



Varipette® 4720

Operating manual

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Table of contents

1	Operating instructions	5
1.1	Using this manual	5
1.2	Danger symbols and danger levels	5
1.2.1	Danger symbol	5
1.2.2	Danger levels	5
1.3	Symbols used	5
2	Product description	6
2.1	Delivery package	6
2.2	Main illustration	6
2.3	Features	7
2.4	Areas of application for the Varitips	8
2.4.1	Materials	8
3	Safety	8
3.1	Intended use	8
3.2	Warnings for intended use	9
4	Operation	10
4.1	Inserting and removing the Varitip	10
4.2	Setting the volume	11
4.3	Pre-wetting	11
4.4	Pipetting with the Varitip P	11
4.4.1	Aspirating liquid	11
4.4.2	Liquid dispensing	11
4.5	Pipetting with the Varitip S	12
4.5.1	Pipetting with the Maxitip and valve	12
4.6	Liquids with specific properties	13
4.6.1	Adjusting the volume selection dial	13
5	Gravimetric check	13
6	Troubleshooting	14
6.1	Error search	14
7	Maintenance	15
7.1	Cleaning	15
7.2	Decontamination before shipment	15

8	Technical data	16
9	Ordering Information	17

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 webpage under www.eppendorf.com.

1.2 Danger symbols and danger levels

The safety instructions of this operating manual indicate the following danger symbols and danger levels:


1.2.1 Danger symbol

	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
Text	Display text or software text
	Additional information

2 Product description

2.1 Delivery package

Quantity	Description
1	Varipette 4720
1	Varitip P
1	Dispensing unit (Varitip S)
2	Maxitip
10	Valves

2.2 Main illustration

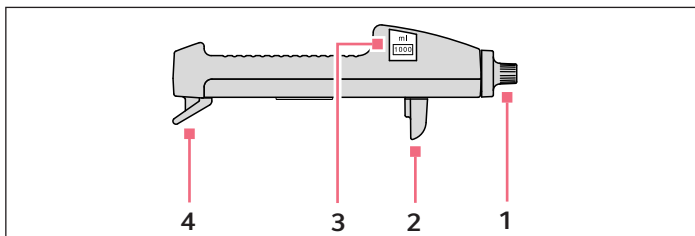


Fig. 1: Varipette

1 Selection dial for setting the volume

3 Volume display

2 Pipetting lever

When pressing the pipetting lever down to the lower stop, the device aspirates the liquid. Dispense the liquid by pressing the lever again.

4 Clamping lever

For fastening the piston of the Varitip.

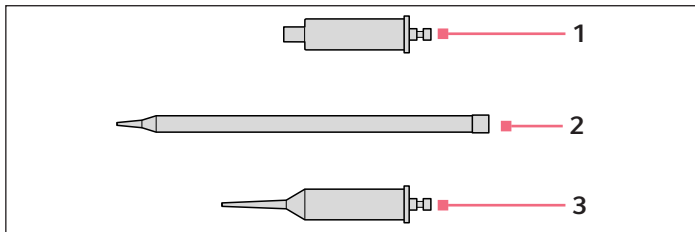


Fig. 2: Varitips

- 1 Varitip S, dispensing unit (2.50 mL – 10.00 mL)**
(Varitip S = Varitip System)
- 3 Varitip P (1.00 mL – 10.00 mL)**
(P = Positive displacement)

2 Varitip S, Maxitip

The Maxitip is attached to the dispensing unit and can be replaced.

2.3 Features

The Varipette is a universal millimeter pipette with a 1.00 to 10.0 mL range for variable use. It allows you to set and dispense any required volume in increments of 10 μ L.

Use the versatile Varipette to dispense:

- aqueous solutions,
- organic liquids,
- liquids with elevated levels of viscosity, and
- liquids that differ substantially from water with regard to their densities or vapor pressures

can be dispensed.

The Varipette is not operable without a Varitip: This unit is composed of a piston, a cylinder and a tip, and is used for aspirating the liquid.

Features of the Varitips:

- Varitip P
Dispensing volume 1.00 to 10.00 mL, with short tip and positive displacement.
- Varitip S with Maxitip

Dispensing volume 2.50 to 10.00 mL. The long Maxitip can be used to remove liquid from high and narrow-necked vessels (diameter = 10 mm, fitting measuring flasks with standard 12/21 ground joint). The liquid will only enter the Maxitip. As a result, the samples or reagents can be dispensed consecutively without entrainment by changing the Maxitip.

The valve that can be inserted to the tip of the Maxitip S reduces the risks associated with transmitting aggressive or toxic solutions, or liquids with radioactive or pathogenic components.

You can use an adapter for storing the Varipette in the pipette carousel 3115 or the pipette carousel 4923.

2.4 Areas of application for the Varitips

Varitip P and Varitip S complement each other in their function.

Please refer to the following table for the recommended areas of application:

	Varitip P	Varitip S
aqueous solutions	+	+
extraction of liquids from deep receptacles	-	+
organic liquids (alcohols, org. acids, etc.)	+	+
solvents with high vapor pressure (e.g. diethyl ether)	-	+
high density liquids	+	+
viscose liquids	+	-

2.4.1 Materials

The pistons inside the Varitip S and Varitip P are made of polyethylene (PE).

The cylinder of the Varitips, the Maxitips and the Maxitip valve (both of which for Varitip S) are made of polypropylene (PP).

3 Safety

3.1 Intended use

The Eppendorf Varipette 4720 is intended for dispensing liquids. In-vivo applications (in or on the human body) are not allowed.

The Eppendorf Varipette 4720 may only be operated by trained specialists. All users must read the operating manual carefully and must have become familiar with the device's mode of operation.

3.2 Warnings for intended use

**WARNING! Damages to health due to infectious liquids and pathogenic germs.**

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- ▶ Wear personal protective equipment.
- ▶ For full instructions regarding the handling of germs or biological material of risk group II or higher, please refer to the "Laboratory Biosafety Manual" (Source: World Health Organization, current edition of the Laboratory Biosafety Manual).

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

- ▶ Wear personal protective equipment.
- ▶ Observe the national regulations for handling these substances.
- ▶ Observe the material safety data sheets and manufacturer's application notes.

**CAUTION! Danger to individuals due to careless use**

- ▶ Never point the opening of the device towards yourself or other people.
- ▶ Only initiate liquid dispensing if it is safe to do so.
- ▶ With any dispensing task please ensure that you do not endanger yourself and other persons.

**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.
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4 Operation

4.1 Inserting and removing the Varitip

- i** Hold down the pipetting lever throughout the entire insertion and removal process.



Fig. 3: Inserting the Varitip

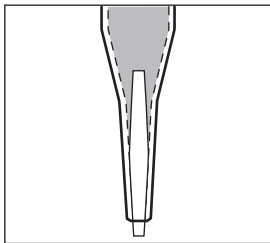


Fig. 4: Valve in the Maxitip

1. Press the pipetting lever sufficiently often for the locking clamp to move right to the bottom. Keep the pipetting lever pressed down.
2. Raise the clamping lever.
3. Slightly turn the Varitip P or the dispensing unit of the Varitip S while pushing it into the clamp or pulling it out of it.
 When inserting the piston its coupling block will slide into the shaft of the locking clamp by itself.
4. Carefully apply pressure to push the coupling unit into position, if required.
5. Lower the clamping lever and push it into place.
6. Let the pipetting lever slide back slowly to the upper stop. Do not let the pipetting lever snap back.
7. For the Varitip S: The valve may be inserted into the Maxitip in any orientation. The valve seals the tip of the Maxitip, preventing the liquid from dripping out.
8. Plug the Maxitip onto the dispensing unit.

4.2 Setting the volume



Fig. 5: Setting the volume

- ▶ Turn the selection dial until the required volume is displayed. The individual digits of the volume display must entirely show in the viewing window. The volume is displayed in mL in 4 digits with two decimal spaces.

4.3 Pre-wetting

Precise pipetting requires the preliminary wetting of the Varitip P and the Maxitip.

- ▶ Aspirate and dispense liquid three times.
 The tip is pre-wetted.

After pre-wetting, the amount of dispensed liquid corresponds exactly to the previously aspirated volume that was set.

4.4 Pipetting with the Varitip P

4.4.1 Aspirating liquid

1. Immerse the tip of the Varitip P in the liquid.
2. Slowly press down the pipetting lever up to the lower stop.
3. Wait for 2 seconds before letting the pipetting lever slide upward slowly.

- i** A small air bubble is left behind in the cylinder of the Varitip P after filling. This has no effect on the accuracy and precision of dispensing.

4.4.2 Liquid dispensing

You can dispense the liquid from the Varitip P freely or against the inner wall of the vessel.

1. Slowly press down the pipetting lever until it reaches the lower stop.
2. Remove any residual droplets left behind on the tip by wiping the tip on the vessel wall.
3. Let the pipetting lever slide back slowly to the upper stop.

- i** Liquids remaining in the Varitip P after pre-wetting and pipetting are not part of the dispensing volume.

4.5 Pipetting with the Varitip S



Fig. 6: Aspirating liquids



Fig. 7: Dispensing liquids

You can pipette in the same way with the Varitip S as with the Varitip P.

Please also observe the following:

- ▶ Always hold the pipette vertically when aspirating liquids.
- ▶ Hold the tip of the Maxitip against the inner wall of the vessel when dispensing liquids.
- ▶ Hold the long tip of the Varitip S against the inner wall of the vessel when dispensing liquids.

Apply an extra stroke to remove any residual liquid from the tip when working with highly wetting liquids:

1. Let the pipetting lever slide upward.
2. Press the pipetting lever to slightly raise the piston.
3. Press the pipetting lever again to dispense the liquid.

4.5.1 Pipetting with the Maxitip and valve

The tip of the Maxitip is closed by the weight of the valve (density = 1.78 g/L).

- ▶ Hold the tip of the Maxitip against the inner wall of the vessel and push back the valve one time before aspirating liquids.
 The aspirated liquid will raise the valve during the aspiration process.
- ▶ Hold the pipette with filled Maxitip and valve vertically during transport.
- ▶ Hold the tip of the Maxitip at an angle against the inner wall of the vessel and push up the valve when dispensing liquids.
- ▶ Hold the aspiration and dispensing vessels steady with the other hand.

4.6 Liquids with specific properties

You can use the Varipette S to dispense liquids that differ substantially from water with regard to their densities or vapor pressures.

Use the Maxitip to determine the required settings.

4.6.1 Adjusting the volume selection dial

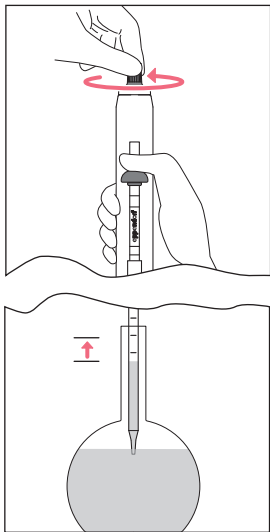


Fig. 8: Correcting the volume

1. Attach the Maxitip.
2. Set the required volume using the selection dial.
3. Keep the pipetting lever pressed down while aspirating the liquid.
4. Turn the selection dial until the meniscus of the liquid has reached the corresponding scale mark. Turn the dial clockwise to raise the liquid level. Turn the dial counter-clockwise to lower the liquid level.
5. Read the setting determined for the required volume from the volume display.
6. Dispense the volume from the Maxitip.



- For liquids with high vapor pressure, repeat aspirating and dispensing the liquid until you can see no more gas bubbles at the tip when dispensing the liquid.
- We recommend the Varipette P for viscose liquids.

5 Gravimetric check

The liquid for pipetting, Aqua bidest, must have the same temperature as the ambient air 20 °C – 27 °C (= reference temperature). In order to calculate the volume from the weight

of the pipetted liquid, divide the weight by the density of the water. Number of determinations: 10

Due to its degree of incorrectness, you cannot use the Maxitip for testing the Varipette.

If you wish to dispense liquids with specific properties, you can set the Varipette to gravimetric instead of volumetric. In this mode, the volume pipetted at the nominal value is weighed.

New set value =

$$2 \times \text{nominal value} - \frac{\text{Weight of pipetted liquid}}{\text{Density of pipetted liquid}}$$

Check the determined value gravimetrically and correct it, if necessary.

6 Troubleshooting

6.1 Error search

Error	Cause	Remedy
Pipetting lever cannot be pressed down completely.	Clamping lever is not fully pressed down.	▶ Properly insert the piston, completely press down the clamping lever.
Piston cannot be controlled via the pipetting lever.	Pipetting lever is not pressed down up to the stop.	▶ Push down the pipetting lever all the way up to the stop.
Incorrect dispensing volume.	Pipetting lever not fully pressed down during liquid aspiration.	▶ Always press down the pipetting lever up to the lower stop; the lower stop varies with the dispensing volume.
	Clamping lever is not fully pressed down.	▶ Properly insert the piston, completely press down the clamping lever.
	Liquid with deviating density, high vapor pressure.	▶ volum./grav. check
Varitip drips.	Piston does not seal.	▶ Exchange Varitip.
	Maxitip not firmly fit onto the dispensing unit.	▶ Plug in long tip.
	Liquid with high steam pressure/low viscosity.	▶ Insert valve into the Maxitip.
Droplets in the tip of the Maxitip.	Increased wetting of the plastic.	▶ Exchange Maxitip.

Regularly check the precision and accuracy of the Varipette to prevent dispensing errors. An SOP (Standard Operation Procedure) for checking pipettes can be found on our website www.eppendorf.com.

The settings must be adjusted for such liquids whose physical properties substantially differ from those of water.

7 Maintenance

7.1 Cleaning



NOTICE! Damage to device from unsuitable cleaning fluids or sharp or pointed objects.

Unsuitable cleaning fluids can damage the device.

- ▶ Never use corrosive cleaning fluids, strong solvents or abrasive polishes.
- ▶ Check the compatibility with the materials used.
- ▶ Do **not** clean the device with acetone or organic solvents with a similar effect.
- ▶ Do **not** clean the device with sharp objects.

Proceed as follows:

- ▶ To remove any contamination on the outside, dampen a soft cloth with a mild detergent and wipe the housing.
- ▶ Wipe the housing with isopropanol (70%) to disinfect the Varipette. wipe.

7.2 Decontamination before shipment

If you wish to return the device to Eppendorf AG or an Eppendorf AG service partner to be checked or repaired, please note the following:



CAUTION! Use of a contaminated device may result in personal injuries and damage to the device.

- ▶ Clean and decontaminate the device in accordance with the cleaning instructions before shipping or storage.

Hazardous substances are:

- solutions presenting a hazard to health
- potentially infectious agents
- organic solvents and reagents
- radioactive substances
- proteins presenting a hazard to health
- DNA

- Please note the information in the document "Decontamination certificate for product returns".
You can find it as a PDF file on our webpage www.eppendorf.com.
- Enter the serial number of the Varipette 4720 in the decontamination certificate.
- With the shipment please include the completed decontamination certificate for product returns with the Varipette 4720.
- Send the pipette to Eppendorf AG or an Eppendorf AG service partner. The address details of Eppendorf AG can be found on the last page of this operating manual. The list of service partners can be found at www.eppendorf.com/worldwide.

8 Technical data

Tab. 1: Varipette 4720 and Varitip S

Volume in mL	Error			
	Systematic (Incorrectness)		Random (Imprecision)	
	in %	in mL	in %	in mL
2.5	± 1.0	± 0.025	± 0.2	± 0.005
5	± 0.4	± 0.02	± 0.2	± 0.01
10	± 0.3	± 0.03	± 0.2	± 0.02

Tab. 2: Varipette 4720 and Varitip P

Volume in mL	Error			
	Systematic (Incorrectness)		Random (Imprecision)	
	in %	in mL	in %	in mL
1	± 0.6	± 0.006	± 0.2	± 0.002
5	± 0.5	± 0.025	± 0.1	± 0.005
10	± 0.3	± 0.03	± 0.1	± 0.01

Liquid	Water (demineralized according to ISO 3696)
Reference temperature	20 °C – 27 °C, ±0.5 °C constant
Number of determinations	10

Test conditions according to ISO 8655 with original Eppendorf Varitip P or Varitip S without valve, liquid dispensed to the inner wall of the weighing vessel.

9 Ordering Information



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

Order no. (International)	Description
	Eppendorf Varipette 4720
4720 000.011	with continuous volume adjustment 1 – 10 mL
	Varitip P
0030 048.130	100 pieces
	Starter Kit
0030 050.525	100 Maxitips, 10 dispensing parts, 10 valves
	Dispensing part for Varitip S
0030 050.533	30 pieces
	Maxitip for Varitip S
0030 050.568	200 pieces
	Valves for Varitip S/Maxitip S, long tip
0030 050.541	100 pieces
	Pipette carousel 3115
3115 000.003	with 6 pipette holder for Research and Reference Pipettes
	Pipette carousel 4923
4923 000.009	exclusively for Reference 2 pipettes
	Multipipette plus, Repeater plus, Varipette - adapter
4981 201.006	for pipette carousel 3115 and pipette carousel 4923
	Wall mount for Multipipette plus, Repeater plus, Varipette
4981 203.009	with adhesive surface

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Eppendorf AG · 22331 Hamburg · Germany

eppendorf@eppendorf.com · www.eppendorf.com