CETONI

# MAGCHEX™ VALVE

## User Manual

**ORIGINAL USER MANUAL 1.07 – JUNE 2017**

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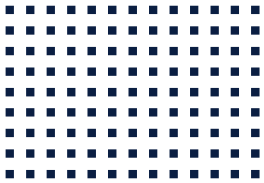


# 1 Overviews & Indexes

## 1.1 Content

## 1.2 Change History

| REV | DATE | CHANGE |
|---|---|---|
| 1.01 | 29.04.2013 | Creation of the manual |
| 1.02 | 16.04.2015 | Added advices about the Pressure Equipment Directive |
| 1.03 | 14.07.2015 | Added safety advices from the manufacturer of the magnets |
| 1.04 | 01.09.2015 | Added the Pressure Equipment Directive 2014/68/EU |
| 1.05 | 11.03.2016 | Revision Guide Design |
| 1.06 | 23.01.2017 | Added stainless steel version |
| 1.07 | 19.06.2017 | Added PEEK version, adaptation of burst pressure |

# 2 Introduction

## 2.1 Foreword

This manual is to support the user in the correct handling and the maintenance of CETONI's MAGCHEX™ check valves.

## 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.

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

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

# 2.3 Safety Advice

## 2.3.1 General Safety Instructions

The MAGCHEX™ check valves may only be operated with the neMESYS syringe pumps of CETONI GmbH.

When used as intended, the MAGCHEX™ check valves do not reach the limit values listed in Article 4, Paragraph 1 of Directive 2014/68/EU. The MAGCHEX™ check valves are therefore not subject to the requirements of Annex 1 of the Directive. Consequently they do not bear a CE marking.

The MAGCHEX™ check valves are designed and approved to work in fluidic systems, which fall within the scope of Article 4 Para. 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, Para. 1 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.

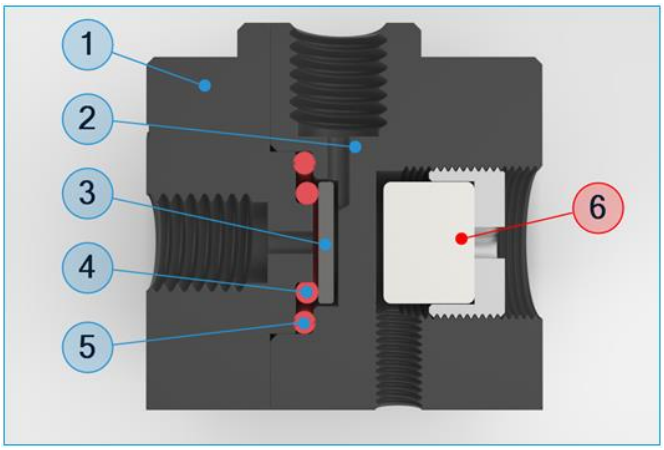
## 2.3.2 Safety Instructions for Handling Magnets

In the MAGCHEX™ check valves magnets are used, for which the manufacturer HKCM Engineering gives the safety instructions that can be found annex. Please read them carefully and observe them when handling the magnets.

# 3 Technical Data & Handling

## 3.1 Wetted Materials

The following sectional view shows the individual components of the MAGCHEX™ check valves. All parts in contact with the fluid are shown with blue identifiers, those of non-wetted parts with red identifiers. In addition, the table below details the materials. Please ensure material compatibility with the respective fluid that is to be used.

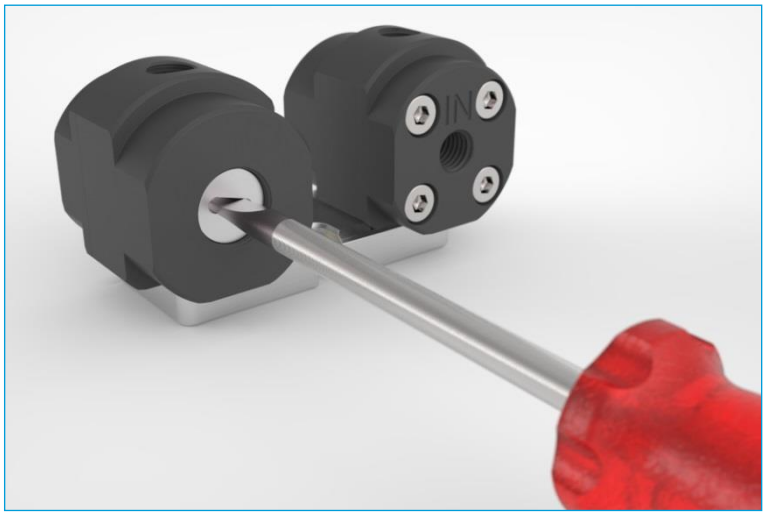



| NO. | DESCRIPTION | MATERIAL |
|---|---|---|
| 1 | inlet housing | • PEEK Polyether ether ketone<br>• Stainless Steel 1.4404 (316L)<br>• PPS Polyphenylene sulfide (on request) |
| 2 | outlet housing | |
| 3 | sealing disc | Magnet, Parylene C-coated |
| 4 | flow seal | O-ring FFKM (Perlast G60A) |
| 5 | housing seal | O-ring FFKM (Perlast G80A) |
| 6 | adjustment screw with magnet | no media contact |

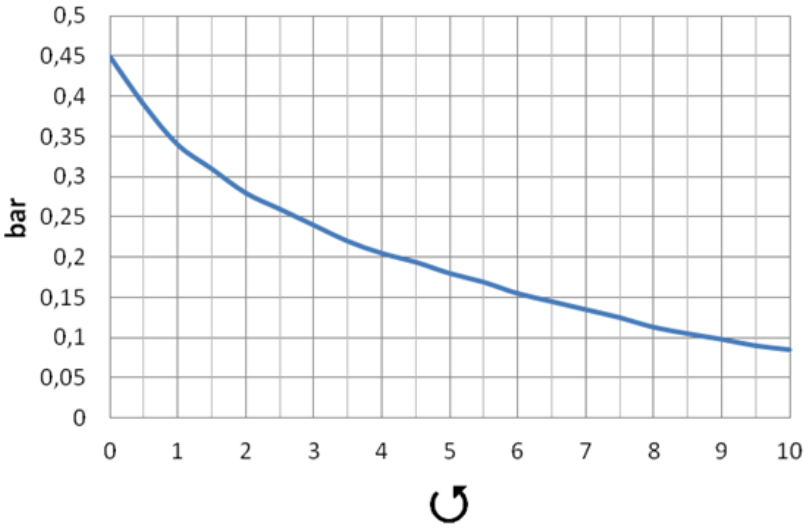
# 3.2 Cracking Pressure Adjustment

The opening or cracking pressure of the MAGCHEX™ is continuously adjustable between 0.1 and 0.4 bar via the adjustment screw.

Fully tightened, the cracking pressure is the highest. Turn the adjustment screw counter clockwise to reduce the cracking pressure as required.




The following graph plots the cracking pressure vs. the number of turns of the adjustment screw relative to the fully-tight position for the use with water and a flow rate of 5 µl/s:




After prolonged time of nonuse, sealing disc and flow seal can stick together and cause a higher initial opening pressure.

## 3.3 Max. Operating Pressure / Temperature

The maximum operating pressure of the MAGCHEX™ check valves is 200 bar, which may be surpassed temporarily by 50 bar. The burst pressure is 400 bar.

The maximum operating temperature is 50°C.

# 4 Maintenance

After use with aggressive fluids, please thoroughly cleanse the check valve with distilled water followed by, if possible, drying with compressed air.

If this procedure is not feasible as well as prior to extended periods of nonuse, you should disassemble and dry the valves. Otherwise, in particular at tiny spots with insufficient/imperfect coating of the magnetic sealing disc, corrosion may occur which may limit the use time of the device.

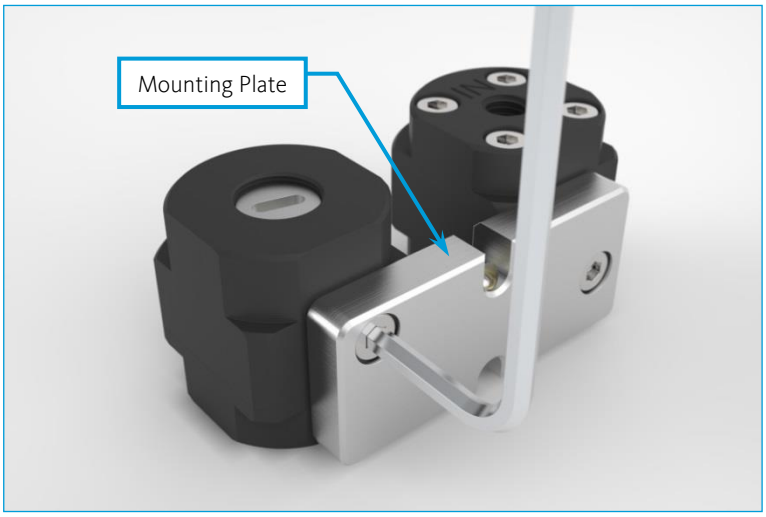
Disassembly of the valve is also necessary before changing the O-rings or the sealing disc. To do this, please proceed as follows:

## 4.1 Disassembly

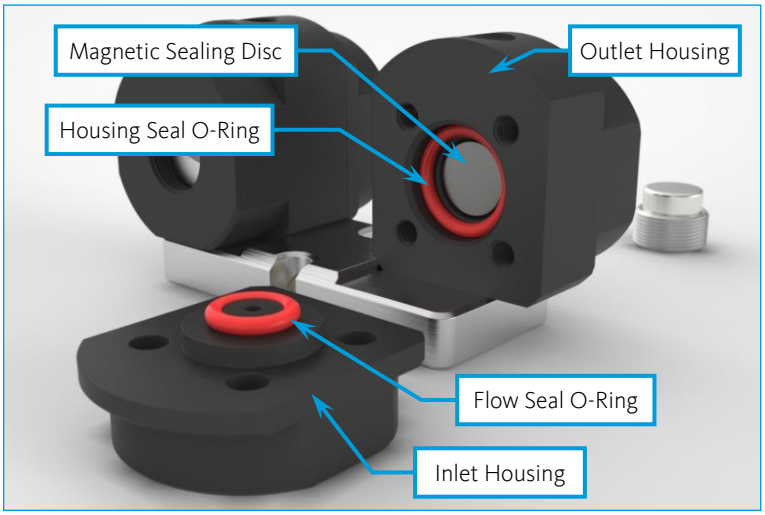
**(1)** Using a screwdriver and turning it counterclockwise, remove the adjustment screw.

**(2)** Remove the four housing screws using a 2.5 mm hexagon socket (Allen) key.

**(3)** Now you may remove the inlet housing part, which contains the flow seal O-ring. In case of the check valve being fixed to a mounting plate, it may be helpful to loosen the attachment screw first to prevent it from being jammed.



**(4)** Remove the remaining parts for cleaning or exchange.

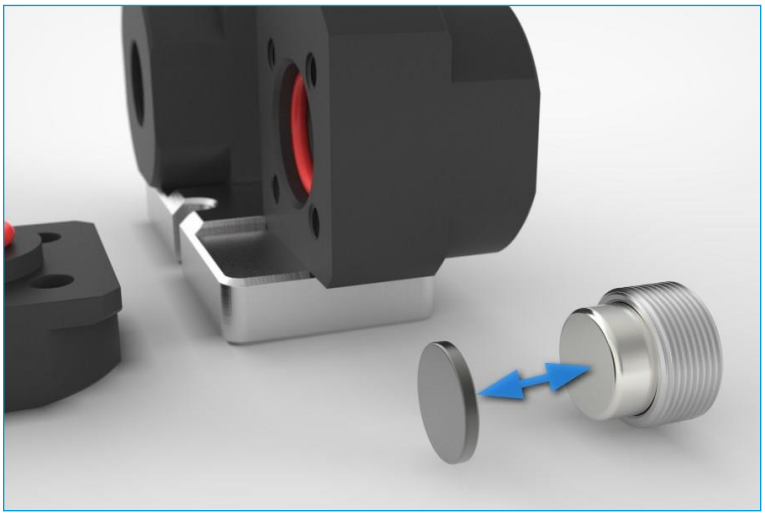



## 4.2 Assembly

**(1)** Insert the housing seal into the outlet housing. Place the flow seal O-ring onto the peg of the inlet housing.

**(2)** Take the sealing disc into one hand and the adjustment screw into the other hand. As both parts are magnets, they will push apart or pull together, depending on their respective orientation.

Orient the sealing disc such that it is being pushed away from the adjustment screw. Insert the disc into the outlet housing whilst maintaining this relative orientation.



**IMPORTANT**. Please make sure to orient the magnetic sealing disc correctly during assembly. Otherwise, the valve may not close!

**(3)** Insert the inlet housing and fix it using the four screws. Re-tighten the screw of the mounting plate.

**(4)** Screw in the adjustment screw to its original position.

# 5 Annex

HKCM® ENGINEERING

## Safety instructions for handling Rare Earth (NdFeB + SmCo) magnets

These safety precautions must be brought to the attention of all personnel who may use, handle or process our magnets and magnet assemblies. Magnets develop strong magnetic fields and strong mechanical forces that may create hazards to people who use them. Everybody who handles magnets should observe this.

**(1) Liability**
HKCM Engineering - operator of the magnet shop - refuse liability for damages or/and injuries caused by improper use and handling of the magnets and accessories delivered. With the purchase of the magnets you acknowledge that you read the safety instructions and inform others about these precautions when giving the magnets away.

**(2) Health precautions**
When handling magnets be careful as they can physically injure you if not treated with respect. Big **NdFeB + SmCo** magnets are the strongest available and can cause physical injury (from size 10 mm). These magnets should be handled with protective gloves and glasses. Strong magnets should be kept away from children as well as very small magnets because of the danger of injuries or swallowing.

These magnets can create hazards through chipping, shattering or pinching on impact. Always make sure that magnetised magnets are under control when they come in contact with each other or with ferromagnetic materials.
Many **NdFeB + SmCo** magnets are nickel coated to which some people may have an allergic reaction. We recommend gold or silver plated magnets for jewellery use. Magnets, if handled correctly, should have no negative impact on the human body. Sometimes they are even used for healing purposes. Always strike the right balance.

**(3) Material and production**
**NdFeB + SmCo** magnets are manufactured from rare powder materials under high pressure and are then coated with thin metal layers. The material is brittle and can easily break or be damaged on the surface when two or more magnets come in contact. The basic material can create sparks through contact, and sparking may ignite. Because of the fire hazard grinding must be avoided. Do not burn them. The magnets will produce toxic fumes when exposed to heat. To fix magnets on surfaces use glue if there are no fixing devices already on the magnet.

**(4) Danger for electronic equipment**
Sensitive electronic instruments and devices may change calibration or be damaged by a powerful magnetic field. Keep magnets away from magnetic storage media i.e. cassette tapes, credit card strips etc. as well as from electronic equipment such as computers, televisions, laptops, MP3 players, mobile phones, digital cameras, radios etc. Keep magnets away from people with pacemakers or motorised insulin pumps.



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