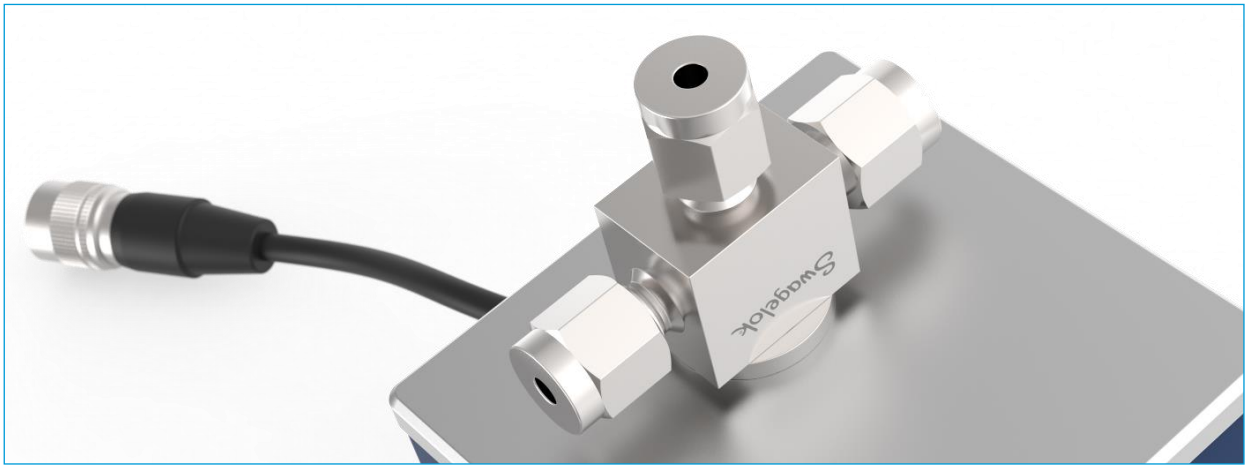
CETONI

CE BALL VALVE

Hardware Manual



ORIGINAL INSTRUCTIONS 1.05 – JULY 2019

CETONI GmbH
Wiesenring 6
07554 Korbussen
Germany

T +49 (0) 36602 338-0
F +49 (0) 36602 338-11
E info@cetoni.de

www.cetoni.de

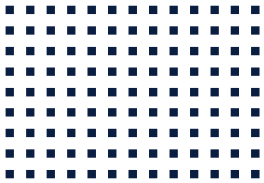
The information and data contained in this document are subject to change without notice. CETONI GmbH is constantly striving to develop all its products. This means that there may be changes in form, equipment and technology. Claims can therefore not be made on the basis of information, illustration or descriptions in these instructions. The description for the product specification in this manual does not constitute an integral part of the contract.

If you control the products with a software from CETONI GmbH, you agree to the applicable license agreement, which can be read in the corresponding software manual. This and all other current product manuals can be found at https://www.cetoni.de/en/downloads/manuals.

CETONI GmbH grants its customers the right to reproduce this manual for the purpose of providing technical information to potential users of CETONI products. Extracts of these documents may only be reproduced or transmitted with a precise reference to the authorship of CETONI GmbH, irrespective of the manner in which they are reproduced or transmitted, either electronically or mechanically. Any duplication or use of excerpts for other purposes requires the written permission of CETONI GmbH.

We are always open to comments, corrections and requests. Please send them to info@cetoni.de.

The general terms and conditions of CETONI GmbH shall apply. Alternative agreements must be in written form.



1 Overviews and Indexes

1.1 Content

1 Overviews and Indexes 5
1.1 Content 5
1.2 Change History 7

2 Introduction 8
2.1 Foreword 8
2.2 Symbols and Key Words Used 8
2.3 Norms and Guide Lines 9
2.4 Application Purpose 9
2.4.1 General Description of the Device 9
2.4.2 Intended Use 9
2.4.3 Reasonably Foreseeable Faulty Application 9
2.4.4 Safety Advice 9
2.4.5 Measures for Safe Operation 11
2.4.6 Safety Devices on the System 11
2.4.7 Condition of the Devices 11
2.5 Warranty and Liability 12
2.6 Scope of Supply 13

3 Technical Data & Handling 14
3.1 Technical Data 14
3.1.1 Mechanical Data 14
3.1.2 Fluidic Data 14
3.1.3 Interfaces (Variants) 15
3.1.4 Environment 15

4 Maintenance and Care 16

5 Operation 17
5.1 Electrical Connection 17
5.1.1 Connection to neMESYS I/O-interface 17
5.1.2 Connection to neMESYS OEM I/O-interface 18
5.1.3 Connection to Qmix I/O-B module 18
5.2 Fluidic Connections 20
5.2.1 First-time Installation 20
5.2.2 Disassembly 21
5.2.3 Reassembly 21
5.2.4 Spare-parts 22
5.3 Switching Positions 23
5.3.1 On-Off (2-Way) Valves (Normally Open) 23
5.3.1 Switching (3-Way) Valves 24

6 Disposal 26

1.2 Change History

REV	DATE	CHANGE
1.00	21.06.2013	Creation of the Manual
1.01	11.03.2016	Revision Guide Design
1.02	22.06.2018	Pictures adapted to current revision Documentation of the switching positions improved
1.03	11.10.2018	reference to Fitok BO series ball valves added
1.04	21.05.2019	Variants electrical connection
1.05	10.07.2019	Connection schematic for KL2012 Bus Terminal added

2 Introduction

2.1 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 Valve Module. We are directly available for any questions or suggestions that you may have.

The Valve Module may only be taken in operation after carefully reading and understanding this manual. We wish you much success in your work with the Valve Module.

2.2 Symbols and Key Words Used

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

HINT. Describes practical tips and useful information to facilitate the handling of the software.

IMPORTANT. Signifies important hints and other useful information that may not result in potentially dangerous or harmful situations.

CAUTION. Identifies a potentially harmful situation. Failure to avert this situation may result in damage to the product or anything in its proximity.

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

2.3 Norms and Guide Lines

CETONI GmbH declares under its sole responsibility, that the Valve Module complies with the health and safety requirements of the relevant European directives.

2.4 Application Purpose

2.4.1 General Description of the Device

The Valve Module is a motorized ball valve. Depending on the type of ball valve, it allows to open, close and switch fluid paths.

2.4.2 Intended Use

The Valve Module is intended to be used for automated opening, closing and switching of fluid paths at pressures up to 2500 psi.

Application usually takes place in laboratory-like rooms.

2.4.3 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.

2.4.4 Safety Advice

The safety of the user and a failure-free operation of the devices are assured only 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 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 responsibilities of the operator for the operation of the devices. The laws and regulations of the place of installation must be observed while operating the devices! To ensure a safe work routine, operators and users must assume responsibility for adhering to regulations.
- The devices must not be used as a medical device or for medical purposes.
- 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 devices and the software.
- The devices and pipes must be checked for damage before operation. Damaged pipes and plug devices must be replaced immediately.
- Cables must be laid in a way that avoids any risk of stumbling.
- It is not allowed to use the devices in an explosive atmosphere or with potentially explosive substances.
- 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.
- Wear protective glasses if you are working with corrosive, hot or otherwise dangerous substances during assembly work on the device.
- Transportation, storage or operation of the devices below 0°C with water in the fluid passages may cause damage to the modules.

2.4.5 Measures for Safe Operation

2.4.5.1 ELECTROMAGNETIC EMISSIONS

The Valve Module is 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 Devices on the System

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

2.4.7 Condition of the Devices

Irrespective of the faultless manufacture of the devices, 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 devices and inform CETONI GmbH without delay. CETONI will put your devices back to an operational condition at the earliest. Do not attempt to repair the devices yourself.

2.5 Warranty and Liability

The devices left our company in perfect condition. Only the manufacturer is permitted to open the devices. All guarantee and liability entitlements, particularly damage entitlements due to personal injuries, are void if the devices are opened by an unauthorized person.

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 considers itself responsible for the devices 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 Centre, and if the devices have been used in accordance with the instruction manual.

The Valve Module conforms to the basic safety regulation standards. Industrial property rights are reserved on the circuits, methods, names, software programs, and units.

2.6 Scope of Supply

The delivery should be in accordance with the order and include the following items in any case:

VALVE MODULE

with the ball valve and the electrical connection of your choice

3 Technical Data & Handling

IMPORTANT. Please carefully read this manual and the associated software manual in their entirety before starting up your Valve Module.

3.1 Technical Data

3.1.1 Mechanical Data

DIMENSIONS (LXWXH)	68 x 68 x 112 mm
WEIGHT	≈730 g

3.1.2 Fluidic Data

WETTED MATERIALS	Stainless Steel 316, PTFE Powdered metal 300 series Stainless Steel Silicone-based lubricant
MEDIA TEMPERATURE	-53 to +148°C
MAX. PRESSURE	172 bar (2500 psi)
DN FOR 1/16“ TUBING	1,32 mm / 0,052“
DN FOR 1/8“ TUBING	2,36 mm / 0,093“
C_V-VALUE FOR 1/16“ ROHR	2 ports: 0,1 / 3 ports: 0,08
C_V-VALUE FOR 1/8“ ROHR	2 ports: 0,2 / 3 ports: 0,15

3.1.3 Interfaces (Variants)

12-PIN PLUG	Connection to neMESYS syringe pumps
12-PIN PLUG (JST)	Connection to neMESYS OEM modules
FREE LEADS	Connection to Qmix I/O-B modules

3.1.4 Environment

OPERATING TEMPERATURE	0°C to 40°C
STORAGE TEMPERATURE	-20°C to 70°C
OPERATING / STORAGE AIT HUMIDITY	20% to 90%, non-condensing

CAUTION. Before using the neMESYS Pressure Sensor, please check the chemical resistance of the wetted materials against the fluid to be used.

CAUTION. Transportation, storage or operation of the modules below 0°C with water in the fluid passages may cause damage to the module.

4 Maintenance and Care

The Valve Module is a series 41G ball valve from Swagelok® Company, that has been equipped with a motor by CETONI GmbH, to allow automated actuation. Alternatively, Fitok BO series ball valves are used, which are almost identical in construction and do not differ in application.

This type off ball valve has a self-adjusting packing gasket which compensates for wear, whereby the ball valve can be operated without maintenance over a long period, depending on the has a self-adjusting packing which compensates for wear, whereby the ball valve can be operated without maintenance over a long period, depending on the operating conditions.

If leak tightness is no longer given, the ball valve can be refurbished or exchanged by CETONI GmbH.

In case of problems that you cannot fix yourself or that require opening the device, please contact CETONI GmbH to coordinate any further actions. The device may be opened only by CETONI GmbH or authorized service personnel. Failure to adhere to this rule will void the warranty.

The software manual includes detailed information about malfunctions with respect to the operating software.

Wipe the device with a moist (not wet) cloth in such way that no liquids get into the inside. In case of heavy soiling you may use some detergent or alcohol.

5 Operation

5.1 Electrical Connection

IMPORTANT. Please read and observe the respective section of the associated software manual before connecting the device.

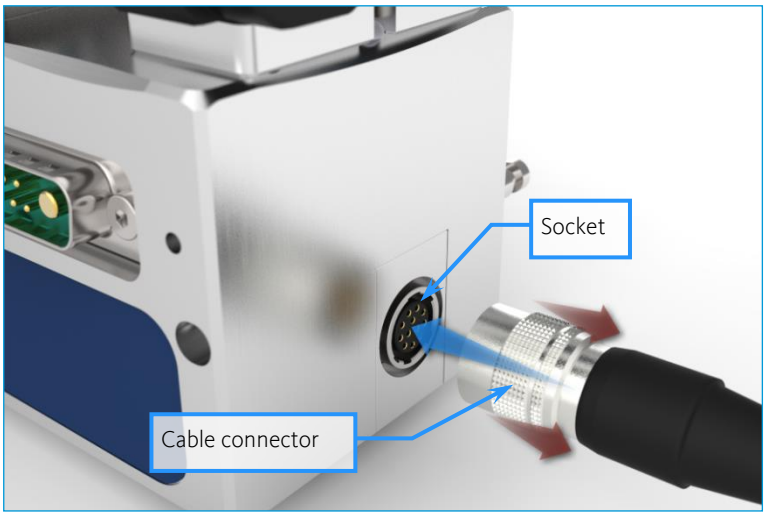
WARNING. Danger of stumbling due to connecting cables! Place cables and tubing in such way as to avoid any danger of stumbling!

5.1.1 Connection to neMESYS I/O-interface

The Valve Module with the 12-pin round connector can be connected to all neMESYS devices that are fitted with the corresponding 12-pin connector.

Plug the cable connector of the Valve Module into the socket of the device until it snaps into place (blue arrow). Please note that the plug will fit only in one orientation!

To remove it, pull on the metal sleeve of the plug. Thereby, the lock is released and the plug can be easily removed. (red arrows)



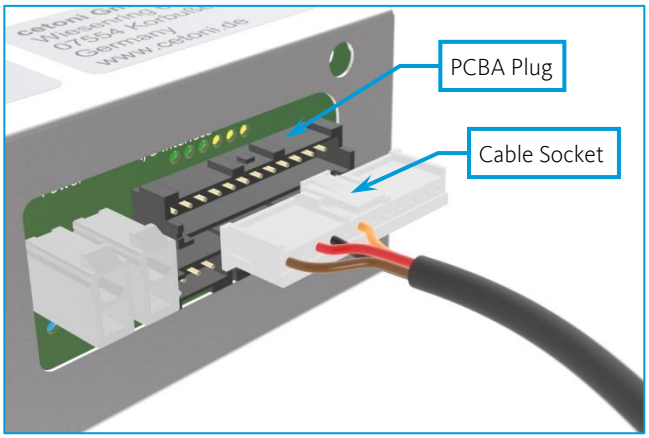
Connection Valve Module

5.1.2 Connection to neMESYS OEM I/O-interface

The Valve Module with the 12-pin JST cable socket can be connected to all neMESYS OEM devices that are fitted with the corresponding 12-pin JST PCBA plug.

Plug the cable socket of the Valve Module into the plug of the neMESYS pump until it snaps noticeable into place. Please note that the connection will fit only one way!

To remove it, pull on the snap-fit rocker of the cable socket. Thus, the lock is released and the cable can be removed easily.



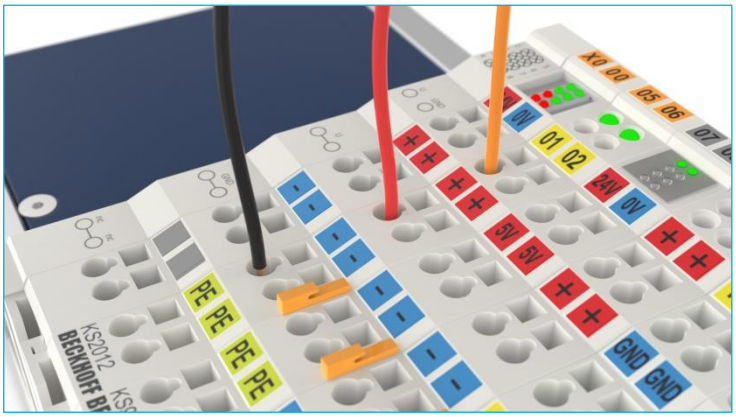
Connection JST cable socket

5.1.3 Connection to Qmix I/O-B module

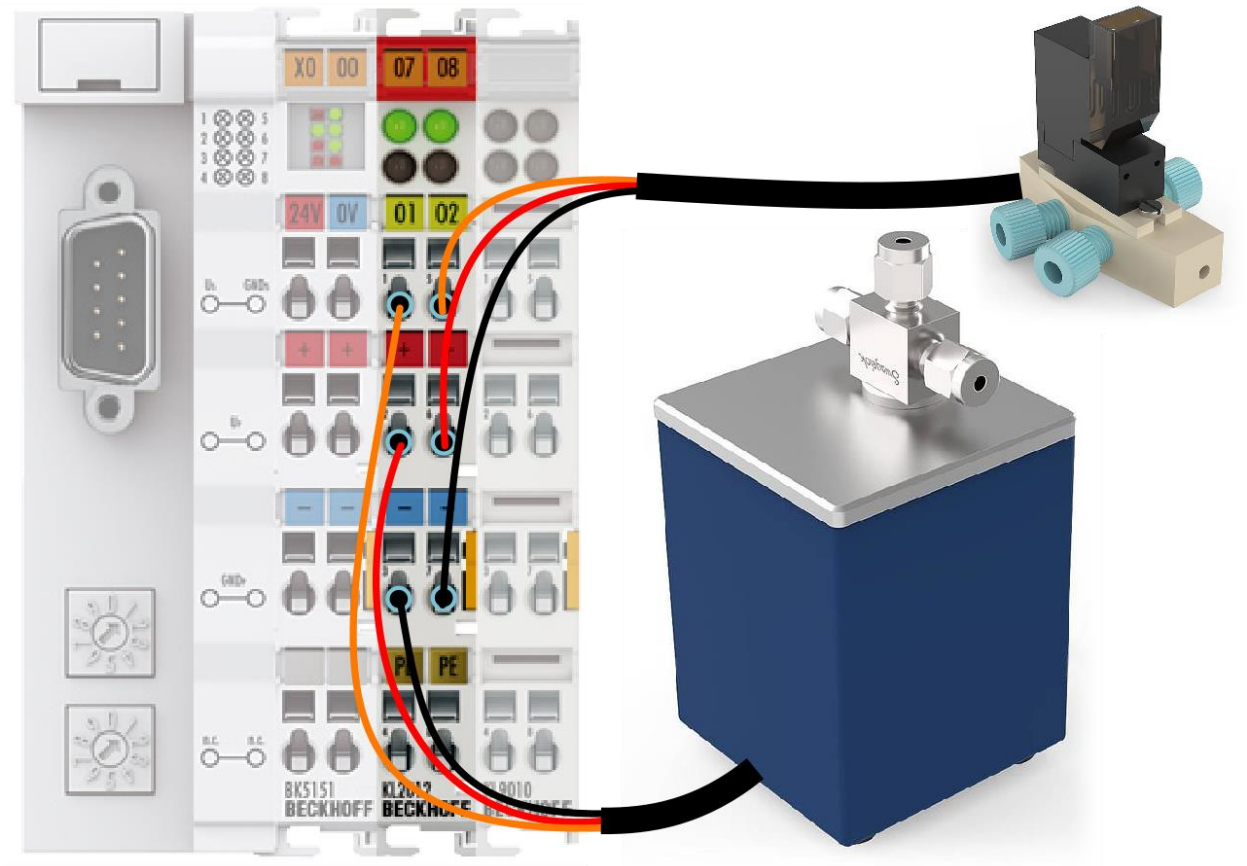
The valve module with free wires can be connected to the Qmix I/O-B module or other suitable I/O devices. The following table shows the assignment of the wires according to their color:

WIRE COLOR	ASSIGNMENT
BLACK	Ground
RED	Supply Voltage 24 ± 0,5 VDC
ORANGE	Signal Low: 0...1,65 V, High: ≥3,85 V

The recommended connection method for the Qmix I/O-B module is to use the KL2012 output terminal (2-channel digital output terminal 24 V DC). Two valves can be connected to this terminal.



The following connection scheme shows how the individual wires are connected to the KL2012 terminal.



If you want to control additional valves, simply add additional KL2012 terminals to your system.

IMPORTANT. Depending on the terminals used, the wiring which is actually required may differ from the picture.

5.2 Fluidic Connections

A Swagelok® tube fitting (or an identical fitting from another manufacturer, e.g. Fitok) is used for fluidic connection. It is suitable for using capillaries made from metal (e.g. stainless steel, titanium) and plastic (e.g. PTFE, PEEK). Please refer to information provided by the respective manufacturer with respect to maximum pressure.

Depending on the type of ball valve, the Valve Module is suitable for capillaries with an external diameter of 1/16" or 1/18". For the assembly or disassembly of the tube fittings of the 1/16" version, you need a 5/16" open-end wrench and for the 1/8" version you need a 7/16" open-end wrench.

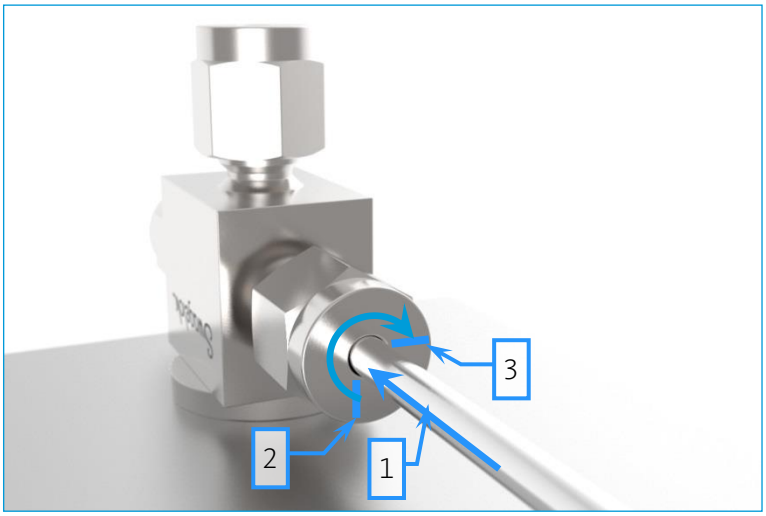
Following is a description of using the tube fittings:

5.2.1 First-time Installation

(1) Fully insert the tube / hose into the fitting and against the shoulder; rotate the nut finger-tight.

(2) Mark the nut at the 6 o'clock position.

(3) Tighten the nut three-quarters turn to the 3 o'clock position with an open-end wrench.



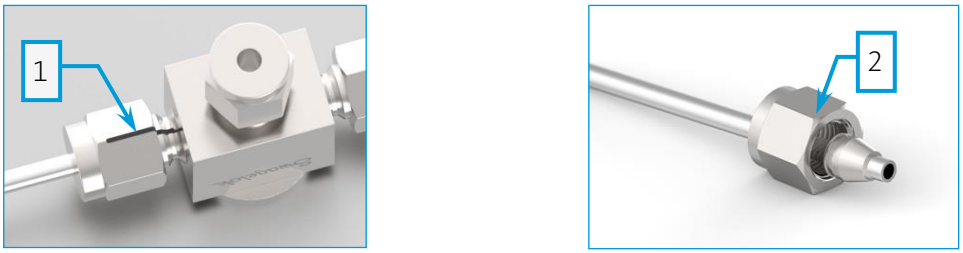
First-time Installation

5.2.2 Disassembly

CAUTION. Release pressure from the system before loosening the fittings.

(1) Before dismantling, draw a marker line across the nut and the fitting body. In this way you create a reference for retightening the cap nut to exactly the same position it was in before.

(2) Pull out the capillaries. The nut and the ferrules remain on the capillary.



Disassembly

5.2.3 Reassembly

(3) To reassemble, insert the capillary with preassembled ferrules into the fitting body until the front ferrule seats against the fitting body.

(4) Rotate the nut with open-end wrench to the previously pulled-up position as indicated by the marks you made before; at this point you will feel a significant increase in resistance.

(5) Retighten the nut slightly. Done!

IMPORTANT. Only use capillaries approved for the anticipated pressure levels.

CAUTION. After connecting, check the tightness of all fluidic connections on a regular basis.

5.2.4 Spare-parts

You can purchase Spare-parts for the tube fittings of both manufacturers directly from Swagelok.

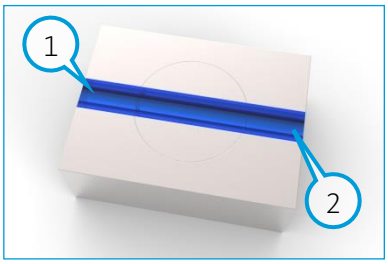
DESCRIPTION	1/16“	1/8“
Union nut and ferrule set	SS-100-NFSET	SS-200-NFSET
Ferrule set	SS-100-SET	SS-200-SET

5.3 Switching Positions

5.3.1 On-Off (2-Way) Valves (Normally Open)

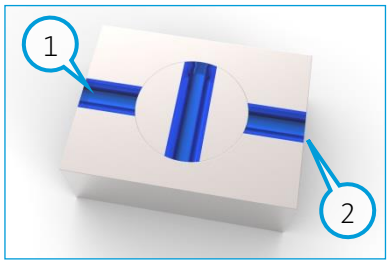
SWITCHING POSITION 1 (POWER-ON POSITION)

port 1 and port 2 connected

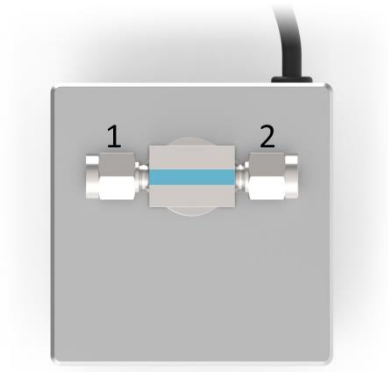


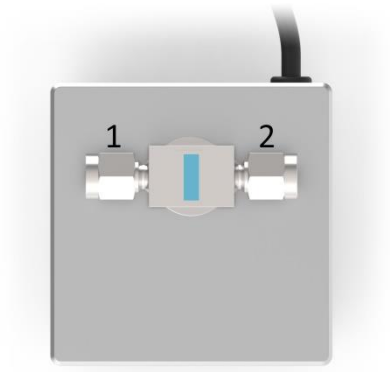
SWITCHING POSITION 2

port 1 and port 2 disconnected

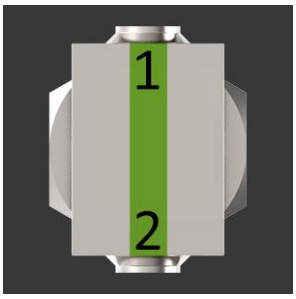


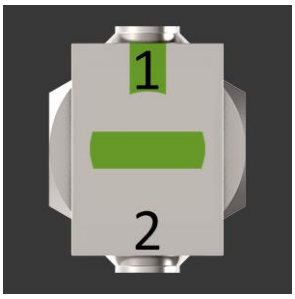
Flow scheme





Top view





Presentation in software

IMPORTANT. If a neMESYS pump is switched on, the connected valve is switched to the power-on position (switching position 1 = open). If the supply voltage fails, the valve remains in the current position.

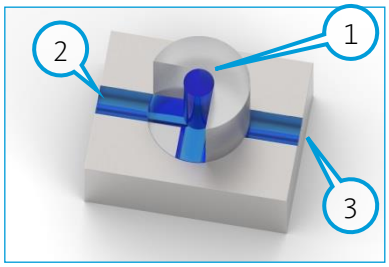
5.3.1 Switching (3-Way) Valves

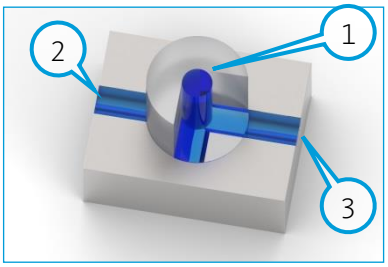
SWITCHING POSITION 1 (POWER-ON POSITION)

- port 1 and port 2 connected
- port 1 and port 3 disconnected

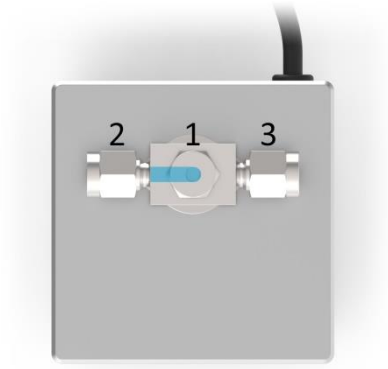
SWITCHING POSITION 2

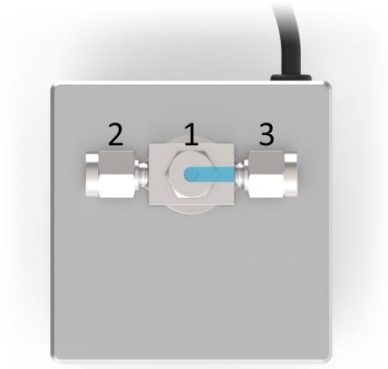
- port 1 and port 2 disconnected
- port 1 and port 3 connected



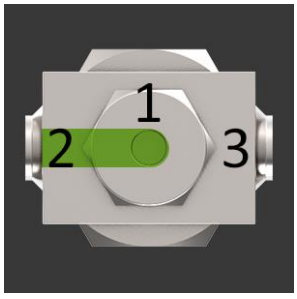


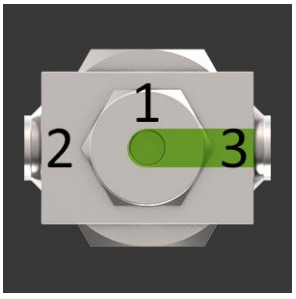
Flow scheme





Top view





Presentation in software

IMPORTANT. If a neMESYS pump is switched on, the connected valve is switched to the power-on position (switching position 1). If the supply voltage fails, the valve remains in the current position.

CAUTION. The fluidic system must be set up by the user so that even an unintentional switching or blocking of the valve can not cause any hazard.

6 Disposal

Please send your old devices back to CETONI GmbH. We will take care of proper disposal according to electric devices regulations.

If necessary, please decontaminate the device before sending it back and attach a completed decontamination declaration with your shipment.