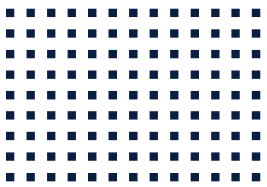


CETONI

CE Stainless Steel Syringes Manual and Reference



ORIGINAL INSTRUCTIONS 1.12- NOVEMBER 2016



CETONI GmbH
Wiesenring 6
07554 Korbussen
Germany

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

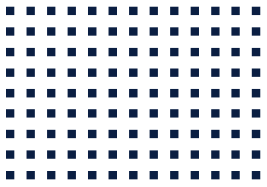
www.CETONI.de

The information and data contained in this documentation can be amended without notice. The reproduction, distribution and utilization of this document as well as the communication of its contents to others without explicit authorization is prohibited. Offenders will be held liable for the payment of damages.

All rights reserved in the event of the grant of a patent, utility model or design.

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

Copyright © CETONI GmbH – Automation and Microsystems. All rights reserved.



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	Safety Devices on the System	10
2.4.6	Condition of the Syringes	11
2.5	Warranty and Liability	11
3	General	12
3.1	Materials	12
3.2	Maintenance and Care of the Syringes	12
3.3	Syringe Configuration	13
4	Mid Pressure Syringes	15
4.1	Technical Data	15
4.2	Disassembly/ Assembly	16
4.2.1	Disassembly of the 1 ml Syringe	16
4.2.2	Disassembly of 2.5 ml, 5 ml & 10 ml Syringes	16
4.2.3	Disassembly of 25 ml, 50 ml & 60 ml Syringes	17

4.2.4	Disassembly of the 25 ml PTFE Syringe	18
4.2.5	Assembly of the 1 ml Syringe	18
4.2.6	Assembly of 2.5ml, 5ml & 10ml Syringes	19
4.2.7	Assembly of 25 ml, 50 ml & 60 ml Syringes	19
4.2.8	Assembly of the 25ml PTFE Syringe	20
5 High Pressure Syringes		21
5.1	Technical Data	21
5.2	Disassembly/ Assembly	22
5.2.1	Disassembly of 2.5 ml, 5 ml & 10 ml Syringes	22
5.2.2	Disassembly of 25 ml, 50 ml, 60 ml & 100 ml Syringes	23
5.2.3	Assembly of 2.5 ml, 5 ml & 10 ml Syringes	24
5.2.4	Assembly of 25 ml, 50ml, 60 ml & 100 ml Syringes	24
6 Disposal		25

1.2 Change History

REV	DATE	CHANGE
1.00	28.05.2013	Creation of the manual
1.01	09.03.2015	Added 1 ml syringe
1.10	27.03.2015	Added safety advices
1.11	30.09.2015	Added 25 ml PTFE syringe, Pressure Equipment Directive updated
1.12	07.11.2016	Revision Guide Design, 60 ml syringe

2 Introduction

2.1 Foreword

Thank you for purchasing a CETONI product. With this manual we would like to support you as far as possible in the operation and maintenance of CETONI stainless steel syringes.

The Syringes may only be taken in operation after carefully reading and understanding this manual.

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

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 pressures.

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

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



CAUTION. The syringes 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 syringes 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 syringes 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 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 Safety Devices on the System

The 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.

2.4.6 Condition of the Syringes

Irrespective of the faultless manufacture of the device, 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 damaged connections and gaskets. If you should notice any damage, please do not use the device and inform CETONI GmbH. CETONI will support you to put your device back to an operational condition at the earliest.

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.

3 General

3.1 Materials

The syringes are made of stainless chromium-nickel steel with the EN material number 1.4301, also known as X5CrNi18-10 or AISI Type 304. 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. The scope of delivery contains the materials EPDM and FKM. A set of EPDM seals is pre-assembled. Some syringes also include NBR.

Before using the syringes, make sure that the sealing material is resistant against the fluid you want to pump. Change to another material if necessary.

The replacement of the seals is described in the sections Fehler! Verweisquelle konnte nicht gefunden werden. und Fehler! Verweisquelle konnte nicht gefunden werden..

The 2.5 ml, 5 ml and 10 ml syringes also have an end piece made of PEEK, which however is not in direct contact with the fluid.



CAUTION. Before using the Syringes, please check the chemical resistance of the wetted materials against the dosing liquid.



CAUTION. Only use fittings and capillaries specified for the anticipated pressure levels.

3.2 Maintenance and Care of the Syringes

Except for the O-rings the syringes are maintenance-free if used as intended. 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.



CAUTION. Check the seals for wear at regular intervals and replace them if necessary.



CAUTION. Always check the leakproofness after connecting and at regular intervals.

3.3 Syringe Configuration



IMPORTANT. Please read and observe the respective sections of the associated software manual as well as the manual of the syringe pump before connecting the device.

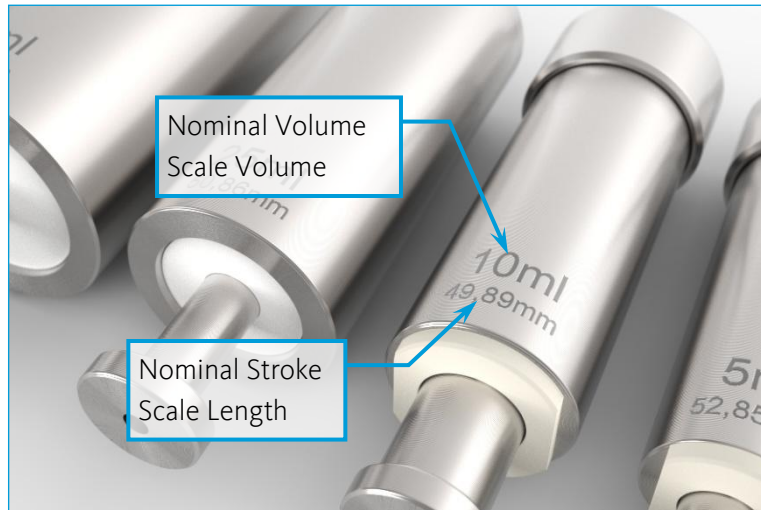
To obtain accurate flow rates during operation, the syringes must be configured in the software, if they are not already preconfigured.

The values needed to configure the CETONI Stainless Steel Syringes in the software are engraved on the syringes and can also be found in the tables in the sections Fehler! Verweisquelle konnte nicht gefunden werden. und Fehler! Verweisquelle konnte nicht gefunden werden..

The required values are the nominal volume and the nominal stroke. The nominal stroke is the stroke at which the syringe contains the nominal volume. Coming from scaled glass syringes, in the software the nominal stroke is referred to as *Scale Length*, the nominal volume as *Scale Volume*.

The actual possible *Piston Stroke* is 60 mm unless otherwise stated. The actual usable volume is accordingly also slightly larger than the nominal volume.

Once the configuration of a specific syringe type has been stored in the software, this configuration may be used directly for later setups.



Syringe Configuration

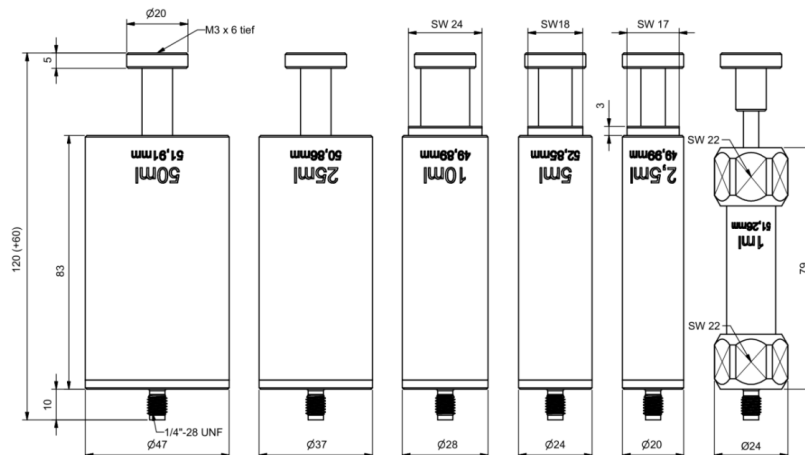
4 Mid Pressure Syringes

4.1 Technical Data

The syringes for the neMESYS mid pressure module are equipped with a ¼"-28 UNF threaded outlet. The piston offers an M3 internal thread for fastening. The maximum operating temperature is 50° C.

For further technical information, refer to the following table and drawing.

SCALE VOLUME	SCALE LENGTH	PISTON STROKE	MAX. PRESSURE	WEIGHT	Ø X LENGTH
[ml]	[mm]	[mm]	[bar]	[g]	[mm]
1	51,26	60	500	200	24 x 120
2.5	49,99	60	200	240	20 x 120
5	52,85	60	100	320	24 x 120
10	49,89	60	50	450	28 x 120
25	50,86	60	20	520	37 x 120
25 PTFE	50,86	60	20	480	38 x ≈124
50	51,91	60	10	690	47 x 120

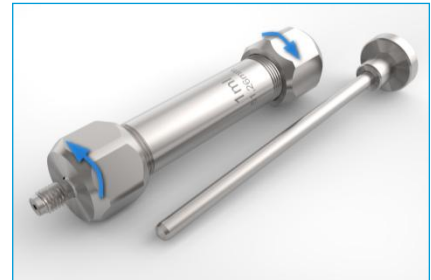


4.2 Disassembly/ Assembly

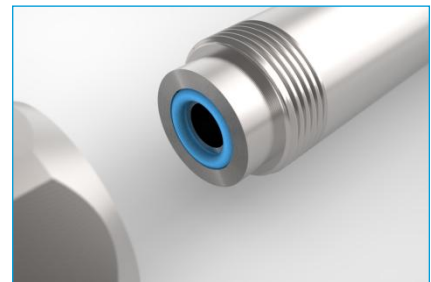
In order to clean the syringes thoroughly or to change the seals, the syringes must be disassembled. The procedure is explained below.

4.2.1 Disassembly of the 1 ml Syringe

This syringe consists of syringe cylinder, piston, front and end piece. First, pull out the piston.



Then use a 22 mm open-end wrench to loosen the front and end piece. If the two parts are very tight, clamp the cylinder gently in a vice.



Now you can completely unscrew the front piece and, if required, replace the O-ring seal (marked blue).

Next unscrew the end piece. Inside the end piece you will find a black washer (3). A support ring made of PTFE (2) and the O-Ring (1) usually stay seated inside the cylinder. Remove them by pushing the piston into the cylinder from the front.

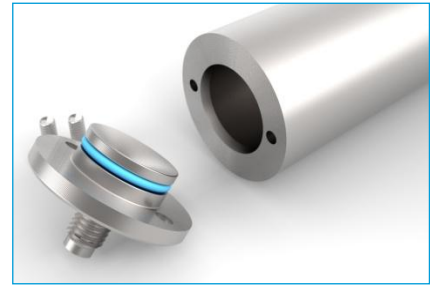


4.2.2 Disassembly of 2.5 ml, 5 ml & 10 ml Syringes

These syringes consist of a syringe body, a front and an end piece. In order to remove the front piece, loosen the two screws with a 2mm Allen wrench.



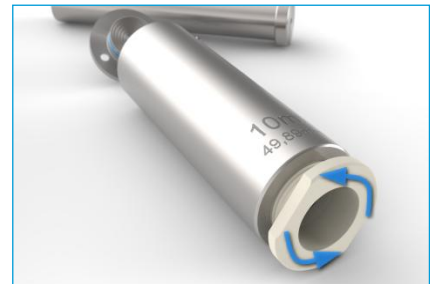
Now you can press out the front piece from the syringe body with the help of the syringe piston and, if required, replace the O-ring seal (marked blue).



Next remove the piston from the syringe.



Now you can unscrew the end piece. If it is not possible to do this by hand, use an open-end wrench or clamp the end piece carefully to a bench vice.

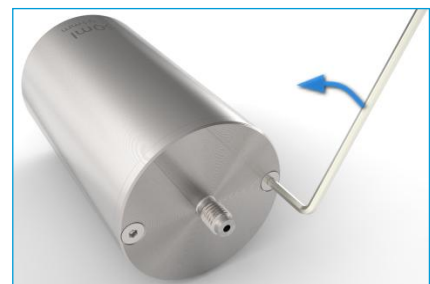


After unscrewing the end piece, you can remove the O-ring seal (marked blue) from the syringe cylinder.



4.2.3 Disassembly of 25 ml, 50 ml & 60 ml Syringes

In order to remove the front piece, loosen and remove the screws with a 2mm Allen wrench.



Now you can press out the front piece from the syringe cylinder with the help of the syringe piston. If necessary you can exchange the O-ring now.



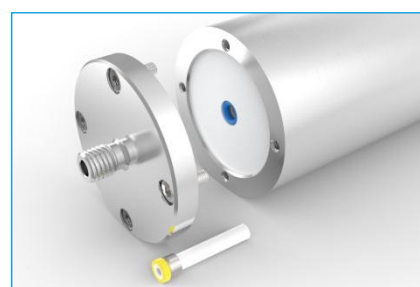
A Teflon guide washer with an O-ring is clicked in place in the syringe cylinder.



A strong pull at the piston is enough to remove the piston along with the guide washer.

4.2.4 Disassembly of the 25 ml PTFE Syringe

After unscrewing the screws with a 2mm Allen wrench, you can pull off the front piece and exchange the O-ring (marked blue in the picture) as well as the PTFE Tube and Ferrule if necessary.



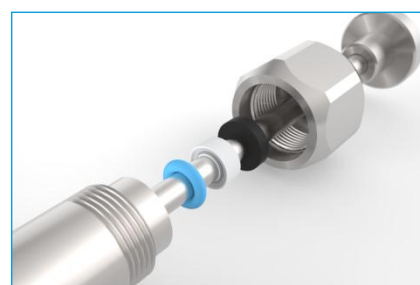
In order to remove the piston and exchange the piston seal, loosen and remove the screws, holding the rear cap, with a 2mm Allen wrench. Now you can pull out the piston together with the rear cap.



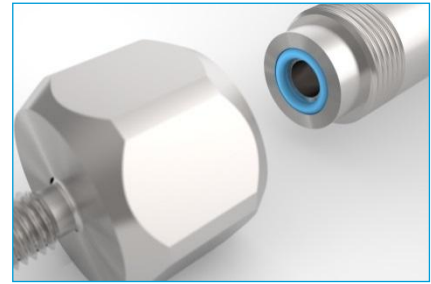
4.2.5 Assembly of the 1 ml Syringe

Slide the end piece, the black washer, the support ring and the O-ring onto the piston in exactly this order. The support ring is dished on one side; make sure it points towards the O-ring.

Now slide the piston into the cylinder and screw the end piece back on.



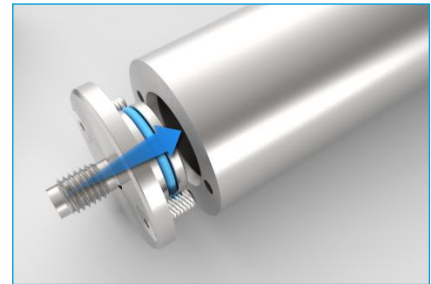
In the front part of the syringe just insert the O-ring into the corresponding recess of the cylinder and screw the front piece back on.



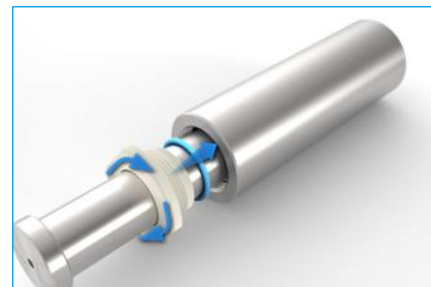
4.2.6 Assembly of 2.5ml, 5ml & 10ml Syringes

Follow the reverse order for assembling the syringes.

Insert the front piece with attached O-ring into the syringe body and tighten the two screws.



Slide the end piece and the O-ring onto the piston. Afterwards insert the piston into the cylinder and screw in the end piece.

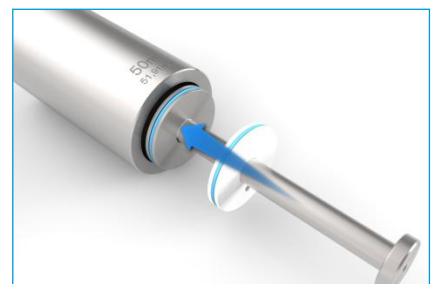


4.2.7 Assembly of 25 ml, 50 ml & 60 ml Syringes

Push the front piece with assembled O-ring into the cylinder and fasten the two screws.



Insert the piston with assembled O-ring and guide washer into the cylinder. Then push the guide washer in the cylinder until the O-ring of the guide washer snaps into its groove.

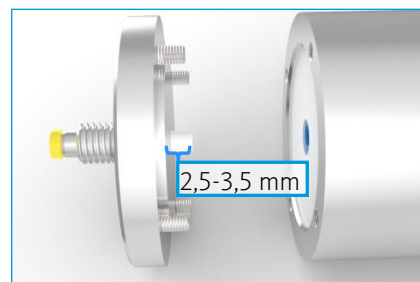


4.2.8 Assembly of the 25ml PTFE Syringe

Slide the piston into the cylinder only a short way and then reassemble the rear cap. The rear cap prevents the piston from tilting within the cylinder and resulting damage of the PTFE insert.



Make sure that the PTFE tube protrudes about 2.5-3.5 mm over the back side of the front piece. Push the protruding tube carefully into the O-Ring, located within the cylinder.



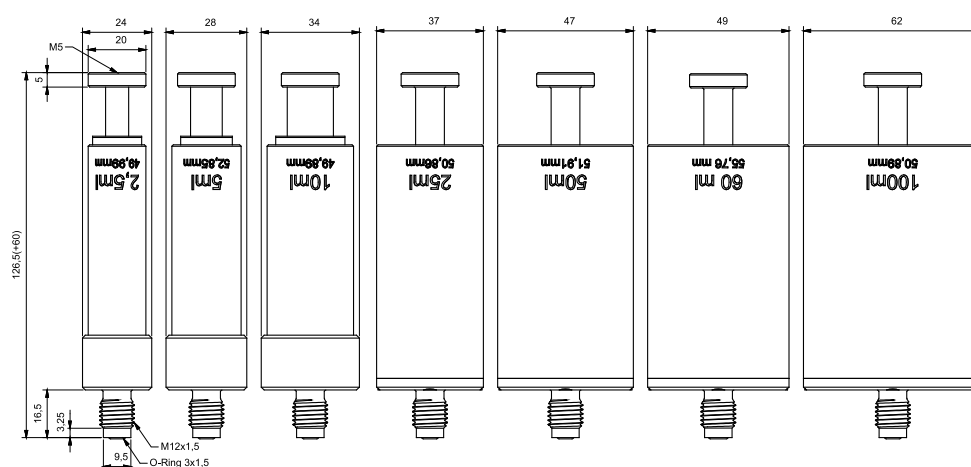
5 High Pressure Syringes

5.1 Technical Data

The syringes for the neMESYS high pressure module are equipped with a M12x1.5 threaded outlet, offering a recess for an O-ring seal. The piston offers an M5 internal thread for fastening. The maximum operating temperature is 50°C.

For further technical information, refer to the following table and drawing.

SCALE VOLUME [ml]	SCALE LENGTH [mm]	PISTON STROKE [mm]	MAX. PRESSURE [bar]	WEIGHT [g]	Ø X LENGTH [mm]
2.5	49,99	60	510	250	24 x 126,5
5	52,85	60	270	370	28 x 126,5
10	49,89	60	120	540	34 x 126,5
25	50,86	60	50	520	37 x 126,5
50	51,91	60	25	700	47 x 126,5
60	55,76	60	22	760	49 x 120
100	50,89	60	12	1010	62 x 126,5



5.2 Disassembly/ Assembly

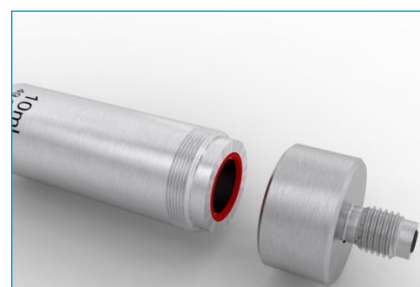
In order to clean the syringes thoroughly or to change the seals, the syringes must be disassembled. The procedure is explained below.

5.2.1 Disassembly of 2.5 ml, 5 ml & 10 ml Syringes

These syringes consist of a syringe cylinder, a front and an end piece. The front piece is screwed to the cylinder. In order to remove it, turn it counter clockwise.



If required, you can now exchange the anterior O-Ring seal (marked red).



Next remove the piston from the syringe.



Now you can unscrew the end piece. If it is not possible to do this by hand, use an open-end wrench for the 10ml syringe or clamp the end piece carefully to a bench vice.



After unscrewing the end piece, you can remove the O-ring seal (marked red) from the syringe cylinder.



5.2.2 Disassembly of 25 ml, 50 ml, 60 ml & 100 ml Syringes

In order to remove the front piece, loosen and remove the four screws with a 2mm Allen wrench.



Now you can press out the front piece from the syringe cylinder with the help of the syringe piston.



In case the front piece sits too tight, take two of the previously removed screws and screw them into the tapped holes. Tighten them alternately to push out the front piece.



A Teflon guide washer with an O-ring is clicked in place in the syringe cylinder.

A strong pull at the piston is enough to remove the piston along with the guide washer.

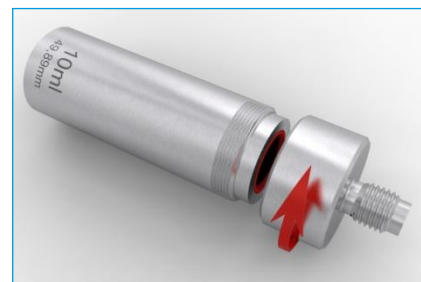


5.2.3 Assembly of 2.5 ml, 5 ml & 10 ml Syringes

Follow the reverse order for assembling the syringes.

Put the O-ring into the anterior groove of the cylinder and screw on the front piece.

(The anterior O-ring is slightly bigger than the rear one.)

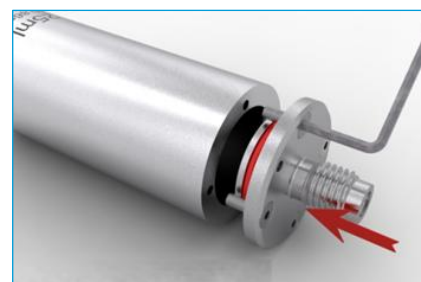


Slide the end piece and the O-ring onto the piston. Afterwards insert the piston into the cylinder and screw in the end piece.



5.2.4 Assembly of 25 ml, 50ml, 60 ml & 100 ml Syringes

Push the front piece with assembled O-ring into the cylinder and fasten the four screws.



Insert the piston with assembled O-ring and guide washer into the cylinder. Then push the guide washer in the cylinder until the O-ring of the guide washer snaps into its groove.



6 Disposal

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

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