



Varipette® 4720

Operating Manual

eppendorf

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User instructions

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1 User instructions

1.1 Using this manual

- ▶ Before using the device for the first time, please read the operating manual.
- ▶ Please view this operating manual as part of the product and keep it somewhere easily accessible.
- ▶ When forwarding the appliance to third parties, be sure to include these operating manual.

2 Product description

2.1 Main illustration

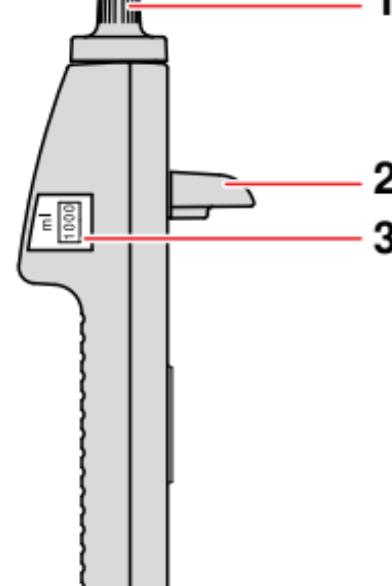


Fig. 1: Varipette

1 Volume setting dial	2 Pipetting lever Pressing the pipetting lever to the bottom stop causes liquid to be aspirated; press it again to dispense the liquid.
3 Volume readout	4 Locking clamp To clamp the Varitip piston firmly.

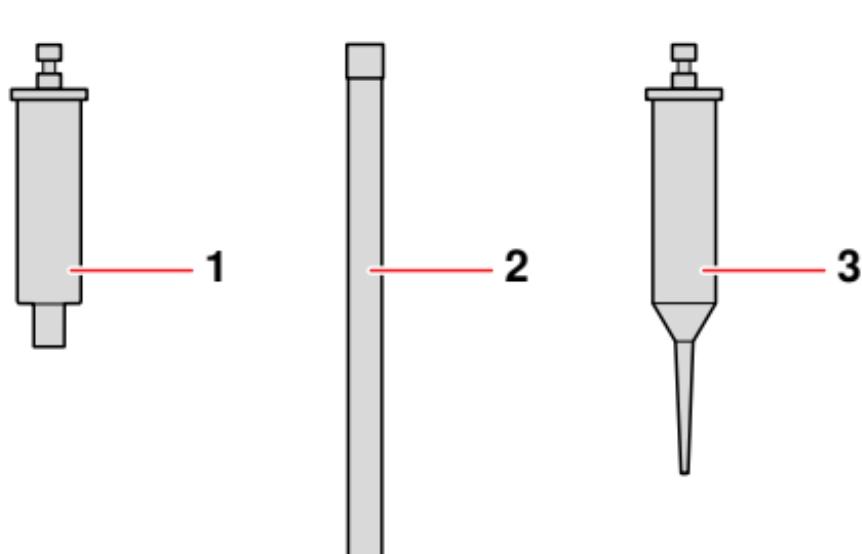


Fig. 2: Varitips

1 Varitip S, barrel and piston, dispensing part (2.50 mL – 10.00 mL) (Varitip S = Varitip System)	2 Varitip S, Maxitip The Maxitip is attached to the dispensing part and is interchangeable.
3 Varitip P (1.00 mL – 10.00 mL) (P = Positive displacement)	

2.2 Features

The Eppendorf Varipette 4720 is a universal, variable milliliter pipette for the range from 1.00 to 10.0 mL. You can set and dispense any volumes in 10 µL increments with precision.

You can use the versatile Varipette to dispense

- aqueous solutions,
- organic liquids,
- liquids of high viscosity and
- liquids whose densities and vapor pressures deviate significantly from those of water.

The Varipette only works with a Varitip inserted. The Varitip which consists of piston, cylinder and tip, aspirates the liquid.

Features of 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). Liquid only gets into the Maxitip, with the result that samples or reagents can be dispensed consecutively without entrainment by changing the Maxitip.
- The valve which can be inserted in the tip of the Maxitip S allows lower-risk transfer of aggressive or toxic solutions or of liquids with radioactive or pathogenic constituents.

The Varipette 4720 can be stored in pipette carousel 3115 using an adapter.



Fig. 3: Pipette carousel 3115

2.3 Fields of application for Varitips

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

The recommended fields of application can be found in the table:

	Varitip P	Varitip S
Aqueous solutions	+	+
Removal of liquid from deep tubes		+
Organic liquids (alcohols, org. acids, et al.)	+	+
Solvents with high vapor pressure (e.g. diethyl ether)		+
Liquids with high density	+	+
Viscous liquids	+	

2.3.1 Compatibility of materials

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

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

3 Safety



Warning! Risk to health from chemicals.

- ▶ Never point the opening of the Varitip at yourself or another person.
- ▶ Only operate the pipetting lever if it is safe to do so.



Warning! 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, function and precision of the device. Eppendorf accepts no warranty or liability for damage caused by non-recommended accessories and spare parts or incorrect use.

- ▶ Use only original accessories recommended by Eppendorf.



Attention! Damage to device from incorrect operation.

The pipette is a lab device.

- ▶ The pipette may only be operated by appropriately qualified and trained laboratory staff.



Opening the housing will void the guarantee.

- Do not remove the housing of the pipette.
- Do not allow the housing to be opened by anyone except service staff authorized by Eppendorf.

4 Operation

4.1 Inserting and removing the Varitip



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



Fig. 4: Inserting the Varitip

1. Press the pipetting lever sufficiently often for the locking clamp to move right to the bottom. Keep the pipetting lever depressed.
2. Raise the locking clamp.
3. Push a Varitip P or the dispensing part of the Varitip S into the mounting with a slight twist to insert it, or pull it out of the mounting to remove it.
The slipping clutch of the piston automatically slides between the grooves of the locking clamp on insertion.
4. Push the slipping clutch right home with gentle pressure if required .
5. Lower the locking clamp and press closed.
6. Let the pipetting lever slide back slowly to the top stop. Do not allow the pipetting lever to snap back.



Fig. 5: Valve in Maxitip

7. For Varitip S: put the valve in the Maxitip either way round.

The valve seals the tip of the Maxitip, preventing liquid's dripping out.

8. Attach the Maxitip to the dispensing part.

4.2 Setting volume



Fig. 6: Setting volume

- ▶ Turn the dial until the desired volume is displayed. The digits of the volume readout must appear completely in the window.
- The volume is displayed in mL in the form of four digits, with two digits after the decimal point.

Example

Desired volume: 8.75 mL

Readout: 08.75

4.3 Pre-wetting

For accurate pipetting, the Varitip P and the Maxitip must be wetted first.

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

After pre-wetting, the quantity of liquid dispensed corresponds exactly to the set volume aspirated beforehand.

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 the pipetting lever to the bottom stop.
3. Wait 2 seconds and let the pipetting lever slide slowly back up to the top.



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 Dispensing liquid

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

1. Slowly press down the pipetting lever until it reaches the bottom stop.
2. Wipe off any residual drips on the tip on the vessel wall.
3. Let the pipetting lever slide back slowly to the top stop.



Liquid which remain in the Varitip P after pre-wetting and pipetting are not part of the dispensing volume.

4.5 Pipette with the Varitip S



Fig. 7: Aspirating liquid



Fig. 8: Dispensing liquid

You can pipette in the same way with the Varitip S as with the Varitip P (see *Pipetting with the Varitip P* on page 9).

In addition, observe the following points.

► Always hold the pipette vertically when aspirating liquid.

► Hold the tip of the Maxitip against the vessel wall when dispensing liquid.

► Hold the long tip of the Varitip S against the vessel wall when dispensing liquid.

If there is a residue in the tip in the case of heavily-wetting liquids, force it out of the tip with an additional stroke.

1. Allow the pipetting lever to slide upwards.

2. Press the pipetting lever to draw the piston up slightly.

3. Press the pipetting lever again to dispense the liquid.

4.5.1 Pipetting with Maxitip and valve

The valve seals the tip of the Maxitip (Fig. 5 on page 8) by its inherent weight (density = 1.78 g/mL).

► Before aspirating liquid, rest the Maxitip tip on the vessel wall and push the valve back once.

During aspiration of liquid, the flow of liquid lifts the valve.

► When transporting the pipette with full Maxitip and valve, keep it vertical.

► For dispensing liquid (generally with a downward movement of the piston) rest the Maxitip tip against the vessel wall at an angle and push up the valve (Fig. 8 on page 10).

► Hold the aspiration and dispensing vessels steady with the other hand.

4.6 Liquids with special characteristics

Liquids whose density and vapor pressure differ significantly from those of water can be dispensed with Varitip S.

Use the graduated Maxitip to determine the required setting volumes.

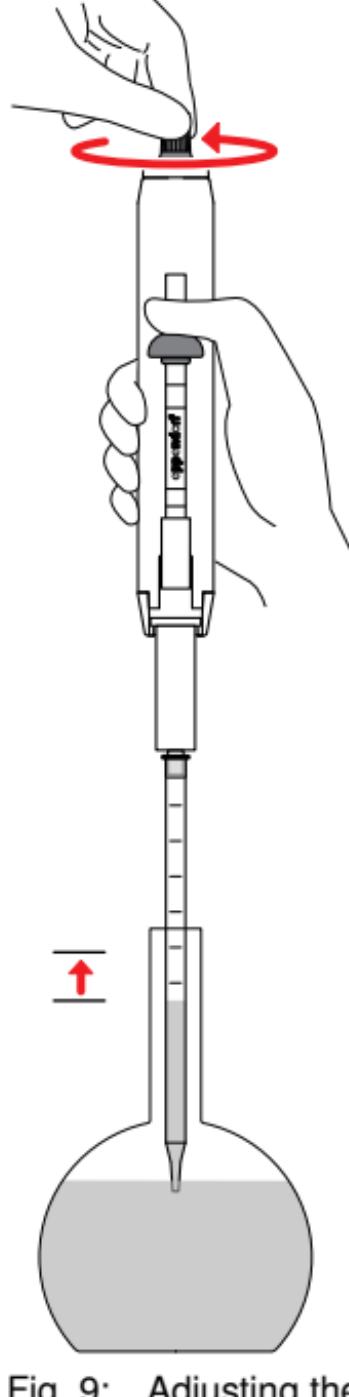


Fig. 9: Adjusting the volume selection dial

1. Attach the Maxitip.
2. Set the desired volume using the dial.
3. Aspirate the liquid, holding down the pipetting lever.
4. Adjust the dial until the meniscus of the liquid reaches the corresponding graduation. Turn clockwise to raise the liquid. Turn anticlockwise to lower the liquid.

5. From the volume readout, read off the setting you determined, which corresponds to the desired volume.

6. Dispense the volume out of the Maxitip.



- For liquids with a high vapor pressure, aspirate and dispense the liquid until no more gas bubbles are forced out of the tip.
- We recommend the Varitip P for viscous liquids.

5 Gravimetric check

The liquid to be pipetted (bi-dist. water) must have taken on the ambient temperature of 20 to 25 °C (= reference temperature). To calculate the volume from the weight of the pipetted liquid, divide this weight by the density of the water. 5 measurements are sufficient to check accuracy and 15 measurements to determine precision. Number of determinations: 10, to ISO 8655. Due to its higher inaccuracy, the Maxitip cannot be used for testing the Varipette.

If liquids with special physical characteristics are to be dispensed, the Varipette can be set gravimetrically instead of volumetrically (see *Liquids with special characteristics* on page 11). To do so, weigh the volume pipetted when the nominal volume is set.

New set value =

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

Likewise check the value determined gravimetrically and correct if necessary.

6 Troubleshooting

6.1 Error search

Error	Cause	Elimination
Pipetting lever cannot be pressed down fully.	Locking clamp is not pressed down fully.	▶ Insert piston correctly, push locking clamp right down.
Piston cannot be moved using the pipetting lever.	Pipetting lever not pushed down to the stop.	▶ Push pipetting lever right down to the bottom stop.
Incorrect dispensing volume.	Pipetting lever not pushed right down when liquid aspirated.	▶ Always push pipetting lever down to bottom stop; bottom stop depends on dispensing volume.
	Locking clamp is not pressed down fully.	▶ Insert piston correctly, push locking clamp right down.
	Liquid with deviating density, high vapor pressure.	▶ Perform volum./grav. check
Varitip dripping.	Piston leaking.	▶ Replace Varitip.
	Maxitip not attached firmly to dispensing part.	▶ Attach tip firmly.
	Liquid with high vapor pressure/ low viscosity.	▶ Insert valve in Maxitip.
Droplets in tip of Maxitip.	Too much wetting of plastic.	▶ Change Maxitip.

The precision and accuracy of the Varipette must be checked regularly to prevent dispensing errors. You can find an SOP (Standard Operation Procedure) for the test on our website www.eppendorf.com.

The setting will have to be changed for liquids whose physical data deviate significantly from those of water (see *Liquids with special characteristics* on page 11 or see *Gravimetric check* on page 12).

7 Maintenance

7.1 Cleaning



Any servicing activities above and beyond cleaning may be performed only by Eppendorf AG or an Eppendorf AG service partner.

Attention! Damage to device from penetration of liquid.

- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ If liquid has penetrated the inside of the housing, have the inner parts of the Varipette 4720 decontaminated only by service partners of Eppendorf AG. Contact your local sales office before making a return.
- ▶ Do not open the housing of the Varipette 4720.

Remove contaminations from the Varipette as follows:

- ▶ Moisten a cloth with soap solution and remove the dirt.
- ▶ Use isopropanol (70%) to disinfect the Varipette.

7.2 Decontamination before shipment

If you wish to return the pipette to Eppendorf AG or an Eppendorf AG service partner for checking or repair, please note the following.



Caution! Risk to health from contaminated pipette.

- ▶ Perform decontamination before returning or storing the pipette.
- ▶ The pipette must be clean and free of hazardous substances.

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
1. Please note the information in the document "Decontamination certificate for product returns". You can find it as a PDF file on our homepage www.eppendorf.com.
 2. Please include with the shipment the completed and signed "Decontamination certificate for product returns" for each pipette.

8 Technical data

Tab. 1: Varipette 4720 and Varitip S

Volume in mL	Error			
	Systematic (inaccuracy)		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 (inaccuracy)		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

The data is valid for the following test conditions, in accordance with ISO 8655.

- | | |
|---------------------------|--|
| Liquid: | Aqua, bidist. |
| Reference temperature: | 20 to 25 °C, constant to ±0.5 °C |
| Number of determinations: | 10, test conditions in accordance with ISO 8655 with original Eppendorf Varitip P or Varitip S without valve, dispensing on the wall of the weighing vessel. |

9 Ordering information**Warning! 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, function and precision of the device. Eppendorf accepts no warranty or liability for damage caused by non-recommended accessories and spare parts or incorrect use.

- ▶ Use only original accessories recommended by Eppendorf.

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

The delivery package includes:

- Varipette 4720
- 1 Varitip P
- 1 dispensing part (Varitip S)
- 2 Maxitip
- 10 valves

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