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## Multipette® M4 · Repeater® M4

Operating manual

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## Table of contents

<b>1</b>	<b>Operating instructions</b> . . . . .	<b>5</b>
1.1	Using this manual . . . . .	5
1.2	Danger symbols and danger levels . . . . .	5
1.2.1	Danger symbols . . . . .	5
1.2.2	Danger levels . . . . .	5
1.3	Symbols used . . . . .	5
1.4	Glossary . . . . .	6
<b>2</b>	<b>Safety</b> . . . . .	<b>9</b>
2.1	Intended use . . . . .	9
2.2	Warnings for intended use . . . . .	9
2.3	Information on product liability . . . . .	10
<b>3</b>	<b>Product description</b> . . . . .	<b>11</b>
3.1	Delivery package . . . . .	11
3.2	Features . . . . .	11
3.3	Product overview . . . . .	12
3.4	Display . . . . .	13
3.5	Dispenser tips – Combitips advanced and ViscoTip . . . . .	13
3.6	Overview of dispenser tips . . . . .	14
3.6.1	Combitips advanced volume ranges . . . . .	14
3.6.2	ViscoTip volume range . . . . .	15
3.7	Materials . . . . .	15
3.8	Warranty . . . . .	16
<b>4</b>	<b>Installation</b> . . . . .	<b>17</b>
4.1	Using the holder . . . . .	17
4.1.1	Mounting the holder on a wall . . . . .	17
4.1.2	Removing wall mount from wall . . . . .	17
<b>5</b>	<b>Operation</b> . . . . .	<b>18</b>
5.1	Inserting the dispenser tip . . . . .	18
5.1.1	Select dispenser tip . . . . .	18
5.1.2	Volume table . . . . .	19
5.1.3	Dispenser tip selection example . . . . .	20
5.1.4	Inserting the dispensing tip . . . . .	20
5.1.5	Picking up dispenser tips out of the rack . . . . .	21
5.2	Setting the volume . . . . .	21
5.2.1	Setting the volume before dispensing . . . . .	21
5.3	Step counter . . . . .	21
5.4	Aspirating liquid . . . . .	22
5.5	Dispensing liquid . . . . .	23
5.5.1	Dispensing liquid . . . . .	24
5.6	Ejecting the dispenser tip . . . . .	25
5.6.1	Ejecting the Combitip with adapter . . . . .	25
5.7	Dispensing with an empty battery . . . . .	25

## Table of contents

### 4 Multipipette® M4 · Repeater® M4 English (EN)

<b>6</b>	<b>Troubleshooting</b> . . . . .	<b>26</b>
6.1	General errors . . . . .	26
6.1.1	Battery . . . . .	26
6.1.2	Dispenser tip . . . . .	26
6.1.3	Display . . . . .	26
6.1.4	Error codes . . . . .	27
6.1.5	Liquid aspiration . . . . .	27
6.1.6	Errors of measurement . . . . .	28
<b>7</b>	<b>Maintenance</b> . . . . .	<b>29</b>
7.1	Cleaning . . . . .	29
7.1.1	Cleaning and disinfecting the housing . . . . .	29
7.2	Replacing the battery . . . . .	29
<b>8</b>	<b>Technical data</b> . . . . .	<b>31</b>
8.1	Errors of measurement . . . . .	31
8.1.1	Errors of measurement with Combitips advanced dispenser tips . . . . .	31
8.2	Test conditions . . . . .	32
8.3	Ambient conditions . . . . .	33
<b>9</b>	<b>Transport, storage and disposal</b> . . . . .	<b>34</b>
9.1	Decontamination before shipment . . . . .	34
9.2	Transport . . . . .	35
9.3	Storage . . . . .	35
9.4	Disposal . . . . .	36
<b>10</b>	<b>Ordering information</b> . . . . .	<b>37</b>
10.1	Dispenser Multipipette M4/Repeater M4 . . . . .	37
10.1.1	Dispenser accessories . . . . .	37
10.2	Dispenser tip – Combitips advanced . . . . .	38
10.2.1	Purity grade – Eppendorf Quality . . . . .	38
10.2.2	Purity grade – Sterile . . . . .	39
10.2.3	Purity grade – Biopur . . . . .	40
10.2.4	Purity grade – PCR clean . . . . .	41
10.2.5	Purity grade – Forensic DNA Grade . . . . .	42
10.2.6	Adapter advanced for Combitips advanced . . . . .	42
10.3	Dispenser tip – ViscoTip . . . . .	42
10.3.1	Purity grade – Eppendorf Quality . . . . .	42
10.4	Accessories . . . . .	43
	<b>Index</b> . . . . .	<b>44</b>
	<b>Certificates</b> . . . . .	<b>47</b>

## 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](http://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:

	<b>Biohazard</b>		<b>Explosive substances</b>
	<b>Toxic substances</b>		<b>Material damage</b>
	<b>Hazard point</b>		

#### 1.2.2 Danger levels

<b>DANGER</b>	<i>Will</i> lead to severe injuries or death.
<b>WARNING</b>	<i>May</i> lead to severe injuries or death.
<b>CAUTION</b>	May lead to light to moderate injuries.
<b>NOTICE</b>	May lead to material damage.

### 1.3 Symbols used

Depiction	Meaning
1.	Actions in the specified order
2.	
▶	Actions without a specified order
•	List
①	Step in the figures
<i>Text</i>	Display or software texts
	Additional information

## **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 Multipipettes and Repeaters. Dispenser tips are single-use consumables which function using the positive displacement principle and consist of a piston and a cylinder.

### **D**

#### **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.

### **I**

#### **Increment**

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

## **ISO 8655**

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

## **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.

## V

### **Viscosity**

Viscosity describes the viscosity 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.



## 2 Safety

### 2.1 Intended use

The Multipette M4/Repeater M4 is a laboratory instrument intended for dispensing liquids in doses of between 1 µL – 50 mL in connection with a dispenser tip (Combitips advanced or ViscoTip). 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 Warnings for intended use

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**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, the Material 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, in its respectively current valid version).



**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 material safety data sheets and manufacturer's 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 the 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 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! 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.
- 

## 2.3 Information on product liability

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

- 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 that are not recommended by Eppendorf.
- The device is maintained or repaired by persons not authorized by Eppendorf AG.
- The user makes unauthorized changes to the device.

**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 50 mL can be dispensed.

### 3.3 Product overview

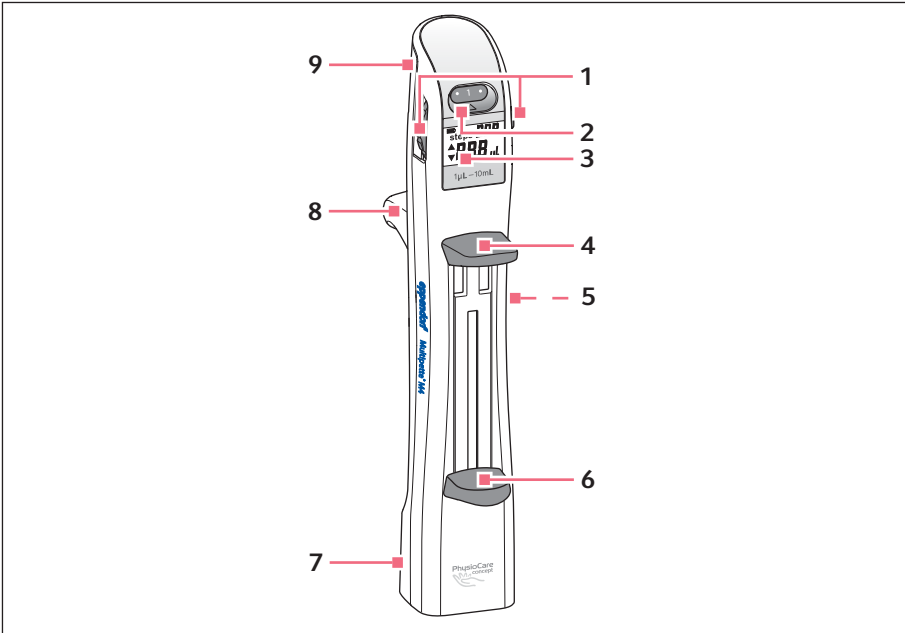


Fig. 3-1: Multipette M4/Repeater M4

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

### 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.

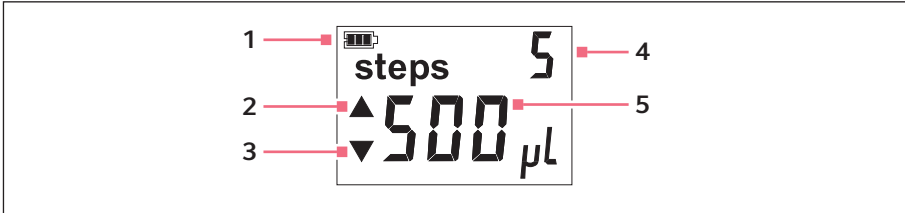


Fig. 3-2: Display on inserted dispenser tip

- |                                   |                                                |
|-----------------------------------|------------------------------------------------|
| <b>1 Battery charge condition</b> | <b>4 Number of dispensing steps</b>            |
| <b>2 Liquid aspiration</b>        | <b>5 Dispensing volume per dispensing step</b> |
| <b>3 Liquid dispensing</b>        |                                                |

**i** 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.

**Product description**

Multipipette® M4 · Repeater® M4  
English (EN)

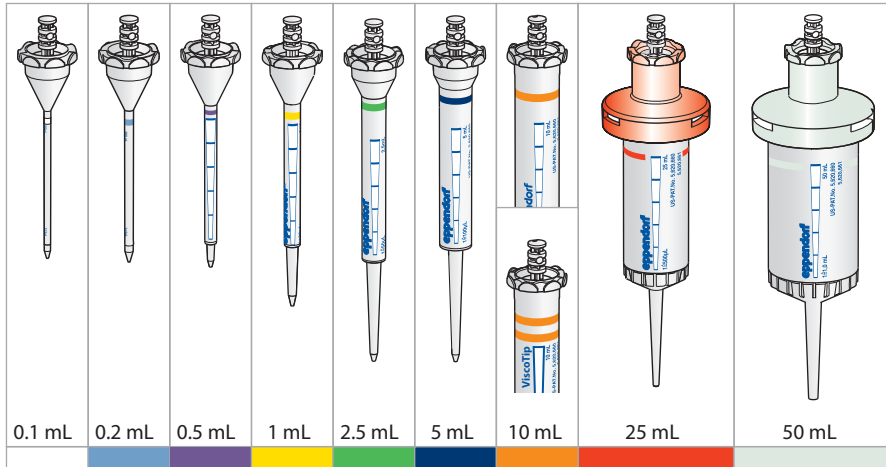
**3.6 Overview of dispenser tips**

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 $\mu$ L – 100 $\mu$ L	1 $\mu$ L
0.2 mL light blue	2.0 $\mu$ L – 200 $\mu$ L	2 $\mu$ L
0.5 mL violet	5.0 $\mu$ L – 500 $\mu$ L	5 $\mu$ L
1 mL yellow	10 $\mu$ L – 1000 $\mu$ L	10 $\mu$ L
2.5 mL green	25 $\mu$ L – 2500 $\mu$ L	25 $\mu$ L
5 mL blue	50 $\mu$ L – 5000 $\mu$ L	50 $\mu$ L
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

### 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	<ul style="list-style-type: none"> <li>• Polyetherimide (PEI)</li> <li>• Polybutylene terephthalate (PBT)</li> <li>• Polyetheretherketone (PEEK)</li> <li>• Acrylonitrile styrene copolymerisate with polycarbonate (ASA/PC)</li> <li>• Silicone</li> </ul>
Holder	Acrylonitrile styrene copolymerisate with polycarbonate (ASA/PC)

### **3.8 Warranty**

In case of warranty claims, contact your local Eppendorf contractual partner.

No warranty is given in the following cases:

- In the case of misuse.
- If unauthorized persons open the dispenser.

The following assemblies are excluded from the warranty:

- Wear parts
- Battery

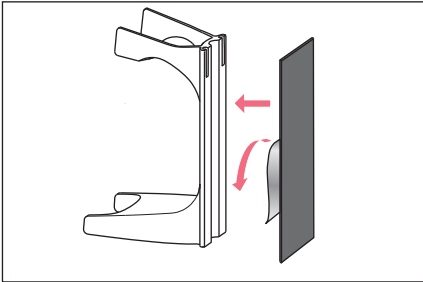


## 4 Installation

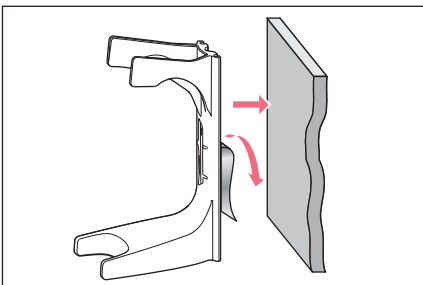
### 4.1 Using the holder

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.

**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.

### 5.1.2 Volume table

Selection dial	Dispensing steps	0.1 mL	0.2 mL	0.5 mL	1.0 mL	2.5 mL	5.0 mL	10 mL	25 mL	50 mL
		 white	 light blue	 violet	 yellow	 green	 blue	 orange	 red	 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

### 5.1.4 Inserting the dispensing tip

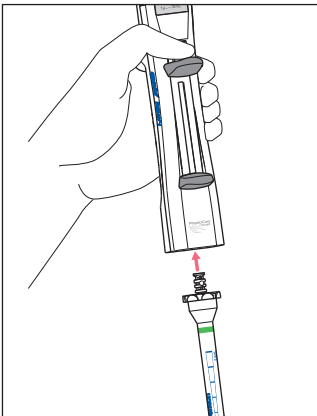


**NOTICE! Damage to the device due to incorrect handling of the inserted dispenser tip.**

- ▶ Insert the dispenser tip straight into the dispenser from below.
- ▶ Do not rotate 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.



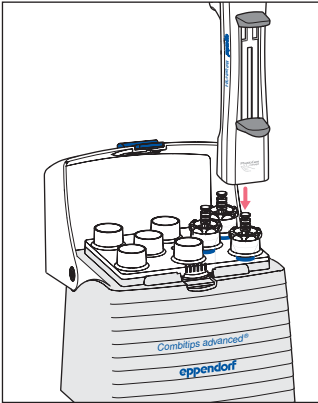
1. Push the filling lever down.
2. Insert the dispensing tip straight from below.
3. If required, push the filling lever down again.

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.

### 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.

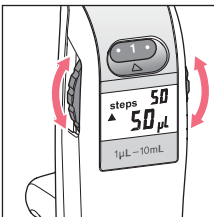
### 5.2 Setting the volume

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.

### 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.

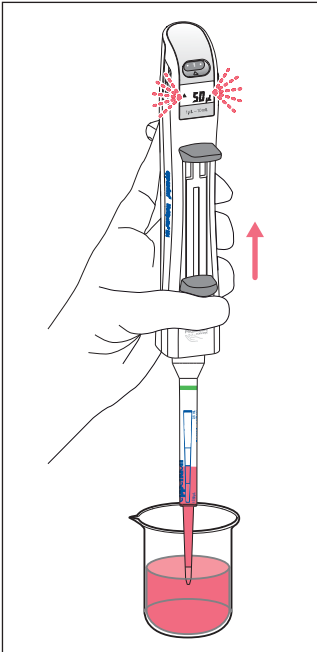
- i** The step counter will **not** continue to count when the dispenser tip is only partially filled after it has been filled to capacity.
- i** If the dispenser tip is partially filled, the step counter continues counting when the filling lever is pressed even if the lower stop was reached.

#### 5.4 Aspirating liquid

- i** 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.

##### Prerequisites

- The dispensing lever has been inserted.



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.

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

## 5.5 Dispensing liquid

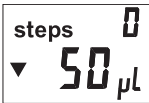
If the dispenser tip is partially filled, you need to press the operating lever repeatedly if the selection dial setting is below 4.

Prerequisites

- Liquid has been aspirated.
- The display flashes.

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.

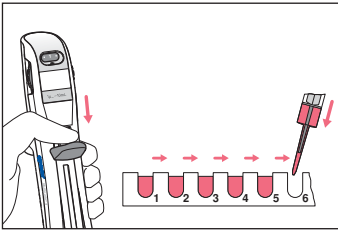
Position of the volume selection dial	Number of times the operating lever was pressed for the reverse stroke
• (= 0.5)	8
1	4
• (= 1.5)	3
2	2
• (= 2.5)	2
3	2
• (= 3.5)	2
≥ 4	1

### 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.



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.

**i** 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.

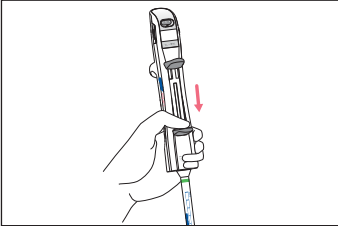
3. Let the operating lever slide back fully to its initial position.
4. Push the operating lever down again to perform the next dispensing step.  
If there is not enough liquid for the selected dispensing volume, the residual stroke lock will prevent any further dispensing operations.  
The dispenser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



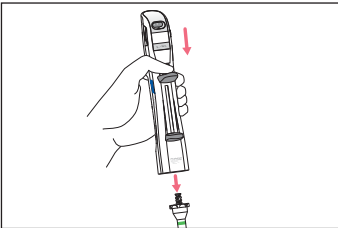
## 5.6 Ejecting the dispenser tip

### 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.

### 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.

## 6 Troubleshooting

### 6.1 General errors

#### 6.1.1 Battery

Problem	Cause	Solution
The battery symbol  appears on the display.	<ul style="list-style-type: none"> <li>Battery capacity is very low.</li> </ul>	▶ Replace the battery.
The battery symbol  appears on the display.	<ul style="list-style-type: none"> <li>Battery capacity is extremely low.</li> </ul>	▶ Replace the battery immediately.

#### 6.1.2 Dispenser tip

Problem	Cause	Solution
It is not possible to eject the dispenser tip.	<ul style="list-style-type: none"> <li>Dispenser tip has not been completely emptied before being ejected.</li> <li>Operating lever not fully operated.</li> </ul>	<ol style="list-style-type: none"> <li>Push the filling lever down as far as it will go.</li> <li>Operate the operating lever firmly and centered.</li> </ol>

#### 6.1.3 Display

Problem	Cause	Solution
Display is dark.	<ul style="list-style-type: none"> <li>Battery fully discharged.</li> </ul>	▶ Replace battery.
	<ul style="list-style-type: none"> <li>Sensor for detection of the dispenser tip defective.</li> </ul>	▶ Call service.
	<ul style="list-style-type: none"> <li>Movement sensor faulty.</li> </ul>	▶ Call service.
Number of the <i>steps</i> shown on the display is incorrect.	<ul style="list-style-type: none"> <li>Incorrect interpretation of the information.</li> </ul>	<p>▶ When selecting the volume, the possible dispensing steps are displayed.</p> <p>▶ After the reverse stroke, the dispensing steps that were carried out are displayed.</p>
	<ul style="list-style-type: none"> <li>Operating lever not fully pushed.</li> </ul>	▶ Always push the operating lever down as far as it will go.

### 6.1.4 Error codes

Problem	Cause	Solution
C02 Err C03 Err	<ul style="list-style-type: none"> <li>Dispenser tip badly bent or twisted during and after inserting it.</li> </ul>	<ul style="list-style-type: none"> <li>Do not bend or twist the inserted dispenser tip.</li> </ul>
	<ul style="list-style-type: none"> <li>Dispenser tip inserted incorrectly or incompletely.</li> </ul>	<ol style="list-style-type: none"> <li>Press the filling lever down all the way.</li> <li>Operate the operating lever to eject the dispenser tip.</li> <li>Check the dispenser tip or adapter for damage to coding.</li> </ol>
	<ul style="list-style-type: none"> <li>Dispenser tip not fully released.</li> </ul>	<ul style="list-style-type: none"> <li>Operate the operating lever again firmly and centered to eject the dispenser tip.</li> </ul>
	<ul style="list-style-type: none"> <li>Coding on the dispenser tip defective.</li> </ul>	<ul style="list-style-type: none"> <li>Insert new dispenser tip.</li> </ul>
S03 Err	<ul style="list-style-type: none"> <li>Volume selection dial not engaged.</li> </ul>	<ul style="list-style-type: none"> <li>Let the number or point engage exactly above the position display.</li> </ul>

### 6.1.5 Liquid aspiration

Problem	Cause	Solution
Large air bubble in the dispenser tip after the liquid has been aspirated.	<ul style="list-style-type: none"> <li>Air has been aspirated while aspirating the liquid.</li> </ul>	<ul style="list-style-type: none"> <li>Re-aspirate the liquid.</li> </ul>
	<ul style="list-style-type: none"> <li>Highly viscous liquid has been aspirated too quickly.</li> </ul>	<ul style="list-style-type: none"> <li>Aspirate liquid more slowly.</li> </ul>
	<ul style="list-style-type: none"> <li>Lag time of the liquid not observed.</li> </ul>	<ul style="list-style-type: none"> <li>Aspirate liquid more slowly.</li> </ul>
	<ul style="list-style-type: none"> <li>Highly viscous liquid has been aspirated too quickly.</li> </ul>	<ul style="list-style-type: none"> <li>Use ViscoTip.</li> </ul>
	<ul style="list-style-type: none"> <li>Combitips advanced used.</li> </ul>	<ul style="list-style-type: none"> <li>Aspirate liquid more slowly.</li> </ul>

### 6.1.6 Errors of measurement

Problem	Cause	Solution
Systematic and/or random error is too high.	<ul style="list-style-type: none"> <li>Reverse stroke given as dispensing volume by mistake.</li> </ul>	▶ Repeat dispensing.
	<ul style="list-style-type: none"> <li>Operating lever not fully pushed during dispensing.</li> </ul>	▶ Repeat dispensing.
	<ul style="list-style-type: none"> <li>Dispenser tip used too many times.</li> </ul>	▶ Use new dispensing tip.
	<ul style="list-style-type: none"> <li>Many air bubbles in the aspirated liquid.</li> <li>Dispenser tip held too crooked whilst dispensing.</li> </ul>	▶ 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](http://www.eppendorf.com/manuals).

**7 Maintenance**  
**7.1 Cleaning**  
**7.1.1 Cleaning and disinfecting the housing**



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

Unsuitable cleaning agents may damage the device.

- ▶ Do not use corrosive 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 or pointed objects to clean the device.



**NOTICE! Damage to the 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.

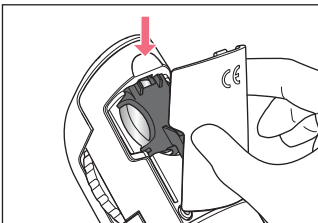


Observe the chemical resistance of the materials.

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.

**7.2 Replacing the battery**

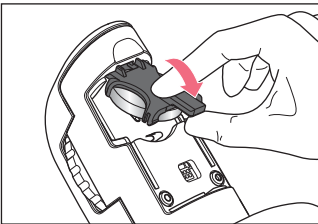
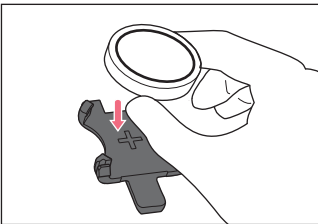
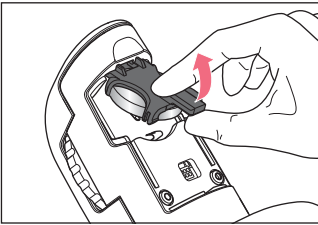
When the display shows the  battery symbol, this indicates that the battery can still be used for approx. 2 weeks. When the display shows the  battery symbol, the battery must be replaced.



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

## Maintenance

### 30 Multipette® M4 · Repeater® M4 English (EN)



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

## 8 Technical data

<b>Multipette M4/Repeater M4</b>	
Weight	105 g
<b>Battery</b>	
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 error		Random error	
			± %	± 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

**Technical data**

Multipette® M4 · Repeater® M4

English (EN)

Test tip Combitips advanced	Dispensing volume	Testing volume	Error of measurement			
			Systematic error		Random error	
			± %	± µL	± %	± µL
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
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

**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



- i** 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.
  
- i** 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](http://www.eppendorf.com/manuals).

### 8.3 Ambient conditions

Environment	For indoor use only
Ambient temperature	5 °C – 40 °C
Relative humidity	10 % – 95 %, non-condensing
Atmospheric pressure	795 hPa – 1060 hPa

## 9 Transport, storage and disposal

### 9.1 Decontamination before shipment

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

## 9.2 Transport

▶ Use the original packaging 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

## 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 packaging	-25 °C – 55 °C	10 % – 95 %	700 hPa – 1060 hPa
Without transport packaging	-5 °C – 45 °C	10 % – 95 %	700 hPa – 1060 hPa

## 9.4 Disposal

In case the product is to be disposed of, the relevant legal regulations are to be observed.

### **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 2002/96/EC 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:

As disposal regulations may differ from country to country within the EU, please contact your supplier if necessary.



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

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

### **Disposing of accumulators and batteries**

Do not dispose of accumulators and batteries as household waste. Dispose of accumulators and batteries according to the locally applicable legal regulations.



**10 Ordering information**  
**10.1 Dispenser Multipette M4/Repeater M4**

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

**10.1.1 Dispenser accessories**

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

**Ordering information**

Multipette® M4 · Repeater® M4  
English (EN)

**10.2 Dispenser tip – Combitips advanced****10.2.1 Purity grade – Eppendorf Quality**

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

### 10.2.2 Purity grade – Sterile

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

**Ordering information**

Multipipette® M4 · Repeater® M4  
English (EN)

**10.2.3 Purity grade – Biopur**

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



#### 10.2.4 Purity grade – PCR clean

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

**Ordering information**

Multipipette® M4 · Repeater® M4  
English (EN)

**10.2.5 Purity grade – Forensic DNA Grade**

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

**10.2.6 Adapter advanced for Combitips advanced**

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

**10.3 Dispenser tip – ViscoTip****10.3.1 Purity grade – Eppendorf Quality**

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

#### 10.4 Accessories

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

**Index****B**

Battery	
Replacing.....	29

**C**

Cleaning .....	29
Color code	
Color code .....	14
Color identification	
Volumes.....	14
Combitip	
Adapter .....	25
Color code .....	14
Volume table.....	19

**D**

Delivery package .....	11
Disinfection .....	29
Dispenser tip	
Eject.....	25
Inserting .....	18
Rack.....	21
Select.....	18
Display	
Sleep function.....	13
Disposal .....	36

**E**

Errors of measurement	
Combitips advanced .....	31

**F**

Free jet dispensing .....	24
---------------------------	----

**H**

Holder	
Wall mount .....	17

**I**

Inserting the dispensing tip .....	20
------------------------------------	----

**L**

Liquid	
Aspiration .....	22
Dispensing .....	23, 24
Free jet dispensing.....	24
Reverse stroke.....	23
Wall dispensing.....	24

**M**

Material .....	15
----------------	----

**R**

Reverse stroke.....	23
---------------------	----

**S**

Sleep function	
Display .....	13
Step counter.....	21
steps.....	21
steps	
Step counter.....	21
Storage.....	35

**T**

Technical data	
Ambient conditions.....	33
Battery for M4.....	31
Multipette M4/Repeater M4.....	31
Troubleshooting	
Battery.....	26
Dispenser tip .....	26
Display .....	26
Error codes.....	27
Errors of measurement .....	28
Liquid aspiration .....	27

**V**

ViscoTip  
Color code ..... 14

Volume  
Setting ..... 21

Volume table..... 19

**W**

Wall dispensing ..... 24

Warranty ..... 16

**Index**

**46** Multipette® M4 · Repeater® M4  
English (EN)

# Declaration of Conformity

The product named below fulfills the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

**Product name:**

Multipette® M4 / Repeater® M4

**Product type:**

Manual dispenser

**Relevant directives / standards:**

2014/35/EU EN 61010- 1

2014/30/EU EN 55011, EN 61326- 1

2011/65/EU EN 50581

EN ISO 8655- 1, EN ISO 8655- 5, EN ISO 8655- 6

Date: February 16, 2016



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