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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 thoroughly 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. It must always be kept 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 at 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	<i>Will</i> lead to severe injuries or death.
WARNING	<i>May</i> 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.	Actions in the specified order
2.	
▶	Actions without a specified order
•	List
<i>Text</i>	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, pharmaceuticals or cosmetics, have not been granted.

2.2 **Application limits**

2.2.1 **Physical properties of the liquid**

Density	up to 2.2 g/cm ³
Vapor pressure	up to 500 mbar
Kinematic viscosity	up to 500 mm ² /s
Temperature	15 °C – 40 °C

2.2.2 **Unsuitable liquids**



NOTICE! Material damage due to incorrect handling

Deposits that are hard to dissolve lead to irreparable damage on 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 which attack FEP, ETFE, PFA, PTFE, PVDF, PP, borosilicate glass or Al₂O₃ ceramics.
- Solutions containing hydrofluoric acid.
- Suspensions, as solid particles can clog or damage the device (e.g. activated carbon).
- Liquids which form insoluble deposits and decomposing solutions (e.g. Biuret reagent).
- Substances which react catalytically with platinum iridium (e.g. H₂O₂)
- Explosive liquids (e.g. carbon disulfide).
- Trifluoroacetic acid.
- Tetrahydrofuran.

2.2.3 Liquids with limited suitability

The dispenser is suitable for the following liquids to a limited extent:

- Dispense flammable liquids in glass tubes only and do not wipe the dispenser when it is dry to avoid an electrostatic charge.
- Liquids which form soluble deposits can make the piston difficult to move.
- Use nitric acid (concentration 60 % maximum) with thread adapters made from ETFE only.

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 towards people.
- ▶ Remove the sealing cap from the discharge tube before pressing down the piston.
- ▶ Only activate the liquid dispensing if you are not endangering other people.
- ▶ To avoid squirting, dispense slowly and evenly. Do not use force.
- ▶ Only disassemble the device when it is 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 transport of the device.**

If the assembled device is not transported properly, reagents will be released. Contact with reagents may be harmful to eyes or skin.

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

**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 the device due to contamination inside the device.

If there is contaminations inside the dispenser, the dosing valve may be blocked and the valve ball may be stuck. When the piston is pushed down, high pressure develops in the dispenser. If the valve ball is not released, liquid is pushed past the sealing lip and enters the inside of the housing.

- ▶ If the piston is hard 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 individuals not authorized by Eppendorf.
- The user makes unauthorized changes to the device.

Product description

Varispenser® 2 - Varispenser® 2x

English (EN)

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 (25 mm, 28 mm, 32 mm, 38 mm, 40 mm)
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 (32 mm, 38 mm, 40 mm)
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 (25 mm, 28 mm, 32 mm, 38 mm, 40 mm)
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 (32 mm, 38 mm, 40 mm)
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

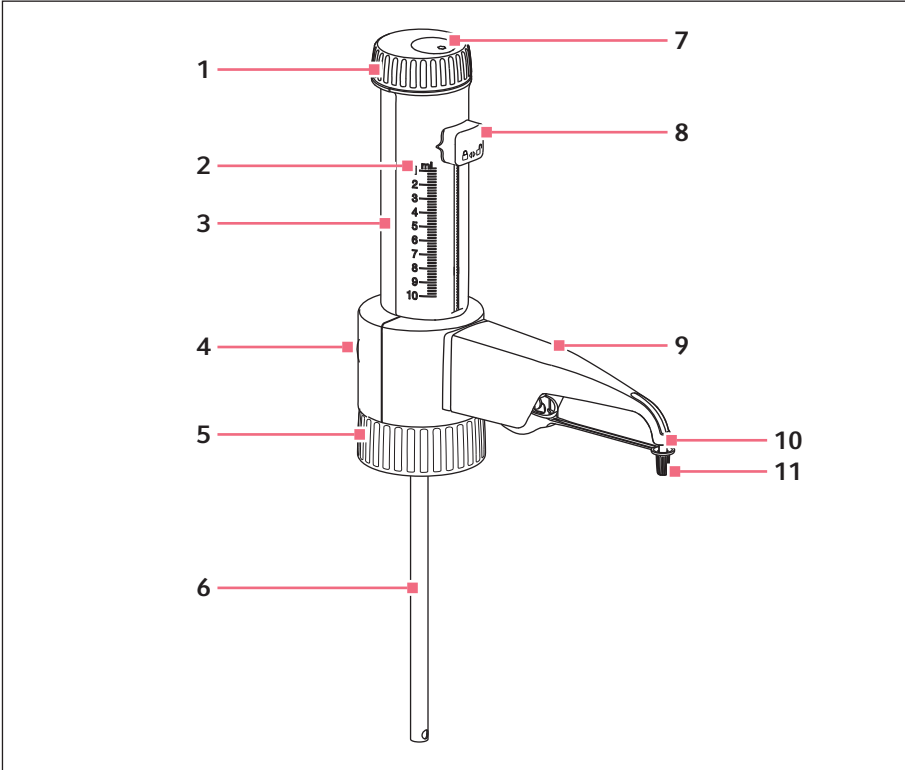


Fig. 3-1: Varispenser 2

- | | |
|--|-------------------------------------|
| 1 Piston bearing | 5 Threaded connection |
| 2 Volume scale
Maximum volume corresponds to the nominal volume | 6 Telescopic aspirating tube |
| 3 Piston pump
Housing, cylinder guard, cylinder und piston | 7 Adjustment cover |
| 4 Ventilation screw
Connecting the optional accessories (not included in the delivery package) | 8 Volume selection slider |
| | 9 Canula arm |
| | 10 Discharge tube |
| | 11 Sealing cap |

3.2.2 Varispenser 2x

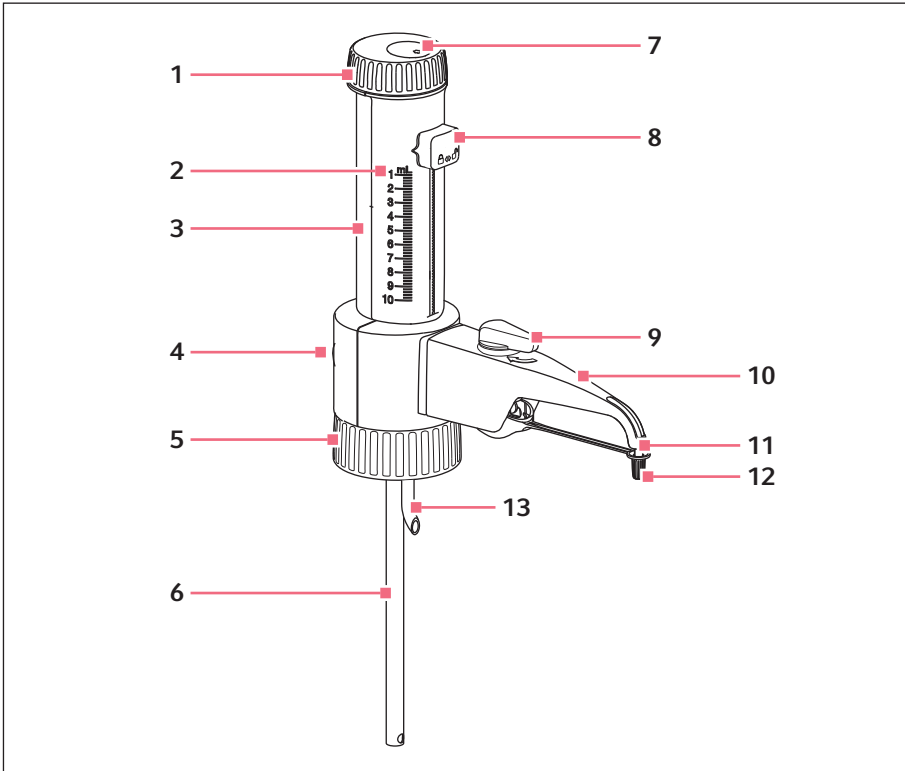


Fig. 3-2: Varispenser 2x

- | | |
|--|---|
| 1 Piston bearing | 6 Telescopic aspirating tube |
| 2 Volume scale
Maximum volume corresponds to the nominal volume | 7 Adjustment cover |
| 3 Piston pump
Housing, cylinder guard, cylinder und piston | 8 Volume selection slider |
| 4 Ventilation screw
Connecting the optional accessories (not included in the delivery package) | 9 Dosing valve
Including valve toggle |
| 5 Threaded connection | 10 Canula arm |
| | 11 Discharge tube |
| | 12 Sealing cap |
| | 13 Recirculation tube |

Product description

Varispenser® 2 - Varispenser® 2x

English (EN)

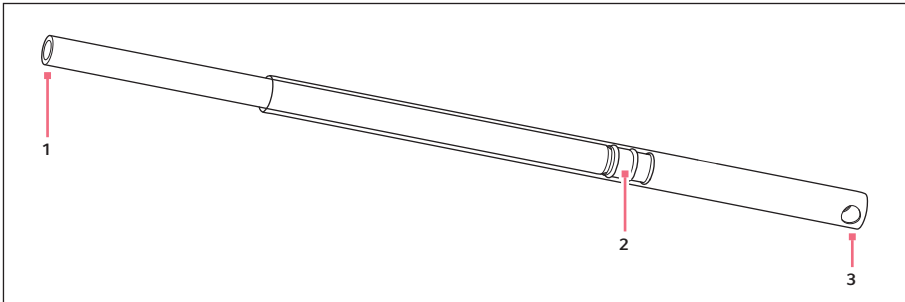
3.2.3 Telescopic aspirating tube

Fig. 3-3: Telescopic aspirating tube

1 Connection opening

Inner tube - connection side for filling valve

3 Aspiration opening

Outer tube

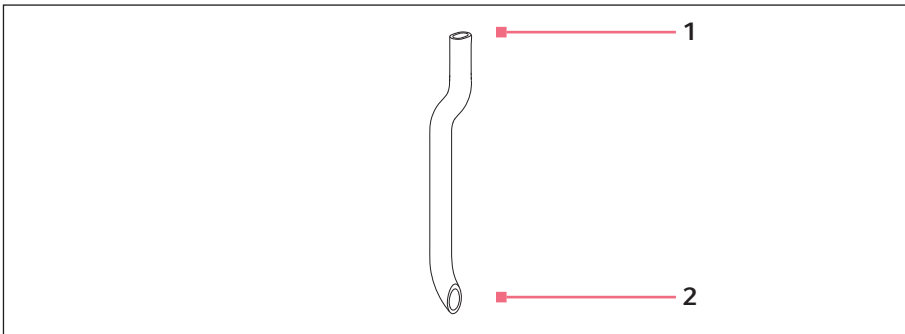
2 Gasket**3.2.4 Recirculation tube – Varispenser 2x**

Fig. 3-4: Recirculation tube

1 Connection opening**2 Discharge opening**

3.2.5 Thread adapter

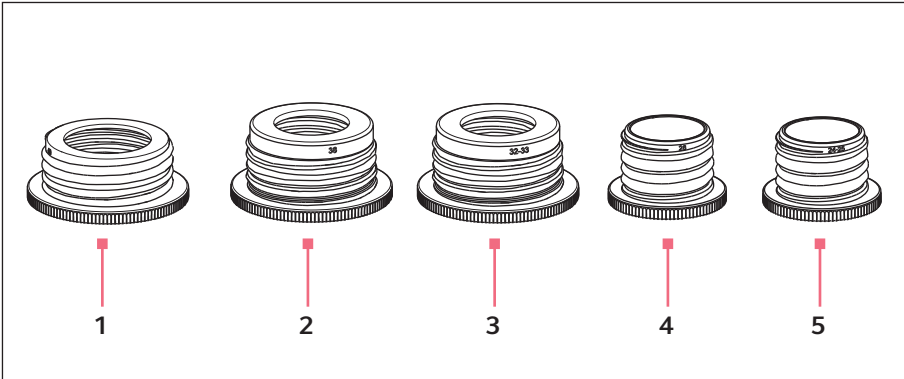


Fig. 3-5: Thread adapter

- | | |
|--------------------------------|--------------------------------|
| 1 Reducing from 45 mm to 40 mm | 4 Reducing from 32 mm to 28 mm |
| 2 Reducing from 45 mm to 38 mm | 5 Reducing from 32 mm to 25 mm |
| 3 Reducing from 45 mm to 32 mm | |

3.2.6 Tool

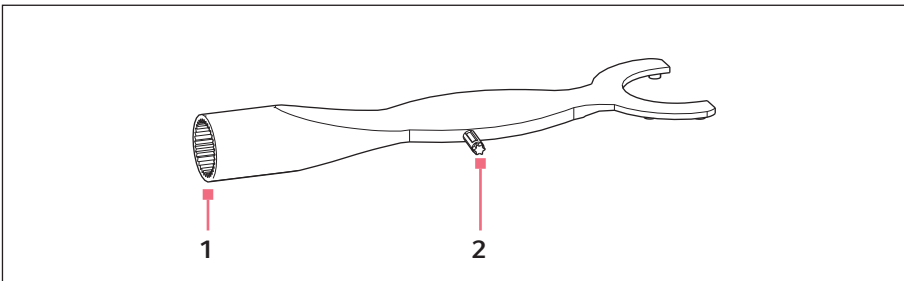


Fig. 3-6: Universal wrench

- | | |
|--|----------------------------|
| 1 Mounting wrench
Mounting side for valves | 2 Adjustment wrench |
|--|----------------------------|

Product description

Varispenser® 2 - Varispenser® 2x

English (EN)

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 chemical resistance before using organic solvents or aggressive chemicals.

Assembly	Material
Filling valve	Perfluoroalkoxy (PFA), Al ₂ O ₃ ceramics, borosilicate glass
Discharge tube	Fluorinated ethylene propylene (FEP)
Discharge valve	Perfluoroalkoxy (PFA), platinum-iridium (Pt-Ir), Al ₂ O ₃ ceramics, borosilicate 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)	Borosilicate glass
Sealing cap	Polypropylene (PP)
Volume selection switch	Polypropylene (PP)
Cylinder	Borosilicate glass

Installation

Varispenser® 2 - Varispenser® 2x

English (EN)

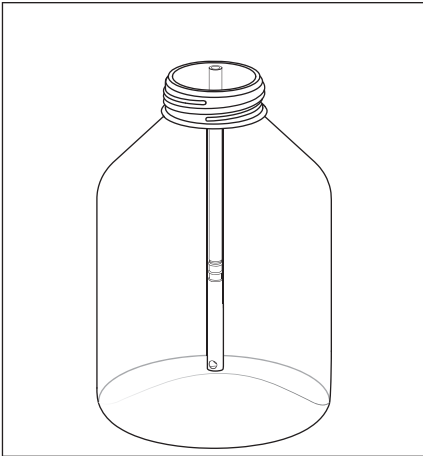
4 Installation**4.1 Adjusting and inserting the telescopic aspiration tube****4.1.1 Adjusting the telescopic aspiration tube to the height of the bottle**

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.

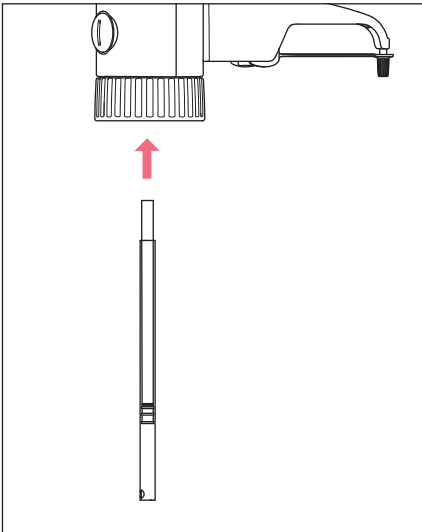
Prerequisites

- 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.

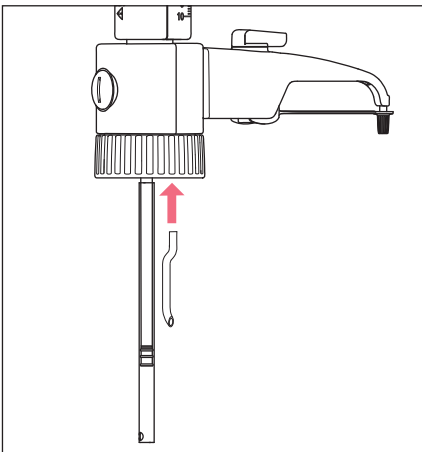


1. Slide the telescopic aspiration tube onto the filling valve straight up to the stop.

4.2 Installing the recirculation tube – Varispenser 2x

Prerequisites

- The telescopic aspirating tube is inserted.



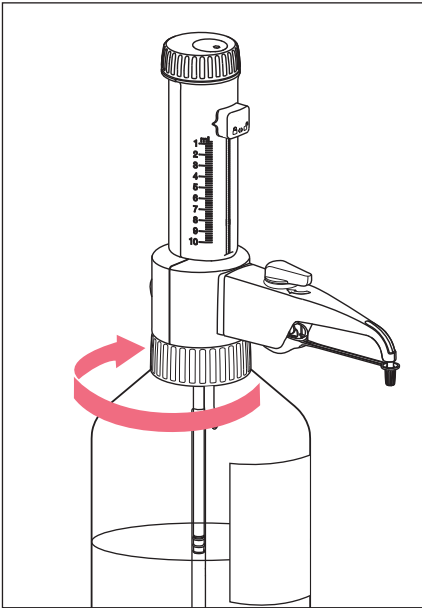
1. Insert the recirculation tube next to the telescopic aspirating tube.
2. Rotate the opening of the recirculation tube outward.

5 **Operation**

5.1 **Screwing the dispenser onto the bottle**

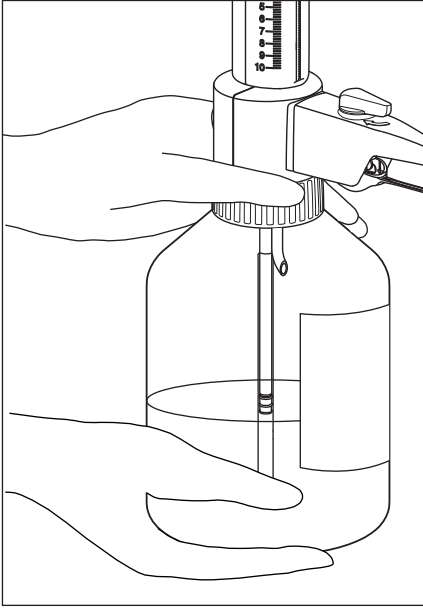
Prerequisites

- 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.

Operation

Varispenser® 2 - Varispenser® 2x

English (EN)

5.3.2 Screwing on the thread adapter

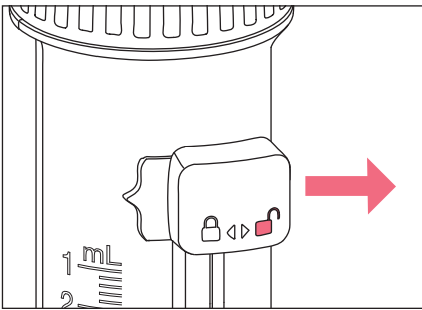
Prerequisites

- 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.

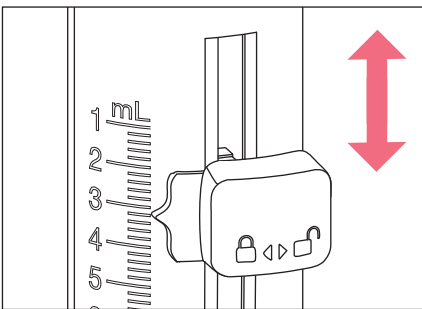
5.4 Operating the volume selection slider**5.4.1 Unlocking the volume selection slider**

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

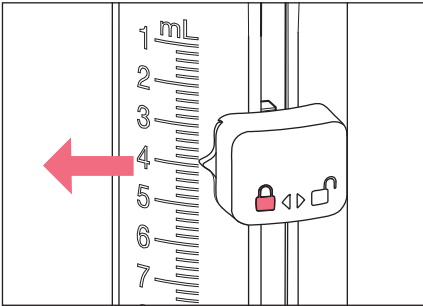
Prerequisites

- 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

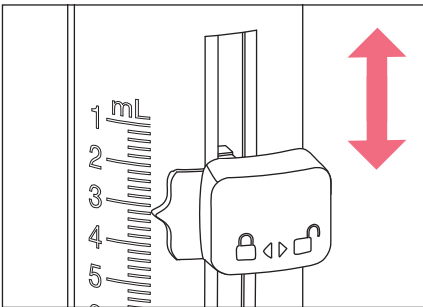


1. Slide the volume selector switch to the left.
 The volume selection slider is locked.
 The volume selection slider cannot be moved.
 The liquid can be dispensed.

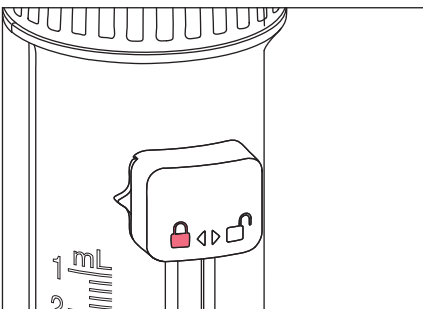
5.5 Locking the piston

Prerequisites

- The volume selection slider is unlocked.



1. Slide the volume selection slider as far upwards as it will go.



2. Slide the volume selection slider to the left.
 The volume selection slider is in the basic position and it is locked.
 No liquid can be dispensed.

5.6 Dispensing liquid – Varispenser 2

**NOTICE! Damage to the device due to contamination inside the device.**

If there is contamination inside the dispenser, the dosing valve may be blocked and the valve ball may be stuck. When the piston is pushed down, high pressure develops in the dispenser. If the valve ball is not released, liquid is pushed past the sealing lip and enters the inside of the housing.

- ▶ If the piston is hard 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.
-

5.6.1 Venting the dispenser

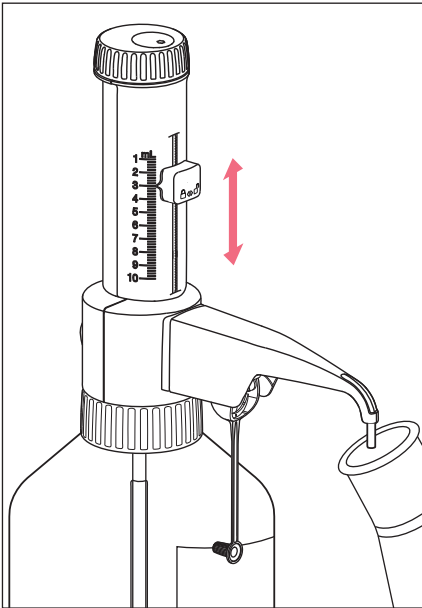
Prerequisites

- The dispenser is clean.
 - The dispenser has been screwed onto the storage bottle.
 - The maximum volume is set.
 - A collection vessel is available.
1. Remove the sealing cap.
 2. Hold a collection vessel under the discharge tube.
 3. Pull up the piston by approx. 30 mm.
 4. Dispense the liquid.
 5. Repeat the procedure 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 accurately.

5.6.2 Dispensing liquid

Prerequisites

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

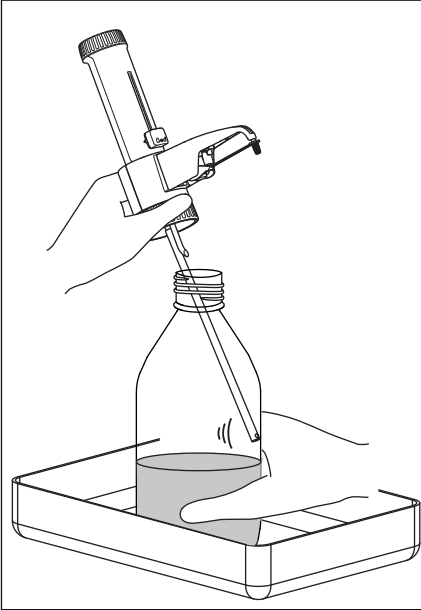


1. Set the required volume.
2. Remove the sealing cap.
3. Hold a destination vessel under the discharge tube.
4. Slowly and evenly pull up the piston until it reaches the stop.
5. Slowly and evenly push the piston down. The set amount of liquid is dispensed.

5.6.3 Emptying the dispenser

Prerequisites

- The piston is in the lower position.



1. Attach the sealing cap.
2. Place the dispenser and the bottle in a collecting vessel.
3. Remove 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.

5.6.4 Rinsing the dispenser

Prerequisites

- The dispenser is empty.
 - A bottle with a neutral cleaning solution is available.
 - A bottle of demineralized water is available.
1. Screw the dispenser onto the bottle containing the neutral cleaning solution.
 2. Place a collection vessel below the discharge tube.
 3. Remove the sealing cap.
 4. Pump several times to flush the dispenser.
 5. Empty the dispenser.
 6. Screw the dispenser onto a bottle containing demineralized water.
 7. Pump several times to flush the dispenser.
 8. Empty the dispenser.
 9. Remove the dispenser and pump it through dry with air several times.

5.7 Dispensing liquid – Varispenser 2x



NOTICE! Damage to the device due to contamination inside the device.

If there is contamination inside the dispenser, the dosing valve may be blocked and the valve ball may be stuck. When the piston is pushed down, high pressure develops in the dispenser. If the valve ball is not released, liquid is pushed past the sealing lip and enters the inside of the housing.

- ▶ If the piston is hard to move, clean the dispenser.



CAUTION! Contamination with reagents when removing the sealing cap.

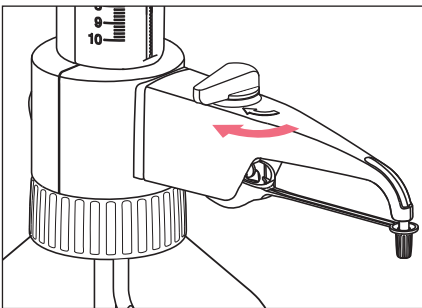
The sealing cap may contain biological and chemical reagents. Contact with reagents may be harmful to eyes or skin.

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

5.7.1 Venting the dispenser

Prerequisites

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

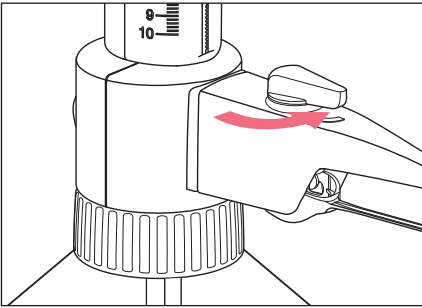


1. Remove the sealing cap.
2. Set the valve toggle to recirculation.
3. Pull up the piston by approx. 30 mm.
4. Dispense liquid into the bottle.
5. Repeat the procedure until the liquid in the cylinder is free from air bubbles.
6. Set the valve toggle to dispensing.
7. Fill the discharge tube with liquid.
8. Set the valve toggle to recirculation.
9. Dispense the remaining liquid into the bottle.
10. Set the valve toggle to dispensing.
The dispenser has been vented.
Liquid can be dispensed.

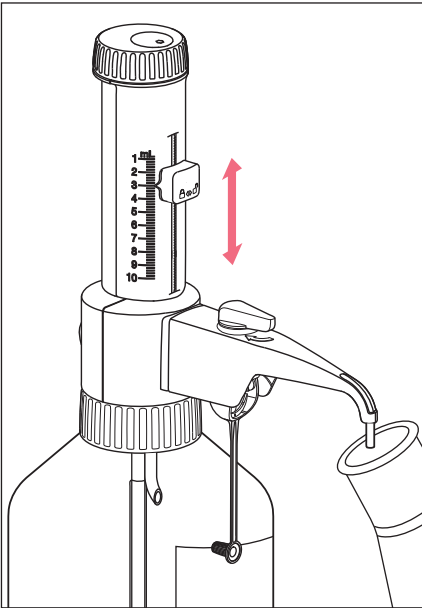
5.7.2 Dispensing liquid

Prerequisites

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



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

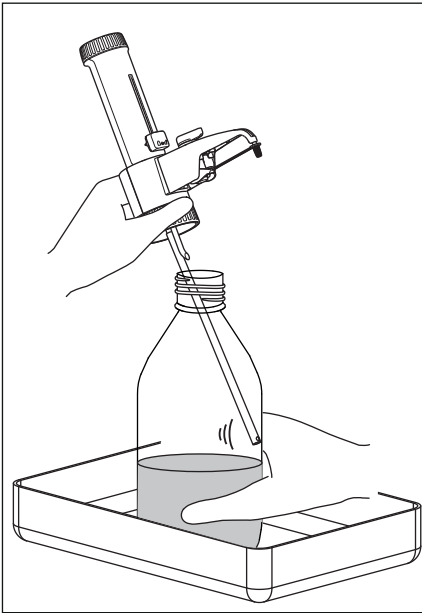


4. Hold a collection vessel under the discharge tube.
5. Slowly and evenly pull up the piston until it reaches the stop.
6. Slowly and evenly push down the piston until it reaches the stop.
The set amount of liquid is dispensed.

5.7.3 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 device and the bottle in a collecting vessel.
3. Remove 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.

5.7.4 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 of demineralized water is available.
1. Screw the dispenser onto the bottle containing the neutral cleaning solution.
 2. Place a collection vessel below the discharge tube.
 3. Remove the sealing cap.
 4. Pump several times to flush the dispenser.
 5. Set the valve toggle to recirculation.
 6. Pump several times to flush the recirculation valve.

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7. Empty the dispenser.
8. Screw the dispenser onto a bottle containing demineralized water.
9. Pump several times to flush the dispenser.
10. Pump several times to flush the recirculation valve.
11. Empty the dispenser.
12. Remove the dispenser and pump it through dry with air several times.

5.8 Cleaning the dispenser

**CAUTION! Personal injury due to contact with reagents.**

The feeding mechanism, 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:

- If the piston is hard to move.
- Regularly for liquids which form soluble deposits.
- When the reagent is changed.
- Prior to autoclaving.
- Prior to storage.
- Prior to service and repair work.

Prerequisites

- The dispenser is empty and flushed.
 - A bottle of demineralized water is available.
 - A bottle with a cleaning solution is available.
 - A soft cleaning brush is available.
1. Pull off the telescopic aspirating tube and clean it with the cleaning brush.
 2. Unscrew the piston mount and carefully pull out the piston.
 3. Use the cleaning brush and water to clean the piston and cylinder.
 4. Insert the piston into the cylinder.
 5. Tighten the piston bearing.
 6. Flush the dispenser with the cleaning solution.
 7. Flush the dispenser with demineralized water.
 8. Empty the dispenser.

5.9 Autoclaving the dispenser

The dispenser does not need to be disassembled for autoclaving.



NOTICE! Material damage from hot metal surfaces.

The plastic parts of the dispenser can melt if they get into contact with hot metal surfaces.

- ▶ Place the dispenser on a cloth during autoclaving.

Prerequisites

- The dispenser has been cleaned.
 - 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 proper seating.
 4. Turn over the dispenser.
The filling valve faces upwards.
 5. Slightly tap the valve block.
Any jammed valve balls are released.
The steam of the autoclave can pass through the valve without any obstruction.
 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 distortion or leaks.

5.10 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. Abort dispensing. 2. Clean the dispenser. 3. If the problem persists, contact the authorized service.
	• The piston seal is damaged.	▶ If the problem persists, contact the authorized service.
The canula arm cannot be mounted.	• The discharge valve has not been screwed far enough into the valve block.	▶ Use the universal wrench to tighten the discharge valve.

6.2 Dispensing and liquid

Problem	Cause	Solution
The aspirated liquid contains air bubbles.	• The dispenser was not vented sufficiently.	▶ 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.	▶ Use the universal wrench to tighten the filling valve. ▶ If the problem persists, replace the filling valve with a new valve.
	• The filling valve is damaged.	▶ If the problem persists, replace the filling valve with a new valve.
	• 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.	▶ Use the universal wrench to tighten the filling valve. ▶ If the problem persists, replace the filling valve with a new valve.
	• The filling valve is damaged.	▶ If the problem persists, replace the filling valve with a new valve.
No liquid can be dispensed.	• The discharge valve is sticky.	▶ Disassemble the discharge valve. ▶ Clean the discharge valve. ▶ Release the jammed valve ball. ▶ If the problem persists, replace the discharge valve with a new valve.
Liquid escapes at the threaded connection.	• The recirculation tube is missing.	▶ Insert the recirculation tube.
	• A slightly volatile liquid was dispensed without the sealing washer.	▶ Insert the sealing washer.
	• Liquids that are sensitive to moisture and/or CO ₂ were dispensed.	▶ Insert the sealing washer. ▶ Use the drying tube.

Problem	Cause	Solution
Liquid escapes at the canula connection.	<ul style="list-style-type: none"> • The port of the discharge valve is leaking. 	<ul style="list-style-type: none"> ▶ Use the universal wrench to tighten the discharge valve. ▶ If the problem persists, replace the discharge valve with a new valve.
Liquid escapes between the cylinder and the housing cases.	<ul style="list-style-type: none"> • Cylinder or cylinder gasket is leaking. 	<ul style="list-style-type: none"> ▶ If the problem persists, send the dispenser to the authorized service.

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 Flushing a dispenser before long-term storage

Prerequisites

- A bottle of demineralized water is available.
 - A bottle with a mixture of glycerol (1 %) in ethanol (reagent-grade, not denatured) is available.
 - A collection vessel is available.
1. Screw the dispenser onto the bottle containing demineralized water.
 2. Set the volume selection slider to maximum volume.
 3. Remove the sealing cap.
 4. Flush the dispenser several times.
 5. Remove the dispenser.
 6. Screw the dispenser onto the bottle containing the glycerol-ethanol mixture.
 7. Flush the dispenser several times.
 8. Remove the dispenser.
 9. 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.

7.3 Replacing valves or canula arm



CAUTION! Personal injury due to contact with reagents.

The feeding mechanism, 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.

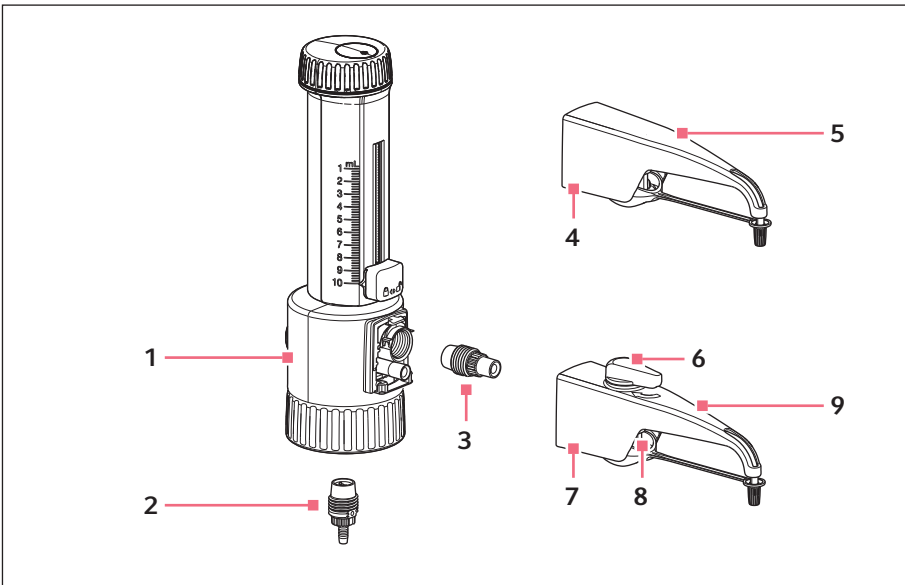


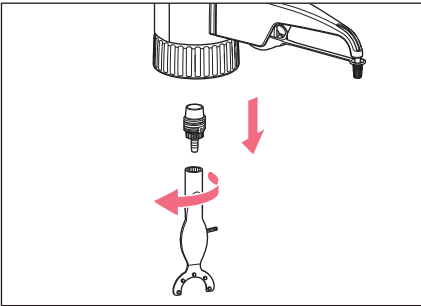
Fig. 7-1: Valve block with valves

- | | |
|--|--|
| <ul style="list-style-type: none"> 1 Valve block
With filling valve und discharge valve 2 Filling valve 3 Discharge valve 4 Housing 5 Canula arm
Varispenser 2 | <ul style="list-style-type: none"> 6 Valve toggle 7 Housing 8 Dosing valve 9 Canula arm
Varispenser 2x |
|--|--|

7.3.1 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.

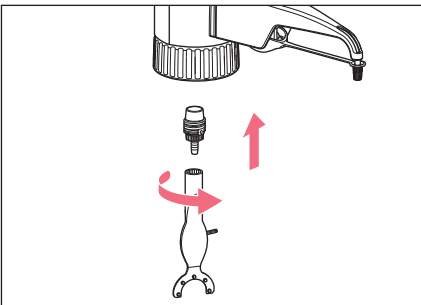


1. Attach the universal wrench to the top of the filling valve.
2. Unscrew the filling valve in a counterclockwise direction.

7.3.2 Mounting the filling valve

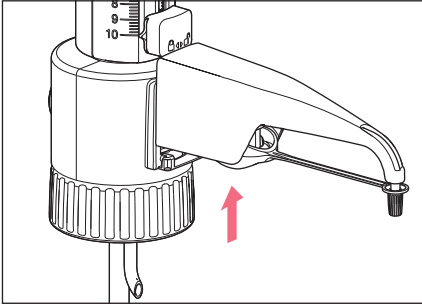
Prerequisites

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

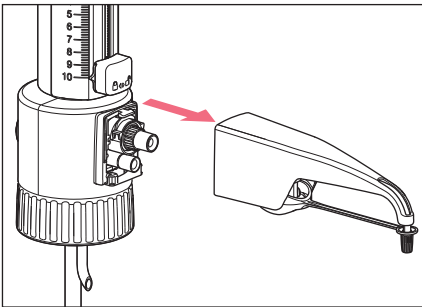


1. Screw a new filling valve into the valve block by hand.
2. Attach the universal wrench.
3. Tighten the filling valve in a clockwise direction.

7.3.3 Disassembling the canula arm – Varispenser 2

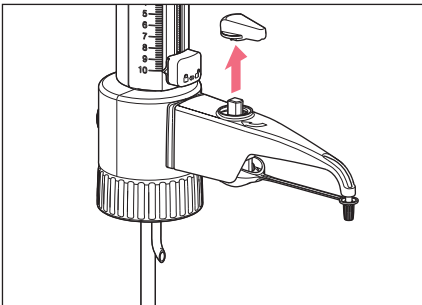


1. Push up the housing of the canula arm on the valve block.

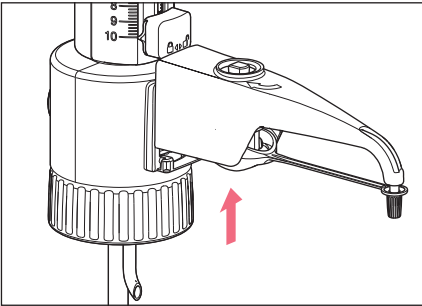


2. Remove the canula arm in a forward motion.

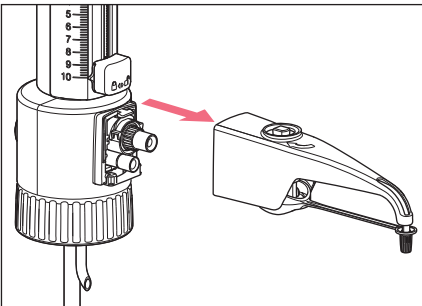
7.3.4 Disassembling the canula arm – Varispenser 2x



1. Pull off the valve toggle.



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

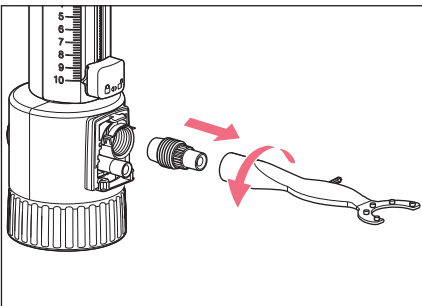


3. Remove the canula arm in a forward motion.

7.3.5 Disassembling the discharge valve

Prerequisites

- The canula arm has been disassembled.

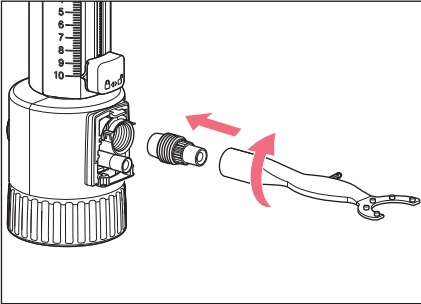


1. Attach the universal wrench to the top of the discharge valve.
2. Unscrew the discharge valve in a counterclockwise direction.

7.3.6 Mounting the discharge valve

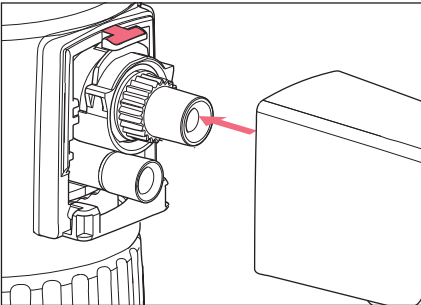
Prerequisites

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



1. Screw a new discharge valve into the valve block by hand.
2. Attach the universal wrench.
3. Tighten the discharge valve in a clockwise direction.

7.3.7 Mounting the canula arm – Varispenser 2

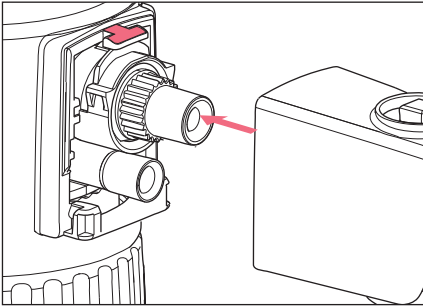


1. Insert the dosing valve into the discharge valve on the valve block.
2. Slide the housing over the lug on the valve block.
3. Push the housing down.
The housing engages in the lower lugs.

7.3.8 Mounting the canula arm – Varispenser 2x

Prerequisites

- The valve toggle has been taken off.



1. Push the dosing valve slightly downward in the housing.
2. Slide the dosing valve into the valve block.
The housing of the canula arm must be above the lug.
3. Push the housing down.
The housing engages.
4. Attach the valve toggle to the top of the dosing valve.

7.4 Adjusting the dispenser

The dispenser has been adjusted to the physical properties of demineralized water at the factory.

The dispenser can be readjusted:

- If the physical properties of the liquid are different to those of water.
- If the error of measurement of the dispensed volume is outside of the tolerance range.

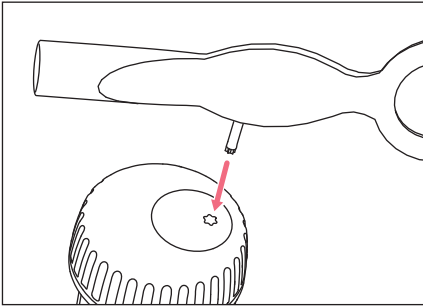


The gravimetric test and the conversion of the measured values for the volume are described in the document "*Standard operating procedure for manual dispensing systems*". The document is available on the webpage www.eppendorf.com/manuals www.eppendorf-support.com. Perform another gravimetric check after adjusting the dispenser.

7.4.1 Remove the adjustment cover.

Prerequisites

- The universal wrench is available.



1. Insert the adjustment wrench of the universal wrench into the adjustment cover.
2. Turn the adjustment wrench and break off the adjustment cover.
 The adjustment cover can be disposed of.

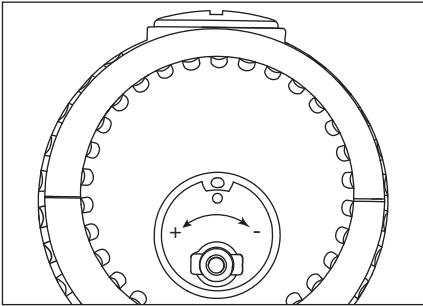
7.4.2 Adjustment range

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

7.4.3 Changing the adjustment

Prerequisites

- The gravimetrically determined measured values are available.



- ▶ Insert the adjustment wrench into the adjustment opening.
Turning in the plus direction increases the dispensing volume.
Turning in the minus direction decreases the dispensing volume.

7.4.4 Checking the dispensing volume

Prerequisites

- The document "*Standard operating procedure for manual dispensing systems*" is available.
- ▶ Perform a gravimetric check of the dispensed volume.

8 Technical data
8.1 Errors of measurement
8.1.1 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 – 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

Technical data

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8.1.2 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

8.1.3 Test conditions

Test conditions and test analysis in accordance with ISO 8655-6.

8.2 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 ²	50 %
Lactic acid	–
Sodium hydroxide ²	30 %
Oxalic acid	–
Perchloric acid	10 %
Phosphoric acid	85 %
Nitric acid ¹	30 %
Hydrochloric acid ^{1, 2}	37 %
Salicylic acid	–
Sulfuric acid ²	98 %
Sulfuric acid	60 %
Tartaric acid (TFA)	–

¹ Use the thread adapter made from ETFE.

² Use the drying tube.

Chemical resistance

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9.2 Organic liquids

Designation	Concentration (maximum)
Acetone	–
Acetonitrile	–
Acetyl aldehyde	–
Benzene	–
<i>n</i> -Butanol	–
<i>n</i> -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	–
<i>n</i> -Hexane	–
Isobutanol	–
Isopropanol	–
Methanol	–
Nitrobenzene	–
Phenol (water saturated)	–
Pyridine	–
Turpentine oil	–
Toluol	–
Triethylene glycol	–
Tripropylene glycol	–
Xylol	–

9.3 Anorganic liquids

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

Chemical resistance

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

Designation	Concentration (maximum)
Acrylonitrile	–
Allyl alcohol	–
Amino acids	–
<i>n</i> -Amyl acetate	–
Amyl alcohol	–
Amyl chloride	–
Aniline	–
Benzaldehyde	–
Benzyl alcohol	–
Glycerol	50 %
Urea	–
<i>m</i> -Cresol	–
2-Pentanone	–
Sodium acetate (pH 5.2)	–
Sodium dichromate	–
Sodium lauryl sulfate (SDS)	–
Propylene glycol	–
Propylene oxide	–
Salicylaldehyde	–
Silver acetate	–
TRIS HCl	–
TRIS buffer (pH 5.2)	1 mol/L
Triton X-100	–

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.

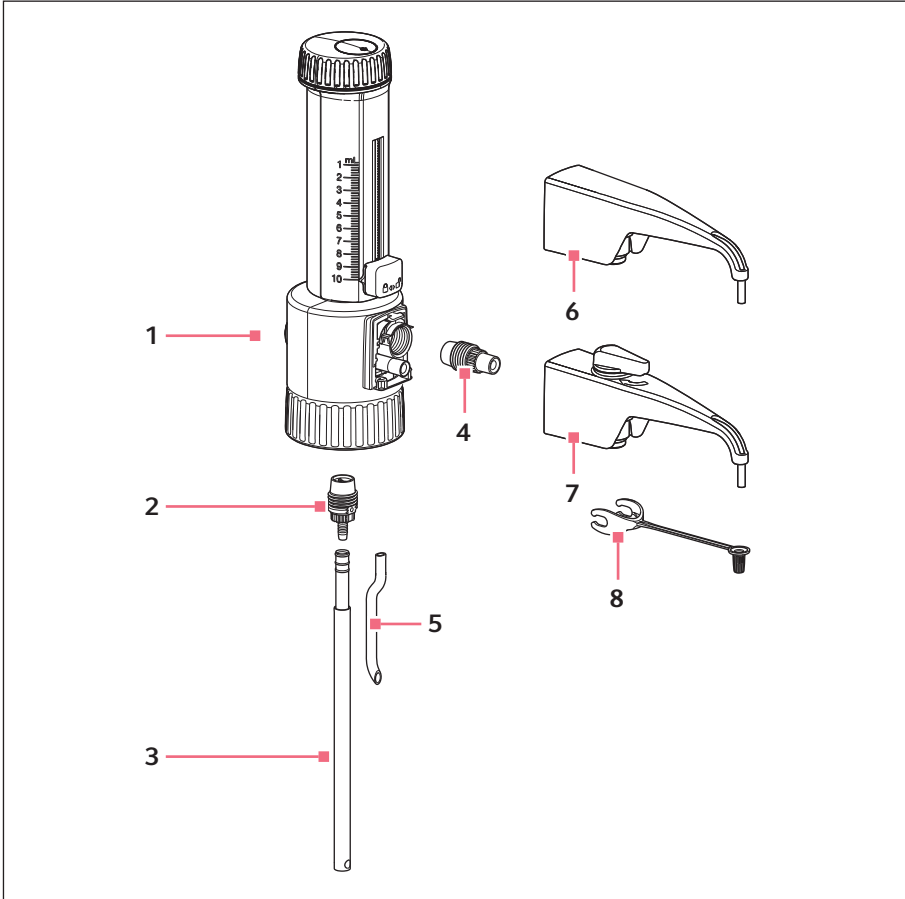
11 Ordering information
11.1 Varispenser 2

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

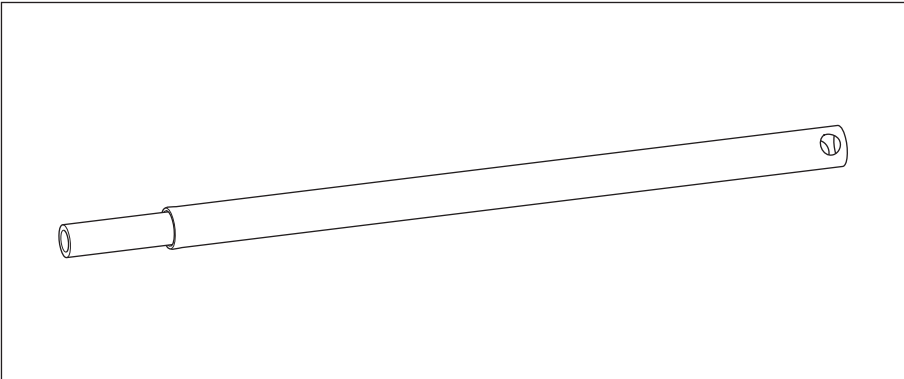
Order no. (International)	Order no. (North America)	Description
		Varispenser 2x Bottle top dispenser with return valve, and valve switch for bottle thread 45 mm, telescopic aspirating tube, universal wrench, 5 adapters (25 mm, 28 mm, 32 mm, 38 mm, 40 mm)
4967 000.014	4967000014	0.2 mL – 2 mL
4967 000.022	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



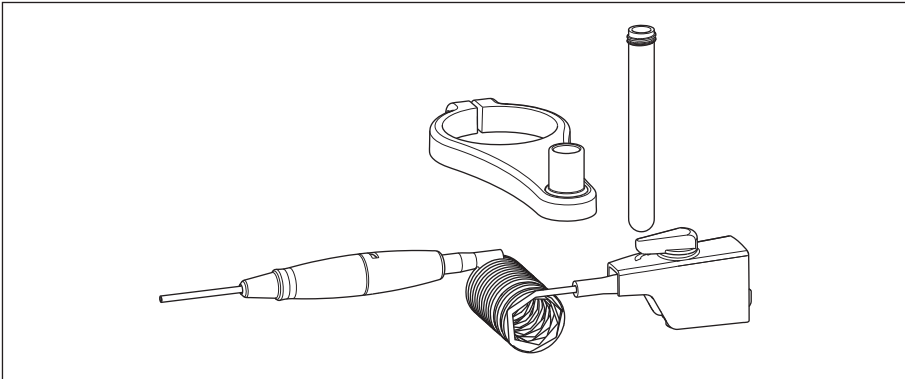
- | | | | |
|---|---|---|--|
| 1 | Ventilation screw | 6 | Canula arm
With discharge tube for Varispenser 2 |
| 2 | Filling valve | 7 | Canula arm
With discharge tube and valve toggle for Varispenser 2x |
| 3 | Telescopic aspirating tube | 8 | Sealing cap |
| 4 | Discharge valve | | |
| 5 | Recirculation tube
Varispenser 2x | | |

11.3.1 Telescopic aspirating tube



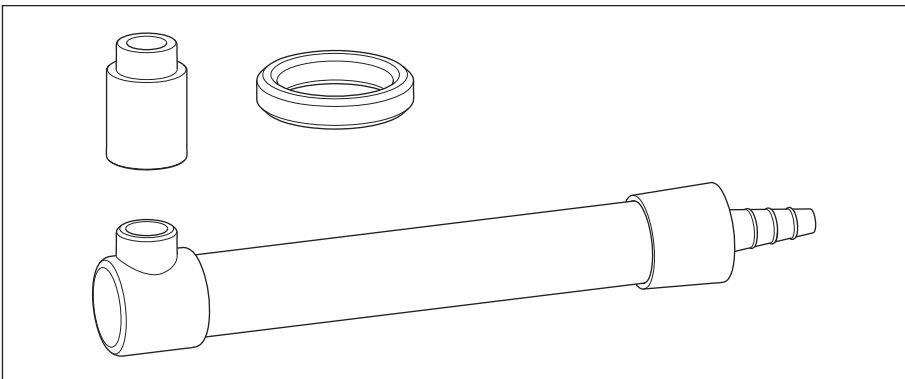
Order no. (International)	Order no. (North America)	Description
4966 503.004	4966503004	Telescopic aspirating tube 70 mm – 140 mm for 2 mL, 5 mL, 10 mL
4966 504.000	4966504000	Telescopic aspirating tube 125 mm – 240 mm for 2 mL, 5 mL, 10 mL
4966 505.007	4966505007	Telescopic aspirating tube 195 mm –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

11.3.2 Flexible discharge tube with recirculation valve



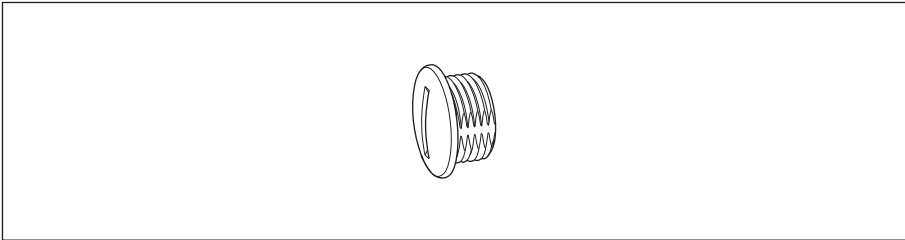
Order no. (International)	Order no. (North America)	Description
4966 501.001	4966501001	Discharge tube spiraled for 2 mL, 5 mL, 10 mL
4966 502.008	4966502008	

11.3.3 Drying tube with sealing washer



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

11.3.4 Ventilation screw



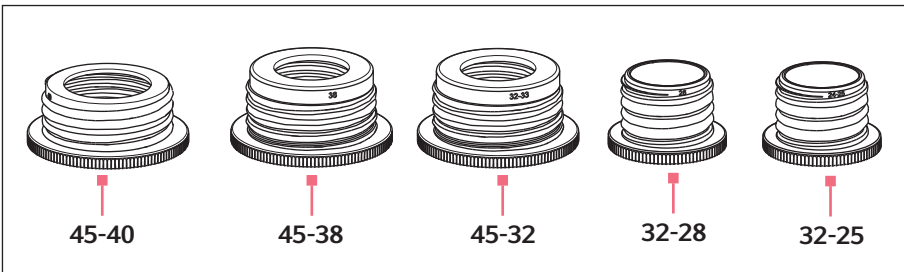
Order no. (International)	Order no. (North America)	Description
4966 601.006	4966601006	Ventilation screw PP
4966 511.007	4966511007	Ventilation screw for microfilters with Luer connector, PP, with PTFE sealing washer

Ordering information

Varispenser® 2 - Varispenser® 2x
English (EN)

11.3.5 Thread adapter

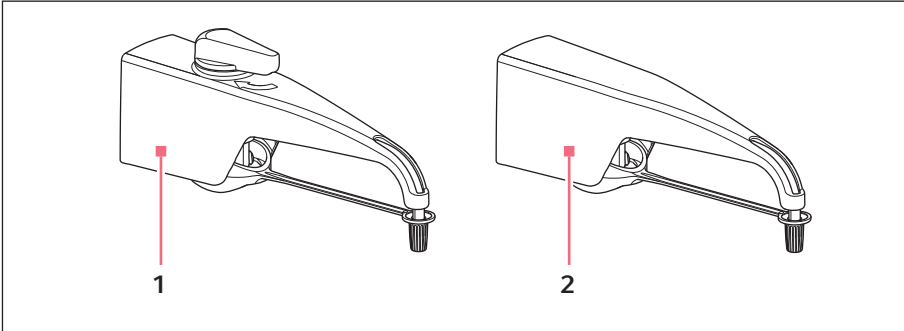
- GL – round thread DIN 138 for glass threads. Number indicates the maximum outer diameter of the male thread.
- S – buttress thread. Thread type for glass bottles seals which is to prevent them becoming loose unintentionally due to vibrations.
- NS – glass vessel with ground glass joint. 1st digit is the inner diameter of the roughened glass, 2nd digit is the 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
4960 832.006	4960832006	for 5 L-jerrycan, ETFE from 45 mm to 17/8" thread

11.4 Spare parts

11.4.1 Canula arm



1 Varispenser 2x

Dosing valve, valve toggle, discharge tube und sealing cap

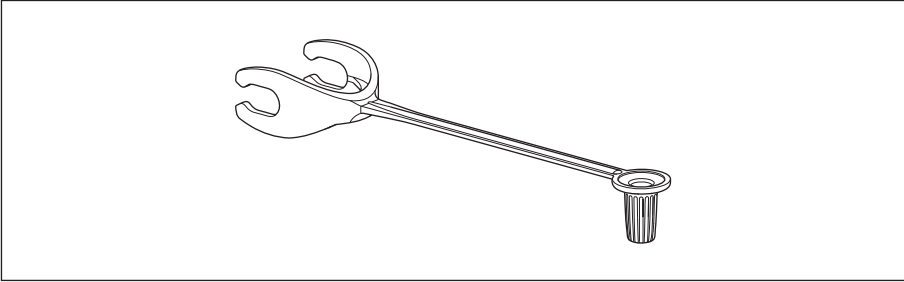
2 Varispenser 2

Discharge tube und sealing cap

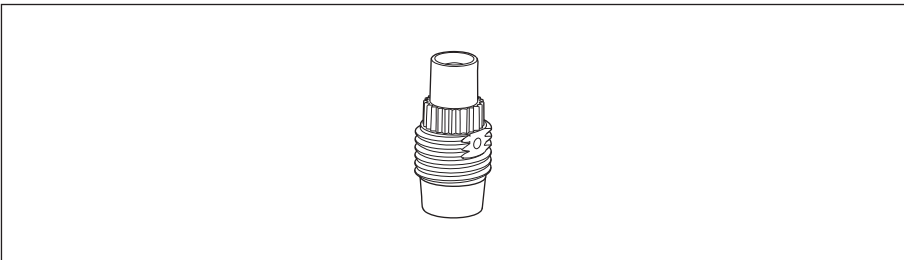
Order no. (International)	Order no. (North America)	Description
4966 608.000	4966608000	Discharge tube Varispenser 2 for 2 mL, 5 mL, 10 mL
4966 609.007	4966609007	for 25 mL, 50 mL, 100 mL
4967 601.000	4967601000	Discharge tube Varispenser 2x for 2 mL, 5 mL, 10 mL
4967 602.006	4967602006	for 25 mL, 50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

Ordering information

Varispenser® 2 - Varispenser® 2x
English (EN)

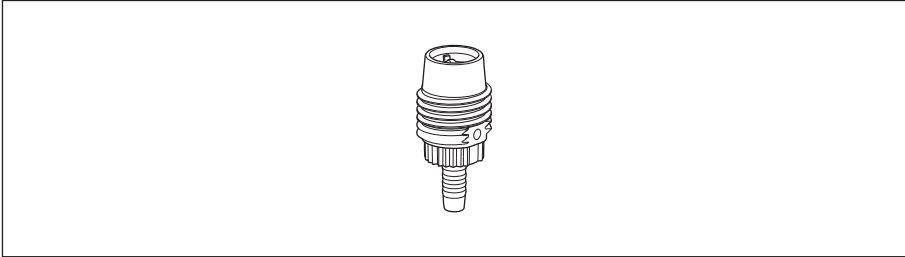
11.4.2 Sealing cap

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

11.4.3 Discharge valve

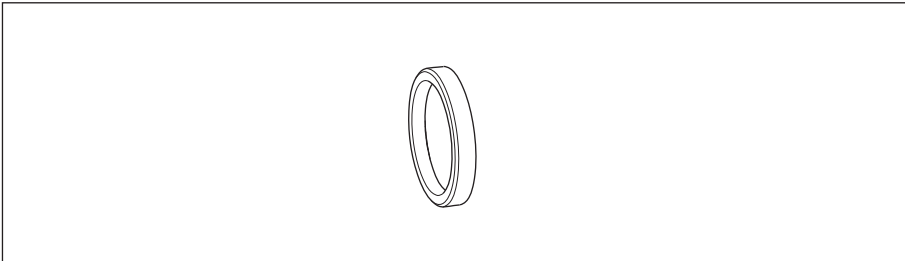
Order no. (International)	Order no. (North America)	Description
4966 604.005	4966604005	Discharge valve for 2 mL
4966 605.001	4966605001	for 5 mL, 10 mL
4966 606.008	4966606008	for 25 mL, 50 mL, 100 mL

11.4.4 Filling valve



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

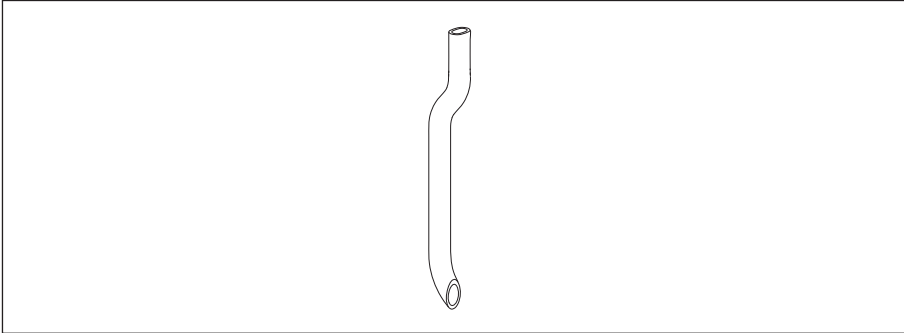
11.4.5 Sealing washer



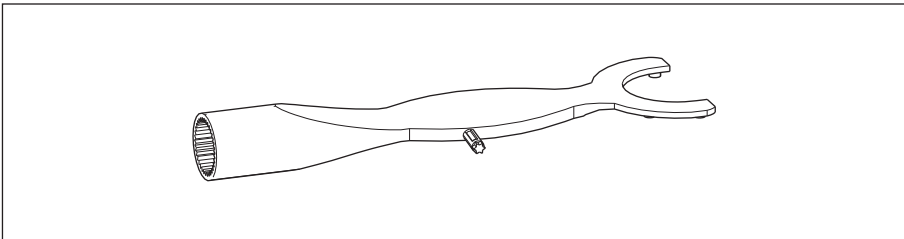
Order no. (International)	Order no. (North America)	Description
4966 613.004	4966613004	Sealing washer for valve block, PTFE

Ordering information

Varispenser® 2 - Varispenser® 2x
English (EN)

11.4.6 Recirculation tube

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

11.4.7 Tool

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

Evaluate Your Manual

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