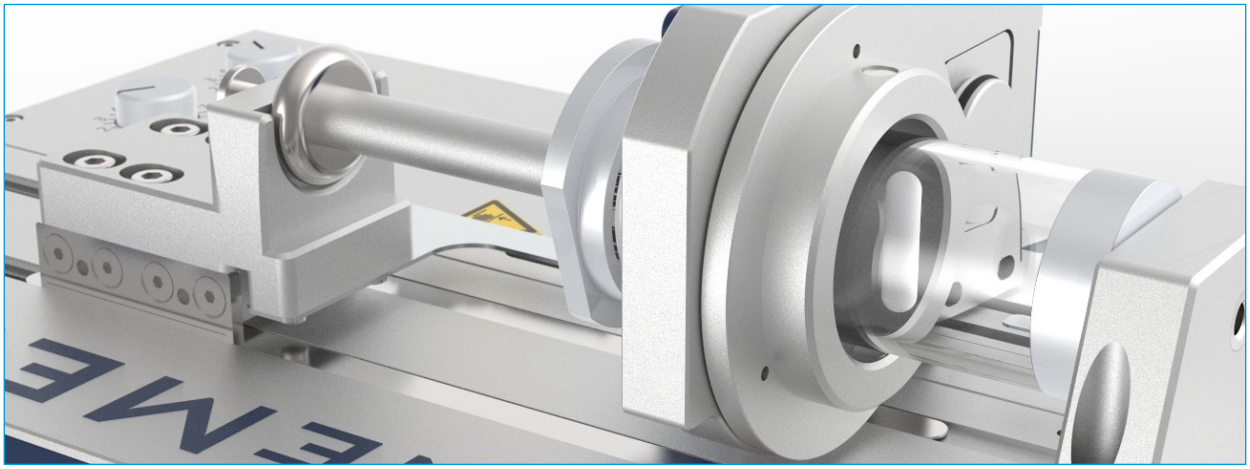
CETONI

CE Nemix 50

Manual Hardware



ORIGINAL MANUAL 2.04– OCTOBER 2023

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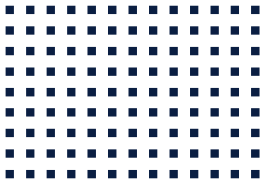


1 Overviews & Indexes

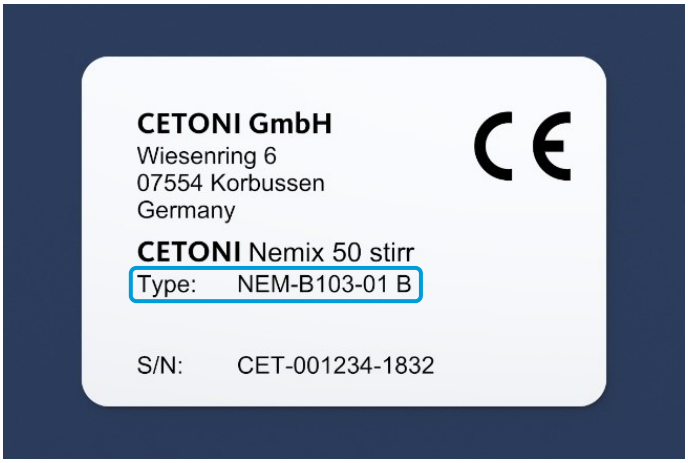
1.1 Table of Contents

1.2 Revision History

REV	DATE	AMENDMENT	VALID FOR
1.00	08.04.2013	Initial Version	NEM-B102-01 A along with NEM-B103-01 A
2.00	02.12.2016	New Design, new syringe holders	NEM-B102-01 B along with NEM-B103-01 B
2.01	23.03.2018	Accessory Port and 10 ml stainless steel syringe added	NEM-B102-01 C along with NEM-B103-01 B
2.02	01.04.2021	100 ml Glass Syringe added, Images updated	
2.03	21.12.2022	Disposal instructions updated	
2.04	12.10.2023	Correction diagrams	

IMPORTANT. In its current revision, this manual applies only to the product types listed in the last line. Should you require a manual from a previous revision, please do not hesitate to contact us. Please let us know your device type and email address and we will send you the appropriate manual as a pdf file.

The type of your product can be found on the label behind "Type:", according to the marked number in the following example:



2 Introduction

2.1 Foreword

Thank you for choosing a product from CETONI. With this manual we want to support you as much as possible in handling the device. Please do not hesitate to contact us in case of any questions or suggestions.

2.2 Symbols and Keywords Used

The following symbols are used in this manual and should assist you in navigating through this document:

TIPP. Describes practical tips and useful information to facilitate the handling of the device.

IMPORTANT. Describes important information and other especially useful notes, in which no dangerous or damaging situations can arise.

ATTENTION. Indicates a potentially harmful situation. If it is not avoided, the product or something in its environment may be damaged.

CAUTION. Indicates a potentially dangerous situation. Failure to avert this situation may result in slight or moderate injuries or property damage

2.3 Standards and Guidelines

CETONI GmbH declares under its sole responsibility, that the individual Nemesys devices and the entire Nemesys syringe pump system comply with the health and safety requirements of the relevant European directives.

2.4 Purpose

2.4.1 General Description

The Nemix 50 syringe stirrer is a combined syringe-pump and syringe-mixing system. It allows the near pulsation-free dosing of fluids and suspensions with concomitant gentle and variable-speed mixing.

2.4.2 Intended Use

The Nemix 50 syringe stirrer is to be used for dosing and mixing of fluids and suspensions. It is intended to be operated in laboratory-like rooms.

2.4.3 Reasonably Foreseeable Misuse

A use for applications distinct from the intended purpose can lead to dangerous situations and is to be omitted.

WARNING. The devices must not be used as medical devices or for medical purposes.

2.4.4 Safety measures

IMPORTANT. Please read this manual, the CETONI system manual and the associated software manual carefully and completely before commissioning your system.

Safety for the operator as well as trouble-free operation of the devices are ensured only when using original equipment parts and original accessories. Warranty claims will not be accepted for damage due to the use of alien accessories or expendables.

The devices have been developed and constructed in such a way as to largely rule out hazards due to its intended use. Nevertheless, you must observe the following security measures in order to exclude any remaining hazards.

- CETONI GmbH points out the operator responsibility during use. Relevant laws and regulations at the location of use must be observed. In the interest of safety, operators and users are responsible to adhere to all relevant regulations.
- The devices must not be used as a medical device or for medical purposes.
- Only operate the devices in safety cabinets.

  There is a risk of crushing on moving parts of the devices! Various hazards may be caused by the media you use.
- In vertical arrangement the assembly will be less stable. Please take precautions to avoid tipping and place the devices at least 40cm from the edge of the table.
- The device is designed and approved to work in fluidic systems, which fall within the scope of Article 4 Paragraph 3 of the Pressure Equipment Directive 2014/68/EU.

  This means that the system may not exceed a maximum volume of 1 liter. With the use of fluids from Group 1 according to Article 13 of the Pressure Equipment Directive 2014/68/EU, the maximum allowable system pressure is 200 bar. For fluids from Group 2 it is 1000 bar. If different, product-specific values for the maximum pressure are given in the section "Technical Data", these values must be complied with. Regarding the maximum operating temperature, the specification from the section "Technical Data" must be observed.

  CETONI GmbH is not liable for consequences that may arise if the user expands the system by peripheral devices, such that one of the values or both values are exceeded.

  It is the user's responsibility to become familiar with the mentioned Pressure Equipment Directive and to comply with the prevailing requirements.
- Before each use of the devices, the user must ensure that they are in good functional safety and in proper condition. The devices may only be operated if they are in faultless condition. Damaged devices, cables, pipes or connectors must be removed from the system immediately and sent for repair or be replaced.
- The operator must be familiar with how to operate the devices and the software.
- Cables are to be laid out such as to prevent the danger of tripping.
- The operation of the devices in explosive atmospheres or with explosive substances is prohibited! The devices are not designed in such a way that the occurrence of sparks and possibly an explosion caused by them can be excluded.

- Wear suitable personal protective equipment when operating or handling the devices with corrosive, hot or otherwise hazardous substances.
- Faulty fluidic connections can lead to damage to the device electronics. Always check the tightness after connecting and at regular intervals.
- Ensure that the connection components used meet the requirements of pressure resistance and chemical resistance.
- Please note that continuous use of the devices may cause wear of the syringes. This may increase the likelihood of leakages. Replace leaking syringes immediately.
- Only carry out assembly work on the devices when they are depressurized. Equip your application with safety measures, such as a release valve, to be able to relieve the pressure in the system in the event of an error or malfunction.
- The devices must not be shut down or stored with pressurized syringes. Before switching off the software that operates the devices, the syringe must be de-pressurized.
- Transport, storage, and operation of the devices at a temperature below 0°C/32°F with water within the fluidic system may cause damage to the device.

2.4.5 Measures for safe operation

2.4.5.1 ELECTROMAGNETIC EMISSIONS

The devices are intended for use in any type of facility, connected directly to the public power supply network that supplies buildings used for domestic purposes.

2.4.5.2 ELECTROSTATIC DISCHARGE

Floors should be made of wood, concrete, or ceramic tiles. If the flooring is made of a synthetic material, the relative humidity must be at least 30%.

2.4.5.3 ELECTRIC DISTURBANCES

The quality of the supply voltage should be to the standard of a typical business or hospital environment.

2.4.5.4 MAGNETIC DISTURBANCES

Do not place power connector cables, even of other appliances, in close proximity of the devices and their cables. Mobile communication devices may not be used in closer proximity of the devices or their cables than the recommended safety distance!

2.4.6 Safety features of the device

In case of an emergency, the device may be switched off at any time by pulling the power supply connector. This will cause no damage to the device itself.

2.4.7 Device condition

Despite a faultless manufacture of the devices, damage may occur at any time whilst the devices are in operation. With this in mind, the user must always carry out a visual check of the devices and any attached or co-operated components prior to use. Particular attention must be paid to crushed power cables and deformed plugs as well as damaged feed lines (tubing, capillaries, etc.). If any damage to the devices is noticed, the devices are not to be used and CETONI GmbH should be informed. CETONI will ensure that operational conditions are reestablished within a reasonable time. Do not attempt to repair the unit yourself.

2.5 Warranty and liability

The devices left our company in perfect condition. Only the manufacturer is permitted to open the device. All guarantee and liability entitlements, in particular damage entitlements due to personal injuries, are void if the devices are opened by personnel not authorized by CETONI.

The duration of the warranty is 1 year from the date of delivery. It is not extended or renewed due to work carried out under warranty.

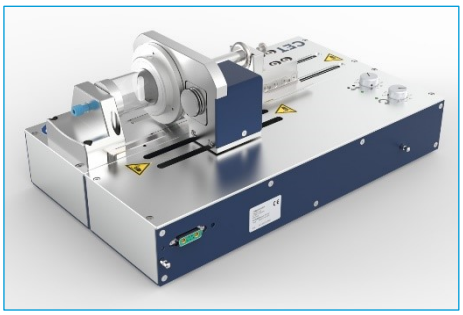
CETONI GmbH considers itself responsible for the unit with regard to safety, reliability, and function only if assembly, new settings, changes, extensions, and repairs are carried out by CETONI GmbH or an authorized center or agent, and if the unit has been used in accordance with this instruction manual.

The devices conform to the basic safety regulation standards. Industrial property rights are reserved on the circuits, methods, names, software programs, and devices.

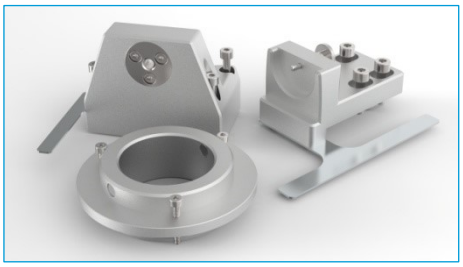
2.6 Scope of supply

The following items should be included in the scope of supply

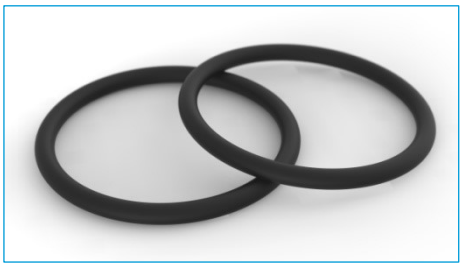
NEMIX 50 SYRINGE STIRRER DEVICE WITH PUMP AND MIXING MODULES



SYRINGE AND PISTON HOLDER AS ORDERED (SIMILAR TO ILLUSTRATION)



REPLACEMENT DRIVE WHEEL RUBBER RINGS



3 Technical Data

3.1 Ambient Conditions

OPERATING TEMPERATURE	0°C – 40°C
STORAGE TEMPERATURE	-20°C – 70°C
OPETRATING HUMIDITY	20% - 90% non-condensing
STORAGE HUMIDITY	20% - 90% non-condensing

3.2 Electrical Data

	SYRINGE PUMP MODULE	**MIXING MODULE**
SUPPLY VOLTAGE	24 VDC (Base Module)	24 VDC (Base Module)
MAX. CURRENT CONSUMPTION	1,5 A	0,7 A
MAX. POWER CONSUMPTION	36 W	17 W

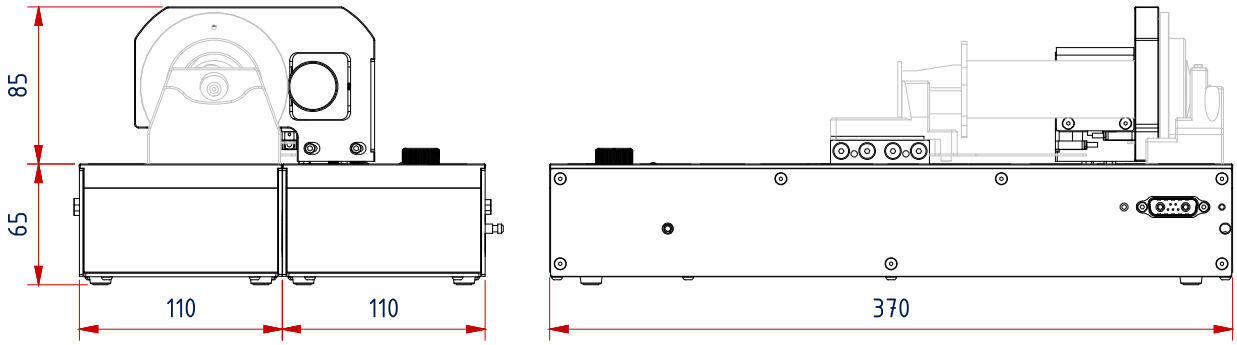
3.3 Electrical Interfaces

CAN	max. 1 Mbit / s
RS232	Contact us to get more information

3.4 Mechanical Data

	SYRINGE PUMP MODULE	MIXING MODULE
TRAVEL	120 mm	120 mm
TRAVEL SPEED	1.2 nm/s – 8 mm/s	7.5 mm/s – 30 mm/s
MIXING SPEED	-	15 min^{-1} – 400 min^{-1}
WEIGHT	3.6 kg	3.4 kg

DIMENSIONS



3.5 Syringes

SYRINGE	SCALE VOLUME	SCALE LENGTH	PISTON STROKE	MAX. PRESSURE
BRAUN PERFUSOR	50 ml	81 mm	88 mm	2 bar
GLASS SYRINGE	50 ml	60 mm	62 mm	8 bar
GLASS SYRINGE	100 ml	120 mm	120 mm	8 bar
CETONI STAINLESS STEEL SYRINGE 10 ML	10 ml	58.89 mm	60 mm	50 bar

4 Transport & Storage

Use the original packaging for transporting and shipping the devices.

Also observe the data provided in section 3.1.

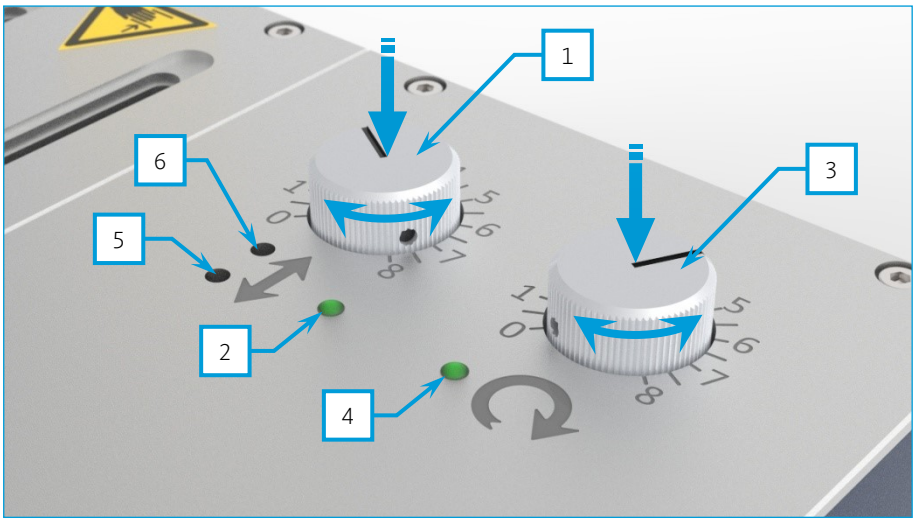
5 Hardware Operation

5.1 Initial Start-Up

Please read the corresponding section in the hardware manual of the base module and the software manual before starting up your devices. These manuals explain how to install the software, configure the system, and connect the devices.

5.2 Mixing Module

The mixing module is operated via its own controls and not via the software.



1. Pressing the adjustment knob [1] will toggle the lateral movement of the mixing assembly ↕. When switched on, the green status LED [2] will be illuminated.

   Turning the adjustment knob [1] will adjust the speed of the lateral movement. The mixing assembly will oscillate between the two sensor barbs and thus automatically adjust to the current fill level of the syringe.

2. Pressing the adjustment knob [3] will toggle the rotary mixing movement ↻. When switched on, the green status LED [4] will be illuminated.

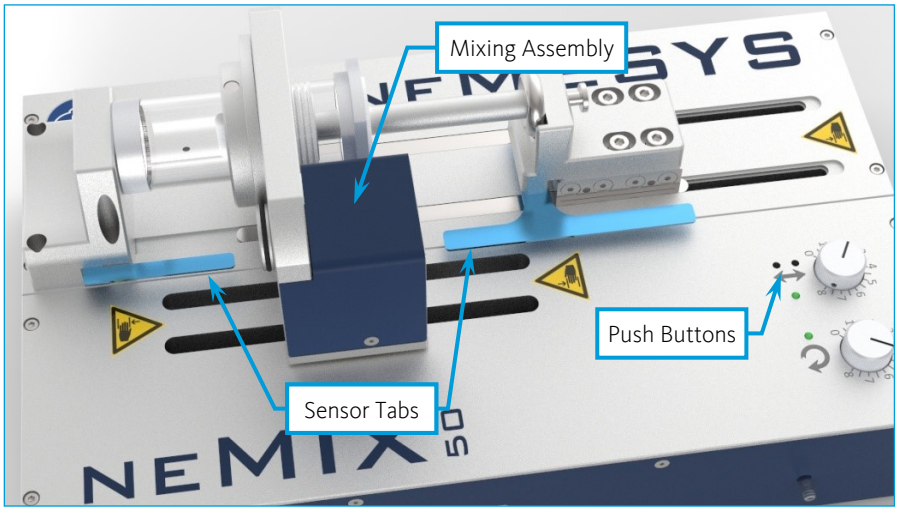
   Turning the adjustment knob [3] will adjust the speed of the rotary mixing.

3. For manual operation of the mixing assembly, two push buttons are recessed underneath small holes [5] and [6]. They allow for- and backward movement of the rotating assembly, respectively, when lateral displacement has not been activated (see step 1). Use a narrow tool to access

these switches, e.g., a screwdriver or paper clip. Please be careful when using these push buttons to avoid damage to the unit due to collision. The speed of movement is fixed to 16 mm/s.

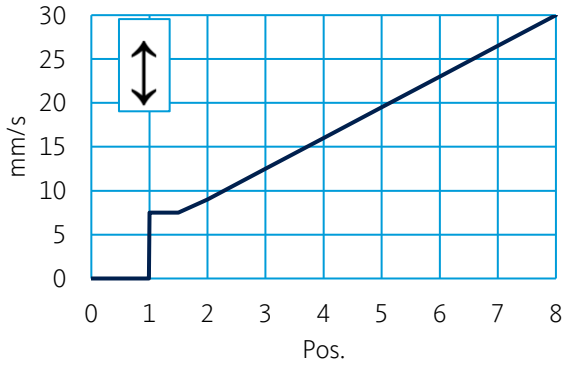
CAUTION. The module's sensors are deactivated during manual positioning via the two push buttons. Please take extra care to avoid any damage to the units during manual operation!

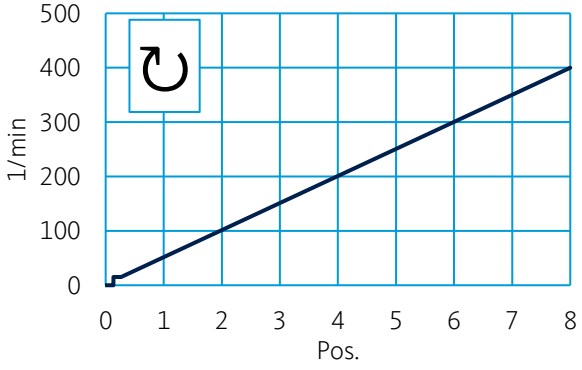
Manual operation of the mixing module may become necessary for mounting a syringe or changing a syringe adaptor. Please make sure that the mixing assembly is being placed between the two sensor tabs (colored blue in the picture) to ensure save operation.



CAUTION. Position the mixing assembly between the two sensor barbs prior to activating linear movement in order to avoid device errors or damages.

The following curves show the speed of the linear displacement [mm/s] and the rotating speed [1/min] relative to the position of the adjustment knobs 1 ↕ and 3 ↻, respectively. The speeds are determined guide values that may vary depending on the nature of the medium Determine the setting for your application with which you achieve the best stirring result and note down the set scale value.

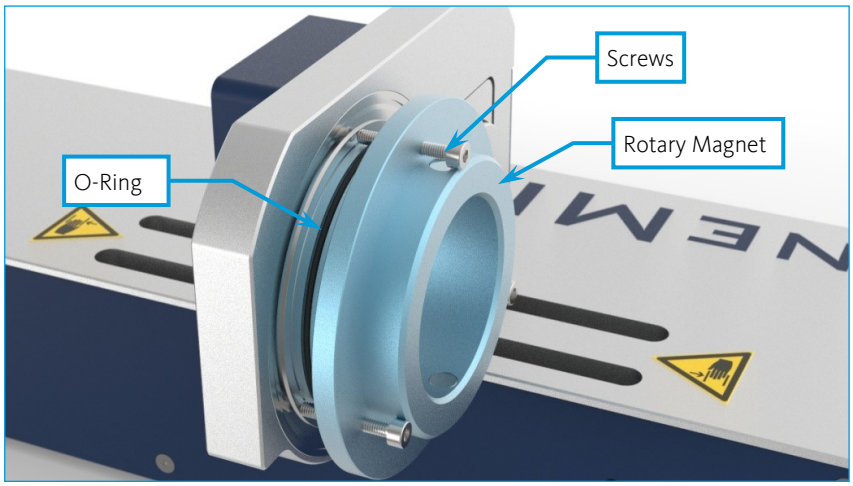




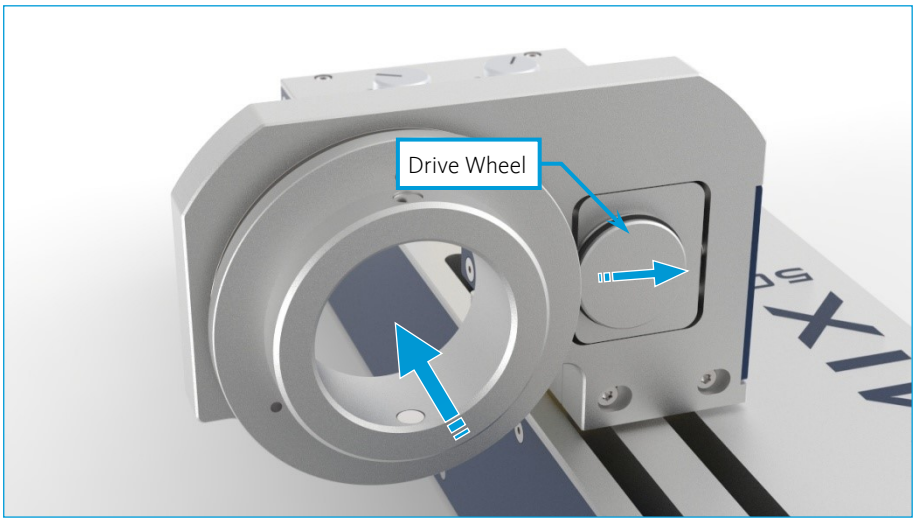
5.2.1 (Dis)Assembly of the Rotary Magnet

Different rotary magnets are available for different syringe sizes.

Screw the three attached M3x20 screws into the corresponding holes of the rotary magnet (bluish in the following figure). They are used to pull out the rotary magnet equally. Screw the screws alternately until you can remove the rotary magnet by hand. Try to avoid tilting.



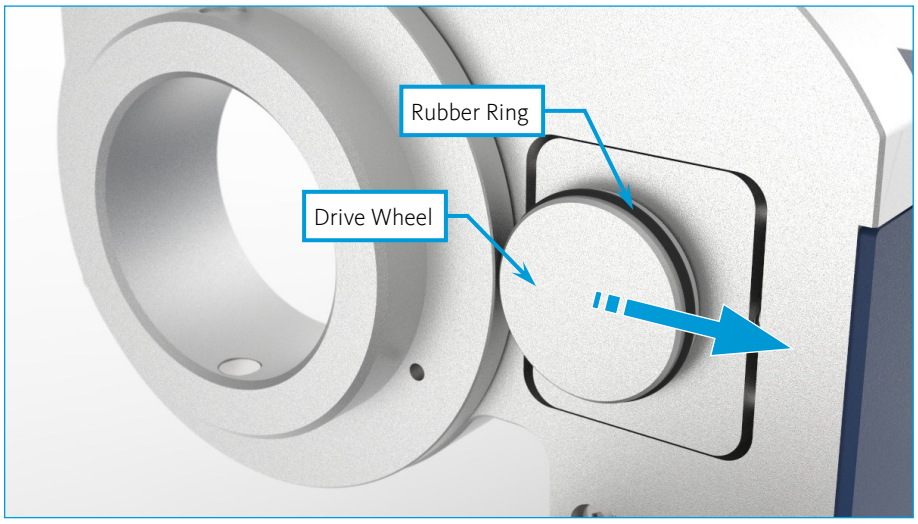
To make assembly easier, lightly lubricate the O-ring with some silicone grease and insert the magnetic ring. Push the drive wheel to the side and, to avoid tilting, press the magnetic ring straight and as far as possible.



5.2.2 (Dis)Assembly of the Drive Wheel Rubber Ring

Prolonged operation may cause wearing of the drive wheel ring. Two replacement rings are delivered with each Nemix 50 device (O-ring 22x2 mm).

Use a sharp or pointy tool to remove the worn ring. Simply push the new ring into the wheel's groove. With the rotary magnet attached, you may need to pull the drive wheel aside during ring assembly.



5.3 Syringe Pump Module

The operation of the hardware of the syringe pump module is described in the following sections. Please refer to the corresponding software manual for software operation.

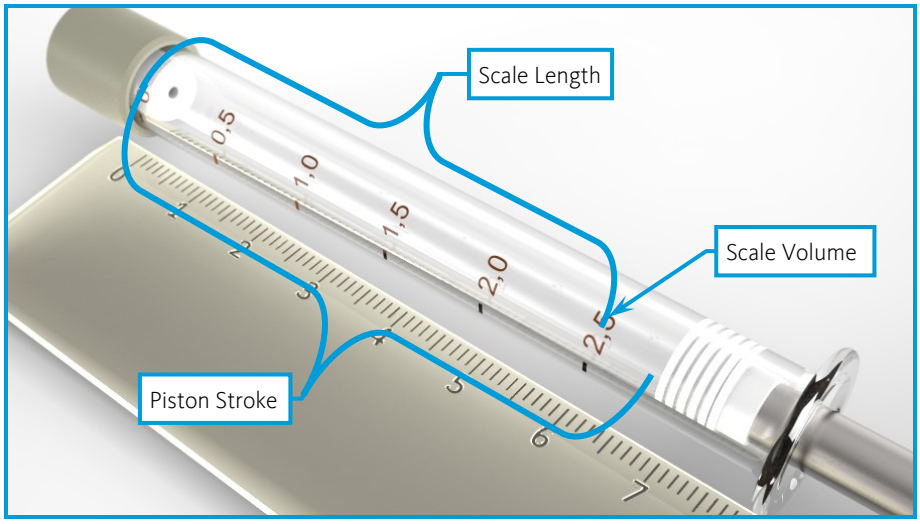
5.3.1 Syringe Configuration

As the system may be used with differently sized syringes, the system has to be configured for the intended syringe. This is to ensure correct flow rates, to utilize the full scale of the syringe, and to avoid any damage to the syringe or the device.

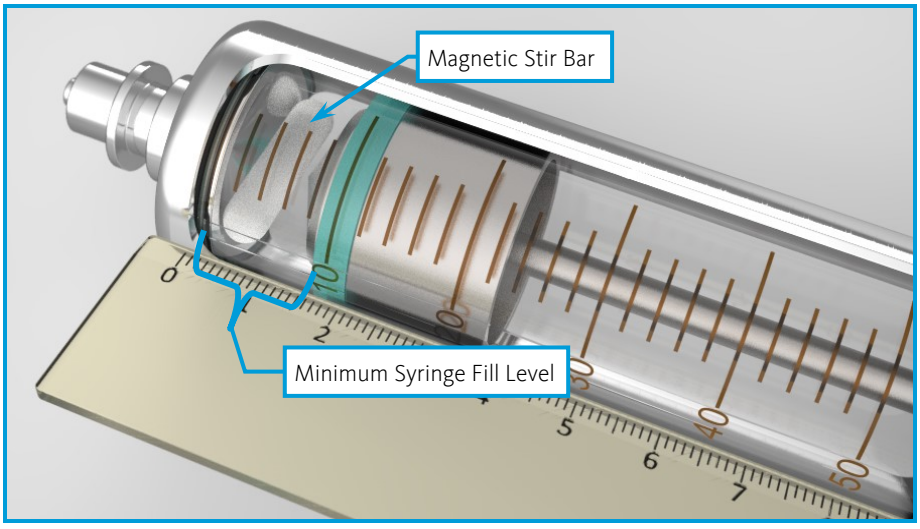
CAUTION. Before operating the syringe module, the relevant syringe must be configured as described in the software manual. Failure to do so may cause damage to the device or the syringe.

Before mounting a syringe, it must be configured and selected in the operating software. The respective process is described in the software manual. You need the volume (*Scale Volume*), the nominal stroke (*Scale Length*) and the total stroke (*Piston Stroke*), which may be different.

These values can be found in section 3.5.



When using a magnetic stir bar in the syringe, the syringe must not be completely emptied. Measure how much space the magnetic stir bar needs and enter this value plus a few millimeters of safety margin as *minimum syringe fill level* when configuring the syringe.

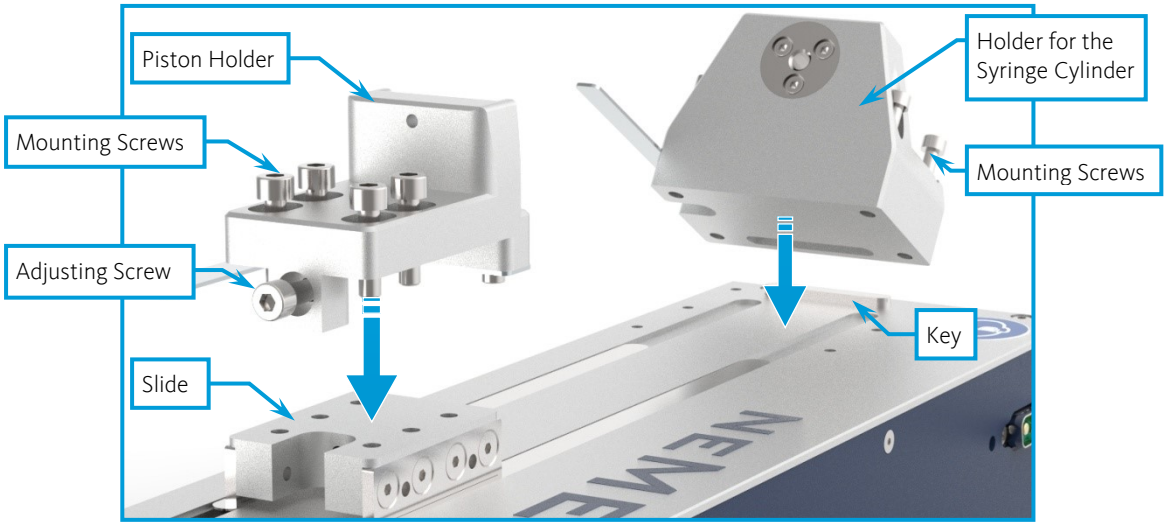


5.3.2 Syringe Holder (Dis)Assembly

Different holders are available for different syringes. They consist of a holder for the syringe cylinder and a holder for the syringe piston.

The holder for the syringe cylinder is placed on the key on the device and fastened with screws (M4x12). To tighten the screws, you need a 3 mm Allen key.

The piston holder is screwed onto the slide with screws (M5x20). To tighten the screws, you need a 4 mm Allen key. A further screw allows the adjustment of the piston holder in order to make the best use of the syringe volume. For this, the four fastening screws must be loosened slightly.



5.3.3 Syringe Mounting

For the mounting or removing a syringe, it may be necessary to move the mixing unit with the two buttons as described in section 5.2.

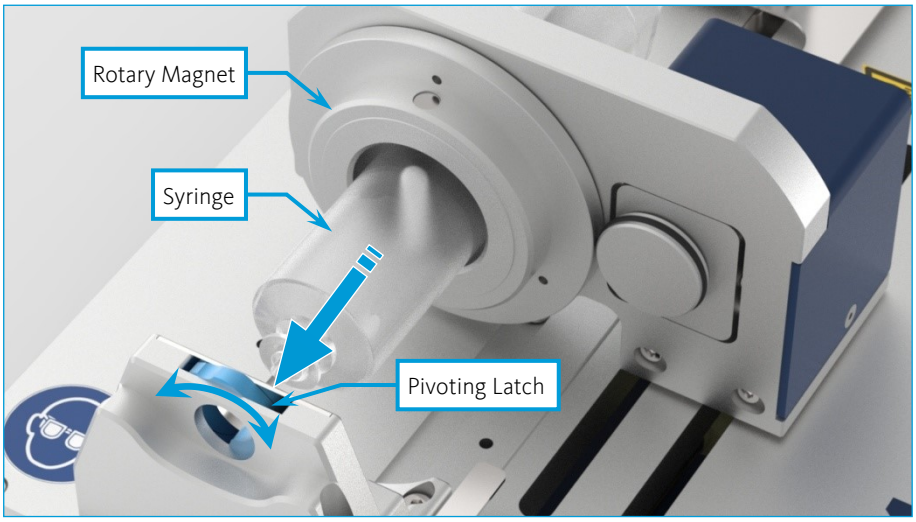
Perform a reference move before syringe mounting in order to calibrate the syringe pump module. How to perform a reference move is described in the software manual. Failure to do so could result in damage to the syringe and the device.

CAUTION. Before mounting a syringe, perform a reference move in order to avoid damage.

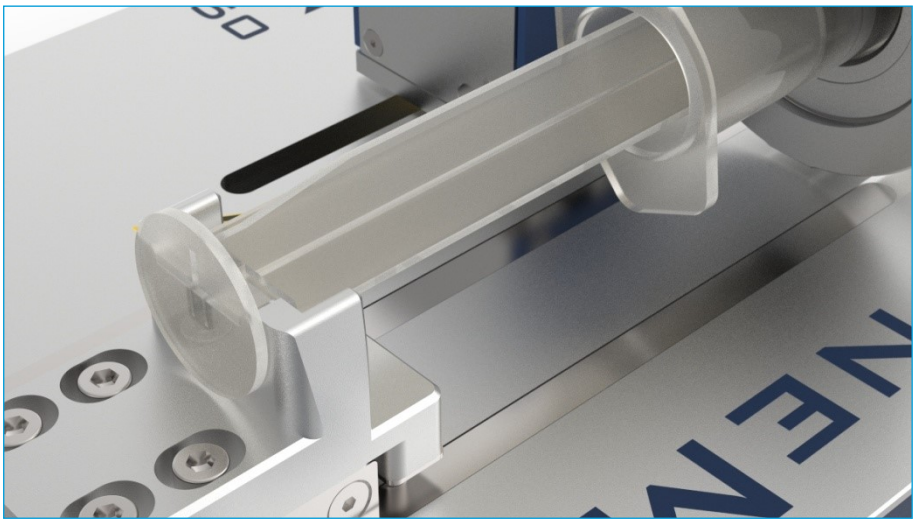
The mounting and dismounting of syringes are described in the following sections:

5.3.3.1 BRAUN PERFUSOR 50 ML

1. Open the pivoting latch of the syringe-cylinder holder (indicated in blue in the picture below). Pass the syringe through the mixing module's rotary magnet and insert the syringe tip into the pivoting latch. Re - close the pivoting latch such that it engages into the syringe tip's groove.



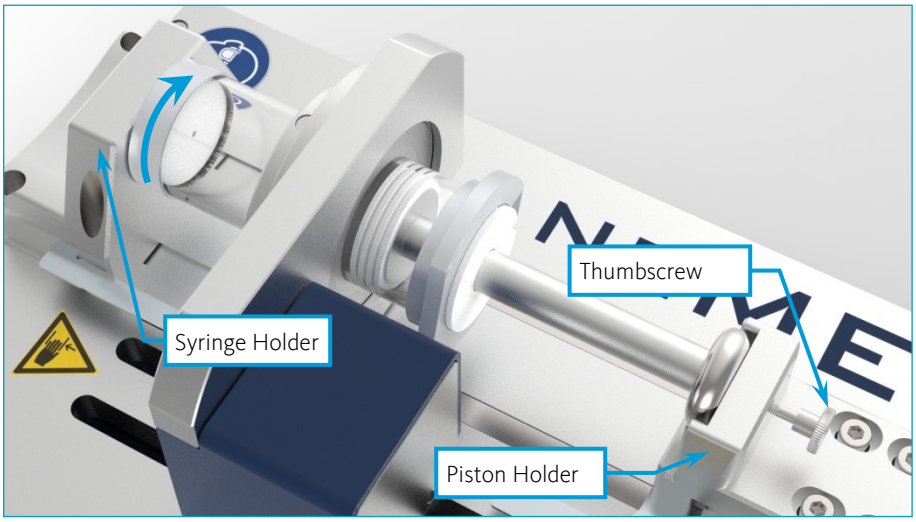
2. Then insert the syringe piston into the piston holder as shown in the following picture.



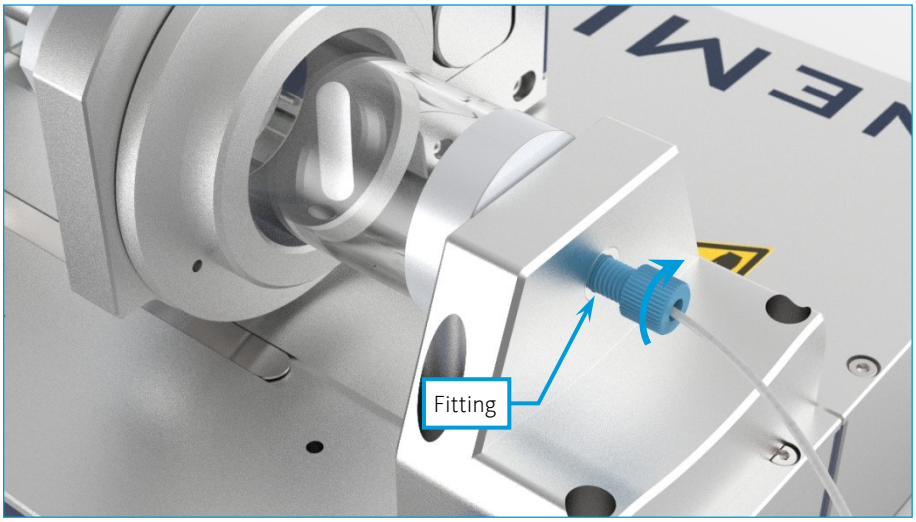
3. Now you can connect a Luer Lock connector to the outlet of the syringe.
4. If you slightly loosen the mounting screws of the piston holder, you can move the piston mount with the adjusting screw (see 5.3.2) so that the syringe can be emptied completely when it is used without a magnetic stir bar.

5.3.3.2 SYRINGES WITH 1/4"-28 MALE THREAD AND M3 THREAD IN THE PISTON

1. Pass the syringe through the mixing module's rotary magnet and screw it into the tapped hole of the syringe holder until it fits flush.
2. Use the thumbscrew (M3x16) to attach the piston to the piston holder.



3. Fasten the tube with a fitting. Screw that fitting into the syringe holder and pull it tight against the syringe.



4. If you slightly loosen the mounting screws of the piston holder, you can move the piston mount with the adjusting screw (see 5.2.2) so that the syringe can be emptied completely when it is used without a magnetic stir bar.

6 Accessory Port

CAUTION. Danger of tripping due to connecting cables and tubes! Lay the cables and tubes in such a way that there is no risk of tripping!

IMPORTANT. Only CETONI devices or accessories may be connected to the interfaces.

Please read and follow the relevant section in the associated software manual before connecting and using accessories.

The syringe pump module is equipped with an accessory port. The port allows, for example, the integration of an external pressure sensor or valve.

Insert the cable connector of the accessory assembly into the socket of the syringe pump module until it clicks into place. Make sure that the connector can only be inserted when the coding lug is facing upwards.

To remove the accessory assembly, pull on the metal sleeve of the connector. This releases the lock and the connector can be easily removed.

7 OEM RS232 Cable Set

7.1 RS232 Wiring

Insert the mixed D-Sub plug of the cable into the socket of the final module. The system should be deactivated when you do this. Tighten both screws on the plug manually. You do not need a bus termination plug, since the plug of the RS232 cable already contains a bus termination resistor.

Now, plug the 9-pin D-Sub socket of the cable into an RS232 connection on your PC or other controller. For greater distances to the socket please use a 1:1 cable with a 9-pin D-Sub plug.

Now, you can reactivate your system and send or receive data through RS232. Since every module contains a gateway from RS232 to the system's internal CAN bus, you can now address each module of your system with only one RS232 cable.

The OEM RS232 cable adapts the device interface to a standardized 9 pin D-Sub connector.

7.2 Communication Settings

For a functioning communication with the Nemesys modules you have to make the following communication settings for the serial interface on your PC or other controller:

- Baud rate: 115200
- Data bit rate: 8
- Parity: none
- Stop bits: 1
- Flow control: none

8 Maintenance & Care

The devices are maintenance-free when used correctly. Solely the drive wheel rubber ring can be replaced as described in section 5.2.2. However, should problems arise that you cannot resolve yourself, or which require opening the device please contact CETONI GmbH to arrange further action. The devices may only be opened by CETONI GmbH or by authorized personnel. Otherwise, the guarantee and warranty claim will void.

Wipe the devices with a damp (not wet) cloth, so that no liquid can drip into the devices. For tough dirt you also can use a little detergent or alcohol.

9 Disposal

This device is an electrical resp. electronic device.

The symbol of a crossed-out wheeled bin indicates that the respective device must be collected separately from unsorted municipal waste at the end of its service life.

If you wish to dispose of your device, please contact us as the manufacturer of the devices via the known contact channels. We will contact you immediately and provide you with all important information on how to return the equipment to our company site.

Please decontaminate the equipment before returning it, if necessary, and enclose the completed decontamination declaration.

Upon receipt of the returned equipment, we will take care of its proper disposal.