

# NEMESYS<sup>®</sup>

Original Instructions 1.44 - June 2010

Manual and Reference

Hardware

NEMESYS

The logo for Cetoni, featuring a stylized blue 'C' with three vertical bars to its right, followed by the word 'cetoni' in a lowercase, italicized sans-serif font, and a registered trademark symbol (®) to the upper right.

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# 1 Summaries and directories

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## 1.2 Change history

Ver	Date	Change
1.30	22.10.2008	<ul style="list-style-type: none"><li>• First version of neMESYS hardware manual</li></ul>
1.31	17.02.2009	<ul style="list-style-type: none"><li>• Pin assignment of RS232 cable fixed (crossed)</li></ul>
1.42	01.02.2010	<ul style="list-style-type: none"><li>• Revised for new device generation</li><li>• Update of flow rates</li><li>• Update of piston holder</li></ul>
1.43	24.02.2010	<ul style="list-style-type: none"><li>• Changes regarding the new Machinery Directive</li></ul>
1.44	29.06.2010	<ul style="list-style-type: none"><li>• Adaption of some formulations</li></ul>

---

## 2 Safety Instructions

### 2.1 Signs and Key Words Used

The following symbols are used in this handbook and are designed to aid your navigation through this document:



#### **IMPORTANT**

*Indicates tips for users and other especially useful information on how to act in dangerous or harmful situations.*



#### **NOTICE**


*Indicates a potentially harmful situation. Failure to avert this situation may result in damage to the product or anything nearby.*



#### **CAUTION**

*Indicates a potentially dangerous situation. Failure to avert this situation may result in light or minor injuries and property damage.*

### 2.2 Standards and Guidelines

 This unit has been tested and registered in accordance with the limit values for industrial units; class 1, group B. Cetoni GmbH declares under its sole responsibility, that the product complies with the relevant provisions stated on the last page.

Operation underlies the following conditions:

1. The unit is not allowed to emit damaging radiation
2. The unit must be able to process damaging radiation, including radiation of a nature that could lead to an undesirable operation.

The product fulfils limit values in accordance with EN55011, class 1, group B. The unit underwent and passed tests in accordance with DIN EN 61000-4-4 (Burst) and DIN EN 61000-4-5 (Surge).

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## 3 Basic Information

### 3.1 Foreword

Thank you for deciding to purchase a cetoni product. We would like to support you with this handbook as far as possible in your interaction with the neMESYS syringe pump system. We are directly available for any questions or suggestions that you may have.

You may not use the neMESYS syringe pump system before you have carefully read and understood this handbook. We wish you much success in your work with the highly precise neMESYS syringe pump system.

### 3.2 Application purpose

#### 3.2.1 Intended Use

The neMESYS devices are syringe pumps. They allow emptying and filling syringes by the relative linear movement of a syringe- and a pistonholder.

#### 3.2.2 Intended Use

The neMESYS syringe pump system serves for precise and pulsation-free dosing of fluids in the range of nanolitres per second up to millilitres per second.

Application usually takes place in laboratory-like rooms.

#### 3.2.3 Reasonably Foreseeable Faulty Application

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



#### **CAUTION**

*The unit must not be used as a medical device or for medical purposes.*

---

## 3.2.4 Safety Advice

The safety of the user and a failure-free operation of the unit are only assured if original parts are used. Only original accessories may be used. Warranty claims will not be accepted for damage due to the use of alien accessories or expendables.

The unit has been developed and constructed in such a way as to largely exclude hazards due to its intended use. Nevertheless, you should observe the following security measures in order to exclude any remaining hazards.

- Cetoni GmbH points out the responsibilities of the operator for the operation of the device. The laws and regulations of the place of installation must be observed while operating the unit! To ensure a safe work routine, operators and users must assume responsibility for adhering to regulations.
- Before operating the unit, the user must at all times ensure the operational reliability and the adequate and orderly condition of the unit.
- The user must be familiar with the operation of the unit.
- The unit and pipes must be checked for damage before operation. Damaged pipes and inputs must be replaced immediately.
- Cables must be laid in a way that avoids any risk of stumbling.
- Moving parts must not be touched whilst the unit is in operation. There is a risk of crushing!
- The usage of the device in explosive atmosphere or with explosive materials is prohibited!

## 3.2.5 Measures for safe operation

### 3.2.5.1 Electromagnetic emissions

The neMESYS dosing system is intended for use in any type of facility, including living quarters, and those that are connected to a public mains network that supplies buildings used for living purposes.

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### **3.2.5.2 Electrostatic discharge**

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

### **3.2.5.3 Electric disturbances**

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

### **3.2.5.4 Magnetic disturbances**

Do not place power connector cables and other appliances in close proximity of the unit and its cables. Portable and mobile communication devices should not be used in closer proximity of the unit or its cables than the recommended safety distance!

## **3.2.6 Safety devices on the unit**

The unit can be switched off at any time in an emergency (rocker switch on the side of the housing); this will cause no damage to the unit.

## **3.2.7 Condition of the unit**

Irrespective of the faultless manufacture of the unit, damage can occur whilst the unit is in operation. With this in mind, always carry out a visual check of the components mentioned before use. Pay particular attention to crushed cables, damaged tubing, and deformed plugs. If you should notice any damage, please do not use the unit and inform cetoni GmbH without delay. cetoni will return the unit to an operational condition as quickly as possible. Do not attempt to carry out a repair to the unit.

## **3.3 Warranty and Liability**

The present unit left our company in perfect condition. The manufacturer is the only entity permitted to open the unit. If the unit is opened by an unauthorised person, all guarantee and liability entitlements, particularly damage entitlements due to personal injuries, are extinguished

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

cetoni GmbH only considers itself responsible for the unit with regard to safety, reliability and function; if assembly, new-settings, changes, extensions and repairs are carried by cetoni GmbH or an authorised centre, and if the unit has been used in accordance with the instruction manual.

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The dosing unit system underlies safety regulation standards. Industrial property rights are reserved on the circuits, methods, names, software programs, and units.

---

## 3.4 Scope of Supply

The scope of delivery of your neMESYS Base Module should include the following articles:



Power cable for non-heating apparatus



USB cable 3 metres



neMESYS CD-ROM – Drivers, Software, Product Information



Bus terminating plug

# 4 Technical specifications

## 4.1 Base module

### Environment

Operating temperature.....0°C to 50°C  
Storage temperature .....-20°C to 75°C  
Operating humidity .....20% to 90%, non-condensing  
Storage humidity .....20% to 90%, non-condensing



### Mechanical Data

Weight..... 1.8 kg  
Dimensions (L x W x H) ..... 310 x 94 x 56 mm

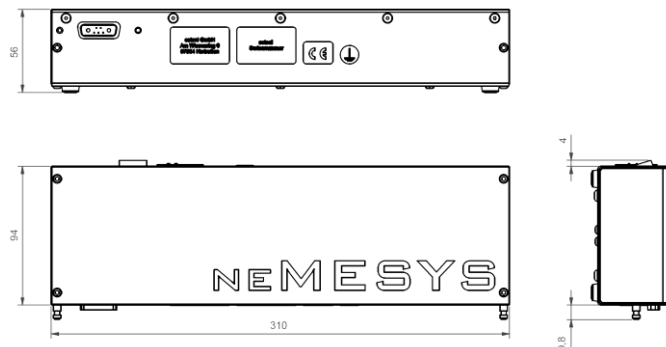
### Electrical data

Supply voltage ..... 90 ~ 264VAC  
Frequency ..... 47 ~ 63 Hz  
Power output.....120 W  
Maximum controllable dosing units (low pressure).. 12  
Maximum controllable dosing units (high pressure) .. 5

### Interfaces

USB ..... 1.1 and 2.0  
CAN.....max. 1 Mbit / s  
RS-232..... max. 115200 bit/s  
Ethernet..... optional  
WLAN..... optional

### Dimensions



## 4.2 Dosing module

### Environment

Temperature (operation)..... 0°C to 45°C  
Temperature (storage)..... -40°C to 75°C  
Air humidity (operation) 20% to 80%, non-condensing  
Air humidity (storage) ... 20% to 80%, non-condensing  
Sound power level of the device is below 70 dB(A)



### Mechanical Data

Weight..... 1.3 kg  
Dimensions (L x W x H)..... 310 x 47 x 56 mm

### Electrical data

Supply voltage ..... 24VDC  
Current typical ..... 0.3 A  
Current peak..... 0.6 A

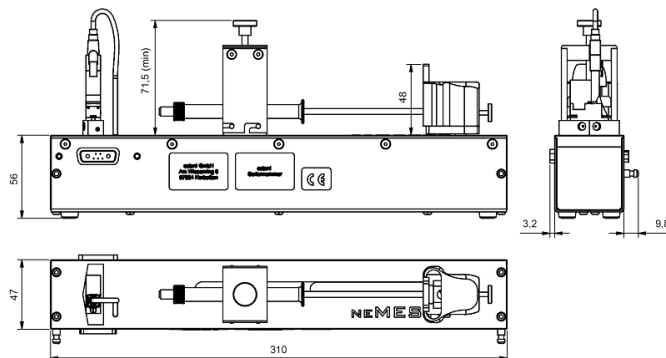
### Interfaces

CAN ..... max. 1 Mbit / s  
RS-232 ..... max. 115200 bit/s

### Configuration

Gear..... 14.1 (optional 1 / 23.7 / 29.2)  
3-2-way valve ..... optional  
Syringe outer diameter ..... 6 to 30 mm  
Syringe piston stroke ..... 62 mm

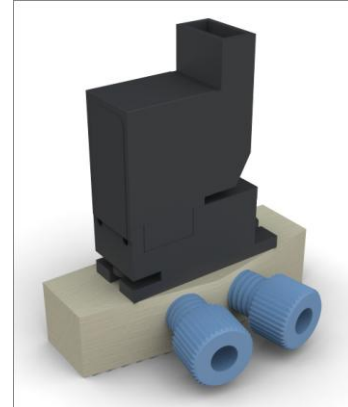
### Dimensions



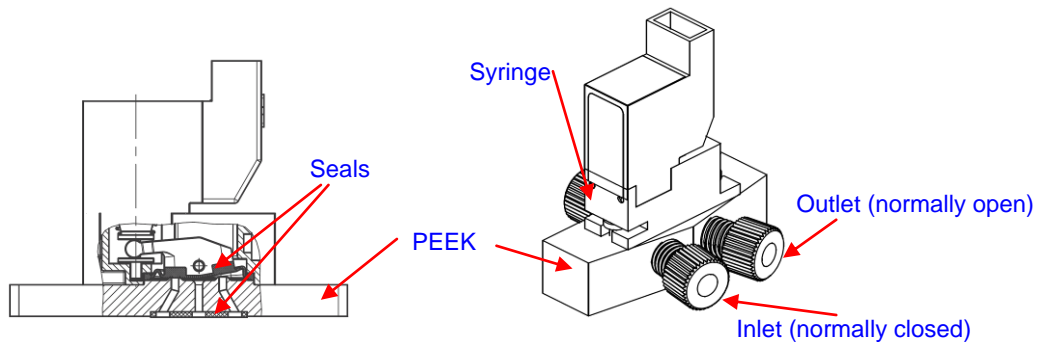
## 4.3 3-Way-Valve

### Technical Data

Body material .....	PEEK
Seal material .....	FFKM (Perfluorelastomer)
Temperature media.....	0 bis +50°C
Viscosity .....	max. 21 mm <sup>2</sup> /s
Internal Volume .....	ca. 45 µl
Pressure max. (syringe side) .....	2 bar
Pressure max. (application side) .....	0,5 bar
Orifice .....	DN 0.6 mm
Port connection .....	Flange, UNF 1/4" - 28



### Drawing



Valve	Orifice	Materials	Working pressure gas (bar)	Working pressure fluid (bar)
<b>ASCO06*</b>	<b>0,6 mm*</b>	<b>FFPM*</b> (EPDM, FPM)	3	3
ASCO135	1,35 mm	FFPM (EPDM, FPM)	1	1

\*The bold printed values indicate the standard configuration. Other variants are optional and delivery times may be longer in case of non standard configuration.



### NOTICE

*There is a danger of the damaging the housing or the sealing material!  
Examine the chemical compatibility of the media you want to pump in combination with the encasing material PEEK and the sealing material FFKM (Perfluorelastomer).*



### IMPORTANT

*Please note that while refilling the syringe via the valve the pressure on the application may not exceed the pressure in the reservoir for more than 0.5 bar.*

Otherwise the valve can slightly open due to the differential pressure and medium can flow from the application back into the syringe.

This affect can also appear when big syringes are rapidly refilled and the negative pressure caused thereby exceeds 0.5bar.

## 4.4 Dosing Capacity

Accuracy and freedom from pulsation of the neMESYS syringe pump system during dosing is decided by the configuration of the dosing units being used, and by the size of the used syringes. The following table gives an overview of the attainable dosing precision with varying configurations together with various syringe sizes.

<b>Gear</b>	<b>1,0</b>	<b>14,1*</b>	<b>23,7</b>	<b>29,2</b>
Pusher Velocity min (nm/min)	383,33	<b>27,26</b>	16,19	13,15
Pusher Velocity max (mm/min)	89,000	<b>6,329</b>	3,759	3,052
Smallest step (µm)	0,488	<b>0,035</b>	0,021	0,017
Pusher Force max. (N)	40	<b>390</b>	660	815
<b>Syringe 0,5 µl / 60 mm stroke</b>				
Flow Rate min (pl/min)	3,194	<b>0,227</b>	0,135	0,110
Flow Rate max (µl/min)	0,139	<b>0,049</b>	0,029	0,024
Dosing Vol. min (pl) = 10 steps	4,069	<b>0,289</b>	0,172	0,140
<b>Syringe 100 µl / 60 mm stroke</b>				
Flow Rate min (nl/min)	0,639	<b>0,045</b>	0,027	0,022
Flow Rate max (µl/min)	148,3	<b>10,55</b>	6,265	5,087
Dosing Vol. min (pl) = 10 steps	813,8	<b>57,87</b>	34,37	27,91
<b>Syringe 25 ml / 60 mm stroke</b>				
Flow Rate min (µl/min)	63,89	<b>11,36</b>	6,746	5,477
Flow Rate max (ml/min)	37,08	<b>2,637</b>	1,566	1,272
Dosing Vol. min (µl) = 10 steps	203,5	<b>14,47</b>	8,593	6,977

---

## 5 Transportation and Storage

### 5.1 Transportation

The individual dosing units must not be transported in a plugged-in condition. Plugging together the dosing units serves only to fix the dosing units connected to the dosing platform and does not offer sufficient stability for the transport of multiple combined units. Disassemble the dosing platform into its individual modules prior to transport and re-connect these after transport.

Use only the original packaging designed for the individual modules for transportation or shipping.



**NOTICE**

*Risk of damaging the electrical plug connector.*

*Do not transport the modules in a plugged-together condition!*

### 5.2 Storage

Observe the information given in the technical data sheets for the operation and storage of the individual modules. (Chapter 4)

## 6 Initial Start-up

### 6.1 Quick Start

Please observe the following steps when bringing the neMESYS-syringe pump system Platform into service and for testing:



#### **IMPORTANT**

*Please read the manual carefully and completely before bringing your neMESYS Dosing Platform into service.*

- (1) Install the software from the CD contained in the scope of supply onto your computer. To do this, start the „neMESYS UserInterface Setup.exe“ program from the CD (section 6.2.)



- (2) Place your neMESYS Base Module on a flat surface in close proximity of your PC. Please connect only **one single** dosing unit to it.





### **NOTICE**

*Risk of damaging the internal device configuration!*

*Connect only one single dosing unit to the base unit when you run the software for the first time! Read chapter 7.3 - Adding Dosing Units before you connect additional dosing units to you base unit to avoid a faulty device configuration!*

- (3) Connect the bus-terminating-plug into the socket of the last connected dosing unit of your dosing platform.



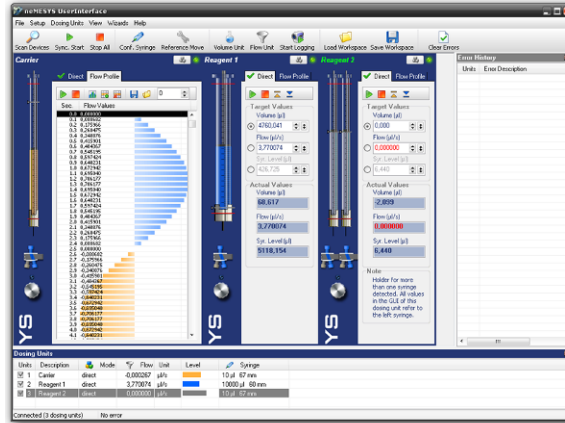
- (4) Using the USB cable included in the scope of supply, connect the Base Module to your PC (section 6.5). Your PC should recognise a new USB-unit and install the necessary driver.



- (5) Using the power connector cable included in the scope of supply, connect the Base Module to the mains power supply.



- (6) Run the software *neMESYS UserInterface* and observe all the steps in order to configure your dosing platform (section 7).



## 6.2 Step 1 - Software Installation



### **IMPORTANT**

*In order to ensure that time-critical control processes of the neMESYS software are not affected, no applications needing high processing power should be executed on the control PC.*

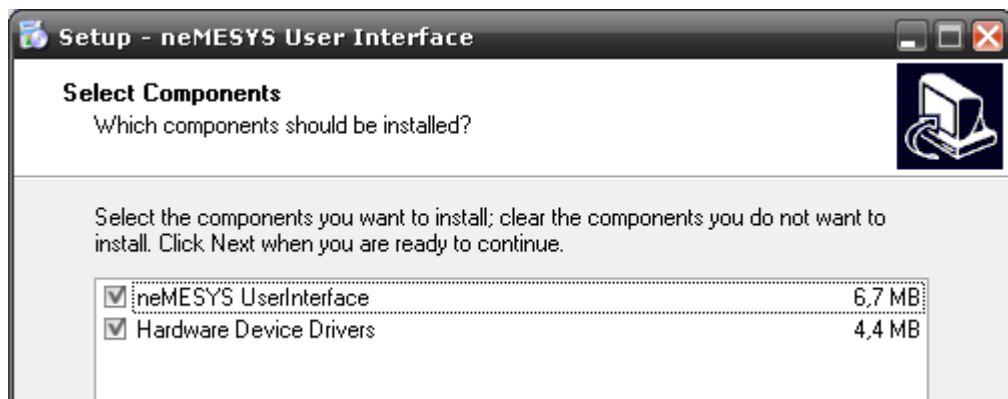
For installation of the software, lay the neMESYS CD-ROM into the CD drive. After you have done this, run the file *neMESYS UserInterface Setup.exe* from the CD. The installation assistant will then guide you through the process of installing the neMESYS software and the hardware driver.



### **IMPORTANT**

*The user must be logged into Windows as the administrator in order to carry out the installation of the hardware driver.*

During the final part of the installation, the hardware device driver will be installed. This step is only necessary if the driver was not already installed onto the computer. If the hardware driver is already installed, please deactivate the component *Hardware Device Drivers* (Figure 1).



*Figure 1 - Hardware device driver installation*

Your computer must fulfil the following system requirements in order to use the *neMESYS UserInterface*:

- PC with Pentium processor (or better) – min. 1 GHz
- at least 1024 MB RAM
- free hard disk space of approx. 20 MByte
- at least 2 free USB 2.0 interfaces

- Windows XP™, Windows 2000™, Windows Vista™ or Windows 7™ operating system
- Scroll wheel mouse

## 6.3 Step 2 - Setting up the Device

Set your neMESYS module on a flat, horizontal surface, e.g. on tables, floor-standing cupboards or apparatus trolleys. The dosing platform can be placed in either a horizontal or vertical position.



### NOTICE

*Consider the reduced stability in the upright position and try to minimize the risk of overturning. Place the devices at least 40cm from the edge of the table to avoid them dropping from the table in case of overturning.*

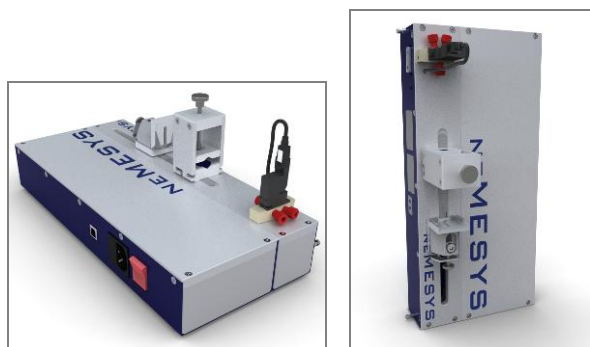


Figure 2 - neMESYS Set-up

## 6.4 Step 3 - Bus terminating connector

Connect the Bus-terminating-plug into the socket of the last connected dosing unit of your dosing platform. Ensure that this plug is plugged into the unit before the unit is switched on. If this plug is not plugged into the unit, disturbances to the data communication may occur.



## 6.5 Step 4 - Connecting the Device

The inlet connector for non-heating apparatus fitted to the unit is connected to the mains power supply with the power cable. The USB cable is used to connect the dosing platform (USB type B) to a free USB socket on the PC (USB type A).



### CAUTION

*Risk of injury from damaged cables and plug devices.*

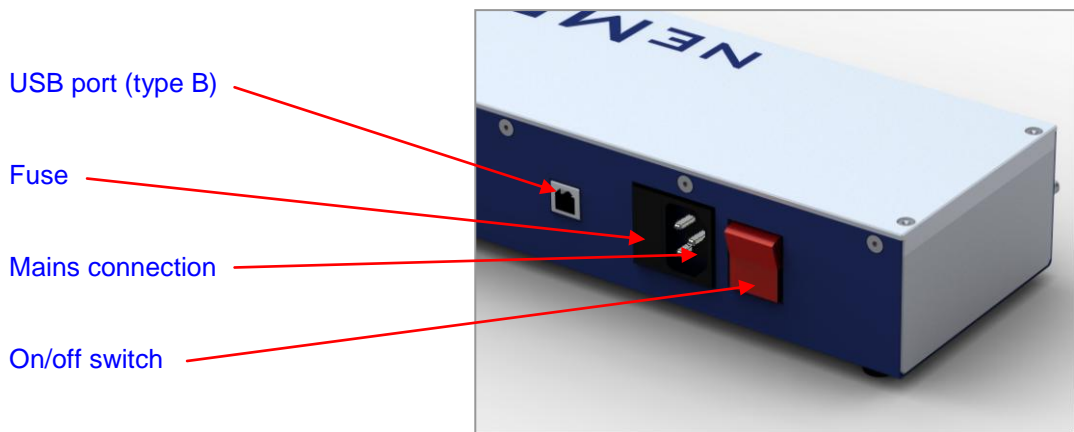
*Inspect the unit and lines for damage before starting the unit! Never operate the unit with damaged lines and plugging devices!*

Switch the power on in order to start the unit and bring it into an operational condition. The LED on the power switch should illuminate when the unit is turned on. If this is not the case, check that the power connector cable is correctly plugged into both the unit and mains power supply.



**IMPORTANT**

*Install the neMESYS software and device driver **before** using the USB to connect the unit to the PC.*



**IMPORTANT**

*Only use cables from the scope of supply.*



**CAUTION**

*Danger of tripping over the power and connection cable.  
When laying cables, ensure any risk of stumbling is avoided!*

## 6.6 Step 5 - Installing a New USB Device

When you connect the neMESYS dosing platform to the PC via a USB for the first time, or if a different USB socket is used at a later date, the Windows hardware assistant will recognise a new USB unit and automatically start, it will then install the necessary driver.

- (1) The hardware assistant recognises a new unit on the USB socket



Figure 3 - Windows Hardware Assistant

- (2) The following dialog appears; this should be configured as shown on the image and confirmed with *Next*.

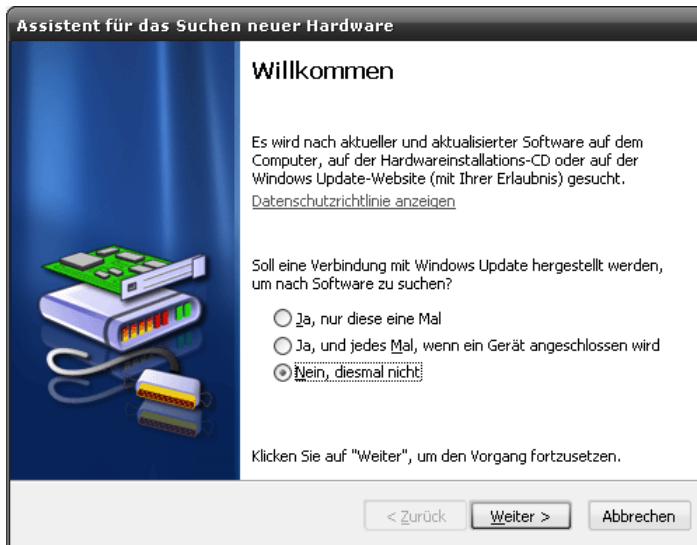


Figure 4 - Hardware Assistant - Welcome

- (3) In the dialog that follows, please select automatic installation and again confirm this dialog with *Next*.

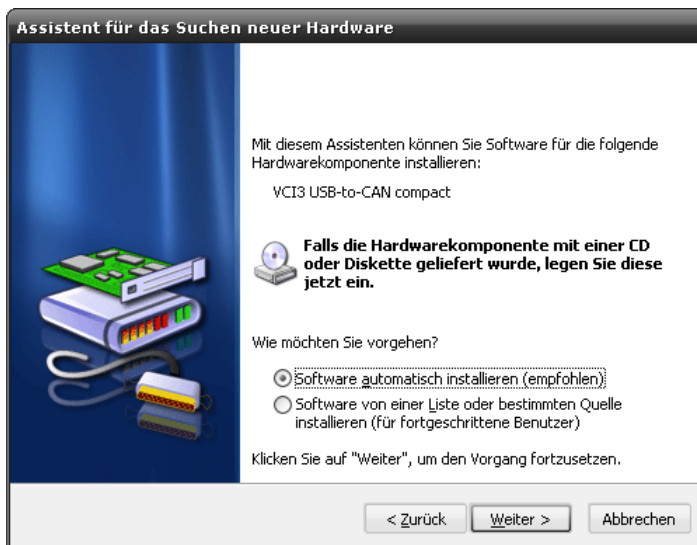


Figure 5 - New USB-to-CAN compact detected

- (4) Windows detects a driver for the new unit and the following dialog appears



Figure 6 - Driver found

Complete the installation by clicking *Finish*.



**IMPORTANT**

*The user must be logged into Windows as the administrator in order to carry out the installation of new hardware.*

You can start the neMESYS UserInterface after the driver has been successfully installed. Please observe the points in the paragraph in order to correctly configure the dosing unit 6 - Initial Start-up.



**NOTICE**

*Risk of data loss due to switching off in an uncontrolled manner!*

**First exit the neMESYS UserInterface software *before* switching off the unit!**

*This is the only way that all settings will be correctly saved and that configuration data will not be lost.*

---

# 7 Operating the Device

## 7.1 Overview

User software that runs under the Windows operating system is available to control the unit. This software enables you to conveniently control the following; all unit parameters, the uncomplicated programming of differing gradients for each individual syringe pump, and the graphic visualisation of the unit condition at each individual axis.

Please deactivate standby and hibernation on your PC while working with the software. Activation of standby mode may lead to a malfunction of the neMESYS hardware device driver.



### **NOTICE**

*Risk of malfunction or data loss due to standby or hibernation.*

*Deactivate standby / hibernation function of your PC to avoid malfunction of the neMESYS hardware device driver.*

## 7.2 Detecting Dosing Units Automatically

A search must be carried out each time that the neMESYS UserInterface software is started. This is so that all the dosing units that make up your dosing platform are detected. Click on the *magnifying glass symbol* in the toolbar, or click in the *Setup* menu on the *Search Device* menu item.

At the same time, connection to the unit will be initialised. When the search is carried out for the first time and more than one Base-Module is connected to your PC, a hardware selection dialog will appear so that you can select the unit with which the PC should connect. Select an entry from the list and click *OK*. If the hardware selection list is empty, then no Base-Module is connected to your PC.

Die Software führt nun einen Suchlauf durch um alle angeschlossenen Dosiereinheiten zu identifizieren (Figure 7).

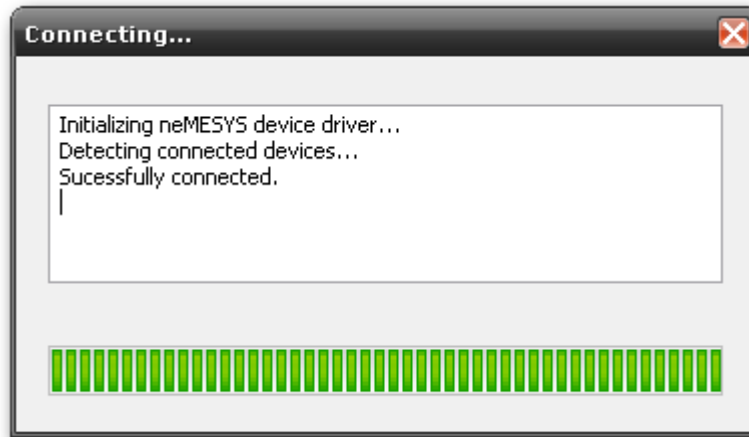


Figure 7 - Status window initialisation and search for dosing units

A user panel for all correctly configured dosing units will be displayed and the dosing unit appears in the list of dosing units (see Software Manual).

## 7.3 Adding Dosing Units

Certain steps must be taken if you would like to add additional dosing units to the dosing system. All dosing units are supplied to you at factory settings. This means that all dosing units have the same address. For this reason, it is not possible to immediately connect and use all dosing units. Please observe the following steps to add new dosing units to the dosing platform.



### **NOTICE**

*Risk of incorrect configuration and damage to the dosing units!*

*Only add **one** additional module to your system and configure this before you add more modules.*

- (1) In the “Setup” menu, please select the “Add Dosing Unit” menu item in order to configure your connected dosing unit and for the software to recognise this. A dialog will appear, follow the instructions in the dialog step by step:

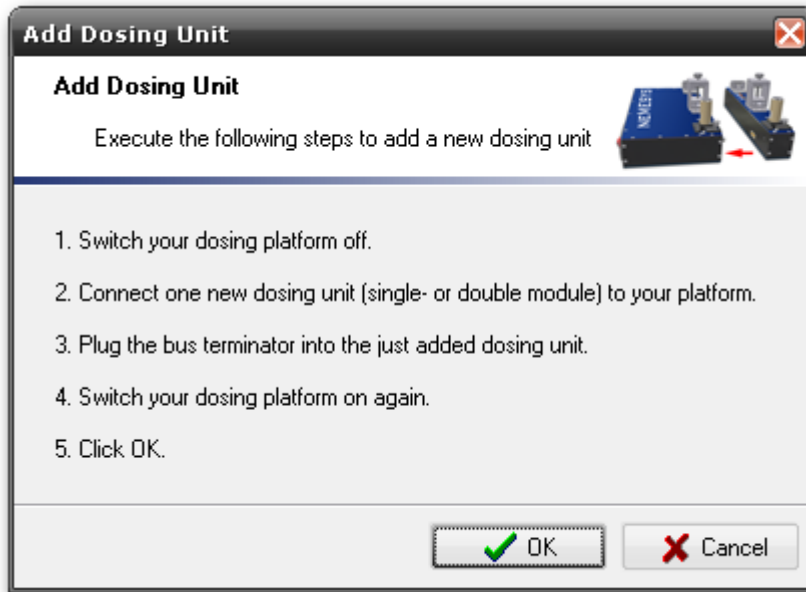


Figure 8 - Add Dosing Unit Dialog

- (2) Switch your dosing platform off.

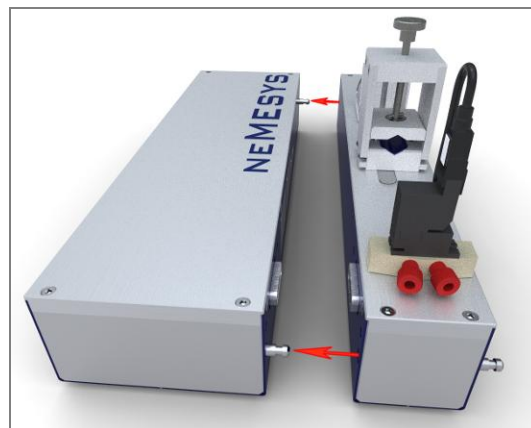


**NOTICE**

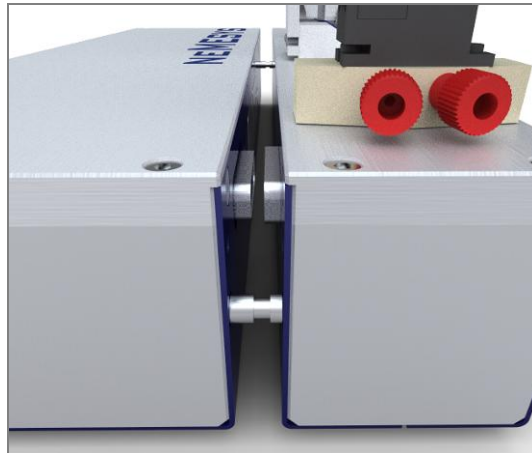
*Risk of data loss due to switching off in an uncontrolled manner.*

*Do not switch off the dosing platform whilst the neMESYS UserInterface software is in use, except in an emergency or if the software clearly stipulates that this should happen. This is the only way that all settings will be correctly saved and that configuration data will not be lost.*

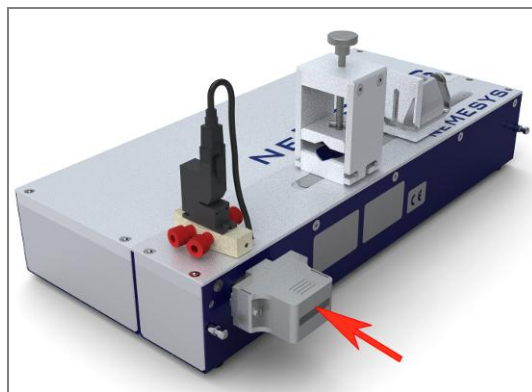
- (3) Place the module that is to be connected next to your dosing platform on a flat horizontal base. The locating pins of the last dosing platform module lay opposite the locating hole of the module to be connected.



- (4) Plug the new module onto the dosing platform. The locating pins will be guided into each respective locating hole. Connect the D-Sub connectors together ensuring a secure contact. In order to guarantee a clean contact between the modules, both modules must lay flat on each other. Ensure that the modules are not tilted or twisted.



- (5) Plug the bus terminating plug in the newly installed module onto the dosing platform.



- (6) Switch the dosing platform on again and click *OK*.



**NOTICE**

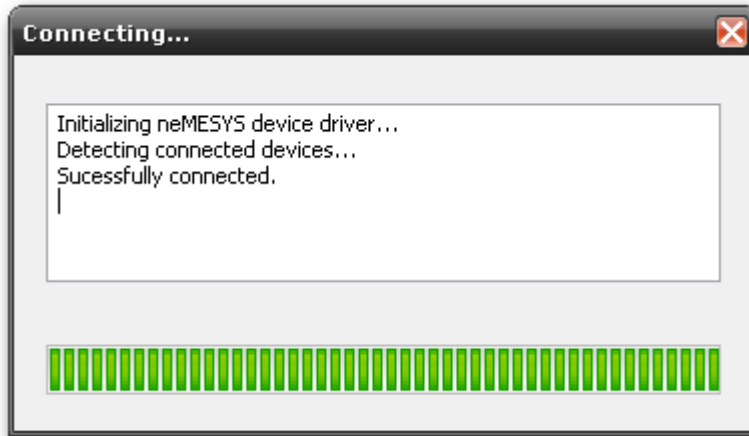
*Risk of incorrect configuration and damage to the dosing units!*

*Only **one** non-configured dosing unit with default values can be connected to the dosing platform (initial connection).*

The software will now configure and add the units independently. To begin with a search is made to detect dosing units that have already been configured and connected. When the search is carried out for the first time and several Base Modules are connected with the PC, a hardware selection dialog will appear in order for you to select the unit with which the PC should connect. Select an entry from the list and click *OK*: If the list is empty, then no Base Module is connected to your PC. No hardware selection dialog will

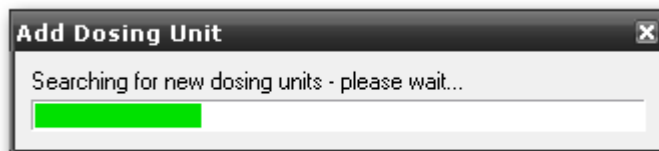
appear if only one Base module is connected to the PC. If this is the case, the software will connect with the module automatically.

The search will now be started.



*Figure 9 - Search dosing units*

When the search is completed, user panels will be superimposed for all detected dosing units. The software will then search for newly connected dosing units with factory settings.



*Figure 10 - Search a dosing unit using factory settings*

When the software has recognised the connected dosing unit, this will be automatically configured and will receive a unique unit address in the dosing platform.

On completion of the configuration, the software will conduct a further search in order to identify the properly configured dosing units. The newly configured dosing unit should now appear with the previously configured units.

When the newly installed dosing unit has been identified, the software will inform you that a calibration of the dosing unit is necessary.

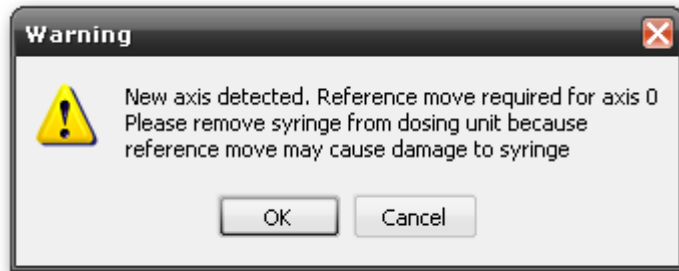


Figure 11 - Calibrating Dosing Unit Dialog

Please carry out this calibration by clicking “OK” on the dialog. During the calibration the pusher is moved to the lower limit.



**NOTICE**

*Risk of damaging syringes!*

*The system may only be calibrated if there is no syringe installed on the dosing unit.*

On completion of the calibration, the connected dosing unit is operational and can be used by you. If you have purchased further dosing units, please connect the next dosing unit with the dosing platform (previously configured units must not be removed), for this and for each further unit repeat steps 1 - 7. Repeat this process until all dosing units are connected to the dosing platform and have been configured by the software.



**IMPORTANT**

*The order in which the dosing units are connected and configured is also the order that they will be displayed in the software; for this reason do not change the order of the dosing units after configuration.*

## 7.4 Removing Dosing Units



**NOTICE**

*Risk of damage by removing the dosing units through tilting!*

*When you remove the dosing unit, ensure that the units are separated from each other in as parallel a manner as possible.*

*Before removing a dosing unit from the syringe pump system, return its settings to the default values, otherwise address conflicts may occur when replacing the unit into this, or another dosing platform*

Please follow the following steps in order to remove dosing units from your dosing platform:

- (1) Select the last dosing by clicking on the **last** dosing unit in the list of dosing units so it is marked grey like in Figure 12 – List of dosing units.

Dosing Units							
Units	Description	Mode	Flow	Unit	Level	Syringe	
<input checked="" type="checkbox"/>	Dosing Unit ...	direct	0,000233	µl/s		10 µl	67 mm
<input checked="" type="checkbox"/>	Reagent 1	direct	-0,205630	µl/s		10000 µl	60 mm
<input checked="" type="checkbox"/>	Reagent 2	direct	0,000000	µl/s		10 µl	67 mm

Figure 12 – List of dosing units

- (2) In the „Setup“ menu, select the „Remove Dosing Unit“ (Figure 12) menu item, to remove the dosing units from the dosing platform.

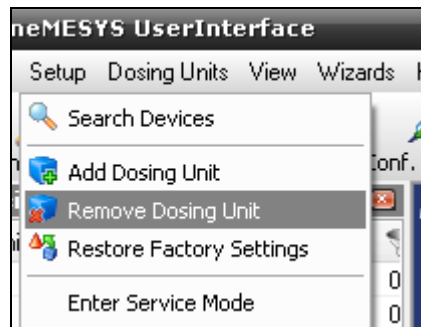


Figure 13 – Menu Remove Dosing Unit

- (3) A dialog will appear, follow the instructions step by step:

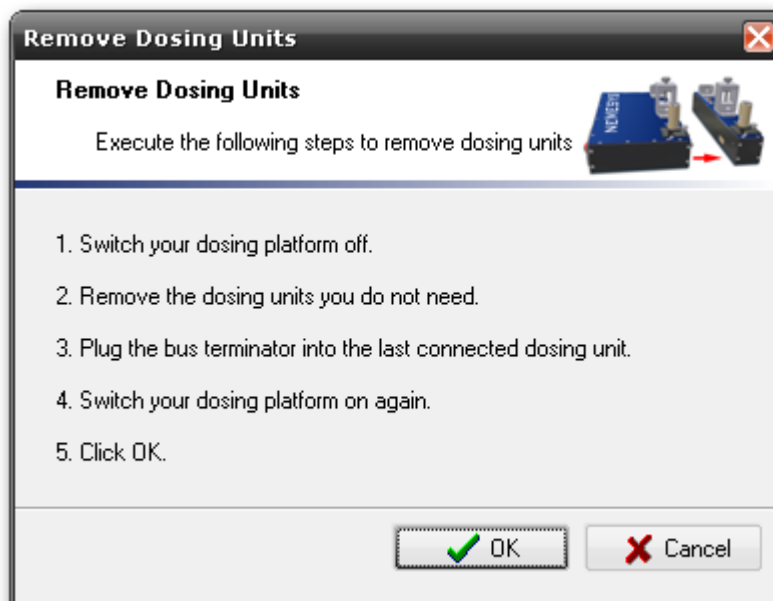


Figure 14 - Remove Dosing Unit Dialog

- 
- (1) Switch your dosing platform off
  - (2) Remove the **last** dosing unit.
  - (3) Connect the Bus terminating plug into the socket of the now last dosing unit of the dosing platform.
  - (4) Switch the dosing platform on again.
  - (5) Close the Remove dosing units dialog by clicking „OK“. A new search will be run in order to detect the new configuration and amount of dosing units in the dosing platform.

**NOTICE**

*Risk of damage with an incorrect configuration!*

*Follow the steps above for each dosing unit which you remove. Never remove a dosing unit from your dosing platform without following this procedure.*

**IMPORTANT**

*After removing a dosing unit, place the bus terminating plug into the last connected dosing unit again.*

---

## 8 Operating the Hardware

### 8.1 Fluidic connections

The type of fluidic connections depends on used syringes. We recommend the use fittings with ¼"-28UNF thread because the valves provide this type of connections. Please take care of a proper installation of fluidic connections on all dosing units and always check tightness of fluidic connections after each change. cetoni is not liable for any damage caused by incorrect fluidic connections.

**NOTICE**

*Risk of damaging device electronic due to incorrect fluidic connections.  
Always check tightness of fluidic connections after any change and in periodic intervals.*

### 8.2 Syringe fitting

**NOTICE**

*To assure precise dosing and to minimize the risk of damages, please use high quality glass syringes with an outer diameter between 6 and 30mm.*

**CAUTION**

*Risk of crushing by touching moving parts!  
Do not touch any moving parts on the unit whilst it is in operation!*

**CAUTION**

*Risk of injury due to damaged syringes!  
On every syringe-exchange check the syringes for damages to avoid injury due to sharp-edged glass.*

**NOTICE**

*Risk of damaging the syringe whilst clamping!  
Place the empty syringe in the reference position of the axis. If this is not possible, make sure, that the remaining stroke of the syringe is at least as much as the remaining stroke of the syringe pump.*



### **NOTICE**

*Risk of abrasive wear of syringes on permanent use.*

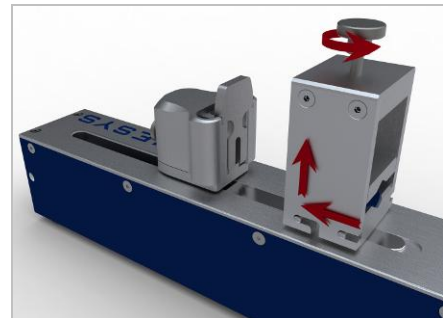
*The permanent use of syringes may lead to abrasive wear that may cause leakage or even damage to syringes. Please check syringes regularly.*

## **8.2.1 Syringe clamping**

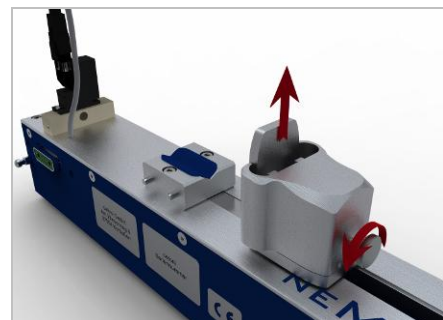
The syringe clamps of the neMESYS Dosing Unit have been designed to offer the largest possible flexibility when using various syringes. You can use syringes with an outer diameter of 6mm to 30mm and with a stroke of up to 65 mm.

Please observe the following steps when clamping a syringe to a neMESYS dosing unit:

- (1) First loosen the knurled knob of the syringe clamp. Push the upper part of the syringe clamp in the direction of the piston clamp. Guide the upper part between the cylinder pins upwards.



- (2) Loosen the knurled knob of the piston holder and remove the piston adapter. It is possible to remove the body part of the piston holder, too.

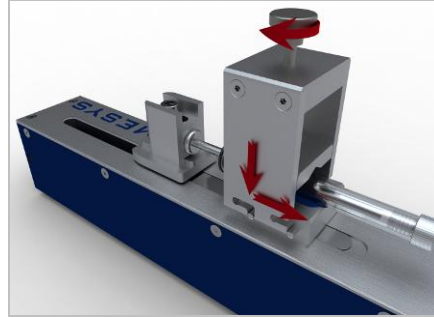


- (3) If your device has a valve, connect the syringe to the selector valve (1/4-28 UNF thread). Place the empty syringe into to the V-groove so that the piston clings to the piston holder.

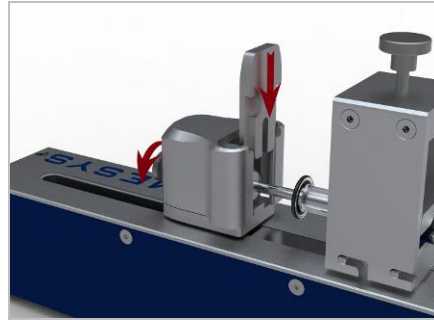
If necessary the piston holder can be adjusted by loosening the hexagon head cap screw with a 4 mm Allen key.



- (4) Now set the clamp of the syringe holder on the dosing unit and fix the syringe by hand-tightening the large knurled knob.



- (5) Add the body part of the piston holder and slide in the appropriate piston adapter so that the “piston-head” is situated between piston-holder and adapter. Fix the piston by tightening the knurled screw on the back. Make sure that the syringe and the piston are in alignment with one another



**NOTICE**

*Risk of abrasive wear of syringes on permanent use.*

*The permanent use of syringes may lead to abrasive wear that may cause leakage or even damage to syringes. Please check syringes regularly.*

## 8.3 Valves

### 8.3.1 Modules with valve

Each dosing unit can be optionally fitted with a 3-2-way valve. The three-way valve makes it possible for a reagent to be taken in and rendered without the syringe having to be changed or manually filled.

Cetoni can provide suitable connection materials like fittings, tubing, and syringes.

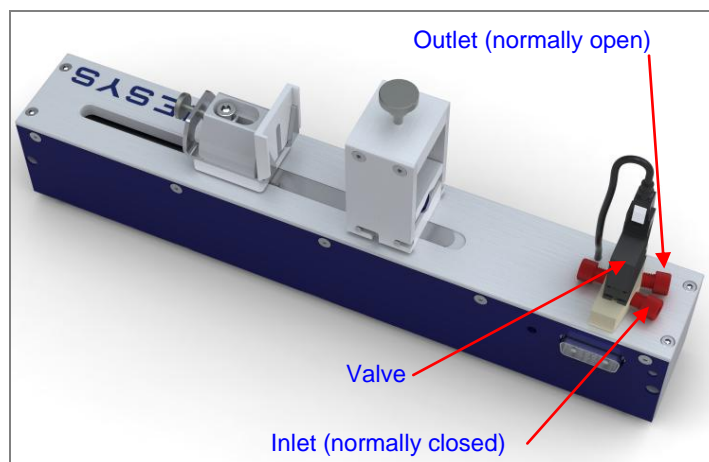
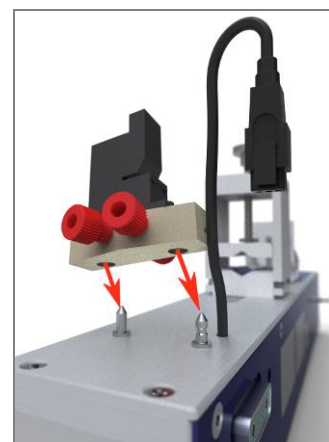


Figure 15 Dosing Unit with valve

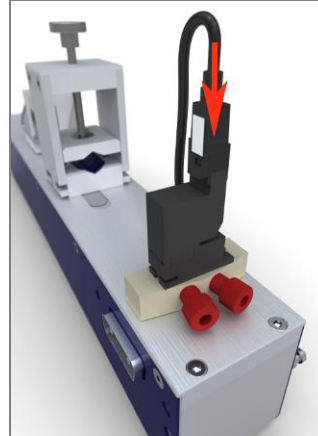
### 8.3.2 Mounting / Changing the valve

To avoid damages of the valve unit it will be delivered separated from the dosing unit. To install the valve unit or change the valve, please operate the following steps:

- (1) The valve can be plugged onto the two pins of the dosing module. To remove it, simply pull it off.



- (2) Afterwards connect the valve plug of the device to the installed valve as seen in the figure on the right. Please take care that the white mark is on the inner side and the detent on the outer side. To remove the cable, press the detent and pull the plug off the valve.



#### **NOTICE**

*Removing the valve can make it easier to connect the valve to the connection material or to clean the valve.*

*By adjusting the piston holder or the syringe in the holder it is easy to change the space between syringe and valve.*



#### **NOTICE**

*There is a danger of the damaging the housing or the sealing material!  
Examine the chemical compatibility of the media you want to pump in combination with the encasing material PEEK and the sealing material FFKM (Perfluorelastomer).*


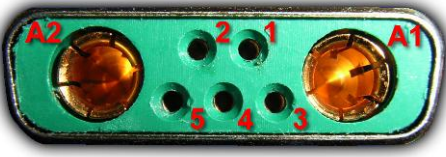


#### **IMPORTANT**

*Make sure that the pressure on the application does not reach more than 0.5 bar. In this case the application medium might be pushed back into the valve or the syringe.*

## 9 Electrical Interfaces

### 9.1 Pin Assignment Modul-Interface

Pin	Male	Female
		
1	RS232 NC	RS232 RX
2	RS232 NC	RS232 TX
3	CAN High	CAN High
4	CAN Low	CAN Low
5	Signal GND	Signal GND
A1	+24 V	+24 V
A2	GND	GND

### 9.2 OEM RS232-Cable Set

#### 9.2.1 RS232 Wiring

Plug the mixed-D-Sub-Male-Connector of the OEM RS232 cable into the female connector of the last dosing unit in your dosing platform. The device should be switched off during wiring. Then tighten both screws. You do not need the terminating plug because a terminating resistor is already built into the RS232 cable (the cable replaces the terminating plug).

Plug the 9pin-D-Sub-Female-Connector into your PC or any other control. If you need to bridge a longer distance please use a 1:1-cable with 9pin-D-Sub male to female.

Now you can power on your dosing platform and send or receive data via RS232. Because each dosing unit contains a built in RS232-to-CAN-gateway you can address each dosing unit of your dosing platform with only one single RS232 cable.

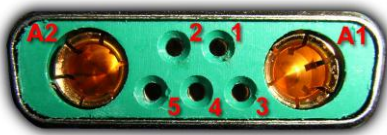

## 9.2.2 Communication Settings

You need to setup the following RS232 communication settings for your PC or any other control for proper communication with neMESYS dosing units:

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

## 9.2.3 Pin Assignment OEM-RS232 cable

The OEM RS232 cable adapts the female neMESYS device interface to a standard female 9 Pin D-Sub connector. The following table shows the pin assignments

Pin	Interface neMESYS Female	Cable	Pin	9 Pin D-Sub Female
				
<b>1</b>	RS232 RX	orange	<b>3</b>	TXD Transmit Data
<b>2</b>	RS232 TX	brown	<b>2</b>	RXD Receive Data
<b>5</b>	Signal GND	black	<b>5</b>	GND Signal GND
housing	PE-potential earth	shield	housing	

---

## 10 Maintenance and Care

If used in accordance with intended purpose, the device is maintenance-free. The manufacturer recommends sending the devices to cetoni GmbH for maintenance every two years. Should there be a failure despite this, please contact cetoni GmbH.

Please decontaminate the device if necessary and include the completed Declaration of Contamination form in case of a return.

### 10.1 Troubleshooting

If mechanical problems occur, which you cannot eliminate yourself, or which require opening the device, please contact cetoni GmbH to coordinate further actions. The device may only be opened by cetoni GmbH or thereby authorized service staff. Otherwise the warranty and obligation of performance is void.

Software-related troubles are dealt with in the Software Manual.

### 10.2 Cleaning

For cleaning it please rub the surface gently with a soft, damp cloth. The cloth must not be wet, so that no fluency can trickle into the device. In case of a heavier soiling you can also use a little bit of detergent or alcohol.

## 11 Disposal

Please return your old devices to cetoni GmbH which will ensure correct disposal according to the Electrical and Electronic Equipment Act.

Please decontaminate the device if necessary and include the completed Declaration of Contamination form.

# 12 Declaration of Conformity

## EG-Konformitätserklärung EC Declaration of Conformity

im Sinne der EG-Richtlinie 2006/42/EG über Maschinen (Anhang II A)  
according to EC directive 2006/42/EC on machinery (Annex II A)

**Name und Anschrift des Herstellers:**  
*Name and address of the manufacturer.*

cetoni GmbH  
Am Wiesenring 6  
07554 Korbußen

Diese Erklärung bezieht sich nur auf die Maschine in dem Zustand, in dem sie in Verkehr gebracht wurde; vom Endnutzer nachträglich angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt. Die Erklärung verliert ihre Gültigkeit, wenn das Produkt ohne Zustimmung umgebaut oder verändert wird.  
*This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user. The declaration is no more valid, if the product is modified without agreement.*

**Hiermit erklären wir, dass die nachstehend beschriebene Maschine / Anlage**  
***Herewith we declare, that the machinery described below***

**Produktbezeichnung / product denomination:** neMESYS Basis- und Dosiermodul  
**Serien- / Typenbezeichnung / model/type:** NEM-B100-01 / NEM-B101-02

allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.  
Ggf.: Die Maschine/Anlage entspricht zusätzlich den Bestimmungen der Richtlinien 2006/95/EG über elektrische Betriebsmittel und 2004/108/EG über elektromagnetische Verträglichkeit.  
*is complying with all essential requirements of the Machinery Directive 2006/42/EC.*  
*Where appropriate: In addition the machinery is in conformity with the EC Directives 2006/95/EC relating to electrical equipment and 2004/108/EC relating to electromagnetic compatibility.*

**Angewandte harmonisierte Normen / Harmonised Standards used**  
EN V 61000-6-2  
DIN EN 61010-1  
DIN EN ISO 14121-1

**Angewandte sonstige technische Normen und Spezifikationen**  
***Other technical standards and specifications used:***

**Name, Anschrift und Kennnummer der benannten Stelle, die das EG-Baumusterprüfverfahren durchgeführt hat, sowie die Nummer der EG-Baumusterprüfbescheinigung oder die das umfassende Qualitätssicherungssystem genehmigt hat.**  
***the name, address and identification number of the notified body which carried out the EC type-examination and the number of the EC type-examination certificate or which approved the full quality assurance system***

**Bevollmächtigter für die Zusammenstellung der relevanten technischen Unterlagen (EU-Adresse)**  
***The person authorised to compile the relevant technical documentation (must be established within EU):***

Herr Michael Kuntschke  
cetoni GmbH  
Am Wiesenring 6  
07554 Korbußen

Korbußen, 23.03.2010  
Ort, Datum  
Place, Date

Kunze, Tilo - Geschäftsführer  
Name, Vorname und Funktion des Unterzeichners  
surname, first name and function of signatory

  
Unterschrift  
Signature