



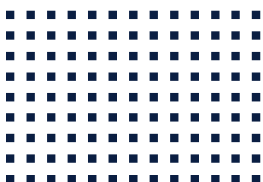
CETONI

CE STAINLESS STEEL SYRINGES

Hardware Manual



ORIGINAL INSTRUCTIONS 1.01 – JUNE 2017



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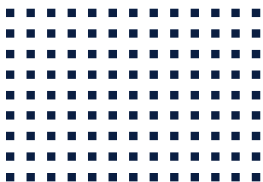
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1.2 Revision History

REV	DATE	CHANGE
1.00	30.06.2017	Creation
1.01	10.11.2017	Added 5 ml syringes

2 Introduction

2.1 Preface

Thank you for purchasing a product from CETONI. With this user manual we would like to support you as well as possible when handling the device. If you have any questions or suggestions, please do not hesitate to contact us.

2.2 Symbols and Keywords Used

The following symbols are used throughout this manual to help you navigate through this document:



HINT. Indicates application tips and useful hints to facilitate operation.



IMPORTANT. Indicates important information and other particularly useful information that does not describe dangerous or harmful situations.



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. If it is not avoided, slight or minor injuries and property damage may result.

2.3 Standards and Directives

When used as intended, the CETONI syringes do not reach the limit values listed in Article 4, Para. 1, Letters a to c and Para 2 of Directive 2014/68/EU. They are therefore not subject to the requirements of Annex 1 of the Directive. Consequently they do not bear a CE marking.

2.4 Application Purpose

2.4.1 General Description of the Device

The CETONI syringes are precise, chemically resistant metal syringes for higher pressure.

2.4.2 Intended Use

CETONI syringes are intended exclusively for use with the neMESYS syringe pumps. In this combination, they serve to generate defined flow rates and pressures.

Application usually takes place in laboratory-like rooms.

2.4.3 Reasonably Foreseeable Faulty Application

The use for purposes other than those intended can lead to dangerous situations and must be avoided.



CAUTION. The syringes must not be used as a medical device or for medical purposes.

2.4.4 Safety measures

The safety for the operator and a trouble-free operation of the syringes are only guaranteed when using original equipment. Only original accessories may be used. No warranty claims exist for damage resulting from the use of external accessories or external consumables.

The syringes have been developed and designed in such a way that hazards are largely excluded by their intended use. Nevertheless, the following safety precautions must be taken to prevent residual risks.

- CETONI GmbH points out the responsibilities of the operator for the operation of the syringes. The laws and regulations of the place of installation must be observed while operating the syringes! To ensure a safe work routine, operators and users must assume responsibility for adhering to these regulations.
- The syringes must not be used as medical devices or for medical purposes.
- The syringes are 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, 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.

- Before operating the syringes, 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 syringes and the software.
- The syringes as well as cables and pipes must be checked for damage before operation. Damaged pipes, cables and plug devices must be replaced immediately.
- Cables and pipes must be laid in a way that avoids any risk of stumbling.
- It is not allowed to use the syringes in an explosive atmosphere or with potentially explosive substances.
- 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 device below 0°C with water in the fluid passages may cause damage to the device.

2.4.5 Condition of the Syringes

Despite the perfect processing of the syringes, damage can occur in the application. Therefore, perform a visual inspection before each use. Pay particular attention to the damaged connections and seals. If you notice any damage, please refrain from using it and inform CETONI GmbH, which will assist you, to restore the syringe as quickly as possible to a working condition.

2.5 Warranty and Liability

The syringes left our company in perfect condition.

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 syringes with regard to safety, reliability and function only if the syringes have been used in accordance with the instruction manual.

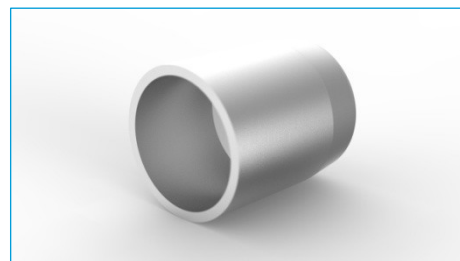
2.6 Scope of Delivery

The following items should be included:

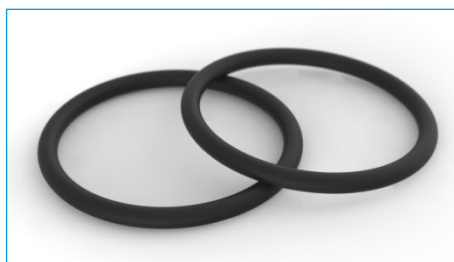
SYRINGE



ASSEMBLY AID FOR SEAL



SPARE SEALS



3 Technical Data

3.1 Materials

The wetted parts of the syringes are made of stainless steel with the EN material number 1.4404 / 1.4571 (316L / 316Ti). With the 3 ml syringes and the 5 ml High Pressure syringe 1.4462 (318LN) is used because of the high load. As customer-specific variation the material can also be other stainless steels or even special alloys. For evaluation of compatibility with the used reagents please refer to the particular material you are using.

O-rings are used as seals. They will be complemented by sliding rings in the future. For some syringes sliding rings are already available upon request.

O-rings have a significantly lower leakage, however, wear out much more quickly and generate abrasion. Sliding rings wear out slower, however, exhibit higher leakage. The preload of the sliding rings is also generated by O-rings.

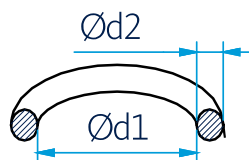
Backup rings avoid, that the O-rings are damaged at very high pressure. They have no direct media contact, but come into contact with leakage.

The material, the minimum required Shore hardness and the dimensions of the O-rings can be found in the following table.

Ød1 = inner diameter

Ød2 = cord diameter

Example: O-ring 12x2 → Ød1=12; Ød2=2



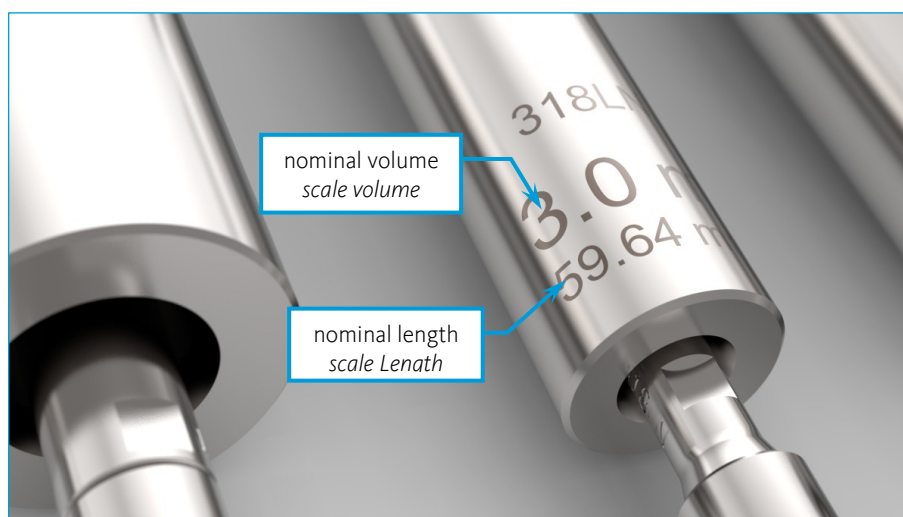
SYRINGE	O-RING MATERIAL <i>installed enclosed</i>	PISTON SEAL <i>Backup ring Sliding Ring</i>	FRONT CAP SEAL	TIP SEAL
3 ml Mid Pressure	EPDM 80 shore A FKM 80 shore A	5,5 x 1,5 5,5 x 1	5,5 x 1,5	/
5 ml Mid Pressure	EPDM 80 shore A FKM 80 shore A	7 x 2 7 x 1,5	7 x 2	/
10 ml Mid Pressure	EPDM 70 shore A FKM 70 shore A	11 x 2 11,5 x 1,5	11 x 2	/
3 ml High Pressure	EPDM 90 shore A FKM 90 shore A	5,5 x 1,5 5,5 x 1	5,5 x 1,5	3 x 1,5

SYRINGE	O-RING MATERIAL	PISTON SEAL	FRONT CAP SEAL	TIP SEAL
	installed <i>enclosed</i>	Backup ring <i>Sliding Ring</i>		
5 ml High Pressure	EPDM 80 shore A <i>FKM 80 shore A</i>	7 x 2 7 x 1,5	7 x 2	3 x 1,5
10 ml High Pressure	EPDM 80 shore A <i>FKM 80 shore A</i>	11 x 2 11,5 x 1,5	11 x 2	3 x 1,5

3.2 Fluidic Data

The fluidic values, which you also need for configuring the syringes, are shown in the following table. Additionally, the nominal stroke of the syringe, which corresponds to the nominal volume, is engraved on the syringe. Originating from glass syringes, the nominal stroke is denominated *scale length* in the software and the nominal volume is termed *scale volume*. By default, the syringes have a small safety reserve in stroke length – the maximum stroke length is also given in the table below, called *piston stroke*. Thus, all values are available in order to completely configure the syringe.

After the initial configuration, the syringe can be stored in the software so that later it can be accessed quickly and easily.



SYRINGE	NOMINAL STROKE <i>scale length</i> [mm]	MAXIMUM STROKE <i>piston stroke</i> [mm]
3 ml	59,64	61
5 ml	58,81	61
10 ml	58,89	61

4 Transport and Storage

Although the syringes are made of corrosion-resistant material, surface corrosion may be caused by media residues during storage. For that reason, disassemble and clean the syringes prior to periods of non-use.



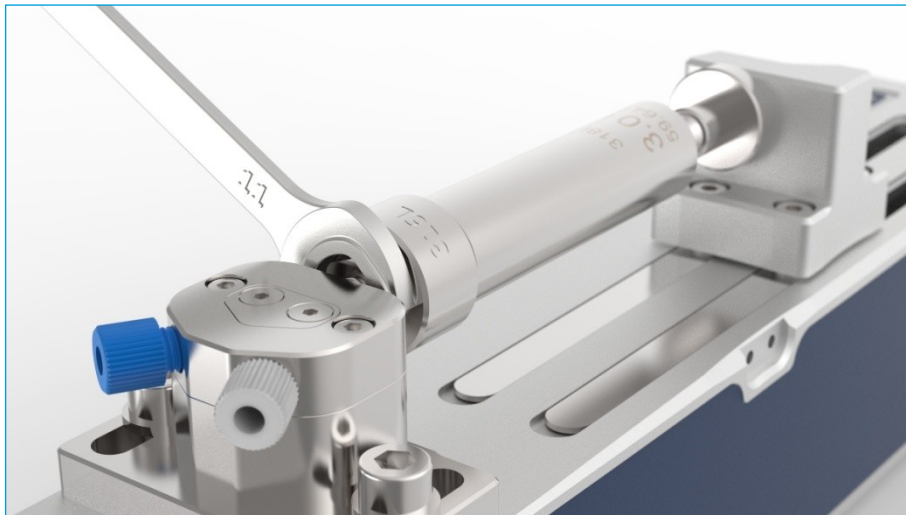
ATTENTION. Transportation, storage or operation of the syringes below 0°C with water in the fluid passages may cause damage.

5 Hardware

The syringes consist of the actual syringe cylinder, a front cap with a screw-in connector and the piston. Disassembly and assembly are described below.

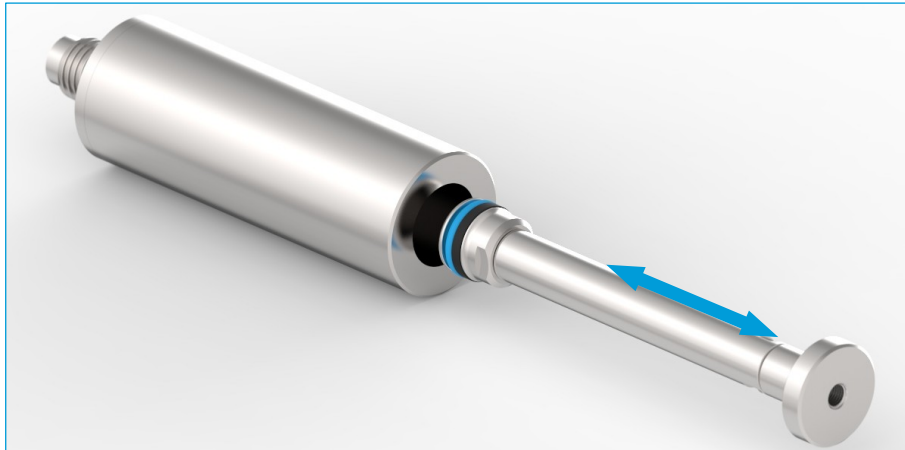
5.1 Mounting on the syringe pump

Installation on the device is described in the device manual. The syringes, in which the front cap is fastened with screws, are screwed into the syringe holder by hand. For tightening small syringes, in which the front cap is fastened by a coupling nut, use an 11 mm wrench, which you attach to the hexagon socket of the front cap.



5.2 Piston Removal/Installation

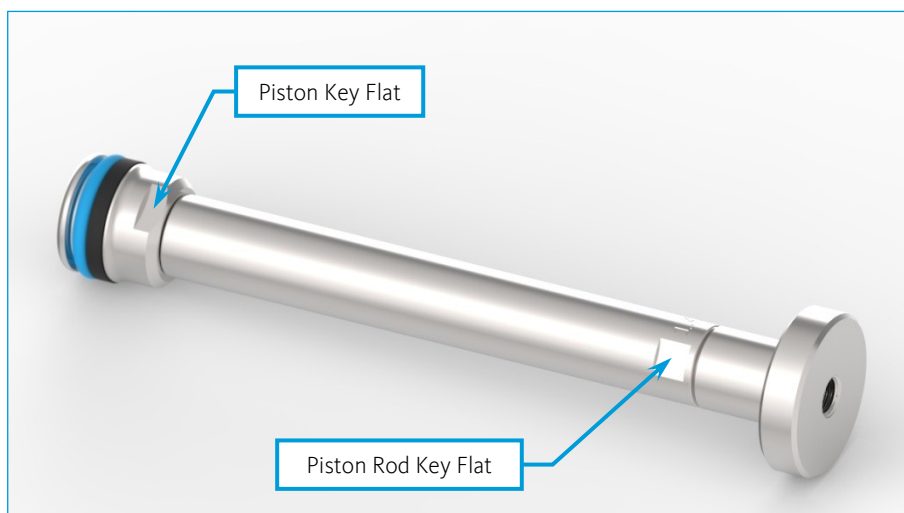
The piston can be simply pulled out of the cylinder or slid into it. Try to keep the piston and cylinder in alignment as far as possible in order to avoid tilting.



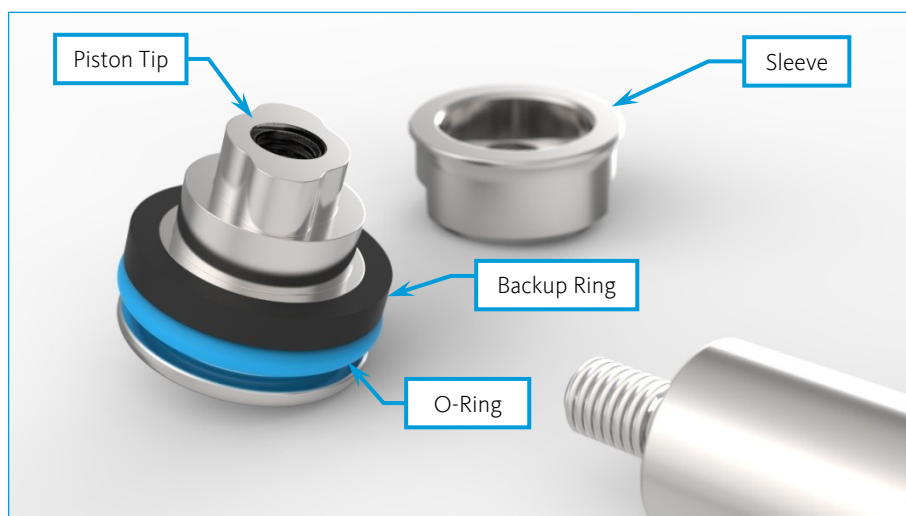
5.3 Piston (Dis)Assembly

Use two open-end wrenches to separate the piston from the piston rod. You can find the required key widths in the following table:

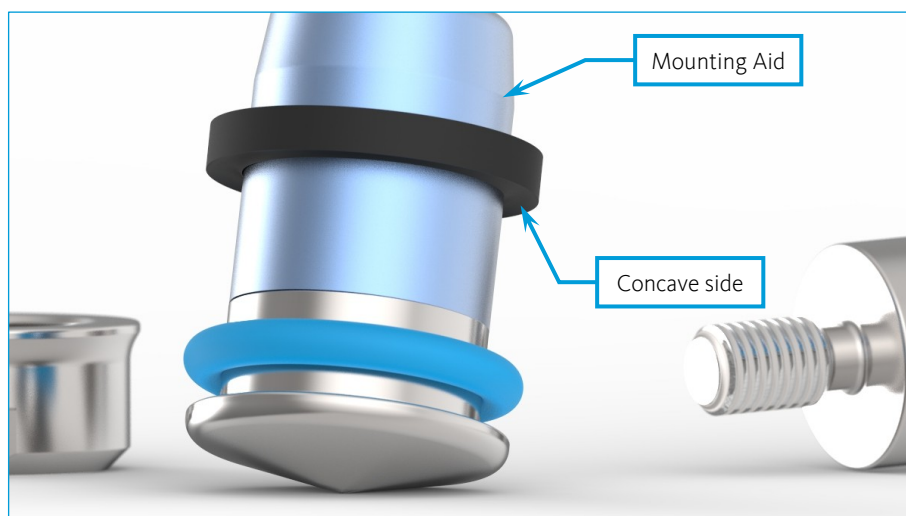
SYRINGE	KEY WIDTH PISTON [mm]	KEY WIDTH PISTON ROD [mm]
3 ml	6	5
5 ml	8	7
10 ml	12	9



Now you can pull the sleeve from the piston tip and pull off the backup ring as well as the O-ring for maintenance purposes.



For mounting, place the mounting aid from the scope of delivery (bluish in the picture) on the piston tip and then slide the O-ring followed by the backup ring onto the piston tip. Make sure that the concave side of the backup ring points towards the O-ring.

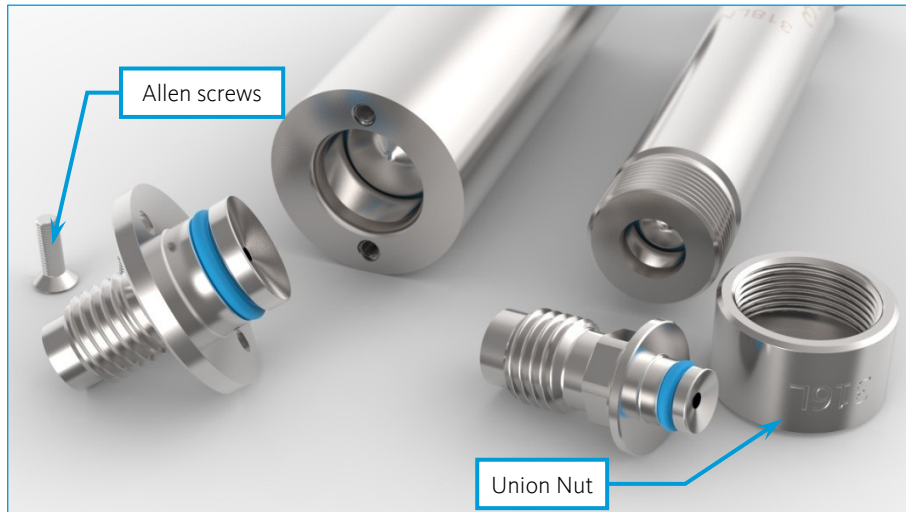


Finally, put on the sleeve and screw the piston back onto the piston rod.

5.4 Front Cap Removal/Installation

Depending on the type of syringe either remove the two Allen screws with a 2 mm Allen key, or unscrew the union nut. Now you can remove the front cap from the cylinder, for example, to exchange the O-Ring.

For reassembly please proceed in reverse order.



6 Maintenance and Care

The syringes are wear parts. The piston seal rubs on the cylinder, whereby the seal wears out. The same applies to a lesser extent for the cylinder. The amount of wear and abrasion depends on many factors, such as pressure, flow rate and the utilized medium.

Excessive wear of the seals can lead to leaks. Therefore, check the condition of the seals at regular intervals. If your application is sensitive to abrasion, we recommend the installation of filters.

A lubrication of the O-rings for example with silicone grease increases their service life considerably and should be made if your application allows.

Replacement seals can be obtained from CETONI GmbH.



ATTENTION. Check the seals of the syringe at regular intervals to prevent leaks and resulting damage.



ATTENTION. In order to protect the application against abrasion particles, equip your system with filters.

7 Disposal

If the syringes are not contaminated with hazardous chemicals, or biologically contaminated, they can be disposed of with municipal waste. Otherwise, they should be disposed of as hazardous waste.