting the cross strut

- Assemble the cross strut according to the drawing shown below.
- Fasten the cross strut provisionally to the support rod.

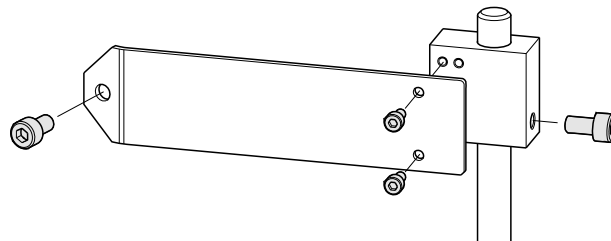


Figure 19 Mounting the cross strut

5 Fixing the support rod

- Screw the cross strut to the rear of the tower with the hex screw provided as shown below.
- Tighten all hex screws.

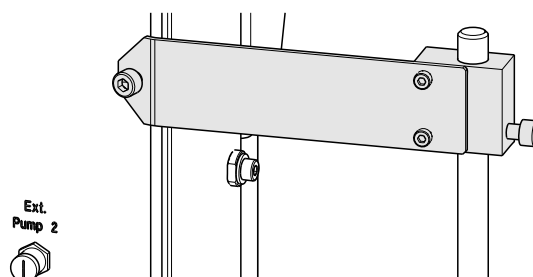


Figure 20 Fixing the support rod

The accessories for the dilution vessel and the necessary tubings and capillaries can then be attached. Additional information can be found in the documentation for the corresponding accessory set.

3.7 Placing tubing and cables in the guide chain

Tubing, capillaries 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, capillaries 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, capillaries 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.



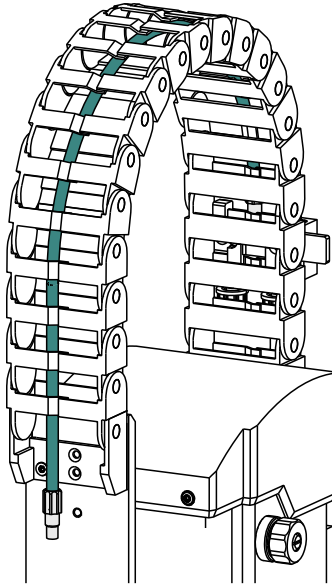
NOTICE

Make sure that tubing, capillaries and cables do not kink.

Inserting and removing the tubing, capillaries and cables requires no tools.

1 Placing tubing, capillaries and cables

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



2 Removing tubing, capillaries and cables

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

3.8 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.

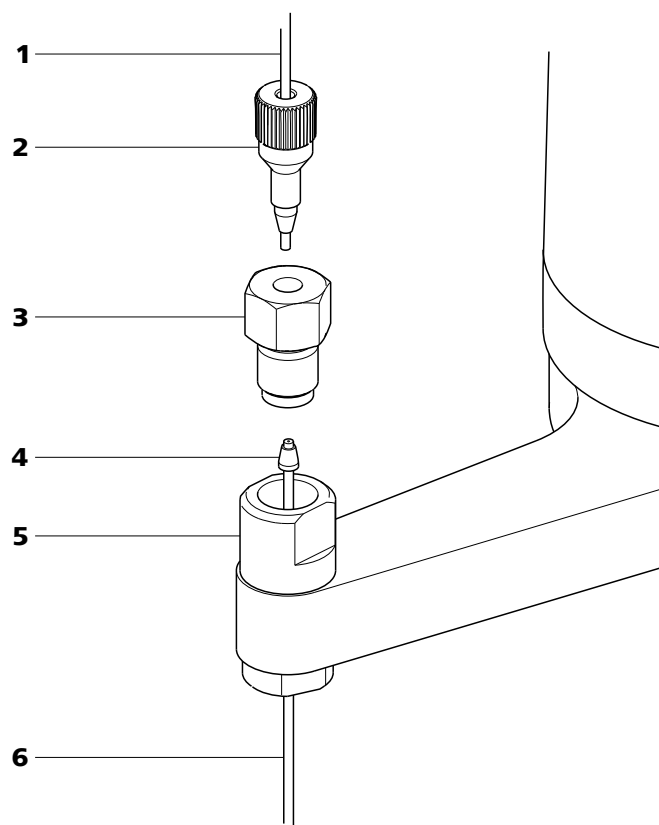


Figure 21 Installing the needle

1 PTFE capillary 6.1803.070 or 6.1831.050 / 6.1831.060 / 6.1831.080	2 PEEK pressure screw 6.2744.010
3 Nut 4.766.4320 (or 6.2833.020 + 6.2744.080)	4 Ferrule
5 Needle holder	6 Sample needle 6.2846.000 (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 PEEK pressure screw

Loosen and remove the nut (21-3) screwed onto the needle holder.

2 Inserting the needle

- Insert the needle from above partway into the opening of the needle holder (21-5).
- Slide the PEEK ferrule (21-4) over the needle from above. The narrow side of the seal must face upwards.

**3 Fastening the needle**

- Screw the nut (21-3) into the needle holder. Lightly push the needle upwards from below during the process.
- Tighten the nut in the needle holder by hand (do not use tools!).

4 Connecting the capillary

- Slide the 6.2744.010 PEEK pressure screw (21-2) over the end of the capillary.
- Manually tighten the PEEK pressure screw with the capillary on the nut of the needle holder. The capillary must be pushed in while doing so.

3.9 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 858 Professional Sample Processor 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.

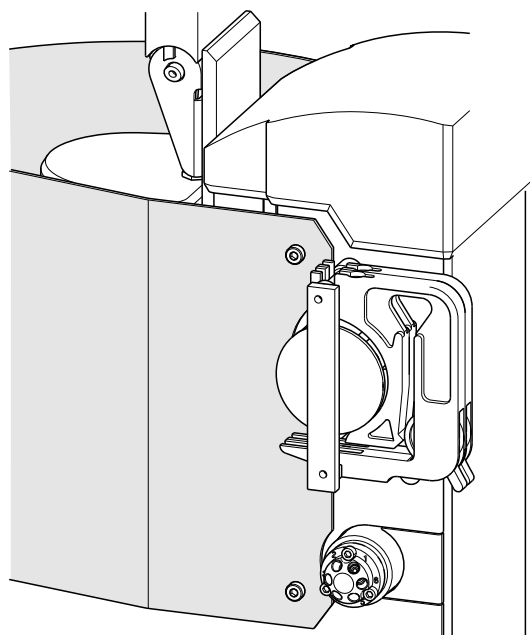


Figure 22 Mounting the safety shield

If a different robotic arm is used, then a different, suitable safety shield can be ordered from Metrohm.

3.10 Connecting the tower stirrer

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

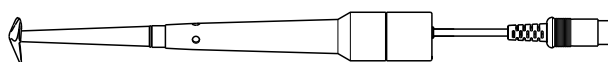


Figure 23 Rod stirrer 802 Stirrer

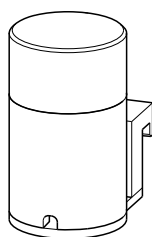


Figure 24 Magnetic stirrer 741 Stirrer

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.

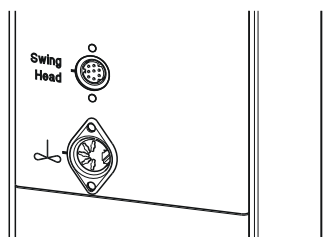


Figure 25 Connecting the tower stirrer



NOTICE

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

3.11 Connecting pumps

The 858 Professional Sample Processor is equipped with two connectors for external pumps which, for example, can be used for rinsing or applying suction to vessels. The appropriate pump models are:

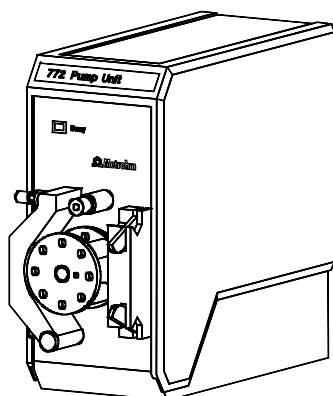


Figure 26 772 Pump Unit

The peristaltic pump **772 Pump Unit** is suitable for organic solvents and aqueous solutions containing precipitates.

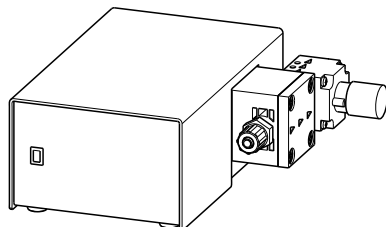


Figure 27 823 Membrane Pump Unit

The **823 Membrane Pump Unit** is suitable for aqueous media without precipitates.

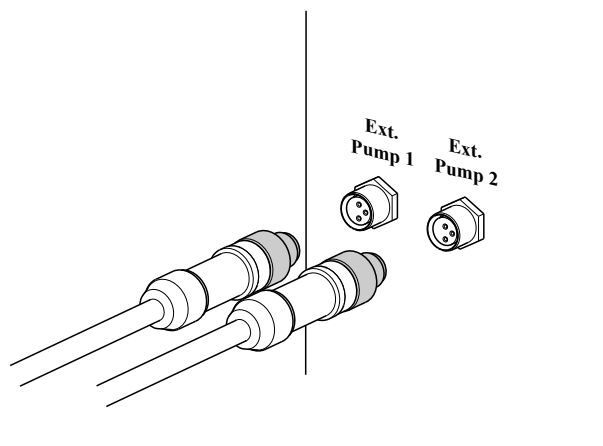


Figure 28 Connecting pumps

The two pump connectors are located on the rear side of the tower. Connect a pump as follows:

1 Connecting the connection cable

- Plug the M8 plug of the pump connection cable into one of the "Ext. Pump" connector sockets. Correct orientation of the 3 contact pins must be observed.
- Tighten the knurled screw at the front end of the plug by hand in clockwise direction. This will secure the plug.

The pump connectors (3-pole M8 plugs) supply 16 Volt feed voltage and may not be loaded with more than a maximum of 600 mA.

3 Connecting the aspiration side

Place a 6.2744.030 tubing olive (29-2) on the aspiration side of the pump tubing.

4 Connecting the pressure side

- Slide the union nut (29-6) of the 6.2744.160 pump tubing connection (without filter) onto the pump tubing.
- Select a suitable adapter (29-7) (depends on the outer diameter of the pump tubing) and slide it onto the pump tubing.
- Place the tubing olive (29-8) onto the pump tubing.
- Screw the union nut (29-6) tight on the tubing olive (29-8).

5 Inserting 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.

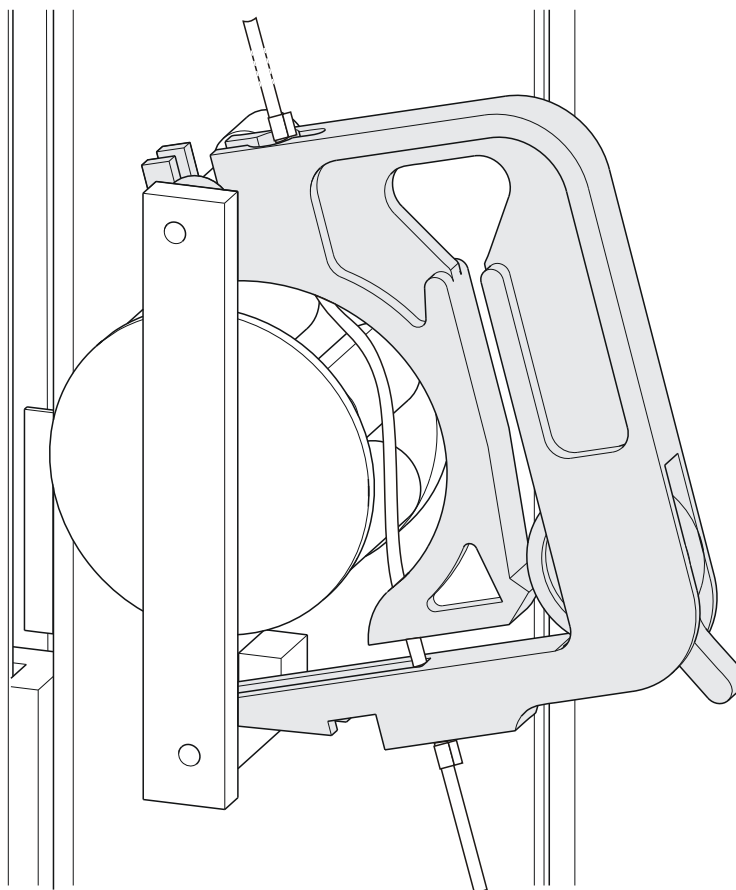


Figure 30 Inserting the tubing cartridge



6 Connecting the capillaries

- Screw the respective capillaries tightly to the two tubing olives with PEEK pressure screws (29-1).

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 Setting the contact pressure

- Press the contact pressure lever (29-5) all the way forward.
- Switch on the drive of the peristaltic pump.
- Then release the contact pressure lever gradually until the liquid is suctioned for the first time.
- Now release the contact pressure lever by two latch positions.

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

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

3.13 Connecting a computer

The 858 Professional Sample Processor 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 858 Professional Sample Processor 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 the instrument to the power grid if you have not already done this (see chapter 3.3, page 17).
- 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.

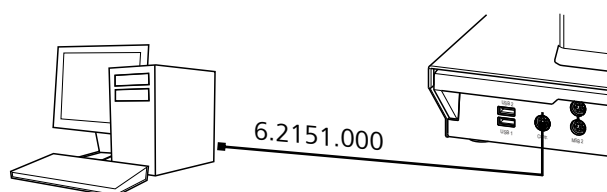


Figure 31 Connecting the computer

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.

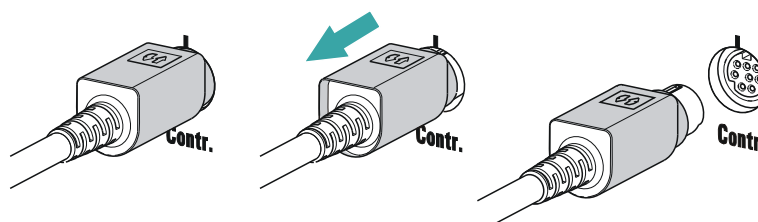
3 Follow the instructions of the installation wizard.

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.

3.14 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.

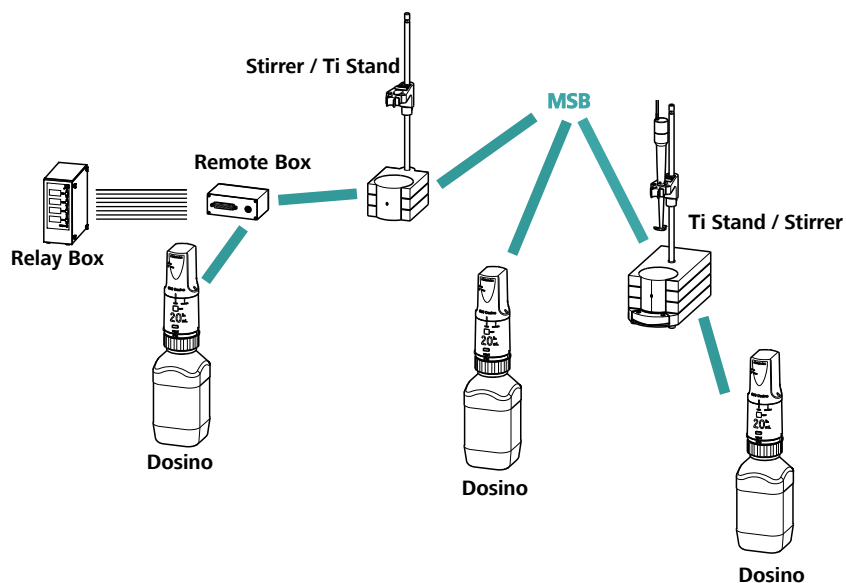


Figure 32 MSB connections

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.



3.14.1 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 858 Professional 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

- 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.

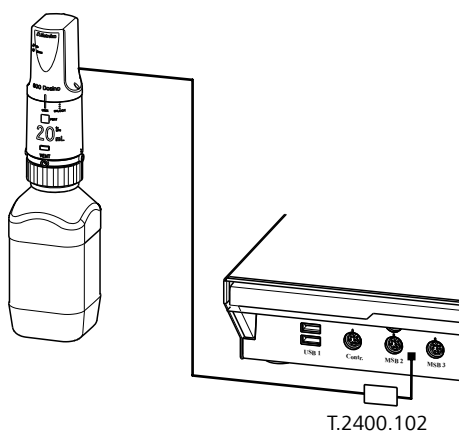


Figure 33 Connecting a dosing device

3.14.2 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.

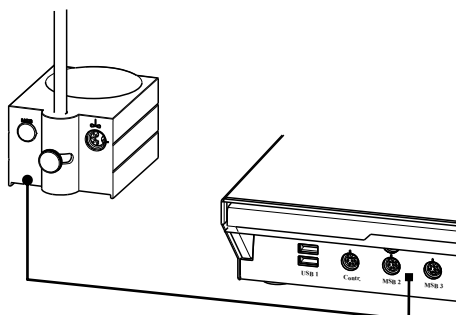


Figure 34 Connecting an MSB stirrer

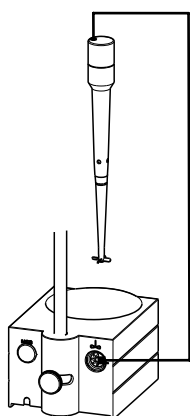


Figure 35 Connecting the rod stirrer to the titration stand

3.15 Connecting USB devices

Two USB connectors (type A sockets) are available for connecting instruments with an USB interface. The 858 Professional 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.



NOTICE

When connecting an USB device, the control instrument automatically recognizes which device is connected. The control software enters a connected USB device automatically into the system configuration (device manager).

3.15.1 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.

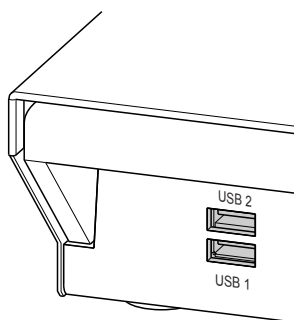


Figure 37 USB connectors

2 Configuring the barcode reader in the control software

- Configure the barcode reader in the configuration of the control software, as described in the online help of the software.



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 control software.
 - 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.

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 (38-2) should be replaced every three months and more frequently with higher backpressure.

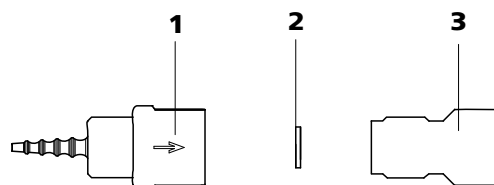


Figure 38 Pump tubing connection – Replacing the filter

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 pressure in the system markedly increases.	<i>Injection valve – Valve blocked.</i>	Rinse the valve with water in the opposite direction or have it cleaned (by Metrohm service technician).
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 values for Swing radius , Swing offset etc. in the control software under "Configuration".
	<i>Sample Processor – The axial distance is not correctly configured.</i>	Enter the correct value for Axial distance in the control software under "Configuration".
	<i>Sample Processor – The wrong rack table is being used.</i>	Initialize the rack using the function Initialize rack in the "Manual Control" of the control software.
The peristaltic pump is pumping too little.	<i>Peristaltic pump – Contact pressure too weak.</i>	Correctly set the contact pressure .
	<i>Peristaltic pump – Filter blocked.</i>	Replace the filter .
	<i>Peristaltic pump – Pump tubing defective.</i>	Replace the pump tubing .
Precision problems - the measured values are highly scattered.	<i>Injection valve – Sample loop.</i>	Check the installation of the sample loop.
	<i>Injection valve – Defective.</i>	Contact Metrohm Service.

6 Appendix

6.1 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.

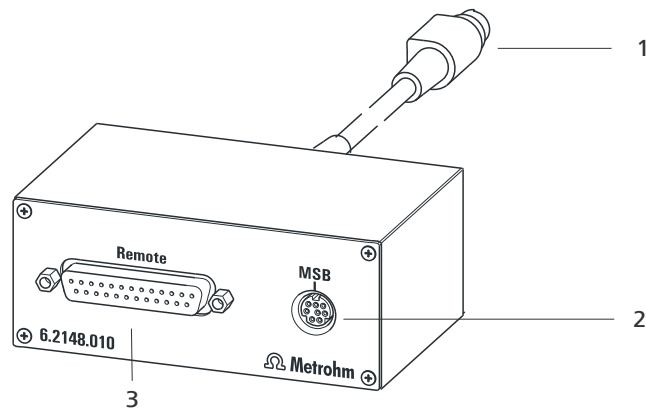


Figure 39 Connectors of the Remote Box

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.

6.1.1 Pin assignment of the remote interfaces

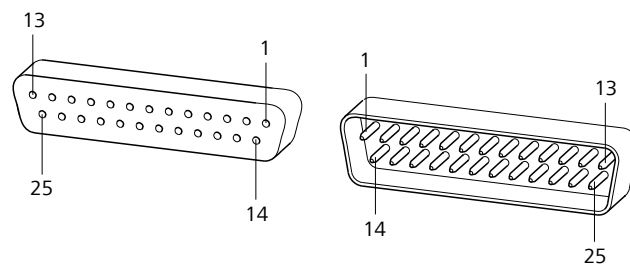
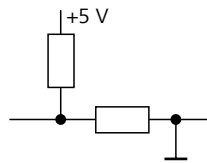


Figure 40 Pin assignment of remote socket and remote plug

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



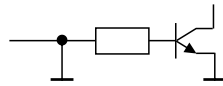
approx. 50 k Ω Pull-up

$t_p > 20$ 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 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 data

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>Shift rate</i>	Adjustable, 3...20 angle degrees/sec

7.2 786 Swing Head

<i>Maximum load</i>	Approx. 15 N
<i>Swing rate</i>	10...55 angle degrees/sec
<i>Beaker sensor connector</i>	M8 socket

7.3 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 pump tubing 6.1826.320 The effective flow rate is dependent on contact pressure and type of tubing.
<i>Maximum pressure</i>	4 bar (0.4 MPa)
<i>Conveyable fluids</i>	Clear fluids without solids
<i>Tubing materials</i>	PVC (Tygon® ST), PVC (Tygon® LFL), PP



7.4 Injection valve

Positions Fill...Inject

7.5 Interfaces and connectors

Controller connection USB Upstream Port (9-pin Mini DIN socket) for connecting a computer to the control system of the device.

*MSB connectors
MSB1...MSB3* Three 9-pin Mini DIN sockets for connecting dosing devices, 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

Rod Stirrer 722/802: 180...3000 rpm

Magnetic Stirrer 741: 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 ± 1 V, I= ≤ 0.8 A

Swing Head connector 9-pin Mini DIN socket

7.6 Power connection

Voltage 100...240 V (±10%)

Frequency 50...60 Hz

Power consumption 115 W

Fuse 2.0 ATH

7.7 Ambient temperature

<i>Nominal working range</i>	5...45 °C Relative humidity <80% (below 30 °C) Relative humidity <50% (below 45 °C)
<i>Storage</i>	-20...60 °C Relative humidity <95% (below 40 °C) Relative humidity <85% (below 50 °C) Relative humidity <50% (below 60 °C)
<i>Transport</i>	-40...60°C Relative humidity <95% (below 40 °C) Relative humidity <85% (below 50 °C) Relative humidity <50% (below 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>	0.73 m
<i>Depth</i>	0.50 m
<i>Weight (without accessories)</i>	1.858.0010: 15.50 kg 1.858.0020: 15.55 kg 1.858.0030: 15.85 kg
<i>Material</i>	
<i>Housing</i>	Metal housing, surface-treated

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