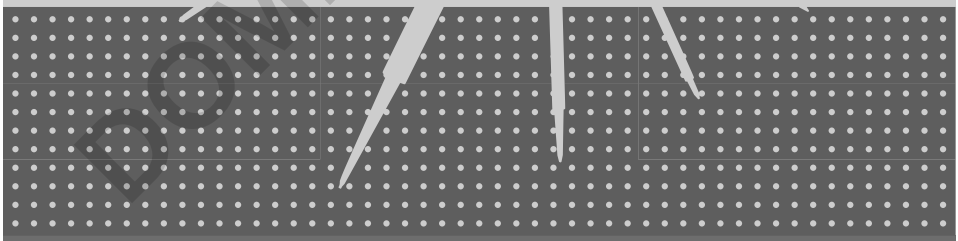
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DOMINIQUE DUTSCHER



Multipette® M4 · Repeater® M4

Operating Manual

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DOMINIQUE DUTSCHE

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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. Observe the instructions for use of the accessories where applicable.
- This operating manual is part of the product. Please keep it in a place that is easily accessible.
- Enclose this operating manual when transferring the device to third parties.
- The current version of the operating manual for all available languages can be found on our webpage 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**		**Explosive substances**
	**Toxic substances**		**Material damage**
	**Hazard point**		

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
1	Step in the figures
Text	Display or software texts
	Additional information

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1.4 Glossary

A

Adapter advanced
Connecting piece for the dispenser when using Combitips advanced 25 mL and 50 mL

Additional volume
The total of the remaining stroke and the reverse stroke.

C

Coding
The dispenser uses coding to detect the Combitip's maximum volume.

Color code
The color code displays the maximum volume.

Combitips advanced
Dispensing tip for all Eppendorf Multipettes and Repeaters. Dispenser tips are single-use consumables which function using the positive displacement principle and consist of a piston and a cylinder.

D

DIN EN ISO 8655
The standard defines limit values for the systematic error, the random error and the test methods for dispensers.

Dispenser
A dispenser is a dispensing device that works according to the positive displacement principle. Multi-dispensers and single stroke dispensers are available.

Dispenser tip
Dispenser consumables (such as the Combitips advanced or ViscoTip) consist of a piston and a cylinder. Dispenser tips work using the positive displacement principle.

Dispensing volume
Volume per dispensing step.

F

Free jet dispensing
Dispensing of liquid without the dispensing tip (pipette tip, dispenser tip) touching the tube inner wall.

G

Graduation
Incremental graduation of a range, a surface or a volume.

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I

Increment
Step size or resolution. The smallest possible change by which a value can be increased.

M

Maximum volume
The maximum volume that can be used for dispensing.

N

Nominal volume
The maximum dispensing volume of a dispensing system specified by the manufacturer.

P

Positive displacement principle
Design characteristic of piston-stroke dispensers. The liquid is in direct contact with the piston of the dispensing tip (Combitip) during aspiration and dispensing operations.

R

Random error
Imprecision. A measure for the scattering (standard deviation) of the measured values around the average value.

Remaining stroke
Liquid reserve. The liquid which remains after all dispensing steps have been completed.

Residual stroke lock
The residual stroke lock prevents dispensing of an incorrect volume if there is not enough liquid available for the dispensing volume.

Reverse stroke
After liquid aspiration, the piston is moved to a defined initial position. Liquid is dispensed during the piston movement. The reverse stroke is not a dispensing step.

S

Stroke
The stroke is the distance traveled by the piston.

Systematic error
Inaccuracy. Deviation of the average value of the dispensed volumes from the selected volume.

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V

Viscosity
Viscosity describes the viscidity of liquids and suspensions. The dynamic or absolute viscosity is indicated in Pa·s or in mPa·s. In older literature, the unit P or cP is used (1 mPa·s corresponds to 1 cP). At room temperature, a 50% glycerol solution has a viscosity of approx. 6 mPa·s. As the glycerol concentration increases, viscosity increases considerably. Absolutely anhydrous glycerol has a viscosity of approx. 1480 mPa·s at room temperature.

ViscoTip
Dispenser tip for highly-viscous liquids with dynamic viscosities between 200 mPa·s and 14000 mPa·s. The ViscoTip is suitable for use in all Eppendorf Multipipettes and Repeaters. Dispenser tips are single-use consumables which function using the positive displacement principle and consist of a piston and a cylinder.

W

Wall dispensing
Dispensing liquid against the tube wall. The pipette tip or the dispensing tip is held against the tube inner wall and the liquid is dispensed.

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2 Safety

2.1 Intended use

The Multipette M4/Repeater M4 is a device for general laboratory use and, in combination with a dispenser tip (Combitips advanced or ViscoTip), it is intended for dispensing liquids in the volume range of 1 µL – 50 mL. In vivo applications (applications in or on the human body) are not permitted.

The Multipette M4/Repeater M4 may only be operated by trained specialists. All users must have read the operating manual carefully and familiarized themselves with the device's mode of operation.

2.2 Application limits

Due to its design, the device is not suitable for use in potentially explosive atmospheres.

The device may only be used in a safe environment, e.g., in a ventilated lab or under a fume hood. The use of substances which may contribute to a potentially explosive atmosphere is not permitted.

2.3 Warnings for intended use



DANGER! Explosion hazard.

- Do not operate the device in areas where work with explosive substances is carried out.
- Do not use this device to process any explosive or highly reactive substances.
- Do not use this device to process any substances that could create an explosive atmosphere.



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

- When handling infectious liquids and pathogenic germs, observe the national regulations, the biosafety level of your laboratory, and the manufacturers' Safety Data Sheets and 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 material of risk group II or higher.

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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 manufacturers' Safety Data Sheets and application notes.



CAUTION! Danger to people due to grossly negligent use.

- Never point the opening of the device towards yourself or others.
- Only initiate liquid dispensing if it is safe to do so.
- For all dispensing tasks, make sure that you are not endangering yourself or anyone else.



NOTICE! Damage to device due to penetration of liquid.

- Only immerse the dispenser tip in the liquid.
- Do not put the dispenser down when the dispenser tip is filled.
- The dispenser itself may not come into contact with the liquid.



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 accessories and spare parts other than those recommended or from improper use.

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



NOTICE! Carry-over, contamination and incorrect dispensing results due to incorrect use of dispenser tips.
Dispenser tips are intended for single use. Prolonged use can have a negative impact on dispensing accuracy.

- Use dispenser tips only once.
- Do not use washed or autoclaved dispenser tips for dispensing.

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3 Product description

3.1 Delivery package

Quantity	Description
1	Multipette M4/Repeater M4
1	Operating manual
1	Combitips advanced 2.5 mL
1	Holder 2
1	Battery (inserted)
1	Eppendorf certificate

3.2 Features

The dispenser (Multipette M4/Repeater M4) is a mechanical dispenser that functions according to the positive displacement principle. The dispenser is used in combination with a dispensing tip (Combitips advanced or ViscoTip) to aspirate and dispense liquids. Depending on dispenser tip used, volumes between 1 µL and 50mL can be dispensed.

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3.3 Product overview

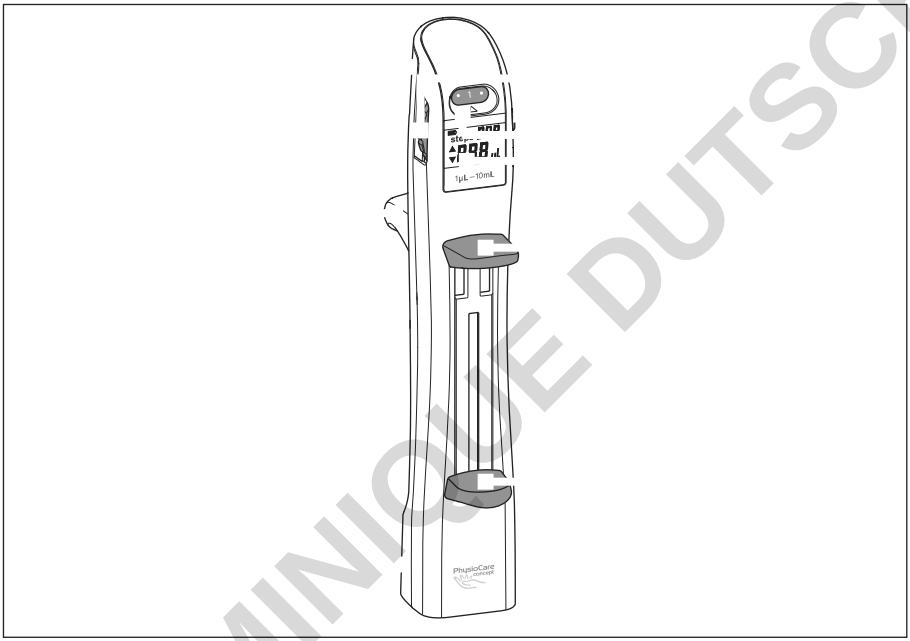


Fig. 3-1: Multipette M4/Repeater M4

1 Volume selection dial
2 Position display
3 Display
4 Operating lever
5 RFID chip
6 Filling lever
7 Serial number
8 Hand rest
9 Battery compartment lid

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3.4 Display

The display activates automatically when a dispenser tip has been inserted and deactivates after a certain period of non-use (sleep function).If a dispenser with an inserted dispenser tip is moved, the display activates automatically.

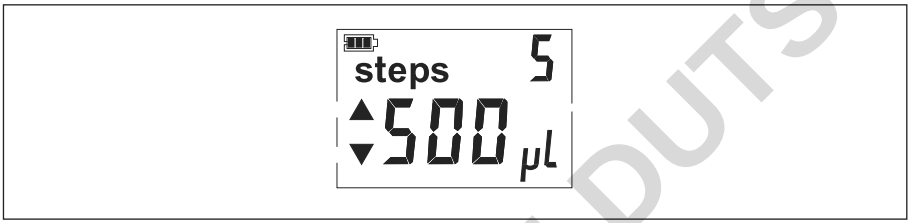


Fig. 3-2: Display on inserted dispenser tip

1 Battery charge condition
2 Liquid aspiration
3 Liquid dispensing
4 Number of dispensing steps
5 Dispensing volume per dispensing step

If the display flashes, the current or next operating step is not a dispensing step.

3.5 Dispenser tips – Combitips advanced and ViscoTip

The dispenser can only be operated with Combitips advanced or ViscoTip dispenser tips. Dispenser tips are single-use items for aspirating and dispensing liquids according to the positive displacement principle. Dispenser tips are available in different sizes, colors and purity grades. Sizes are denoted using a color code.

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3.6 Overview of dispenser tips

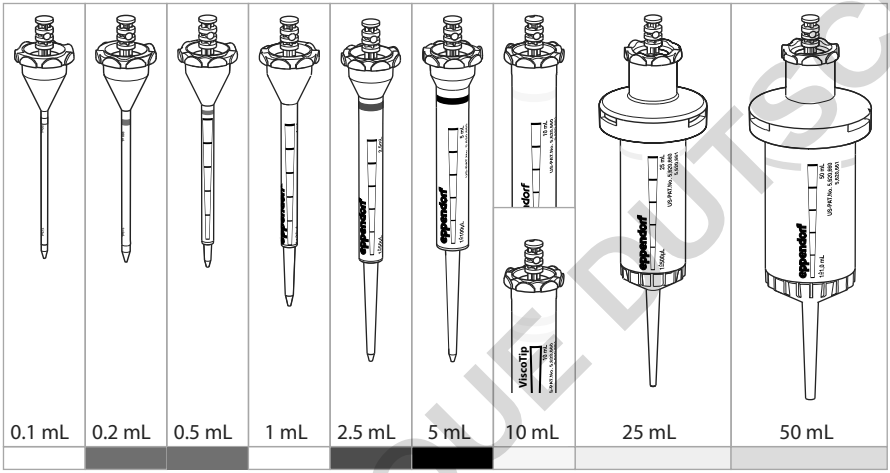


Fig. 3-3: Combitips advanced (one colored ring) and ViscoTip (two colored rings)

3.6.1 Combitips advanced volume ranges

Combitips advanced	Volume range	Increment
0.1 mL white	1.0 µL – 100 µL	1 µL
0.2 mL light blue	2.0 µL – 200 µL	2 µL
0.5 mL violet	5.0 µL – 500 µL	5 µL
1 mL yellow	10 µL – 1000 µL	10 µL
2.5 mL green	25 µL – 2500 µL	25 µL
5 mL blue	50 µL – 5000 µL	50 µL
10 mL orange	0.1 mL – 10 mL	0.1 mL
25 mL red	0.25 mL – 25 mL	0.25 mL
50 mL light gray	0.5 mL – 50 mL	0.5 mL

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3.6.2 ViscoTip volume range

ViscoTip	Volume range	Increment
10 mL orange	0.1 mL – 10 mL	0.1 mL

3.7 Materials

NOTICE! Aggressive substances may damage dispensers, dispenser tips and accessories.

- Check the chemical resistance when using organic solvents or aggressive chemicals.
- Observe the cleaning instructions.

The assemblies which can be accessed by the user are made of the following materials:

Assembly	Material
Housing parts	Improved polypropylene (PP)
Filling lever, operating lever	Refined polypropylene (PP), dyed
Viewing window	Polycarbonate (PC)
Volume selection dial	Acrylonitrile styrene copolymerisate with polycarbonate (ASA/PC)
Other external components	• Polyetherimide (PEI) • Polybutylene terephthalate (PBT) • Polyetheretherketone (PEEK) • Acrylonitrile styrene copolymerisate with polycarbonate (ASA/PC) • Silicone
Holder	Acrylonitrile styrene copolymerisate with polycarbonate (ASA/PC)

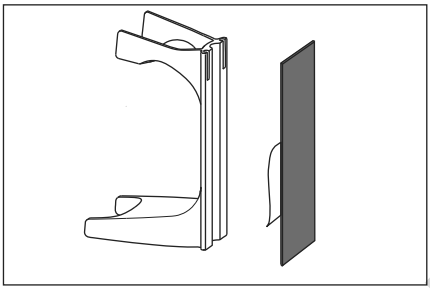
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4 Installation

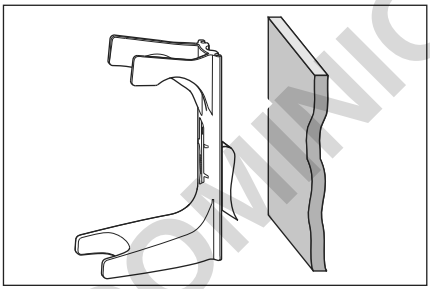
4.1 Using the holder

The holder can be mounted on a wall or inserted into the pipette carousel.

4.1.1 Mounting the holder on a wall



1. Clean smooth glass or ceramic surfaces (e.g., with ethanol) and allow them to dry.
2. Remove the protective film from one side of the adhesive tape.
3. Firmly press the adhesive tape onto the rear side of the holder.



4. Remove the protective film from the other side of the adhesive tape.
5. Press the wall mount firmly against the wall.
   It may only be placed under load after 24 hours.

4.1.2 Removing wall mount from wall

- Twist mount and remove adhesive strip.

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5 Operation

5.1 Inserting the dispenser tip

NOTICE! Damage to device due to incorrect dispenser tip.
The dispenser shaft is built to hold only the Combitips advanced or ViscoTip dispenser tips. Other dispenser tips can damage the holder.

- Please only use Eppendorf brand dispenser tips (Combitips advanced or ViscoTip).

5.1.1 Select dispenser tip

With the dispenser and every dispenser tip, 20 different dispensing volumes can be selected.

Select a dispenser tip according to the following criteria:

- The desired dispensing volume is possible.
- The desired number of dispensing steps is possible.
- The geometry of the dispenser tip matches the geometry of the aspiration and destination vessels.

- Use the volume table to select the corresponding volume and dispenser tip.

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5.1.2 Volume table

Selection dial	Dispensing steps	0.1 mL white	0.2 mL light blue	0.5 mL violet	1.0 mL yellow	2.5 mL green	5.0 mL blue	10 mL orange	25 mL red	50 mL light gray
•	100	1.0	2.0	5.0	10	25	50	0.1	0.25	0.5
1	50	2.0	4.0	10	20	50	100	0.2	0.50	1.0
•	33	3.0	6.0	15	30	75	150	0.3	0.75	1.5
2	25	4.0	8.0	20	40	100	200	0.4	1.00	2.0
•	20	5.0	10	25	50	125	250	0.5	1.25	2.5
3	16	6.0	12	30	60	150	300	0.6	1.50	3.0
•	14	7.0	14	35	70	175	350	0.7	1.75	3.5
4	12	8.0	16	40	80	200	400	0.8	2.00	4.0
•	11	9.0	18	45	90	225	450	0.9	2.25	4.5
5	10	10	20	50	100	250	500	1.0	2.50	5.0
•	9	11	22	55	110	275	550	1.1	2.75	5.5
6	8	12	24	60	120	300	600	1.2	3.00	6.0
•	7	13	26	65	130	325	650	1.3	3.25	6.5
7	7	14	28	70	140	350	700	1.4	3.50	7.0
•	6	15	30	75	150	375	750	1.5	3.75	7.5
8	6	16	32	80	160	400	800	1.6	4.00	8.0
•	5	17	34	85	170	425	850	1.7	4.25	8.5
9	5	18	36	90	180	450	900	1.8	4.50	9.0
•	5	19	38	95	190	475	950	1.9	4.75	9.5
10	5	20	40	100	200	500	1000	2.0	5.00	10.0
Specifications in:		[µL]	[µL]	[µL]	[µL]	[µL]	[µL]	[mL]	[mL]	[mL]

5.1.3 Dispenser tip selection example

The following table shows different ways of dispensing 50 µL.

Dispenser tip	Number of dispensing steps when completely filled	Position of the volume selection dial
0.5 mL	10	5
1.0 mL	20	2.5
2.5 mL	50	1
5.0 mL	100	0.5

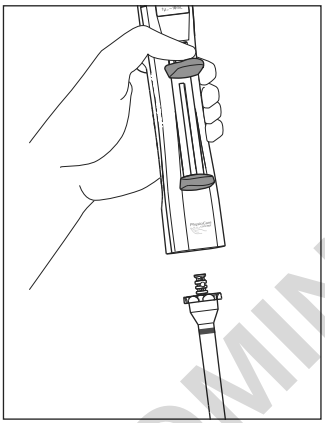
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5.1.4 Inserting the dispenser tip

NOTICE! Damage to device due to incorrect handling of the inserted dispenser tip.

- Insert the dispenser tip straight into the dispenser from below.
- Do not turn the inserted dispenser tip.
- Never hold the dispenser by the dispenser tip.

If you keep the operating lever pushed down while inserting the dispenser tip, it will be easier to insert the dispenser tip.



1. Push the filling lever down.
2. Insert the dispensing tip straight from below.
3. If required, push the filling lever down again.
   The display shows the direction of the next piston movement, the selected dispensing volume and the possible dispensing steps.

If you want to have a different view of the text printed on the dispenser tip, eject the dispenser tip and re-insert it in a different position.

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5.1.5 Picking up dispenser tips out of the rack



1. Push the dispenser onto the dispenser tip at a right angle.
2. Push the filling lever down.
   The display shows the direction of the next piston movement, the selected dispensing volume and the possible dispensing steps.

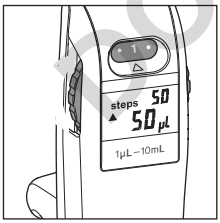
5.2 Setting the volume

The volume selection wheel has 20 positions. Every second position is marked with a figure. The other positions are marked with a dot. You can select the dispensing volume before liquid aspiration and change it during the dispensing steps.

5.2.1 Setting the volume before dispensing

Prerequisites

- The dispensing tip has been inserted.



1. Turn the volume selection dial until it locks into the desired position.
   The display shows the volume and the number of possible dispensing steps.

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5.3 Step counter

On the display, the step counter shows the dispensing steps next to *steps*. The possible dispensing steps are displayed when a dispenser tip is inserted or the volume is selected. The dispensing steps that were performed are displayed during dispensing. After the volume setting was changed and dispensing performed, the step counter starts again at *steps* 1. In case of aspiration without dispensing the residual liquid, the step counter continues. If the Combitip is only partially filled, the number of times the operating lever was pressed is also counted if the lowest position (residual stroke lock) was already reached. If the volume is changed in the case of partial filling, the possible steps are not shown.

The step counter will **not** continue to count when the dispenser tip is only partially filled after it has been filled to capacity.

If the dispenser tip is partially filled, the step counter continues counting when the filling lever is pressed even if the lower stop was reached.

5.4 Aspirating liquid

If a new dispenser tip is used, we recommend venting it. For this purpose, it is sufficient to aspirate and dispense a small amount of fluid once. Small air bubbles that are still in the area of the piston afterwards have no effect on the dispensing volume.

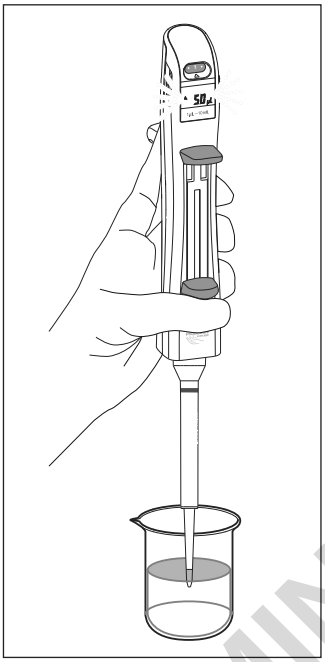
If you are aspirating solutions with a high viscosity into a dispenser tip with a large volume, draw up the filling lever especially slowly. This prevents any leakage occurring between the piston and the cylinder in the dispenser tip.

When dispensing alcohol ≥ 70%, the 5 mL and 10 mL dispenser tips must be pre-wet. The volume to be dispensed must include the remaining stroke.

Prerequisites

- The dispensing tip has been inserted.

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1. Immerse the pipette into the liquid.
2. Slowly and steadily slide the filling lever up.
   The display flashes during aspiration. The small air bubble at the dispenser tip piston is due to technical reasons. The dispenser tip is completely filled when the filling lever has reached the upper stop.
3. Wipe off any residual drips on the tip on the vessel wall.

To empty the dispenser tip, you can push the filling lever down at any time.

5.5 Dispensing liquid

If the dispenser tip is partially filled, you need to press the operating lever repeatedly if the selection dial setting is below 4.

Prerequisites

- Liquid has been aspirated.
- The display flashes.

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1. Press the operating lever to trigger the reverse stroke.
   When the reverse stroke is completed, the display will stop blinking. The *steps* display is set to *0*. During the subsequent dispensing procedures the completed *steps* steps are displayed.



After the liquid is aspirated the reverse stroke must be triggered.

Dispense the reverse stroke into the aspiration tube or a waste tube. The reverse stroke is not a dispensing step.

- If you want to complete all dispensing steps using the wall dispensing method, also complete the reverse stroke using the wall dispensing method.
- If you want to complete all dispensing steps using the free jet dispensing method, also complete the reverse stroke using the free jet dispensing method.
- If a drip forms after free jet dispensing, this drip always belongs to the next dispensing step.

Position of the volume selection dial	Number of times the operating lever was pressed for the reverse stroke
• (= 0.5)	8
1	4
• (= 1.5)	3
2	2
• (= 2.5)	2
3	2
• (= 3.5)	2
≥ 4	1

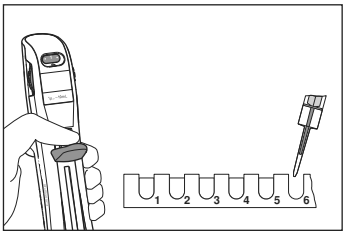
5.5.1 Dispensing liquid

Prerequisites

- Liquid has been aspirated.
- Reverse stroke has been performed.

The liquid dispensing angle should always be as steep as possible. A dispensing angle greater than 45° can result in an incorrect dispensing volume during the final dispensing steps.

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1. Place the tip of the dispenser tip at a steep angle on the tube inner wall of the target tube (wall dispensing) or hold the dispenser tip over the target (free jet dispensing).
2. Push the operating lever down as far as it will go.
   The display shows the *steps* and the number of dispensing steps performed.

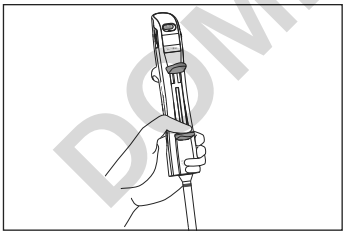
The faster you push the operating lever down, the faster the liquid is dispensed. Adjust the liquid dispensing to the tube geometry to prevent liquid splashing out of the tube. For highly viscous liquids, always operate the operating lever slowly.

3. Let the operating lever slide back fully to its initial position.
4. Push the operating lever down again to perform the next dispensing step.
   If there is not enough liquid for the selected dispensing volume, the residual stroke lock will prevent any further dispensing operations.
   The dispenser tip can be filled again or the residual liquid can be discarded.

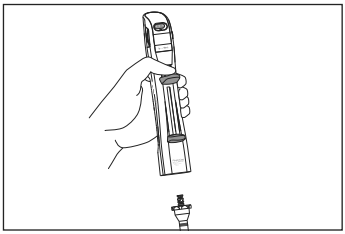
5.6 Ejecting the dispenser tip

Prerequisites

- The dispensing tip has been emptied.



1. Push the filling lever down as far as it will go.
   The display flashes.
   The display shows the ▼ symbol.



2. Hold the dispensing tip over a waste container.
3. Push the operating lever all the way down.
   The dispensing tip is ejected.

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5.6.1 Ejecting the Combitip with adapter

Prerequisites

- The dispensing tip has been emptied.

1. Push the operating lever all the way down.
2. Unscrew the adapter.
3. Dispose of dispenser tip.
4. If required, rinse the Adapter advanced with demineralized water and dry.

The Adapter advanced is a wear part. Do not reuse the adapter if it shows any visible signs of wear. An Adapter advanced is included in each box of 25 mL or 50 mL Combitips advanced.

5.7 Dispensing with an empty battery

The dispenser is also operational when the battery is empty.

▸ Use the volume table to set the volume.

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6 Troubleshooting

6.1 General errors

6.1.1 Battery

Problem	Cause	Solution
The battery symbol appears on the display.	• Battery capacity is very low.	▸ Replace the battery.
The battery symbol appears on the display.	• Battery capacity is extremely low.	▸ Replace the battery immediately.

6.1.2 Dispenser tip

Problem	Cause	Solution
It is not possible to eject the dispenser tip.	• Dispenser tip has not been completely emptied before being ejected. • Operating lever not fully operated.	1. Push the filling lever down as far as it will go. 2. Operate the operating lever firmly and centered.

6.1.3 Display

Problem	Cause	Solution
The display is dark.	• Battery fully discharged.	▸ Replace battery.
	• Sensor for detection of the dispenser tip defective.	▸ Call service.
	• Movement sensor faulty.	▸ Call service.
Number of the *steps* shown on the display is incorrect.	• Incorrect interpretation of the information.	▸ When selecting the volume, the possible dispensing steps are displayed. ▸ After the reverse stroke, the dispensing steps that were carried out are displayed.
	• Operating lever not fully pushed.	▸ Always push the operating lever down as far as it will go.

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6.1.4 Error codes

Problem	Cause	Solution
C02 Err C03 Err	• Dispenser tip badly bent or twisted during and after inserting it.	▸ Do not bend or twist the inserted dispenser tip.
	• Dispenser tip inserted incorrectly or incompletely.	1. Press the filling lever down all the way. 2. Operate the operating lever to eject the dispenser tip. 3. Check the dispenser tip or adapter for damage to coding.
	• Dispenser tip not fully released.	▸ Operate the operating lever again firmly and centered to eject the dispenser tip.
	• Coding on the dispenser tip defective.	▸ Insert new dispenser tip.
S03 Err	• Volume selection dial not engaged.	▸ Let the number or point engage exactly above the position display.

6.1.5 Liquid aspiration

Problem	Cause	Solution
Large air bubble in the dispenser tip after the liquid has been aspirated.	• Air has been aspirated while aspirating the liquid.	▸ Re-aspirate the liquid.
	• Highly viscous liquid has been aspirated too quickly.	▸ Aspirate liquid more slowly.
	• Lag time of the liquid not observed.	▸ Aspirate liquid more slowly.
	• Highly viscous liquid has been aspirated too quickly. • Combitips advanced used.	▸ Use ViscoTip. ▸ Aspirate liquid more slowly.

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6.1.6 Errors of measurement

Problem	Cause	Solution
Systematic and/or random error is too high.	• Reverse stroke given as dispensing volume by mistake.	▸ Repeat dispensing.
	• Operating lever not fully pushed during dispensing.	▸ Repeat dispensing.
	• Dispenser tip used too many times.	▸ Use new dispensing tip.
	• Many air bubbles in the aspirated liquid. • Dispenser tip held too crooked whilst dispensing.	▸ Repeat dispensing.

Regularly check the precision and accuracy of the to prevent dispensing errors.

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.

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7 Maintenance

7.1 Service options

Eppendorf recommends having your device checked and maintained by trained specialist personnel at regular intervals.

Eppendorf offers you tailor-made service solutions for the preventive maintenance, qualification and calibration of your device. For information, offers and contact options, please visit www.eppendorf.com/epservices.

7.2 Cleaning

7.2.1 Cleaning and disinfecting the housing

NOTICE! Damage to device from unsuitable cleaning agents or sharp or pointed objects.
Use of unsuitable cleaning agents may damage the device.

- Do not use caustic cleaning agents, strong solvents or abrasive polishes.
- Check the compatibility with the materials used.
- Please note the information on chemical resistance.
- Do **not** clean the device with acetone or organic solvents with a similar effect.
- Do **not** use sharp objects to clean the device.

NOTICE! Damage to device due to penetration of liquid.

- Only immerse the pipette tip in the liquid.
- Do not put the pipette down when the pipette tip is filled.
- The pipette itself may not come into contact with the liquid.

Observe the chemical resistance of the materials.

1. Moisten a cloth with a cleaning agent, a decontamination agent or isopropyl (70 %).
2. Remove any contamination on the outside.
3. Moisten the cloth with water.
4. Wipe down the housing and remove residual cleaning agent.

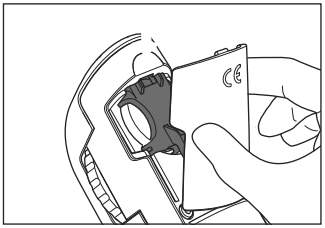
7.3 Decontamination

The dispenser can be decontaminated with UV light. This may lead to permanent discoloration of the material. The discoloration has no effect on the functionality of the dispenser.

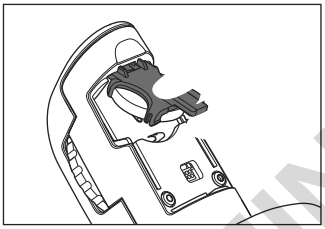
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7.4 Replacing the battery

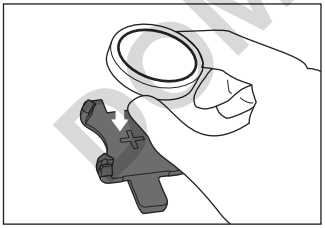
When the display shows the battery symbol, this indicates that the battery can still be used for approx. 2 weeks. When the display shows the battery symbol, the battery must be replaced.



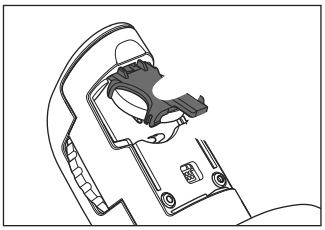
1. Press down on the recess and remove the battery compartment lid.



2. Lift the battery holder and remove it.



3. Insert new battery in the battery holder. The positive pole position is marked on the battery holder.



4. Insert battery holder let it snap into place.
   The display will be shown for a short time.
   The battery charge level will be shown for a short time.
5. Close the battery compartment lid

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8 Technical data

Multipette M4/Repeater M4	
Weight	105 g

Battery	
Type	Button cell
Voltage	3 V
Operational life	approx. 2 years

8.1 Errors of measurement
8.1.1 Errors of measurement with Combitips advanced dispenser tips

Test tip Combitips advanced	**Dispensing volume**	**Testing volume**	**Error of measurement**			
			systematic		**random**	
			± %	**± µL**	**± %**	**± µL**
0.1 mL white	1 µL – 20 µL	1 µL	8	0.08	13	0.13
		2 µL	1.6	0.032	3	0.06
		10 µL	1.2	0.12	2.4	0.24
		20 µL	1	0.2	2	0.4
0.2 mL light blue	2 µL – 40 µL	2 µL	6	0.12	8	0.16
		4 µL	1.3	0.052	2	0.08
		20 µL	0.8	0.16	1.5	0.3
		40 µL	0.8	0.32	1.5	0.6
0.5 mL violet	5 µL – 100 µL	5 µL	4	0.2	8	0.4
		10 µL	0.9	0.09	1.5	0.15
		50 µL	0.8	0.4	0.8	0.4
		100 µL	0.8	0.8	0.6	0.6
1 mL yellow	10 µL – 200 µL	10 µL	4	0.4	8	0.8
		20 µL	0.9	0.18	0.9	0.18
		100 µL	0.6	0.6	0.6	0.6
		200 µL	0.6	1.2	0.4	0.8
2.5 mL green	25 µL – 500 µL	25 µL	4	1	8	2
		50 µL	0.8	0.4	0.8	0.4
		250 µL	0.6	1.5	0.6	1.5
		500 µL	0.5	2.5	0.3	1.5

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Test tip Combitips advanced	Dispensing volume	Testing volume	Error of measurement			
			systematic		random	
			± %	± µL	± %	± µL
5 mL blue	50 µL – 1000 µL	50 µL	3	1.5	5	2.5
		100 µL	0.6	0.6	0.6	0.6
		500 µL	0.5	2.5	0.5	2.5
		1000 µL	0.5	5	0.25	2.5
10 mL orange	0.1 mL – 2 mL	0.1 mL	3	3	4	4
		0.2 mL	0.5	1	0.6	1.2
		1 mL	0.5	5	0.4	4
		2 mL	0.5	10	0.25	5
25 mL red	0.25 mL – 5 mL	0.25 mL	3	7.5	3	7.5
		0.5 mL	0.4	2	0.6	3
		2.5 mL	0.3	7.5	0.5	12.5
		5 mL	0.3	15	0.25	12.5
50 mL light gray	0.5 mL – 10mL	0.5 mL	6	30	10	50
		1 mL	0.3	3	0.5	5
		5 mL	0.3	15	0.5	25
		10 mL	0.3	30	0.25	25

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8.2 Test conditions

Test conditions and test evaluation in compliance with ISO 8655, Part 6. Tested using a standardized analytical scale with evaporation protection.

- Number of determinations: 10
- Use of water in accordance with ISO 3696
- Test with completely-filled dispenser tip
- Tested at 20 °C – 27 °C, ±0.5 °C
- Dispensing against the tube inner wall

The three largest testing volumes per tip (100 %, 50 %, 10 % of the nominal volume) correspond to the specifications in accordance with ISO 8655, Part 5. The test is to be carried out with these three testing volumes for testing of the systematic and random error in compliance with the standard. The smallest adjustable volume of 5 % serves to provide additional information.

Higher viscous liquids may cause deviating measured values. For more information on viscous liquids and their influence on errors of measurement, please go to www.eppendorf.com/manuals.

8.3 Ambient conditions

Environment	For indoor use only. The surroundings must not be moist.
Ambient temperature	5 °C – 40 °C
Relative humidity	10 % – 95 %, non-condensing.
Atmospheric pressure	795 hPa – 1060 hPa

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9 Transport, storage and disposal

9.1 Decontamination before shipment

CAUTION! Use of a contaminated device may result in personal injury 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 health hazard
- potentially infectious agents
- organic solvents and reagents
- radioactive substances
- proteins presenting a health hazard
- DNA

1. Please note the information in the "Decontamination certificate for product returns" document.
   It is available as a PDF document on our website www.eppendorf.com/decontamination.
2. Enter the serial number of the device on the decontamination certificate.
3. Enclose the completed decontamination certificate for returned goods with the device.
4. Send the device to Eppendorf SE or to an authorized service center.

9.2 Transport

- Use the original packaging and the transport securing devices for transport.

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-25 °C – 60 °C	10 % – 95 %	300 hPa – 1060 hPa
Air freight	-40 °C – 45 °C	10 % – 95 %	300 hPa – 1060 hPa

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9.3 Storage

NOTICE! Damage to device due to incorrect storage.

- Remove the battery if you will not be using the device for an extended period (> 2 months).
- Do not store the device with the dispenser tip inserted.
- Select a secure storage location.
- Do not expose the device to aggressive gases over an extended period.

NOTICE! Damage due to UV radiation.

- Do not store consumables in areas with strong UV radiation.

	Air temperature	**Relative humidity**	**Atmospheric pressure**
In transport packing	-25 °C – 55 °C	10 % – 95 %	700 hPa – 1060 hPa
Without transport packing	-5 °C – 45 °C	10 % – 95 %	700 hPa – 1060 hPa

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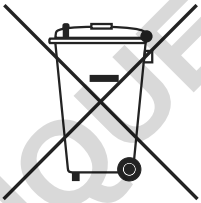
9.4 Disposal

Observe the relevant legal regulations when disposing of the product.

Information on the disposal of electrical and electronic devices in the European Community:

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. They are marked with the following symbol to indicate this:





WARNING! Risk of explosion or fire due to overheated rechargeable batteries and batteries.

- Do not heat rechargeable batteries and other batteries to temperatures above 60 °C and do not throw them into a fire.

Do not dispose of batteries as household waste. Dispose of batteries in accordance with the local regulations.

As the disposal regulations may differ from one country to another within the EU, please contact your supplier for more information.

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10 Ordering Information

10.1 DispenserMultipette M4/Repeater M4

Order no. (International)	Order no. (North America)	Description
4982 000.012	–	**Multipette M4**
–	4982000020	**Repeater M4**
4982 000.314	–	**Multipette M4 Starter Kit** Multipette M4, Combitip Rack, Combitip Assortmentpack
–	4982000322	**Repeater M4 Starter Kit** Repeater M4, Combitip Rack, Combitip Assortmentpack

10.2 Spare parts

Order no. (International)	Order no. (North America)	Description
4982 601.008		**Battery compartment lid**
4982 604.007	4982604007	**Battery holder**
4980 215.003	022269119	**Battery 3 V**

10.3 Accessories for the dispenser

Order no. (International)	Order no. (North America)	Description
3116 000.015	3116000015	**Carousel 2** for 6 Eppendorf Research/plus, Reference/2 or Biomaster additional holders are optionally available
3116 000.058	3116000058	**Stand 2** for one Eppendorf Multipette (Repeater) M4
3116 000.147	3116000147	**Holder 2** for one Eppendorf Multipette (Repeater) M4 for Carousel 2, Charger Carousel 2 or wall mounting

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10.4 Dispenser tip – Combitips advanced
10.4.1 Purity grade – Eppendorf Quality

Order no. (International)	Order no. (North America)	Description
0030 089.405	0030089405	**Combitips advanced 0.1 mL** 100 pieces Eppendorf Quality
0030 089.413	0030089413	**Combitips advanced 0.2 mL** 100 pieces Eppendorf Quality
0030 089.421	0030089421	**Combitips advanced 0.5 mL** 100 pieces Eppendorf Quality
0030 089.430	0030089430	**Combitips advanced 1.0 mL** 100 pieces Eppendorf Quality
0030 089.448	0030089448	**Combitips advanced 2.5 mL** 100 pieces Eppendorf Quality
0030 089.456	0030089456	**Combitips advanced 5.0 mL** 100 pieces Eppendorf Quality
0030 089.464	0030089464	**Combitips advanced 10 mL** 100 pieces Eppendorf Quality
0030 089.472	0030089472	**Combitips advanced 25 mL** 100 pieces + 4 Adapter Eppendorf Quality
0030 089.480	0030089480	**Combitips advanced 50 mL** 100 pieces + 4 Adapter Eppendorf Quality

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10.4.2 Purity grade – Sterile

Order no. (International)	Order no. (North America)	Description
–	0030089510	**Combitips advanced 0.1 mL** 100 pieces Sterile, individually wrapped
–	0030089529	**Combitips advanced 0.2 mL** 100 pieces Sterile, individually wrapped
–	0030089537	**Combitips advanced 0.5 mL** 100 pieces Sterile, individually wrapped
–	0030089545	**Combitips advanced 1.0 mL** 100 pieces Sterile, individually wrapped
–	0030089553	**Combitips advanced 2.5 mL** 100 pieces Sterile, individually wrapped
–	0030089561	**Combitips advanced 5.0 mL** 100 pieces Sterile, individually wrapped
–	0030089570	**Combitips advanced 10 mL** 100 pieces Sterile, individually wrapped
–	0030089588	**Combitips advanced 25 mL** 100 pieces + 4 Adapter Sterile, individually wrapped
–	0030089596	**Combitips advanced 50 mL** 100 pieces + 4 Adapter Sterile, individually wrapped

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10.4.3 Purity grade – Biopur

Order no. (International)	Order no. (North America)	Description
0030 089.618	0030089618	**Combitips advanced 0.1 mL** 100 pieces Biopur, individually wrapped
0030 089.626	0030089626	**Combitips advanced 0.2 mL** 100 pieces Biopur, individually wrapped
0030 089.634	0030089634	**Combitips advanced 0.5 mL** 100 pieces Biopur, individually wrapped
0030 089.642	0030089642	**Combitips advanced 1.0 mL** 100 pieces Biopur, individually wrapped
0030 089.650	0030089650	**Combitips advanced 2.5 mL** 100 pieces Biopur, individually wrapped
0030 089.669	0030089669	**Combitips advanced 5.0 mL** 100 pieces Biopur, individually wrapped
0030 089.677	0030089677	**Combitips advanced 10 mL** 100 pieces Biopur, individually wrapped
0030 089.685	0030089685	**Combitips advanced 25 mL** 100 pieces + 4 Adapter Biopur, individually wrapped
0030 089.693	0030089693	**Combitips advanced 50 mL** 100 pieces + 4 Adapter Biopur, individually wrapped

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10.4.4 Purity grade – PCR clean

Order no. (International)	Order no. (North America)	Description
0030 089.766	–	**Combitips advanced 0.1 mL** 100 pieces PCR clean
0030 089.774	–	**Combitips advanced 0.2 mL** 100 pieces PCR clean
0030 089.782	–	**Combitips advanced 0.5 mL** 100 pieces PCR clean
0030 089.790	–	**Combitips advanced 1.0 mL** 100 pieces PCR clean
0030 089.804	–	**Combitips advanced 2.5 mL** 100 pieces PCR clean
0030 089.812	–	**Combitips advanced 5.0 mL** 100 pieces PCR clean
0030 089.820	–	**Combitips advanced 10 mL** 100 pieces PCR clean
0030 089.839	–	**Combitips advanced 25 mL** 100 pieces + 4 Adapter PCR clean
0030 089.847	–	**Combitips advanced 50 mL** 100 pieces + 4 Adapter PCR clean

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10.4.5 Purity grade – Forensic DNA Grade

Order no. (International)	Order no. (North America)	Description
0030 089.855	0030089855	**Combitips advanced 1.0 mL** 100 pieces Forensic DNA Grade, individually wrapped
0030 089.863	0030089863	**Combitips advanced 2.5 mL** 100 pieces Forensic DNA Grade, individually wrapped
0030 089.871	0030089871	**Combitips advanced 5.0 mL** 100 pieces Forensic DNA Grade, individually wrapped

10.4.6 Adapter advanced for dispenser tip

Order no. (International)	Order no. (North America)	Description
0030 089.715	0030089715	**Adapter advanced 25 mL** 1 piece Eppendorf Quality
0030 089.723	0030089723	**Adapter advanced 50 mL** 1 piece Eppendorf Quality
0030 089.731	0030089731	**Adapter advanced 25 mL** 7 pieces Biopur, individually wrapped
0030 089.740	0030089740	**Adapter advanced 50 mL** 7 pieces Biopur, individually wrapped

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10.5 Dispenser tip – ViscoTip

10.5.1 Purity grade – Eppendorf Quality

Order no. (International)	Order no. (North America)	Description
		ViscoTip 10 mL 100 pieces
0030 089.502	0030089502	Eppendorf Quality

10.6 Accessories for Combitips advanced

Order no. (International)	Order no. (North America)	Description
		Combitips advanced Rack 1 piece
0030 089.758	0030089758	Eppendorf Quality, for 8 dispenser tips (0.1 – 10 mL)

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