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Varispenser® 2
Varispenser® 2x

Operating manual

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1 Operating instructions

1.1 Using this manual

- Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- This operating manual is part of the product. Thus, it must always be easily accessible.
- Enclose this operating manual when transferring the device to third parties.
- You will find the current version of the operating manual for all available languages on our website under www.eppendorf.com/manuals.

1.2 Danger symbols and danger levels

1.2.1 Danger symbols

The safety instructions in this manual have the following danger symbols and danger levels:

 **Biohazard**	 **Toxic substances**
 **Hazard point**	 **Material damage**

1.2.2 Danger levels

DANGER	*Will* lead to severe injuries or death.
WARNING	*May* lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Depiction	Meaning
1. 2.	Actions in the specified order
▸	Actions without a specified order
•	List
Text	Display text or software text
	Additional information

2 Safety

2.1 Intended use

The models of the series Varispenser 2 and the models of the series Varispenser 2x are laboratory devices for dispensing watery solutions directly from a supply bottle.The dispensers may only be used within the specified technical and physical limits.

Applications in or on the human body (in vivo applications) are not permitted.

The device has been designed for general laboratory applications and conforms to the requirements of the relevant norms, e.g., DIN EN ISO 8655. The use of the device for particular applications (e.g., for trace analysis, in the food industry, etc.) must be checked meticulously by the user himself. Special permits for particular applications, e.g., for the production or administration of food, pharmaceutics or cosmetics, have not been granted.

2.2 Application limits

2.2.1 Unsuitable liquids

NOTICE! Material damage due to improper handling.
Deposits that are difficult to dissolve lead to irreparable damage to the piston, the valves and the discharge tube.

▸ Only use approved liquids.

The dispenser is not suitable for the following solutions, substances and liquids:

- Liquids with low ignition temperatures.
- Liquids that attack FEP, ETFE, PFA, PTFE, PP, borosilicate glass or Al_2O_3 ceramics.
- Solutions which contain hydrofluoric acid.
- Suspensions, as solid particles can block or damage the device (e.g., activated carbon).
- Liquids that form non-dissolving deposits and disintegrating solutions (e.g., biuret reagent).
- Substances which react catalytically with platinum iridium (e.g., H_2O_2)
- Explosive liquids (e.g., carbon disulfide).
- Trifluoroacetic acid.
- Tetrahydrofuran.

2.2.2 Limited liquids

The dispenser is only of limited suitability for the following liquids:

- Only dispense flammable liquids into glass tubes and do not wipe the dispenser with a dry cloth to avoid static charge.
- Liquids which form dissolving deposits can make the piston difficult to move.
- Only use nitric acid (60 % maximum) with thread adapters made from ETFE.

2.3 User profile

The device and accessories may only be operated by trained and skilled personnel.

Before using the device, read the operating manual carefully and familiarize yourself with the device's mode of operation.

2.4 Warnings for intended use

WARNING! Damage to health from infectious liquids and pathogenic germs.

- When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the Safety Data Sheets, and the manufacturer's application notes.
- Wear your personal protective equipment.
- Consult the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, as amended) for comprehensive regulations on the handling of germs or biological materials of risk group II or higher.

WARNING! Damage to health due to toxic, radioactive or aggressive chemicals.

- Wear your personal protective equipment.
- Observe the national regulations for handling these substances.
- Observe the Safety Data Sheets and manufacturer's application notes.

CAUTION! Contamination due to contact with biological and chemical reagents.
Contact with reagents may be harmful to eyes or skin.

- Wear your personal protective equipment.
- Make sure that no reagents are leaking from the device.
- Before starting work, check if the piston can be moved easily.
- Do not point the opening of the discharge tube toward people.
- Remove the sealing cap from the discharge tube before pressing down the piston.
- Only initiate liquid dispensing if you do not put persons in danger.
- To avoid squirting, dispense slowly and evenly. Do not use force.
- Only disassemble the device in a clean state.

CAUTION! Contamination with reagents when removing the sealing cap.
The sealing cap may contain biological and chemical reagents. Contact with reagents may be harmful to eyes or skin.

- Wear your personal protective equipment when removing the sealing cap.

CAUTION! Personal injury due to incorrect transportation of the device.
If the mounted device is not transported properly, reagents may be released. Contact with reagents may be harmful to eyes or skin.

- To transport the mounted device, hold the head gear of the device with one hand and support the bottom of the bottle with the other hand.
- Do not hold the device by the cylinder sleeve.

CAUTION! Poor safety due to incorrect accessories and spare parts.
The use of accessories and spare parts other than those recommended by Eppendorf may impair the safety, functioning and precision of the device. Eppendorf cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment.

- Only use accessories and original spare parts recommended by Eppendorf.

NOTICE! Material damage from incorrect use.

- Only use the product for its intended purpose as described in the operating manual.
- Ensure adequate material resistance when using chemical substances.
- In case of doubt, contact the manufacturer of this product.

NOTICE! Damage to device due to contamination in the device.
If there is contamination in the dispenser, the dispensing valve may block and the valve ball might get stuck. When the piston is pressed down, a high pressure develops in the dispenser. If the valve ball is not released, liquid is pressed past the sealing lip into the inside of the housing.

- If the piston is difficult to move, clean the dispenser.

2.5 Information on product liability

In the following cases, the designated protection of the device may be compromised. Liability for any resulting property damage or personal injury is then transferred to the operator:

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables which are not recommended by Eppendorf.
- The device is maintained or repaired by people not authorized by Eppendorf.
- The user makes unauthorized changes to the device.

3 Product description

3.1 Delivery package

3.1.1 Varispenser 2 – 2 mL – 10 mL

Quantity	Description
1	Varispenser 2
1	Operating manual
5	Thread adapter
1	Telescopic aspirating tube (125 mm – 240 mm)
1	Universal wrench
1	Certificate

3.1.2 Varispenser 2 – 25 mL – 100 mL

Quantity	Description
1	Varispenser 2
1	Operating manual
3	Thread adapter
1	Telescopic aspirating tube (170 mm – 330 mm)
1	Universal wrench
1	Certificate

3.1.3 Varispenser 2x – 2 mL – 10 mL

Quantity	Description
1	Varispenser 2x
1	Operating manual
5	Thread adapter
1	Telescopic aspirating tube (125 mm – 240 mm)
1	Universal wrench
1	Recirculation tube
1	Certificate

3.1.4 Varispenser 2x – 25 mL – 100 mL

Quantity	Description
1	Varispenser 2x
1	Operating manual
3	Thread adapter
1	Telescopic aspirating tube (170 mm – 330 mm)
1	Universal wrench
1	Recirculation tube
1	Certificate

3.2 Product overview
3.2.1 Varispenser 2

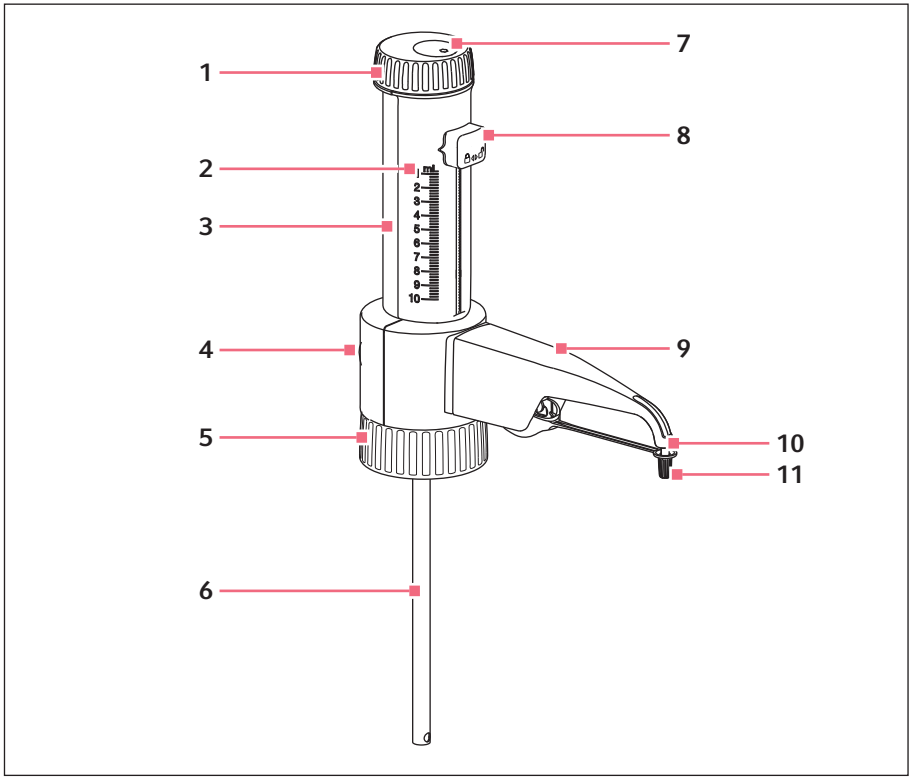


Fig. 3-1: Varispenser 2

1 **Piston bearing**

2 **Graduation**
The maximum volume is the nominal volume

3 **Piston pump**
Housing, cylinder protection, cylinder and piston

4 **Ventilation screw**
For connecting optional accessories (not included in the delivery package)

5 **Thread connection**

6 **Telescopic aspirating tube**

7 **Adjustment cover**

8 **Volume selection slider**

9 **Canula arm**

10 **Discharge tube**

11 **Sealing cap**

3.2.2 Varispenser 2x

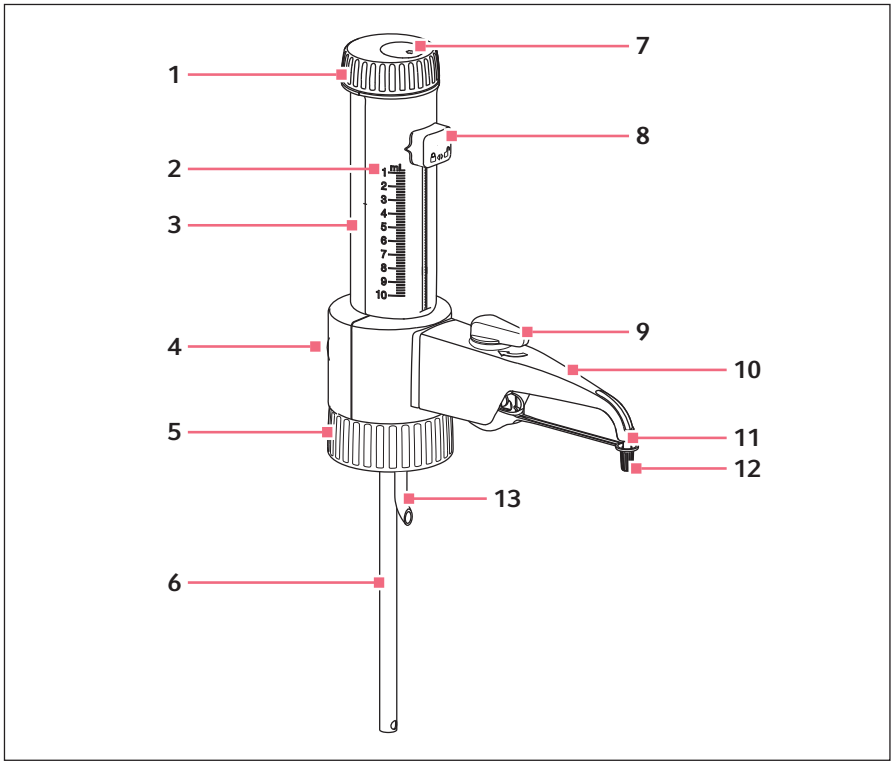


Fig. 3-2: Varispenser 2x

1 **Piston bearing**

2 **Graduation**
The maximum volume is the nominal volume

3 **Piston pump**
Housing, cylinder protection, cylinder and piston

4 **Ventilation screw**
For connecting optional accessories (not included in the delivery package)

5 **Thread connection**

6 **Telescopic aspirating tube**

7 **Adjustment cover**

8 **Volume selection slider**

9 **Dispensing valve**
With valve toggle

10 **Canula arm**

11 **Discharge tube**

12 **Sealing cap**

13 **Recirculation tube**

3.2.3 Telescopic aspirating tube

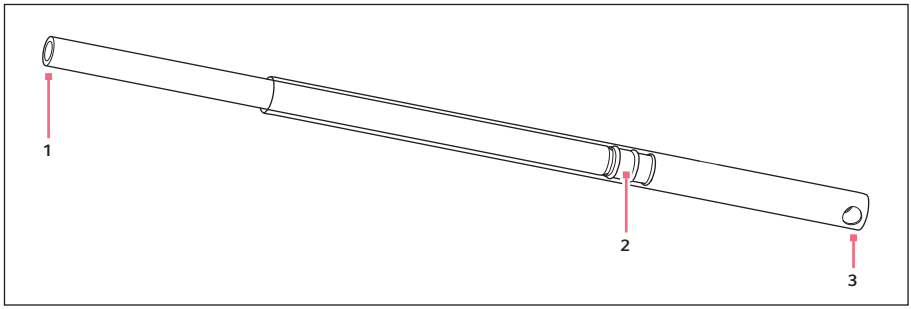


Fig. 3-3: Telescopic aspirating tube

1 Connection opening
Inner tube - connection side for filling valve

2 Sealing

3 Suction openings
Outer tube

3.2.4 Recirculation tubeVarispenser 2x

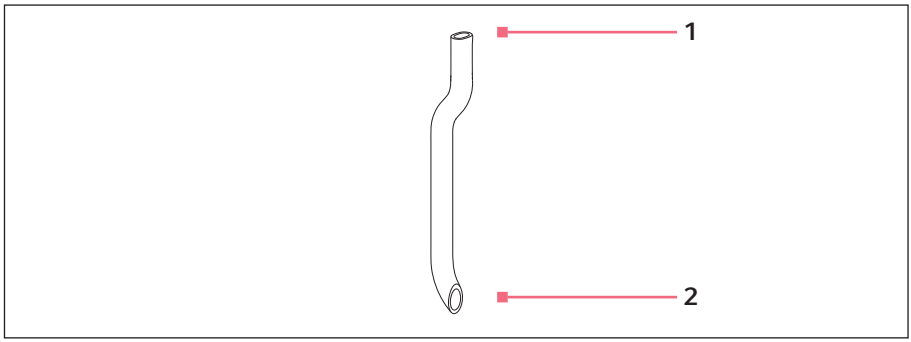


Fig. 3-4: Recirculation tube

1 Connection opening

2 Discharge opening

3.2.5 Thread adapter– 2 mL – 10 mL

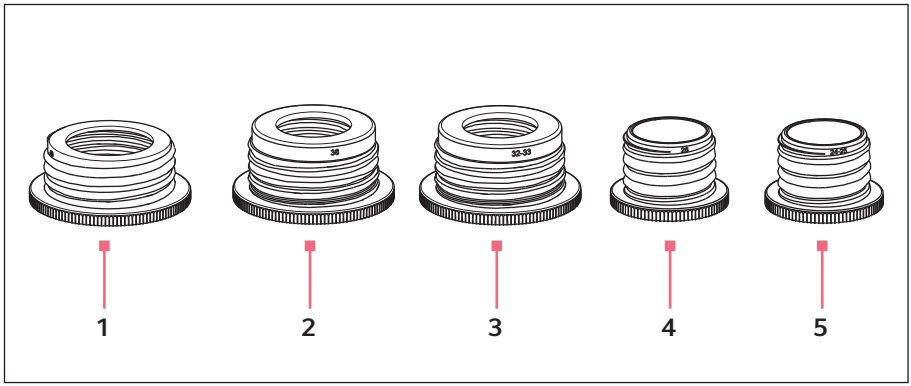


Fig. 3-5: Thread adapter

1 **Reduction from 45 mm to 40 mm**
2 **Reduction from 45 mm to 38 mm**
3 **Reduction from 45mm to 32 mm**
4 **Reduction from 32mm to 28 mm**
5 **Reduction from 32mm to 25 mm**

3.2.6 Thread adapter – 25 mL – 100 mL

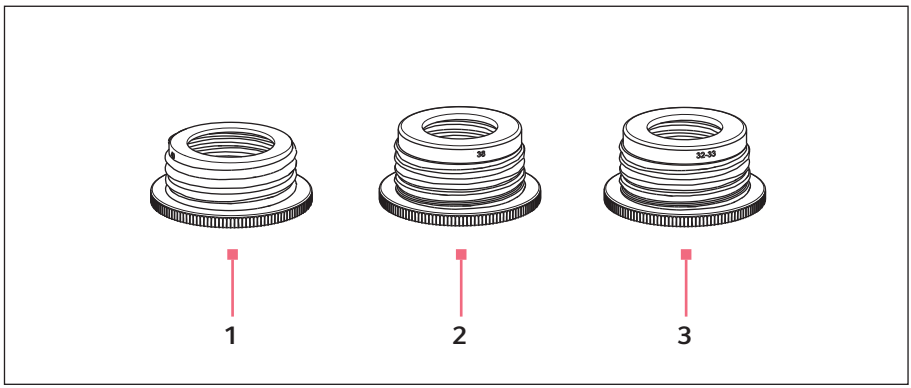


Fig. 3-6: Thread adapter

1 **Reduction from 45mm to 40 mm**
2 **Reduction from 45 mm to 38 mm**
3 **Reduction from 45mm to 32 mm**

3.2.7 Tool

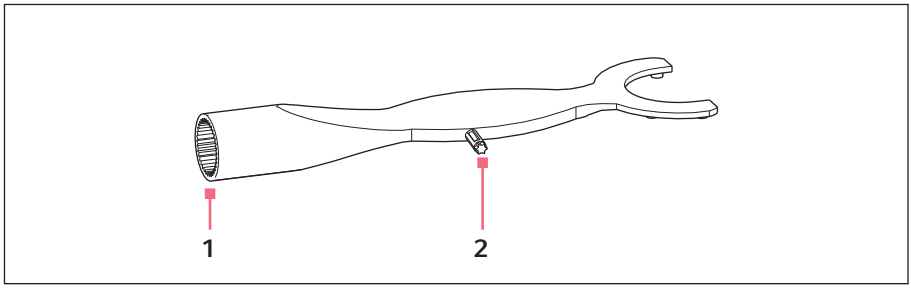


Fig. 3-7: Universal wrench

1 Installation wrench
Installation side for valves

2 Adjustment wrench

3.3 Features

When handling aggressive liquids, the dispenser offers the greatest possible protection for users and the laboratory environment. The user has to judge for himself whether the Varispenser is suitable for the intended application. The user has to judge the chemical compatibility of the reagents used himself.

The Varispenser is autoclavable.

Varispenser 2

The Varispenser 2 is a bottle top dispenser for dispensing liquids with milliliter accuracy.

- Dispensing - Dispense liquid from a bottle into a destination vessel.
- Adjustment option - Set the dispenser to liquids with a density other than water.

Varispenser 2x

The Varispenser 2x is a bottle top dispenser for dispensing liquids with milliliter accuracy without wasting liquid.

- Dispensing - Dispense liquid from a bottle into a destination vessel.
- Recirculation - Recirculate liquid from the bottle back into the bottle, e.g., to remove air bubbles from the cylinder.
- Adjustment option - Set the dispenser to liquids with a density other than water.

3.4 Materials

NOTICE! Aggressive substances may damage the Varispenser 2 and accessories.

- Check the resistance to chemicals before using organic solvents or aggressive chemicals.

Assembly	Material
Filling valve	Perfluoroalkoxy (PFA), Al_2O_3 ceramics, boroslilicate glass
Discharge tube	Fluorinated ethylene propylene (FEP)
Discharge valve	Perfluoroalkoxy (PFA), platinum-iridium (Pt-Ir), Al_2O_3 ceramics, boroslilicate glass
Piston bearing	Polypropylene (PP)
Sealing lip of the piston	Perfluoroalkoxy (PFA)
Recirculation tube	Fluorinated ethylene propylene (FEP)
Telescopic aspirating tube	Fluorinated ethylene propylene (FEP), polytetrafluorethylene (PTFE)
Valve ball (filling valve)	Boroslilicate glass
Sealing cap	Polypropylene (PP)
Volume selection switch	Polypropylene (PP)
Cylinder	Boroslilicate glass

4 Installation

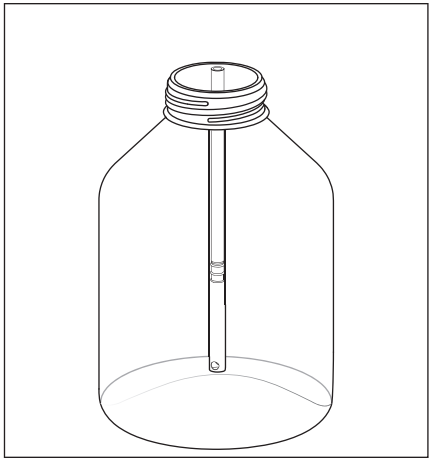
4.1 Adjusting and inserting the telescopic aspiration tube

4.1.1 Adjusting the telescopic aspiration tube to the height of the bottle

Prerequisites

- The bottle is larger than the collapsed telescopic aspirating tube.

Use an empty bottle to adjust the telescopic aspiration tube.



1. Hold the telescopic aspiration tube next to the bottle.
2. Extend the telescopic aspiration tube. The telescopic aspiration tube is supposed to reach from the bottle opening to just above the base of the bottle.

4.1.2 Shorten the telescopic aspiration tube for smaller bottles.

Prerequisites

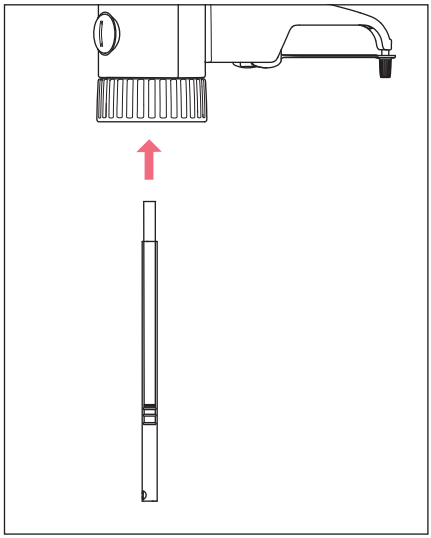
- The bottle is smaller than the collapsed telescopic aspirating tube.

1. Extend the telescopic aspiration tube all the way.
2. Shorten the inner tube at the connecting side.
3. Shorten the outer tube in relation to the suction openings.
4. Assemble the telescopic aspiration tube.

4.1.3 Inserting the telescopic aspirating tube

Prerequisites

- The telescopic aspiration tube is adjusted to the height of the bottle.

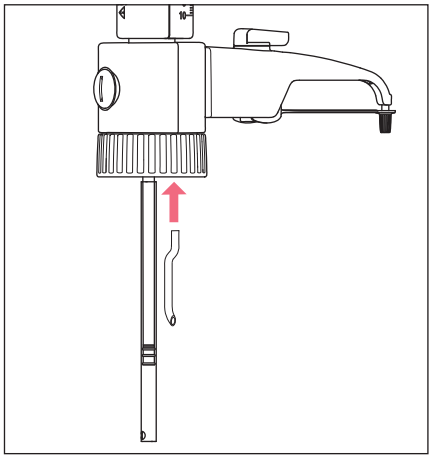


1. Slide the telescopic aspiration tube onto the filling valve straight up to the stop.

4.2 Installing the recirculation tube – Varispenser 2x

Prerequisites

- The telescopic aspirating tube is inserted.



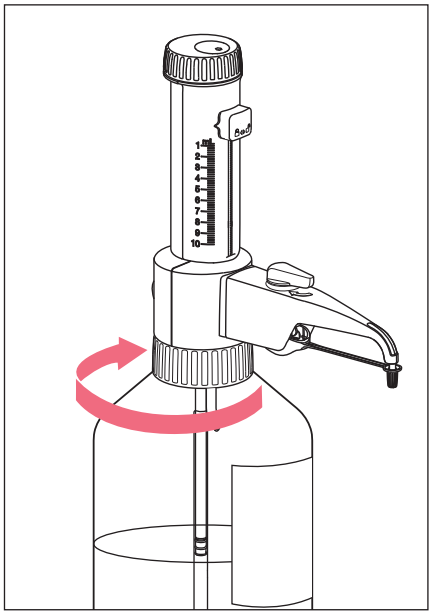
1. Insert the recirculation tube next to the telescopic aspirating tube.
2. Rotate the opening of the recirculation tube outward.

5 Operation

5.1 Screwing the dispenser onto the bottle

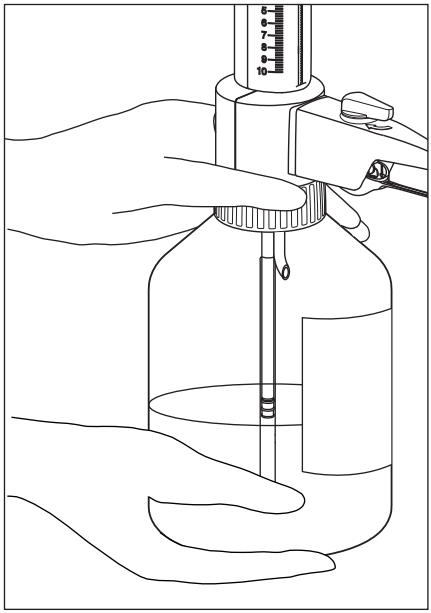
Prerequisites

- Varispenser 2x – The recirculation tube is installed.
- The telescopic aspirating tube is installed.
- The length of the telescopic aspirating tube has been adjusted to the size of the bottle.



1. Put the dispenser straight onto the bottle thread and tighten it.
2. Align the discharge tube to the label on the bottle.

5.2 Carrying the dispenser and the bottle



1. Grasp the dispenser by the thread connection.
2. Hold the bottle at its base.
3. Carry the dispenser and the bottle upright.

5.3 Screwing on the thread adapter

The thread connection of the dispenser is designed for bottle threads of 45 mm. For other bottle threads a thread adapter can be used. The diameter of the thread adapter is imprinted on the adapter. If the bottle thread is smaller than 32 mm, a second adapter must be used.

5.3.1 Determining the diameter of the flask neck

Prerequisites

- A suitable thread adapter is available.

Some thread adapters are included in the delivery package.Other diameters can be ordered.

1. Measure the inner diameter of the bottle top or the outer diameter of the flask neck.
2. Choose the suitable thread adapter.

5.3.2 Screwing on the thread adapter

Prerequisites

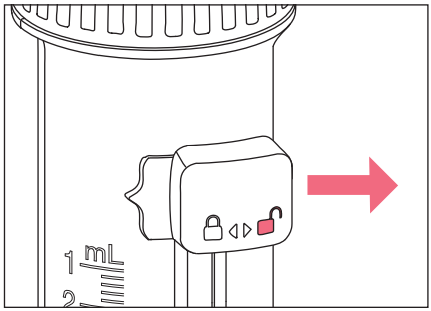
- A suitable thread adapter is available.

If you need a thread adapter with a higher resistance to chemicals, use a PTFE/ETFE adapter.

1. Screw the thread adapter onto the flask neck.
   The dispenser can be screwed onto the bottle.

5.4 Operating the volume selection slider

5.4.1 Unlocking the volume selection slider

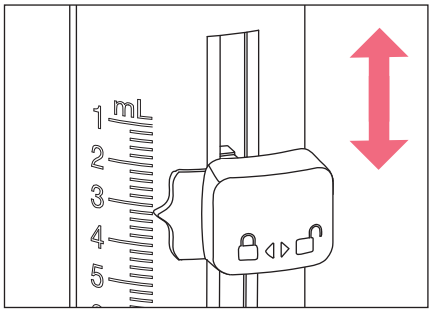


1. Slide the volume selection slider to the right.
   The volume selection slider is unlocked.
   The volume selection slider can be moved.
   The volume can be set.

5.4.2 Setting the volume

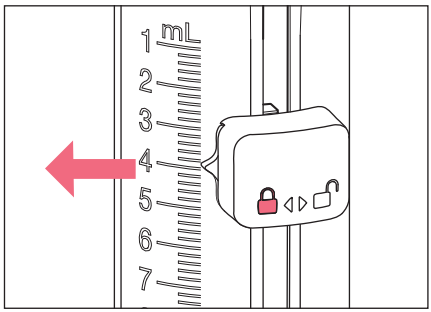
Prerequisites

- The volume selection slider is unlocked.



1. Slide the volume selection slider to the desired volume.
   The volume has been set.
   The volume selection slider can be locked.

5.4.3 Locking the volume selection slider

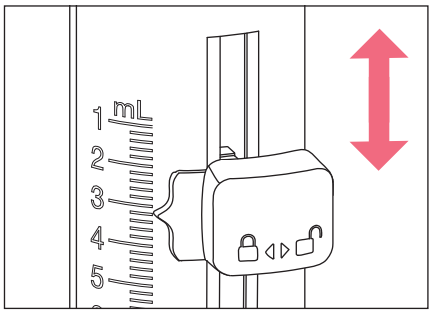


1. Slide the volume selector switch to the left.
   The volume selection slider is locked.
   The volume selection slider cannot be moved.
   The liquid can be dispensed.

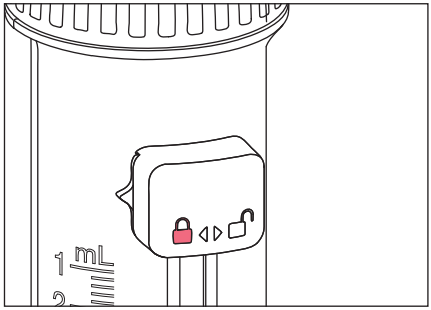
5.5 Locking the piston

Prerequisites

- The volume selection switch is unlocked.



1. Slide the volume selection switch all the way to the top.



2. Slide the volume selection switch to the left.
   The volume selection switch is in its initial position and is locked.
   The piston cannot be moved.
   The liquid cannot be dispensed.

5.6 Rinsing the dispenser

Prerequisites

- A bottle with demineralized water is available.
- A collection vessel is available.

1. Screw the dispenser onto the bottle.
2. Set the volume selection slider to the maximum volume.
3. Remove the sealing cap.
4. Rinse the dispenser several times.
5. Unscrew the dispenser.
6. Tap the telescopic aspirating tube inside against the bottle.
   The residual liquid flows out of the telescopic aspirating tube.
   The dispenser is empty.

5.7 Dispensing liquid – Varispenser 2

NOTICE! Damage to device due to contamination in the device.
If there is contamination in the dispenser, the dispensing valve may block and the valve ball might get stuck. When the piston is pressed down, a high pressure develops in the dispenser. If the valve ball is not released, liquid is pressed past the sealing lip into the inside of the housing.

▸ If the piston is difficult to move, clean the dispenser.

CAUTION! Contamination with reagents when removing the sealing cap.
The sealing cap may contain biological and chemical reagents. Contact with reagents may be harmful to eyes or skin.

▸ Wear your personal protective equipment when removing the sealing cap.

5.7.1 Venting the dispenser

Prerequisites

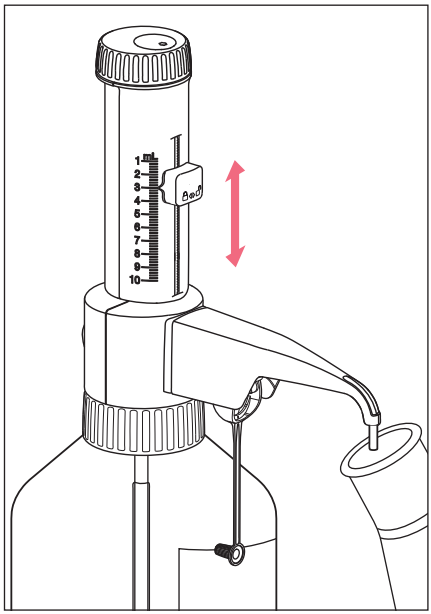
- The dispenser is clean.
- The dispenser is screwed onto the supply bottle.
- The maximum volume has been set.
- A collection vessel is available.

1. Remove the sealing cap.
2. Hold the collection vessel below the discharge tube.
3. Lift the piston about 30 mm.
4. Dispense the liquid.
5. Repeat until the liquid in the cylinder is free from air bubbles.
6. Discard the liquid.
   The dispenser has been vented.
   The liquid can be dispensed precisely.

5.7.2 Dispensing liquid

Prerequisites

- The dispenser has been vented.
- A destination vessel is available.

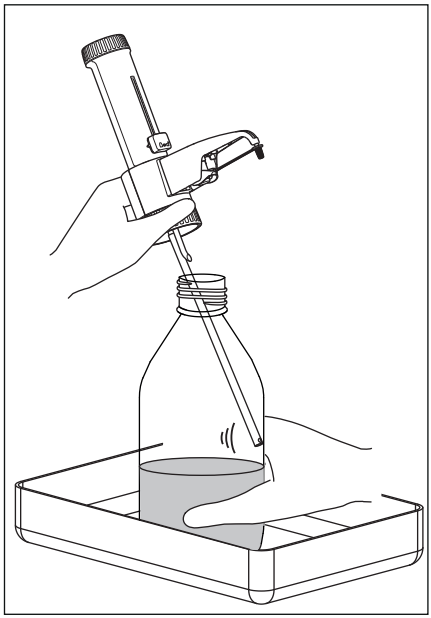


1. Set the desired volume.
2. Slowly and evenly pull the piston up until the stop.
3. Slowly and evenly push the piston down. The set amount of liquid is dispensed.

5.7.3 Emptying the dispenser

Prerequisites

- The piston is in the lower position.



1. Attach the sealing cap.
2. Place the dispenser and bottle into a collecting vessel.
3. Unscrew the dispenser.
4. Pull the dispenser out of the bottle until the telescopic aspirating tube is no longer immersed in the liquid.
5. Tap the telescopic aspirating tube inside against the bottle.
   The residual liquid flows out of the telescopic aspirating tube.
   The dispenser is empty.

5.7.4 Rinsing the dispenser

Prerequisites

- The dispenser is empty.
- A bottle with a neutral cleaning solution is available.
- A bottle with demineralized water is available.

1. Screw the dispenser onto the bottle with the neutral cleaning solution.
2. Place a collection vessel below the discharge tube.
3. Remove the sealing cap.
4. Flush the dispenser by pumping several times.
5. Empty the dispenser.
6. Screw the dispenser onto a bottle with demineralized water.
7. Flush the dispenser by pumping several times.
8. Empty the dispenser.
9. Unscrew the dispenser and pump dry air through it several times.

5.8 Dispensing liquid – Varispenser 2x

NOTICE! Damage to device due to contamination in the device.
If there is contamination in the dispenser, the dispensing valve may block and the valve ball might get stuck. When the piston is pressed down, a high pressure develops in the dispenser. If the valve ball is not released, liquid is pressed past the sealing lip into the inside of the housing.

- If the piston is difficult to move, clean the dispenser.

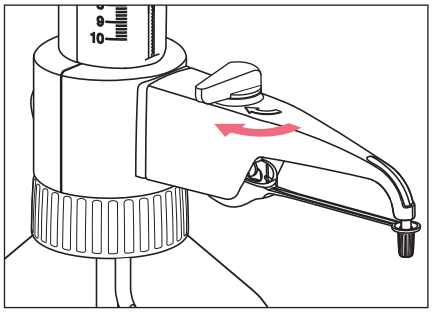
CAUTION! Contamination with reagents when removing the sealing cap.
The sealing cap may contain biological and chemical reagents. Contact with reagents may be harmful to eyes or skin.

- Wear your personal protective equipment when removing the sealing cap.

5.8.1 Venting the dispenser

Prerequisites

- The dispenser is clean.
- The dispenser is screwed onto the supply bottle.
- The maximum volume has been set.
- A collection vessel is available.

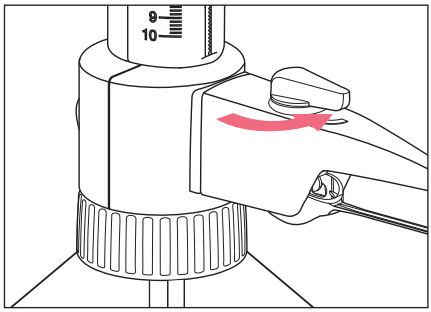


1. Remove the sealing cap.
2. Set the valve toggle to recirculation.
3. Lift the piston about 30 mm.
4. Dispense liquid into the bottle.
5. Repeat until the liquid in the cylinder is free from air bubbles.
6. Set the valve toggle to dispensing.
   The dispenser is vented.
   The liquid can be dispensed precisely.

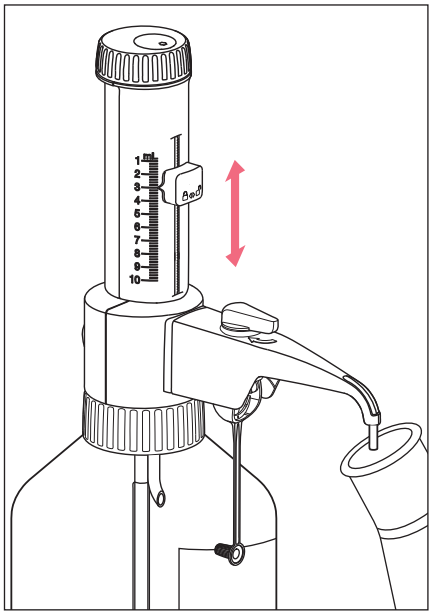
5.8.2 Dispensing liquid

Prerequisites

- The dispenser is clean.
- A destination vessel is available.



1. Set the valve toggle to dispensing.
2. Remove the sealing cap.

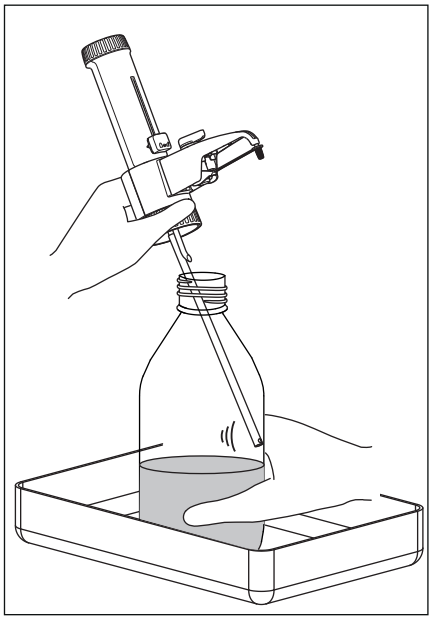


3. Hold a collection vessel below the discharge tube.
4. Slowly and evenly pull the piston up until the stop.
5. Slowly and evenly push the piston down until the stop.

5.8.3 Emptying the dispenser

Prerequisites

- The piston is in the lower position.
- The valve toggle is set to dispensing.



1. Attach the sealing cap.
2. Place the dispenser and bottle into a collecting vessel.
3. Screw off the dispenser.
4. Pull the dispenser out of the bottle until the telescopic aspirating tube is no longer immersed in the liquid.
5. Tap the telescopic aspirating tube against the inside of the bottle.
   The residual liquid flows out of the telescopic aspirating tube.
   The dispenser is empty.

5.8.4 Rinsing the dispenser

Prerequisites

- The dispenser is empty.
- The valve toggle is set to dispensing.
- A bottle with a neutral cleaning solution is available.
- A bottle with demineralized water is available.

1. Screw the dispenser onto the bottle with the neutral cleaning solution.
2. Place a collection vessel below the discharge tube.
3. Remove the sealing cap.
4. Flush the dispenser by pumping several times.
5. Set the valve toggle to recirculation.
6. Flush the recirculation valve by pumping several times.
7. Empty the dispenser.
8. Screw the dispenser onto a bottle with demineralized water.
9. Flush the dispenser by pumping several times.
10. Flush the recirculation valve by pumping several times.
11. Empty the dispenser.
12. Unscrew the dispenser and pump dry air through it several times.

5.9 Flushing the dispenser after using strong acids or bases

If strong acids or bases have been dispensed, first of all the liquid remaining in the dispenser must be neutralized.

- A bottle with neutralization liquid is available.
- A collection vessel is available.
- A bottle with demineralized water is available.

1. Screw the dispenser onto the bottle containing the neutralization liquid.
2. Remove the sealing cap.
3. Hold the collection vessel below the discharge tube.
4. Flush the dispenser several times.
5. Flush the recirculation valve by pumping several times.
6. Unscrew the dispenser.
7. Screw the dispenser onto the bottle with demineralized water.
8. Flush the dispenser several times.
9. Unscrew the dispenser.
10. Pump dry air through the dispenser several times.

6 Troubleshooting

6.1 Dispenser and piston

Problem	Cause	Solution
The piston is difficult to move.	• The sealing cap is on the discharge tube.	▸ Remove the sealing cap.
	• Crystals have formed.	1. Cancel the dispensing procedure. 2. Clean the dispenser. 3. If the problem persists, send the dispenser to the authorized service.
	• The piston seal is damaged.	▸ Send the dispenser to the authorized service.
The canula arm cannot be mounted.	• The discharge valve has not been screwed far enough into the valve block.	▸ Tighten the discharge valve using the universal wrench.

6.2 Dispensing and liquid

Problem	Cause	Solution
The aspirated liquid contains air bubbles.	• The dispenser has not been sufficiently vented.	▸ Vent the dispenser.
	• The telescopic aspirating tube has not been mounted correctly.	▸ Slide the telescopic aspirating tube firmly onto the filling valve.
	• The telescopic aspirating tube is damaged.	▸ Shorten the telescopic aspirating tube or replace it.
	• The filling valve is loose.	▸ Tighten the filling valve using the universal wrench. ▸ If the problem persists, replace the filling valve.
	• The filling valve is damaged.	▸ Replace the filling valve with a new one.
	• The telescopic aspirating tube is not immersed in the liquid.	▸ Lengthen the telescopic aspirating tube until it is immersed in the liquid.
	• The bottle is empty.	▸ Fill the bottle.

Problem	Cause	Solution
The dispenser does not aspirate any liquid.	• The telescopic aspirating tube has not been mounted correctly.	▸ Slide the telescopic aspirating tube firmly onto the filling valve.
	• The filling valve is clogged.	1. Clean the dispenser. 2. If the problem persists, replace the filling valve.
The dispensed volume is too low.	• The telescopic aspirating tube has not been mounted correctly.	▸ Slide the telescopic aspirating tube firmly onto the filling valve.
	• The telescopic aspirating tube is damaged.	▸ Shorten the telescopic aspirating tube or replace it.
	• The dispenser is adjusted incorrectly.	▸ Adjust the dispenser. ▸ If the problem persists, send the dispenser to the authorized service.
	• The filling valve is loose.	▸ Tighten the filling valve with the universal wrench. ▸ If the problem persists, replace the filling valve.
	• The filling valve is damaged.	▸ Replace the filling valve with a new one.
Liquid dispensing is not possible.	• The discharge valve is clogged.	▸ Remove the discharge valve. ▸ Clean the discharge valve. ▸ Loosen the valve ball if stuck. ▸ If the problem persists, replace the discharge valve.
Liquid is leaking from the thread connection.	• The recirculation tube is missing.	▸ Insert a recirculation tube.
	• Highly volatile liquid has been dispensed without a sealing ring.	▸ Insert a sealing ring.
	• Liquids sensitive to humidity or CO_2 have been dispensed.	▸ Insert a sealing ring. ▸ Use a drying tube.

7 Maintenance

7.1 Decontamination before shipment

If you are shipping the device to the authorized Technical Service for repairs or to your authorized dealer for disposal please note the following:

WARNING! Risk to health from contaminated device

1. Observe the notes on the decontamination certificate. You find it as a PDF file on our website (www.eppendorf.com/decontamination).
2. Decontaminate all the parts you would like to dispatch.
3. Include the fully completed decontamination certificate in the package.

7.2 Cleaning the dispenser

CAUTION! Personal injury due to contact with reagents.
The feeding mechanics, valves, telescopic aspirating tube and discharge tube are filled with reagents. Reagents enter the bottle with the cleaning solution. Contact with reagents may be harmful to eyes or skin.

- ▸ Wear your personal protective equipment.
- ▸ Discard the cleaning solution after cleaning.

The dispenser must be cleaned in the following cases:

- It is difficult to move the piston.
- Regularly, if liquids that form soluble deposits are used.
- The reagent is changed.
- Prior to autoclaving.
- Before storage.
- Prior to service and repair work.

Prerequisites

- The dispenser is empty and has been flushed.
- A bottle with demineralized water is available.
- A soft cleaning brush is available.

1. Remove the telescopic aspiration tube and clean it using the brush.
2. Unscrew the piston bearing and carefully pull out the piston.
3. Clean the piston and cylinder using the brush and demineralized water.
4. Thoroughly dry the piston and the cylinder.
5. Insert the piston into the cylinder.
6. Tightly screw on the piston bearing.
7. Flush the dispenser with demineralized water and then empty it.

7.3 Autoclaving the dispenser

The dispenser can be autoclaved without disassembling it.

NOTICE! Material damage due to hot metal surfaces.
The plastic parts of the dispenser can melt upon contact with hot metal surfaces.

▸ Place the dispenser on a pad during autoclaving.

Prerequisites

- The dispenser has been cleaned .
- The maximum volume has been set.
- Varispenser 2x – The valve toggle is set to dispensing.
- Autoclave at 121 °C and 2 bar positive pressure.

1. Remove the sealing cap.
2. Remove the telescopic aspirating tube.
3. Check the filling valve for tight fit.
4. Turn the dispenser around.
   The filling valve is pointing upwards.
5. Slightly tap at the valve block.
   This will loosen any valve balls that were stuck.
   The steam of the autoclave can pass the valve unhindered.
6. Place the dispenser and the telescopic aspirating tube in the autoclave on a cloth.
7. Autoclave for 20 minutes.
8. Let the dispenser cool down for 2 hours after autoclaving.
9. Check all parts for deformations or leaks.

7.4 Replacing valves or the canula arm

CAUTION! Personal injury due to contact with reagents.
The feeding mechanics, valves, telescopic aspirating tube and discharge tube are filled with reagents.
Contact with reagents may be harmful to eyes or skin.

- Only disassemble a cleaned and decontaminated device.

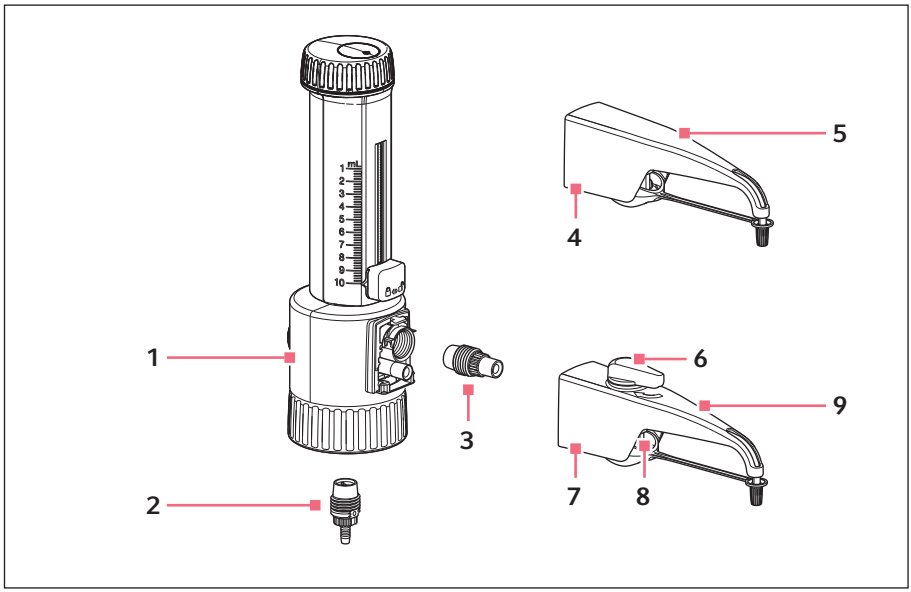


Fig. 7-1: Valve block with valves

1 **Valve block**
With filling valve and discharge valve

2 **Filling valve**

3 **Discharge valve**

4 **Housing**

5 **Canula arm**
Varispenser 2

6 **Valve toggle**

7 **Housing**

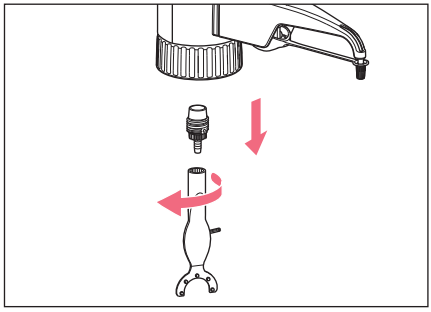
8 **Dispensing valve**

9 **Canula arm**
Varispenser 2x

7.4.1 Removing the filling valve

Prerequisites

- The dispenser is clean.
- The telescopic aspirating tube has been removed.
- Varispenser 2x – the recirculation tube has been removed.
- The universal wrench is available.

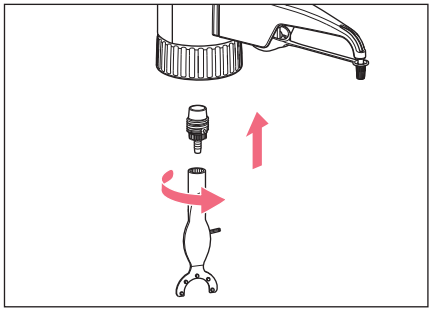


1. Fit the universal wrench onto the filling valve.
2. Unscrew the filling valve counter-clockwise.

7.4.2 Installing the filling valve

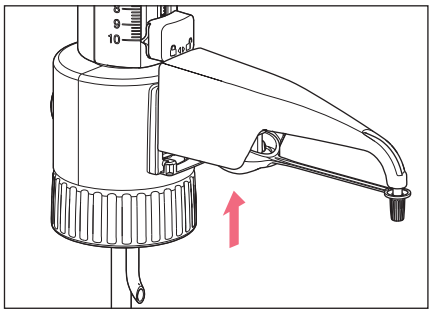
Prerequisites

- The faulty filling valve has been removed.
- A new filling valve is available.
- The universal wrench is available.

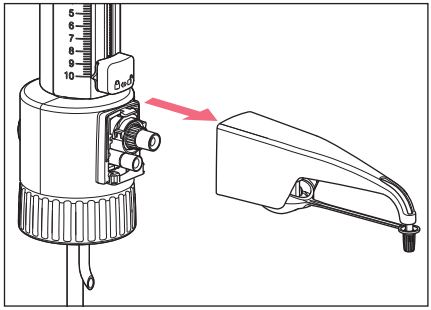


1. Manually screw the new filling valve into the valve block.
2. Fit the universal wrench.
3. Tighten the filling valve clockwise.

7.4.3 Removing the canula arm – Varispenser 2

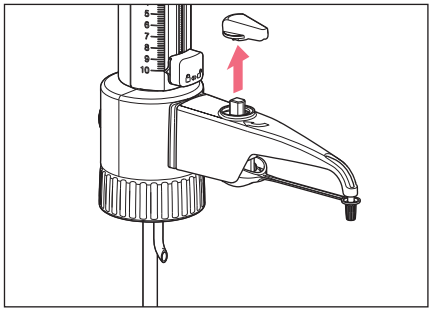


1. Push the housing of the canula arm on the valve block upwards.

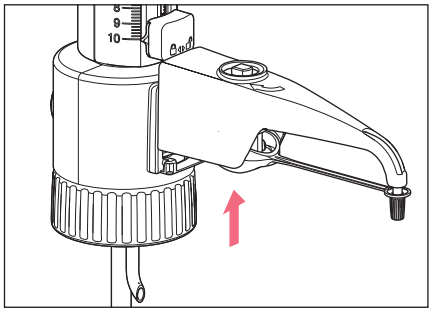


2. Remove the canula arm in a forward motion.

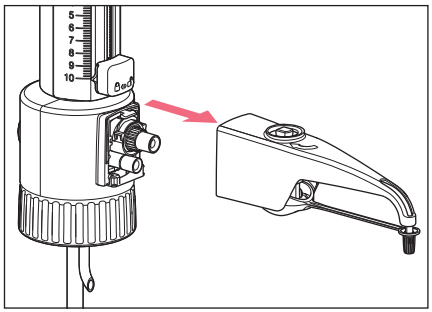
7.4.4 Removing the canula arm – Varispenser 2x



1. Remove the valve toggle.



2. Push the housing of the canula arm on the valve block upwards.

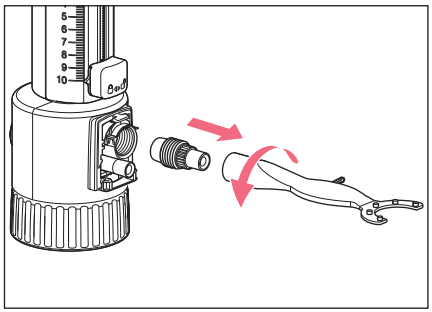


3. Remove the canula arm in a forward motion.

7.4.5 Removing the discharge valve

Prerequisites

- The canula arm has been removed.

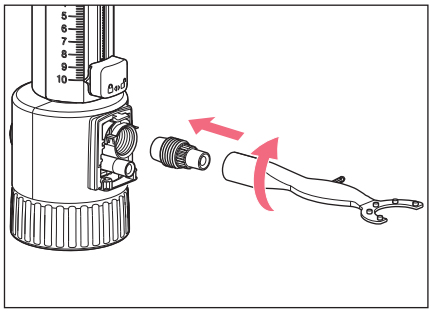


1. Fit the universal wrench onto the discharge valve.
2. Unscrew the discharge valve counter-clockwise.

7.4.6 Mounting the discharge valve

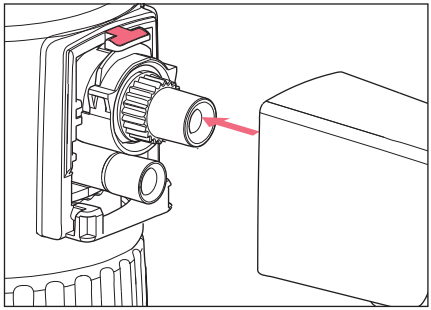
Prerequisites

- The faulty discharge valve has been removed.
- A new discharge valve is available.
- The universal wrench is available.



1. Manually screw the new discharge valve into the valve block.
2. Tighten the discharge valve clockwise.

7.4.7 Mounting the canula arm – Varispenser 2

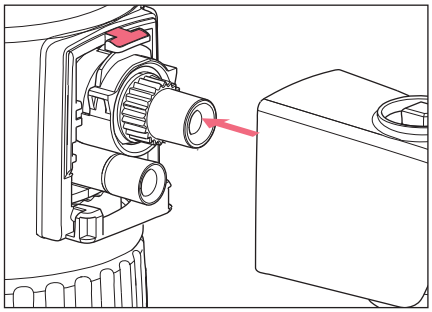


1. Insert the dispensing valve into the discharge valve on the valve block.
2. Slide the housing over the nose on the valve block.
3. Push down the housing.
   The housing locks into the lower noses.

7.4.8 Mounting the canula arm – Varispenser 2x

Prerequisites

- The valve toggle has been removed.



1. Slightly push down the dispensing valve in the housing.
2. Slide the dispensing valve into the valve block.
   The housing of the canula arm must be above the nose.
3. Push down the housing.
   The housing locks in.
4. Fit the valve toggle onto the dispensing valve.

7.5 Adjusting the dispenser

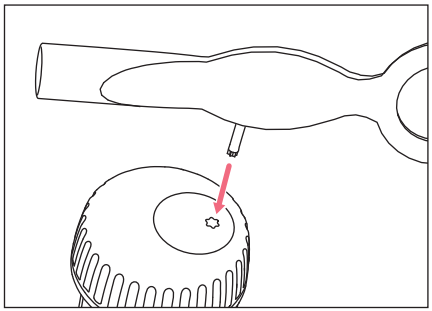
The dispenser is factory-adjusted to the physical features of demineralized water.

The dispenser can be adjusted differently:

- If the physical features of the liquid differ from those of water.
- If the measurement error of the dispensed volume is outside of the tolerance range.

A description of how to conduct the gravimetric test and how to convert the volume measurement values is contained in the document *"Standard operating procedure for manual dispensing systems"*. The document is available on the webpage www.eppendorf.com/manuals.

7.5.1 Removing the adjustment cover



1. Fit the pin of the universal wrench into the adjustment cover.
2. Turn the universal wrench and break off the adjustment cover.
   The adjustment cover can be discarded.

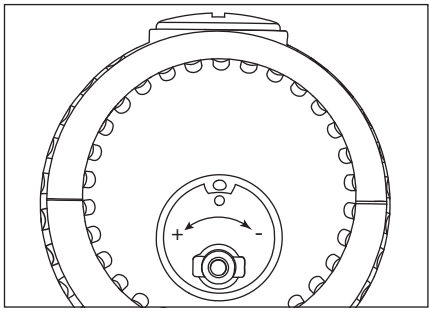
7.5.2 Adjustment range

Nominal volume	Maximum ±	per revolution
2 mL	12 µL	~ 16 µL
5 mL	30 µL	~ 40µL
10 mL	60 µL	~ 80 µL
25 mL	150 µL	~ 130 µL
50 mL	300 µL	~ 265 µL
100 mL	600 µL	~ 400 µL

7.5.3 Changing the adjustment

Prerequisites

- The gravimetrically determined measured values are available.



▸ Fit the universal wrench into the adjustment opening.
Turning it in the direction "Plus" will increase the dispensing volume.
Turning it in the direction "Minus" will decrease the dispensing volume.

7.5.4 Checking the dispensing volume

Prerequisites

- The document *"Standard operating procedure for manual dispensing systems"* is available.

▸ Check the dispensed volume by carrying out a gravimetric test.

8 Technical data

8.1 Physical features of liquids

Density	up to 2.2 g/cm³
Vapor pressure	up to 500 mbar
Kinematic viscosity	up to 500 mm²/s
Temperature	15 °C – 40 °C

8.2 Errors of measurement

8.2.1 Varispenser 2

Model	**Testing volume**	**Error of measurement**			
		Systematic error		**Random error**	
		± %	**± µL**	**± %**	**± µL**
0.2 mL – 2 mL	0.2 mL	5	10	1	2
	1 mL	1	10	0.2	2
	2 mL	0.5	10	0.1	2
0.5 mL – 5 mL	0.5 mL	5	25	1	5
	2.5 mL	1	25	0.2	5
	5.0 mL	0.5	25	0.1	5
1 mL – 10 mL	1 mL	5	50	1	10
	5 mL	1	50	0.2	10
	10 mL	0.5	50	0.1	10
2.5 mL – 25 mL	2.5 mL	5	125	1	25
	12.5 mL	1	125	0.2	25
	25 mL	0.5	125	0.1	25
5 mL – 50mL	5 mL	5	250	1	50
	25 mL	1	250	0.2	50
	50 mL	0.5	250	0.1	50
10 mL – 100 mL	10 mL	5	500	1	100
	50 mL	1	500	0.2	100
	100 mL	0.5	500	0.1	100

8.2.2 Varispenser 2x

Model	Testing volume	Error of measurement			
		Systematic error		Random error	
		± %	± µL	± %	± µL
0.2 mL – 2 mL	0.2 mL	5	10	1	2
	1 mL	1	10	0.2	2
	2 mL	0.5	10	0.1	2
0.5 mL – 5 mL	0.5 mL	5	25	1	5
	2.5 mL	1	25	0.2	5
	5 mL	0.5	25	0.1	5
1 mL – 10 mL	1 mL	5	50	1	10
	5 mL	1	50	0.2	10
	10 mL	0.5	50	0.1	10
2,5 mL – 25 mL	2.5 mL	5	125	1	25
	12.5 mL	1	125	0.2	25
	25 mL	0.5	125	0.1	25
5 mL – 50 mL	5 mL	5	250	1	50
	25 mL	1	250	0.2	50
	50 mL	0.5	250	0.1	50
10 mL – 100 mL	10 mL	5	500	1	100
	50 mL	1	500	0.2	100
	100 mL	0.5	500	0.1	100

8.2.3 Test conditions

Test conditions and test analysis in accordance with ISO 8655-6. Tested with an analytical balance tested by the Board of Weights and Measures.

The errors were determined under the following conditions:

Liquid	Demineralized water according to ISO 3696
Number of measurements	10
Ambient temperature	20 °C, constant

8.3 Ambient conditions

Ambience	Only for use indoors.
Ambient temperature	15 °C – 40 °C
Relative humidity	10 % – 90 %, non-condensing.
Atmospheric pressure	700 hPa – 1060 hPa

9 Chemical resistance

9.1 Acids and bases

Designation	Concentration (maximum)
Adipic acid	–
Aluminum hydroxide	–
Formic acid	98 % – 100 %
Boric acid	10 %
Chloroacetic acid	–
Chromic acid	50 %
Chromo-sulfuric acid	–
Acetic acid	12 % – 96 %
Ethylenediaminetetraacetic acid	–
Potassium hydroxide	50 %
Lactic acid	–
Sodium hydroxide	30 %
Oxalic acid	–
Perchloric acid	10 %
Phosphoric acid	85 %
Nitric acid[1]	30 %
Hydrochloric acid[1]	37 %
Salicylic acid	–
Sulfuric acid	98 %
Sulfuric acid	60 %
Tartaric acid (TFA)	–

[1] Use an ETFE thread adapter.

9.2 Organic liquids

Designation	Concentration (maximum)
Acetone	–
Acetonitrile	–
Acetyl aldehyde	–
Benzene	–
n-Butanol	–
n-Butyl acetate	–
1,2-Dichlorobenzene	–
1,2-Dichloroethane	–
Diethyl ether	–
Diethylene glycol	–
Dimethylformamide	–
1,4-Dioxane	–
Acetic acid ethyl ester	–
Ethanol	100 %
Formaldehyde	40 %
Glycol	–
n-Hexane	–
Isobutanol	–
Isopropanol	–
Methanol	–
Nitrobenzene	–
Phenol (water saturated)	–
Pyridine	–
Turpentine oil	–
Toluol	–
Triethylene glycol	–
Tripropylene glycol	–
Xylol	–

9.3 Inorganic liquids

Designation	Concentration (maximum)
Ammonium chloride solution	–
Barium chloride	–
Iodine potassium iodide solution	–
Calcium chloride	–
Potassium chloride	–
Potassium permanganate	–
Copper sulfate	–
Magnesium chloride	–
Phosphoric acid	85 %
Mercury chloride	–
Silver nitrate	–
Zinc chloride	10 %
Zinc sulfate	10 %

9.4 Saline solutions, buffers, wetting agents, oils and other solutions

Designation	Concentration (maximum)
Acrylonitrile	–
Allyl alcohol	–
Amino acids	–
n-Amyl acetate	–
Amyl alcohol	–
Amyl chloride	–
Aniline	–
Benzaldehyde	–
Benzyl alcohol	–
Glycerol	50 %
Urea	–
m-Cresol	–
2-Pentanone	–
Sodium acetate (pH 5.2)	–
Sodium dichromate	–
Sodium lauryl sulfate (SDS)	–

Designation	Concentration (maximum)
Propylene glycol	–
Propylene oxide	–
Salicylaldehyde	–
Silver acetate	–
TRIS HCl[1]	–
TRIS buffer (pH 5.2)	1 mol/L
Triton X-100	–
[1] Wear parts have to be replaced at shorter intervals.	

9.5 Cleaning and decontamination agents

Designation	Concentration (maximum)
Biocidal ZF	–
CIDEX Activated Dialdehyde Solution	–
Dismozon pur (peroxide-based)	4 %
DNA *AWAY*	–
DNA Erase	–
Ethanol	70 %
Helipur (phenol-based)	6 %
Hexaquart S (QAV-based)	5 %
Hi-TOR Plus	–
Isopropanol	70 %
Korsolex basic (aldehyde-based)	5 %
Meliseptol (alcohol-based)	–
Sodium hypochlorite	4 %
RNase AWAY	–
RNase Exitus plus	–
Sterillium	–

10 Transport, storage and disposal

10.1 Transport

NOTICE! Damage as a result of incorrect packing.
Eppendorf AG is not liable for damage caused by improper packing.

- The device may only be stored and transported in its original packaging.

Tab. 10-1: Transport conditions

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-20 °C – 50 °C	10 % – 90 %, non-condensing.	300 hPa – 1060 hPa
Air freight	–20 °C – 50 °C	10 % – 90 %, non-condensing.	300 hPa – 1060 hPa

10.2 Storage

Tab. 10-2: Storage conditions

	Air temperature	Relative humidity	Atmospheric pressure
Storage	-20 °C – 50 °C	10 % – 90 %, non-condensing.	300 hPa – 1060 hPa

10.3 Disposal

Observe the relevant legal regulations for disposing of the product.

11 Ordering information

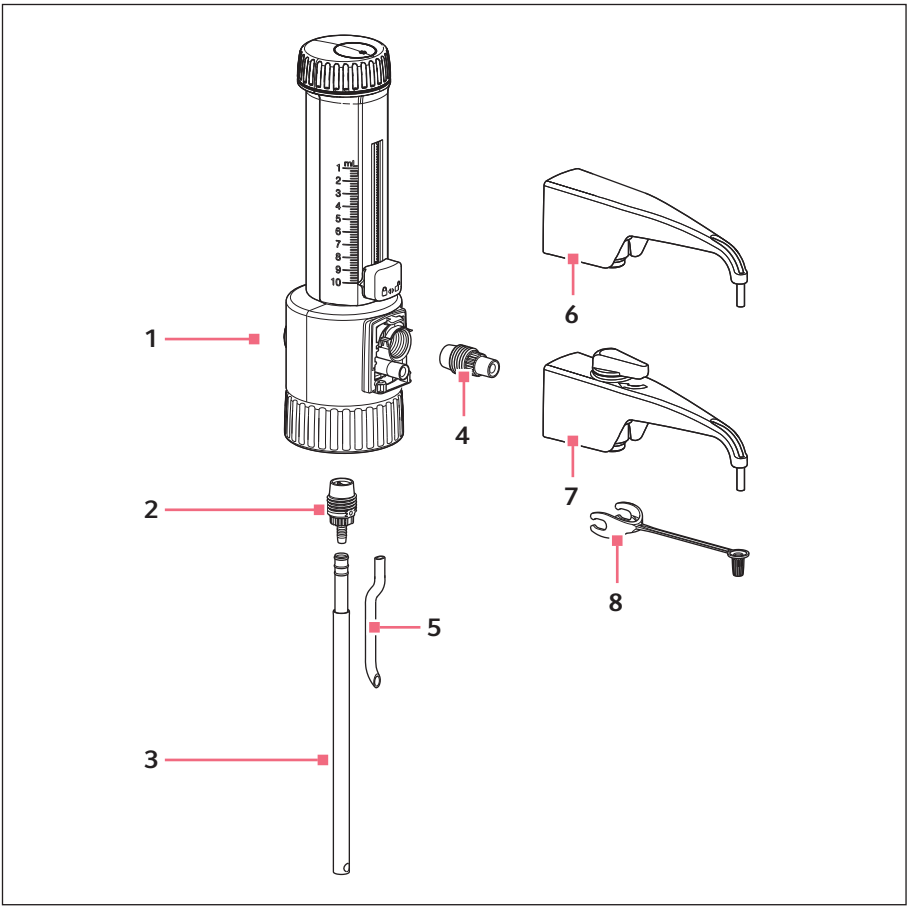
11.1 Varispenser 2

Order no. (International)	Order no. (North America)	Description
		Varispenser 2 Bottle top dispenser for bottle thread 45 mm, telescopic aspirating tube, universal wrench, 5 adapters (25 mm, 28 mm, 32 mm, 38 mm, 40 mm)
4966 000.010	4966000010	0,2 mL – 2 mL
4966 000.029	4966000029	0,5 mL – 5 mL
4966 000.037	4966000037	1 mL – 10 mL
		Varispenser 2 Bottle top dispenser for bottle thread 45 mm, telescopic aspirating tube, universal wrench, 3 adapters (32 mm, 38 mm, 40 mm)
4966 000.045	4966000045	2,5 mL – 25 mL
4966 000.053	4966000053	5 mL – 50 mL
4966 000.061	4966000061	10 mL – 100 mL

11.2 Varispenser 2x

Order no. (International)	Order no. (North America)	Description
		Varispenser 2x Bottle top dispenser with return valve, and valve switch for bottle thread 45 mm, telescopic aspirating tube, universal wrench, 5 adapters (25 mm, 28 mm, 32 mm, 38 mm, 40 mm)
4967 000.014	4967000014	0,2 mL – 2 mL
4967 000.022	4967000022	0,5 mL – 5 mL
4967 000.030	4967000030	1 mL – 10 mL
		Varispenser 2x Bottle top dispenser with return valve, and valve switch for bottle thread 45 mm, telescopic aspirating tube, universal wrench, 3 adapters (32 mm, 38 mm, 40 mm)
4967 000.049	4967000049	2,5 mL – 25 mL
4967 000.057	4967000057	5 mL – 50 mL
4967 000.065	4967000065	10 mL – 100 mL

11.3 Accessories



1 **Ventilation screw**

2 **Filling valve**

3 **Telescopic aspirating tube**

4 **Discharge valve**

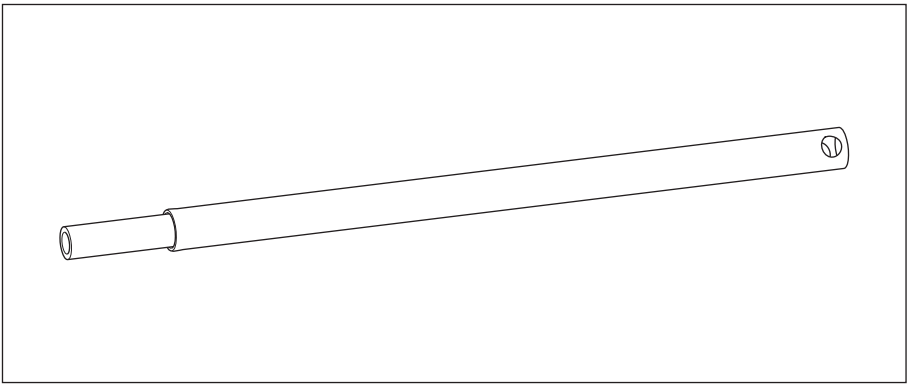
5 **Recirculation tube**
Varispenser 2x

6 **Canula arm**
With discharge tube for Varispenser 2

7 **Canula arm**
With discharge tube and valve toggle for Varispenser 2x

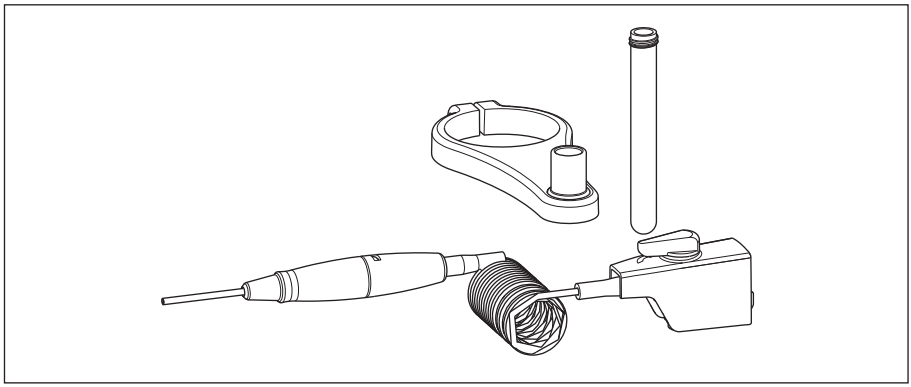
8 **Sealing cap**

11.3.1 Telescopic aspirating tube



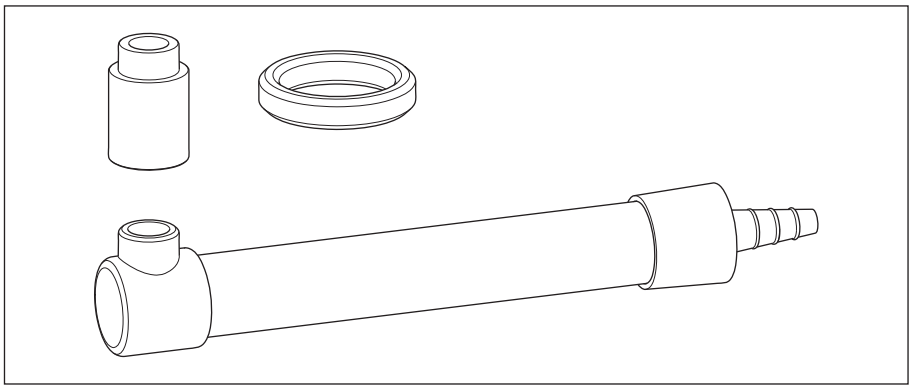
Order no. (International)	Order no. (North America)	Description
		Telescopic aspirating tube 70 mm – 140 mm
4966 503.004	4966503004	for 2 mL, 5 mL, 10 mL
		Telescopic aspirating tube 125 mm – 240 mm
4966 504.000	4966504000	for 2 mL, 5 mL, 10 mL
		Telescopic aspirating tube 195 mm – 350 mm
4966 505.007	4966505007	for 2 mL, 5 mL, 10 mL
		Telescopic aspirating tube 250 mm – 480 mm
4966 506.003	4966506003	for 2 mL, 5 mL, 10 mL
4966 508.006	4966508006	for 25 mL, 50 mL, 100 mL
		Telescopic aspirating tube 170 mm – 330 mm
4966 507.000	4966507000	for 25 mL, 50 mL, 100 mL

11.3.2 Flexible discharge tube



Order no. (International)	Order no. (North America)	Description
		Discharge tube spiraled
4966 501.001	4966501001	for 2 mL, 5 mL, 10 mL
4966 502.008	4966502008	for 25 mL, 50 mL, 100 mL

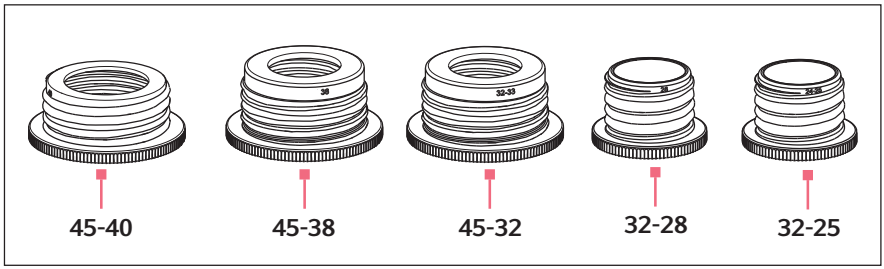
11.3.3 Drying tube with sealing washer



Order no. (International)	Order no. (North America)	Description
		Drying tube
4966 509.002	4966509002	without filling, including sealing washer (PTFE)

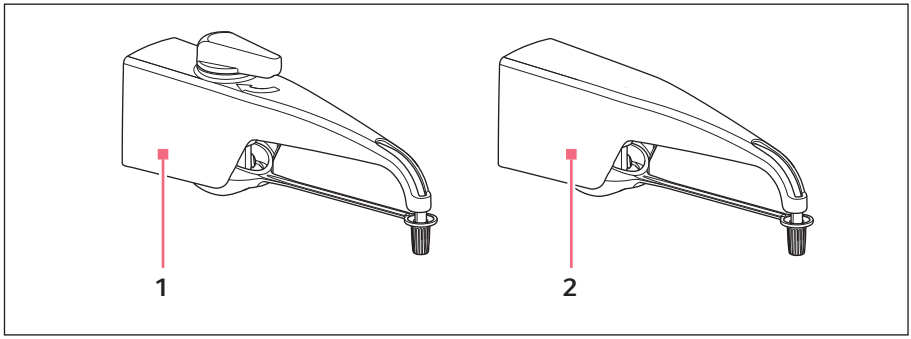
11.3.4 Thread adapter

- GL – round thread DIN 138 for glass thread. The number indicates the maximum outer diameter of the external thread.
- S – buttress thread.Thread type for glass bottle tops to avoid unintended loosening due to vibration.
- NS – ground joint glass vessel. 1st number inner diameter roughened glass, 2nd number length into the vessel.



Order no. (International)	Order no. (North America)	Description
		Bottle thread adapter PP
4960 800.040	4960800040	From GL 32 to GL 25,
4960 800.139	4960800139	From GL 32 to GL 27
4960 800.058	4960800058	From GL 32 to GL/S 28
4960 800.120	4960800120	From GL 45 to GL 32
4960 800.155	4960800155	From GL 45 to GL 38
4960 800.147	4960800147	From GL 45 to S 40
4960 800.082	4960800082	From GL 32 to NS 19/26
4960 800.090	4960800090	From GL 32 to NS 24/29
4960 800.104	4960800104	From GL 32 to NS 29/32
		Bottle thread adapter ETFE
4966 614.000	4966614000	From GL 32 to GL 25
4960 835.005	4960835005	From GL 32 to GL/S 28
4966 615.007	4966615007	From GL 45 to GL 32
4960 839.000	4960839000	From GL 45 to GL 38
		Bottle thread adapter PTFE
4960 834.009	4960834009	From GL 45 to S 40
		Thread adapter for 5 L-jerrycan, ETFE
4960 832.006	4960832006	from 45 mm to 17/8" thread

11.4 Spare parts
11.4.1 Canula arm

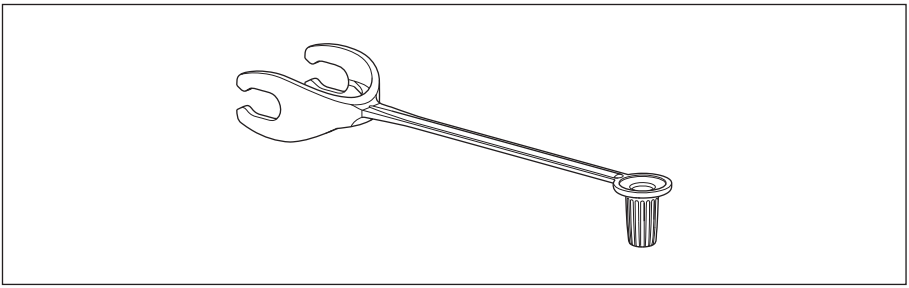


1 Varispenser 2x
Dispensing valve, valve toggle, discharge tube and sealing cap

2 Varispenser 2
Discharge tube and sealing cap

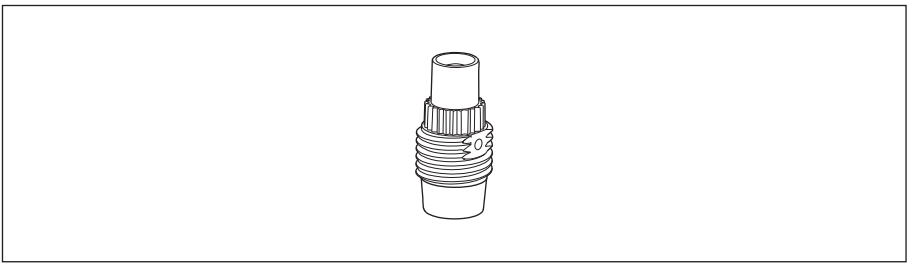
Order no. (International)	Order no. (North America)	Description
		Discharge tube Varispenser 2
4966 608.000	4966608000	for 2 mL, 5 mL, 10 mL
4966 609.007	4966609007	for 25 mL, 50 mL, 100 mL
		Discharge tube Varispenser 2x
4967 601.000	4967601000	for 2 mL, 5 mL, 10 mL
4967 602.006	4967602006	for 25 mL, 50 mL, 100 mL

11.4.2 Sealing cap



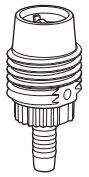
Order no. (International)	Order no. (North America)	Description
		Sealing cap PP, blue
4966 611.001	4966611001	for 2 mL, 5 mL, 10 mL
4966 612.008	4966612008	for 25 mL, 50 mL, 100 mL

11.4.3 Discharge valve



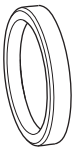
Order no. (International)	Order no. (North America)	Description
		Discharge valve
4966 604.005	4966604005	for 2 mL
4966 605.001	4966605001	for 5 mL, 10 mL
4966 606.008	4966606008	for 25 mL, 50 mL, 100 mL

11.4.4 Filling valve



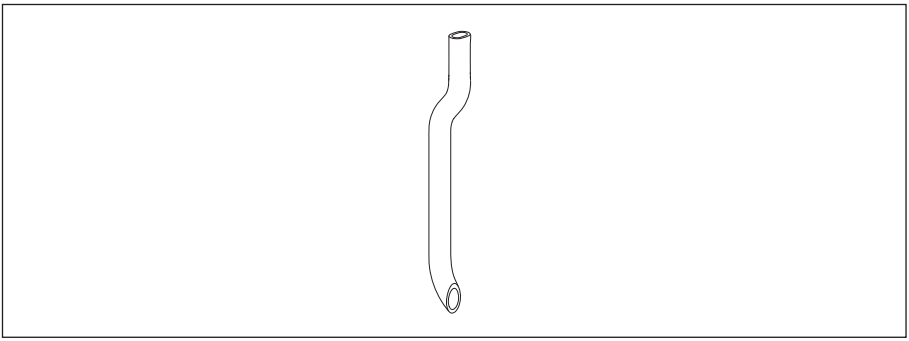
Order no. (International)	Order no. (North America)	Description
		Filling valve with valve ball
4966 602.002	4966602002	for 2 mL, 5 mL, 10 mL
4966 603.009	4966603009	for 25 mL, 50 mL, 100 mL

11.4.5 Sealing washer



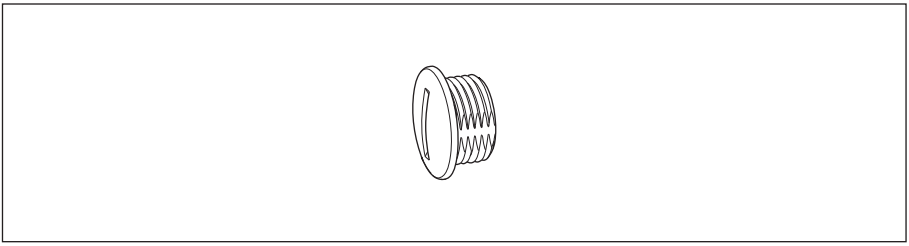
Order no. (International)	Order no. (North America)	Description
		Sealing washer
4966 613.004	4966613004	for valve block, PTFE

11.4.6 Recirculation tube



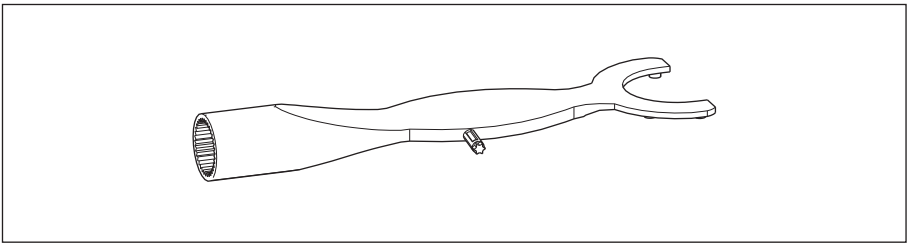
Order no. (International)	Order no. (North America)	Description
		Recirculation tube
4966 610.005	4966610005	FEP

11.4.7 Ventilation screw



Order no. (International)	Order no. (North America)	Description
		Ventilation screw
4966 601.006	4966601006	PP
		Ventilation screw
4966 511.007	4966511007	for microfilters with Luer connector, PP, with PTFE sealing washer

11.4.8 Tool



Order no. (International)	Order no. (North America)	Description
4966 607.004	4966607004	**Universal wrench**

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