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Automated Liquid Handling System epMotion® 5073

Operating Manual

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1 About this manual

1.1 Notes on this manual

The dates in this manual correspond to the international date format as specified in ISO 8601. All dates are shown in the format YYYY-MM-DD or YYYY-MM.

1. Before using the product, read this manual completely.
2. Please ensure that you have the manual available during the use of the product.



Should you require any other manuals, please contact Eppendorf SE.

1.2 Warning notice structure



HAZARD LEVEL! Type of danger

Source of danger

Consequences of disregarding the danger

– Measures to avoid the danger

Symbol	Hazard level	Type of danger	Meaning
	DANGER	Personal injury	Will lead to severe injuries or death.
	WARNING	Personal injury	May lead to severe injury or death.
	CAUTION	Personal injury	May lead to minor or moderate injuries.
	NOTE	Material damage	May lead to material damage.

1.3 Graphics

Depiction	Meaning
1.	Work steps
2.	
•	Bullet point
<i>Text</i>	Display text
Key	Name for port, button, status lamp, or key
	Important information
	Hint

1.4 Other applicable documents

The following documents supplement this manual:

- Software manual for epBlue with MultiCon
- Original operating manual for MultiCon PC

2 Safety

2.1 Intended use

The epMotion 5073 is intended for use in laboratories for research, development, industrial and routine work, as well as for training and education. The areas of application include, but are not limited to, the fields of life sciences, biotechnology and chemistry.

All epMotion 5073 automated pipetting systems (l and t) are designed to monitor the contamination-free, precise and correct dispensing and transfer of liquids, and to automatically control the merging of liquids.

The autoclavable dispensing tools work in a volume range of 0.2 µL to 1000 µL.

The epMotion 5073t with an integrated Eppendorf ThermoMixer module is used for applications which allow mixing and incubating with open tubes.

The epMotion 5073 automated pipetting system is intended exclusively for indoor use and operation by qualified specialists.

2.2 Residual risks when used as intended

If the product is not used as intended, the installed safety devices may not function correctly. To reduce the risk of personal injury and material damage and to avoid dangerous situations, please observe the general safety instructions.

2.2.1 Personal injury

2.2.1.1 General hazards

Looking into an LED can damage your eyes.

- Do not look directly into the LED.

2.2.1.2 Biological hazards

Improper handling of operating material may lead to poisoning and/or skin irritation.

- Observe the information on the safety data sheet.
- Proceed with caution and alertness when handling operating material.
- Wear personal protective equipment.

Pathogenic biological agents can harm your health and the environment.

- Observe national regulations and the biosafety level of your laboratory.
- Wear your personal protective equipment.
- Observe the Safety Data Sheets and instructions for use for the accessories.
- For information on handling germs or biological material of risk group II or higher, read the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, in the current version).

There may be contaminated material on the device and the accessories. Persons may become infected by direct contact with contaminated material.

- Find out more about the risk of contamination before starting work.
- Check the device decontamination certificate of the device.
- Work on decontaminated devices only.
- Wear personal protective equipment.

When working with substances that are hazardous to health, aerosols may be produced when the vacuum pump is degassed, which may cause damage to the eyes and respiratory tract.

- Wear personal protective equipment when working with substances that are hazardous to health.

2.2.1.3 Explosion hazards

The use of explosive substances or substances with violent reactions may cause explosions. Do not operate the device under the following conditions:

- In an explosive atmosphere
- In areas where work with explosive substances is carried out
- With explosive substances or substances with violent reactions
- With substances that may, combined with a reactant or without such reactant, form an explosive atmosphere

2.2.1.4 Electrical hazards

If you touch parts that are under high voltage, you may receive an electric shock. A life-threatening electric shock can cause cardiac arrhythmia, burns and respiratory paralysis.

- Make sure that the housing and mains/power cord are undamaged.
- Do not open or remove the housing.
- If the supplied mains/power cord with plug is defective, replace it with a mains/power cord with plug of the same type.
- Only clean and maintain the device when it is disconnected from the mains/power line.
- Have the device checked for electrical safety by an authorized service technician every 12 months.

2.2.1.5 Mechanical hazards

If the front panel is opened during operation, the carrier may still be in motion. If you reach into the device while the carrier is still moving, you may injure yourself.

- Do not reach into the device until the carrier has come to a standstill.

The device is very heavy. Improper transport or lifting of the device may result in serious injury.

- Transport and lift the device only with a sufficient number of people and with suitable means.
- Use transport aids and load-bearing devices designed for the weight of the device.

If the device is standing on an unstable surface, it may fall down. Persons may be injured.

- Make sure that the surface is always stable.

2.2.2 Material damage

2.2.2.1 General hazards

The use of accessories and spare parts other than those recommended by Eppendorf SE may impair the safety, functioning, and precision of the device. Eppendorf SE cannot be held liable or accept any liability for damage resulting from the use of accessories and spare parts other than those recommended.

- Only use the accessories and spare parts recommended by Eppendorf SE.
- Only use accessories and spare parts that are in perfect technical condition.

2.2.2.2 Chemical hazards

Aggressive chemicals as well as aggressive cleaning agents and disinfectants can damage the material of the device, rotor and accessories. This may cause damage to the interior of the device during operation.

- Protect all components from aggressive chemicals.
- Clean and disinfect all components only with recommended cleaning agents and disinfectants.
- Clean the rotor, device and accessories immediately if they come into contact with aggressive chemicals.
- Check all components for material changes before each use.
- Take a damaged device out of operation.
- Replace a damaged rotor.
- Replace damaged accessories.

2.2.2.3 Electrical hazards

Connecting the device to devices that are not described in the manual may damage the electronics of the device.

- Only connect devices that are described in the manual.
- If you want to connect other devices, contact your Eppendorf partner.

Connecting the device to an incorrect mains/power supply will damage the device.

- Connect the device only to a mains/power supply that meets the requirements on the name plate.
- Use only earth/grounded sockets with a PE conductor.
- Compare the technical information on the mains/power cord and mains/power plug with the technical information on the name plate, taking into account national laws and regulations. This also includes test seals if they are required by law. Use only approved mains/power cords with plugs.
- Make sure that the mains/power plug and earth/grounded socket match and that the electrical PE conductors of the device and the building installation are securely connected to each other.

Spilled liquid can get into the interior of the device. This can corrode electronic components and damage the device.

- Clean up spilled liquids immediately. Observe the specifications in the Safety Data Sheet for the liquid.
- Contact your authorized service technician.

2.2.2.4 Information security

Malware can cause the loss and misuse of data as well as the loss of samples. Risks arise from computer viruses, trojans, spam mails, phishing mails, infected websites and apps.

- Always check all storage media with an up-to-date antivirus software before using them on the device and with the software.
- Do not download any software or apps from unknown or uncertified sources.
- Do not open any e-mail attachments or links from unknown sources.
- Contact your IT department in case of any problems.

2.3 Target groups

This manual is intended for the following target groups, who have different qualifications and levels of knowledge.

Owner

The owner is any natural or legal person who operates or owns the device.

The owner provides the product and the necessary infrastructure. The owner has a special responsibility to ensure the safety of all persons working on the product.

User

The user operates the product and works with it. The user must be instructed in the use of the product. The user must have read and fully understood the manual.

Any tasks that go beyond operation may only be performed by the user if this is specified in this manual. The owner must explicitly assign these tasks to the user.

Technical personnel

The technical personnel supervises the building services and ensures the technical prerequisites for the operation of the product.

Authorized service technician

The authorized service technician is trained and certified by Eppendorf SE to service, maintain and repair the product.

2.4 Information for the owner

The owner must ensure the following:

- The product is in a safe operating condition.
- The safety devices are all available and functional.
- The product is serviced and cleaned according to the information in this manual.
- The product is disposed of in accordance with local regulations.
- All work on the product is carried out by users, technical personnel or authorized service technicians who are suitably qualified.
- Personal protective equipment is available and is worn.

- The manual is available during the use of the product.
- The manual is part of the product. The product will only be passed on to others with its manual.

2.5 Personal protective equipment

Personal protective equipment serves to ensure the safety and protection of the user when working with the product.

Personal protective equipment must comply with country-specific regulations and the regulations of the laboratory.

Laboratory protective clothing

The clothing protects against contamination and infection when working with pathogenic agents.

2.6 Information on product liability

The owner of the device will be held liable for personal and material damage in the following cases:

- The device is used outside of its intended use
- The device is not used in accordance with the operating manual
- Manipulation of safety devices
- The device has spare parts installed that are not authorized by Eppendorf SE
- The device is used with accessories or consumables that are not recommended by Eppendorf SE
- Cleaning agents are used that are not recommended by Eppendorf SE
- Chemicals are used that are not recommended by Eppendorf SE
- Shipment not in original packing or in improper substitute packing
- The device is maintained or repaired by persons not authorized by Eppendorf SE
- Unauthorized modifications

2.7 Information and safety devices on the device

Warning symbols

Symbol	Meaning	Location
	Observe the safety-relevant information in the operating manual.	On the front of the carrier
 	WARNING Hand injury. After opening the front panel, wait until the carrier has come to a standstill. Do not reach into the device until this happened.	On the front of the tool holder

Safety

epMotion® 5073

English (EN)

Symbol	Meaning	Location
	WARNING Burns. Wait for the surface to cool down before touching the surface.	On the Eppendorf ThermoMixer module On each thermal module
	NOTICE UV radiation. Wear personal protective equipment.	At the rear of the device
	NOTICE UV radiation. The UV protection shield prevents UV radiation from escaping from the device. Do not remove the UV protection shield.	Under the bottom panel of the drawer The label is only visible to authorized service.
	WARNING Electric shock. If the lamp becomes damaged or is replaced: • Switch off the lamp and disconnect it from the mains/power supply voltage. • Read the operating manual.	On the UV lamp housing
	WARNING Eye damage. Do not look directly in the worktable light.	On the front of the rear panel

Safety devices

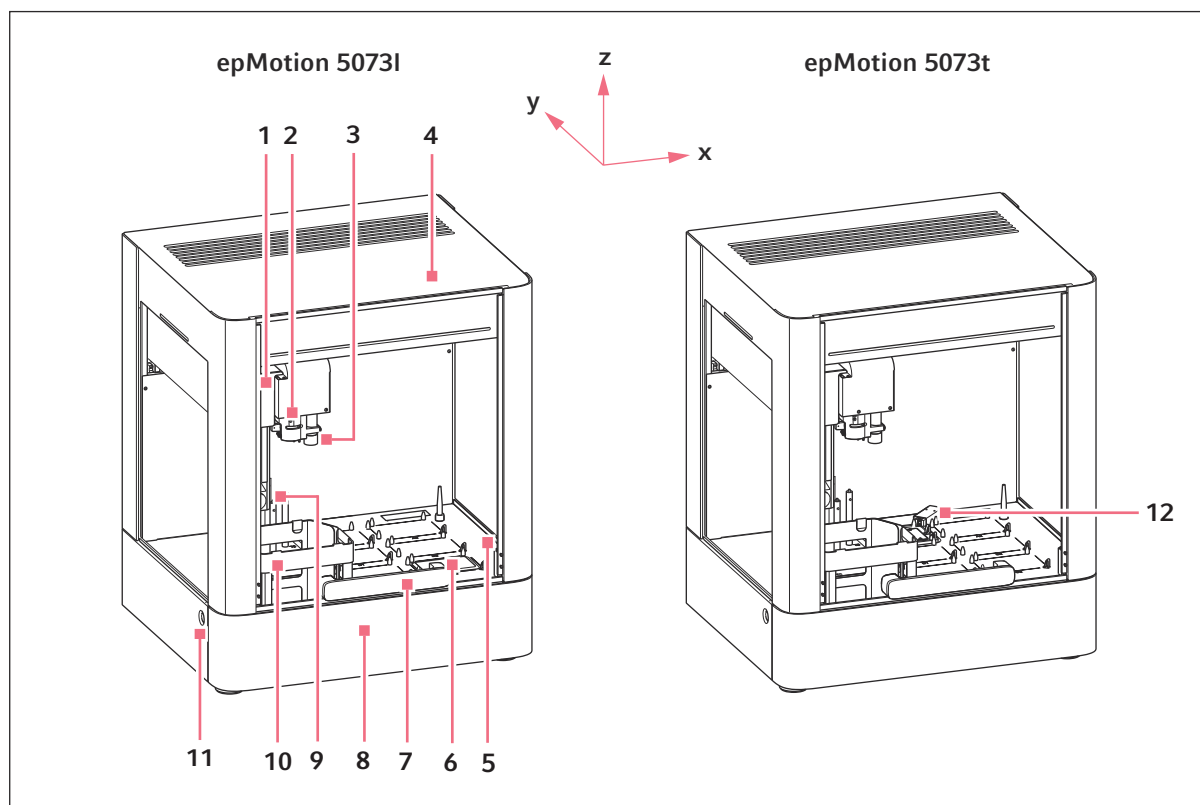
Meaning	Location
Protection against • Contamination • Moving parts • LED light source • UV radiation	Housing and front panel

3 Product description

3.1 Product overview

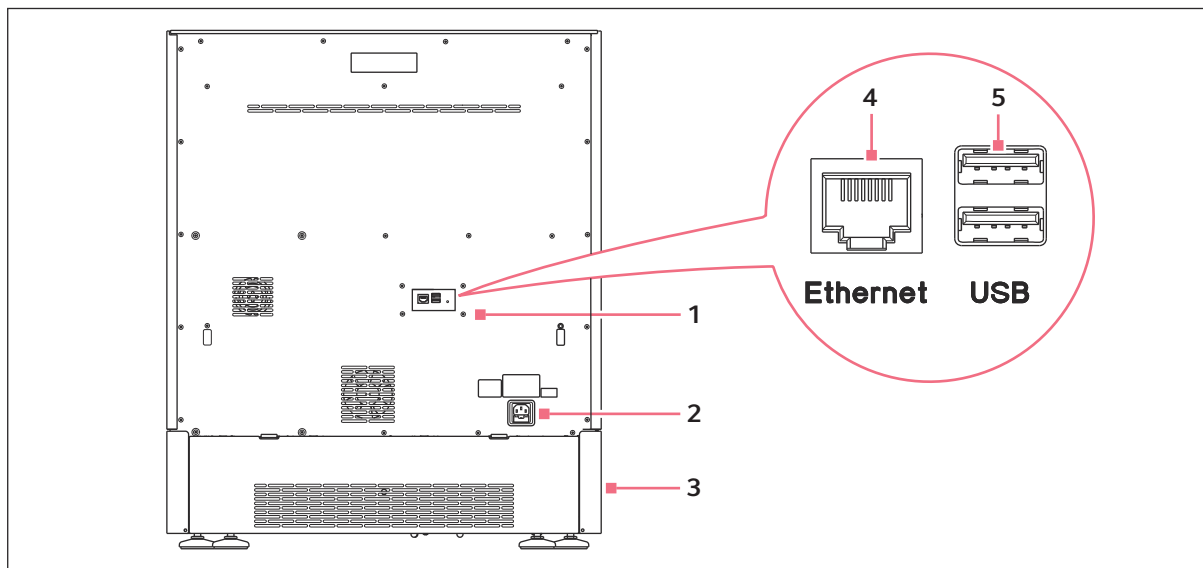
The device is available in different versions.

3.1.1 epMotion 5073I and 5073t



- | | |
|------------------|---------------------------------|
| 1 Carrier | 7 Front panel |
| 2 Tool holder | 8 Drawer |
| 3 Optical sensor | 9 Position of dispensing tools |
| 4 Top cover | 10 Solid waste system |
| 5 Worktable | 11 Mains/power switch |
| 6 Thermal module | 12 Eppendorf ThermoMixer module |

3.1.2 Interfaces



1 Interfaces

2 Mains/power connection

3 Mains/power switch

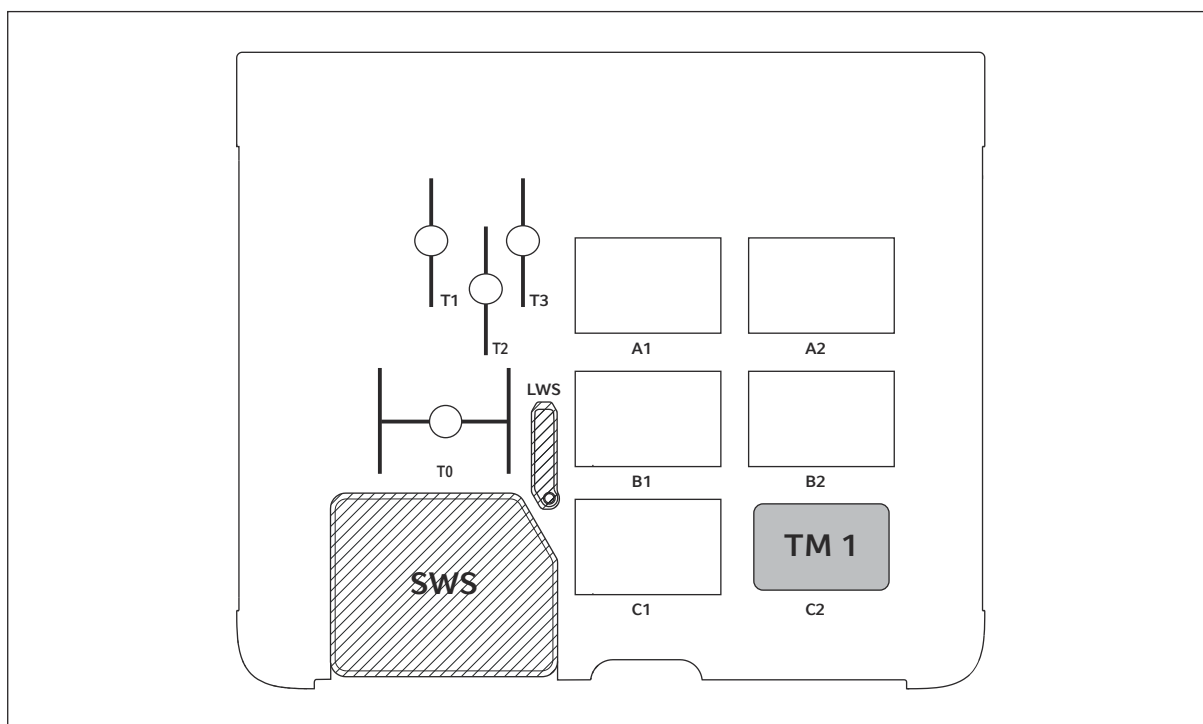
4 Ethernet interface for MultiCon PC

5 USB interface for software updates

3.2 Basic components

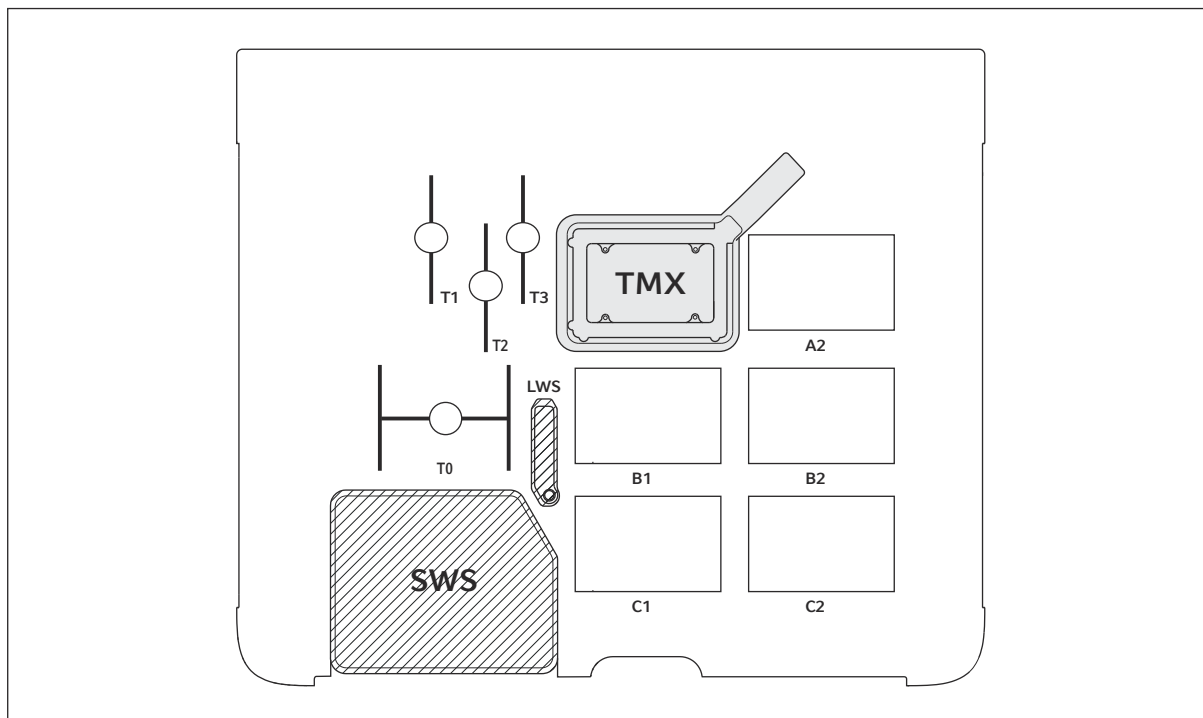
3.2.1 Worktable

3.2.1.1 Worktable epMotion 5073I



T1 — T3	Locations for dispensing tools	C2	Location for thermal module (optional)
T0	Location for gripper, incl. gripper tower	SWS	Location for solid waste system
A1 — C1	Locations for labware	LWS	Location for liquid waste system

3.2.1.2 Worktable epMotion 5073t



T1 — T3	Platz für Dosierwerkzeuge	A2 — C2	Plätze für Labware
T0	Platz für Greifer, inkl. Gripper Tower	SWS	Platz für Feststoffabfallsystem
TMX	Platz für Eppendorf ThermoMixer Modul	LWS	Platz für Flüssigabfallsystem

3.2.2 Optical sensor

The optical sensor records the intensity of the reflected light using a lateral infrared light source, a semi-transparent mirror, a fixed lens and travel in the Z-direction.

The optical sensor can detect horizontal, plane surfaces.

The optical sensor has the following functions:

- Level measurement in the labware
- Pipette tip recognition
- Inspection of labware on the worktable

3.2.3 Status display and worktable light

Status display

The status display indicates the current status of the device by the color and function of the LED. You can activate or deactivate the status display in epBlue.

LED color	LED lighting pattern	Device status
Blue	Lights up	The device is executing an application.
Blue	Flashes	The user has stopped the application or opened the front panel.
Yellow	Lights up	A user intervention is required.
Red	Lights up	The application was canceled due to an error.
Green	Flashes	The application was successfully terminated in the last 5 min.
Green	Lights up	The application was successfully terminated more than 5 min ago.
White	Lights up	The device is ready for operation.
White	Flashes	The device starts.

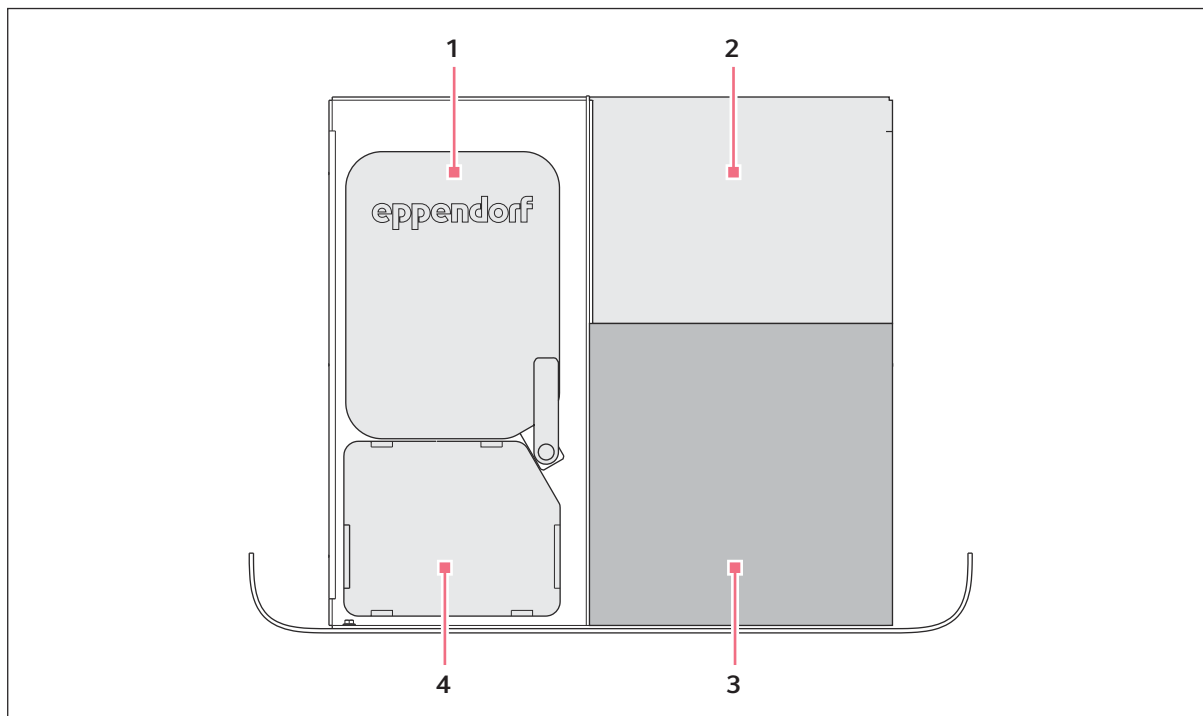
Worktable light

When the device is ready for use, the worktable is illuminated in white.

You can activate or deactivate the worktable light in epBlue.

 When working with photosensitive samples and reagents, deactivate the worktable light.

3.2.4 Drawer



1 Location for liquid waste system

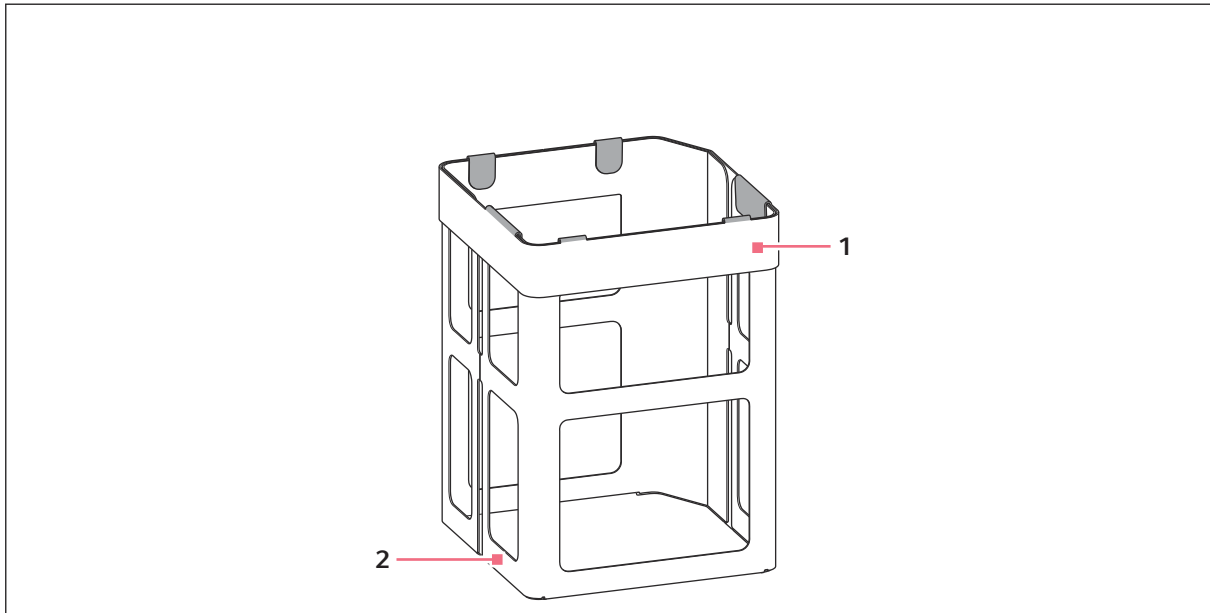
2 Location for documents

3 Location for epT.I.P.S. boxes in the sizes 10 μ L, 50 μ L and 300 μ L

4 Location for solid waste system

3.2.5 Waste system

3.2.5.1 Solid waste system



1 Fixing frame with clamps

2 Waste bag holder

The solid waste system consists of the waste bag holder and the fixing frame. A waste bag is inserted into the holder and secured with the fixing frame.

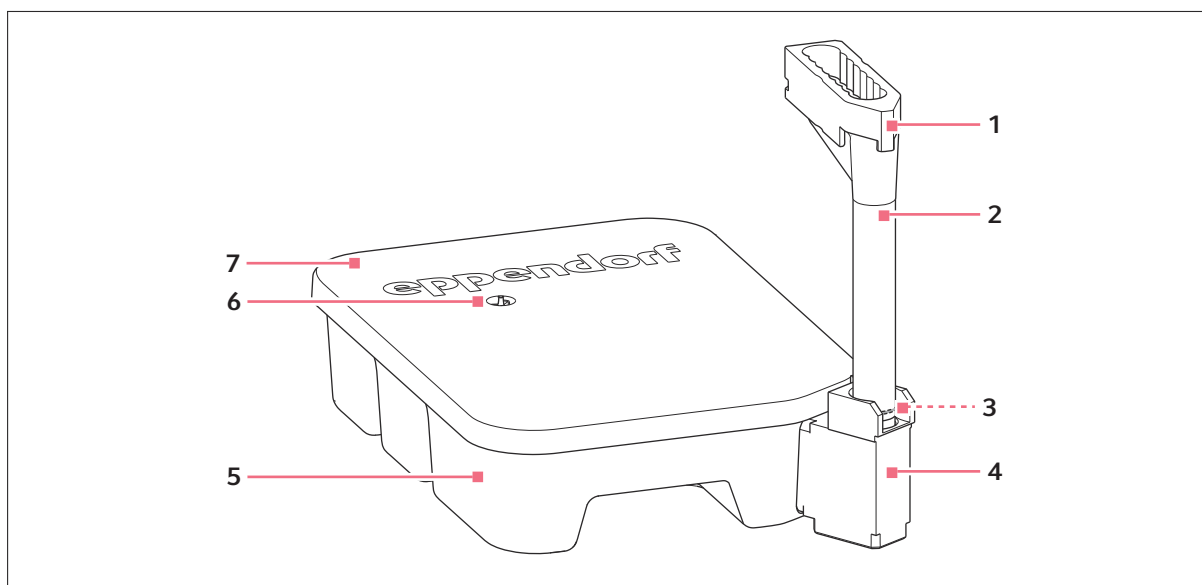
The solid waste system is placed in the drawer of the device. When the drawer is closed, the solid waste system protrudes over the epMotion worktable.

Product description

epMotion® 5073

English (EN)

3.2.5.2 Liquid waste system



1 Splash guard

2 Waste funnel

3 O-ring

4 Spout

5 Waste tray

6 Ventilation hole

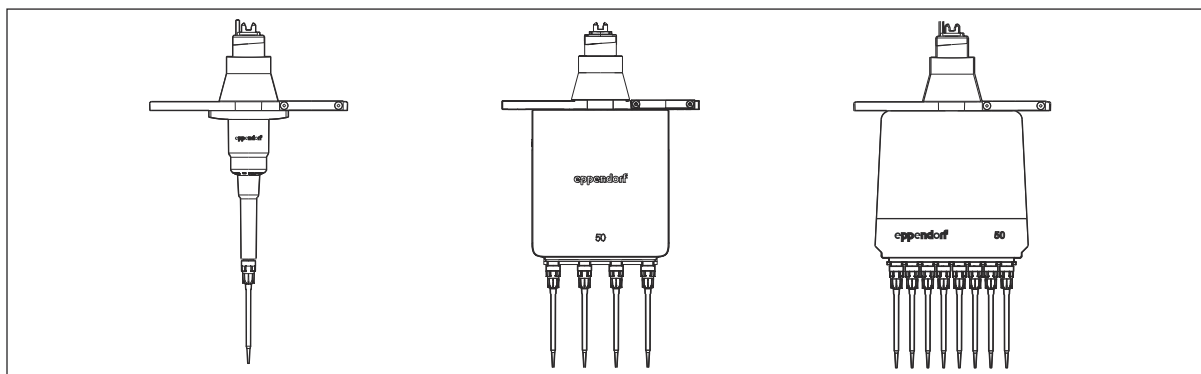
7 Tray lid

The liquid waste system collects the liquid waste. The liquid waste system is available with a maximum volume of 1.5 L.

The tray lid, splash guard and o-ring on the waste funnel prevent liquid waste from leaking out or the contamination from liquid waste splashes.

The liquid waste system is reusable. You can decontaminate and clean the liquid waste system, see [Chapter 9.2 "Cleaning" on page 109](#).

3.2.6 Dispensing tools



Dispensing tools are piston-stroke pipettes that work according to the air cushion principle.

When the piston moves upwards in the dispensing tool, liquid is aspirated into the pipette tip. When the piston moves downwards in the dispensing tool, liquid is dispensed from the pipette tip.

In multi-channel dispensing tools, all pistons move simultaneously.

Table 1: Available dispensing tools and their volume ranges

Volume range	Single-channel dispensing tool	Four-channel dispensing tool	Eight-channel dispensing tool
0.2 µL – 10 µL	TS 10	-	TM 10-8
1 µL – 50 µL	TS 50	TM 50-4	TM 50-8
20 µL – 300 µL	TS 300	TM 300-4	TM 300-8
40 µL – 1000 µL	TS 1000	TM 1000-4	TM 1000-8

The errors of measurement of the dispensing tools can be found in the Technical data chapter.

3.2.7 Gripper

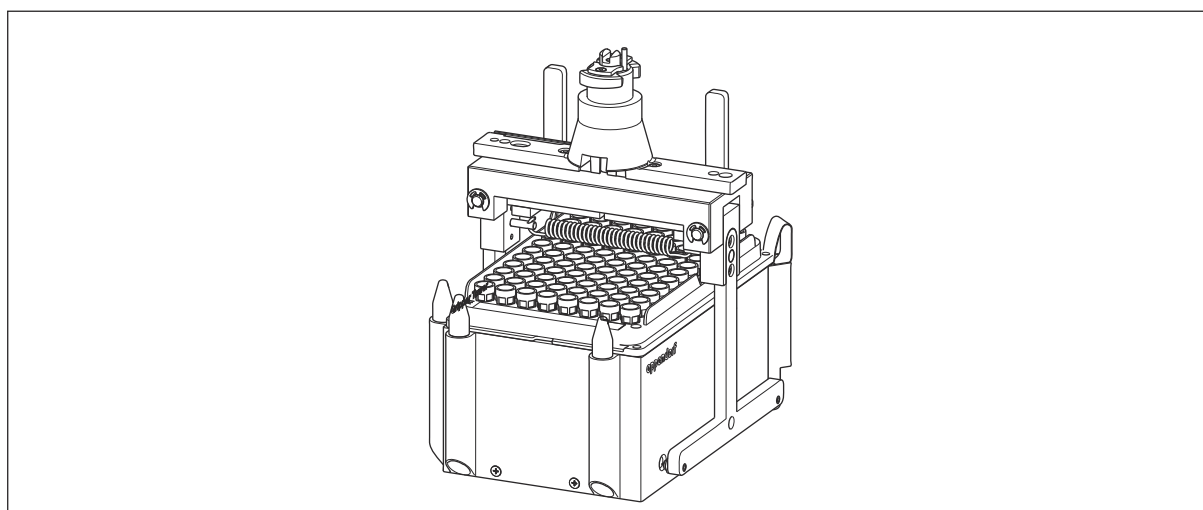


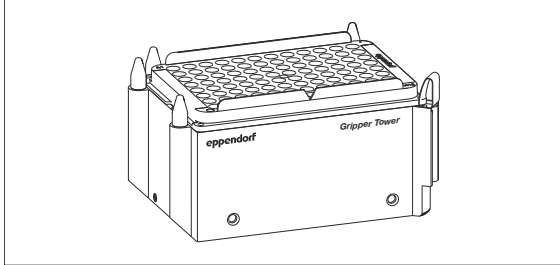
Fig. 3-1: Gripper with Gripper Tower

The gripper transports the labware to the epMotion worktable. The gripper has 2 gripper arms with mandrels on the inside. The gripper holds the labware with mandrels.

Product description

epMotion® 5073

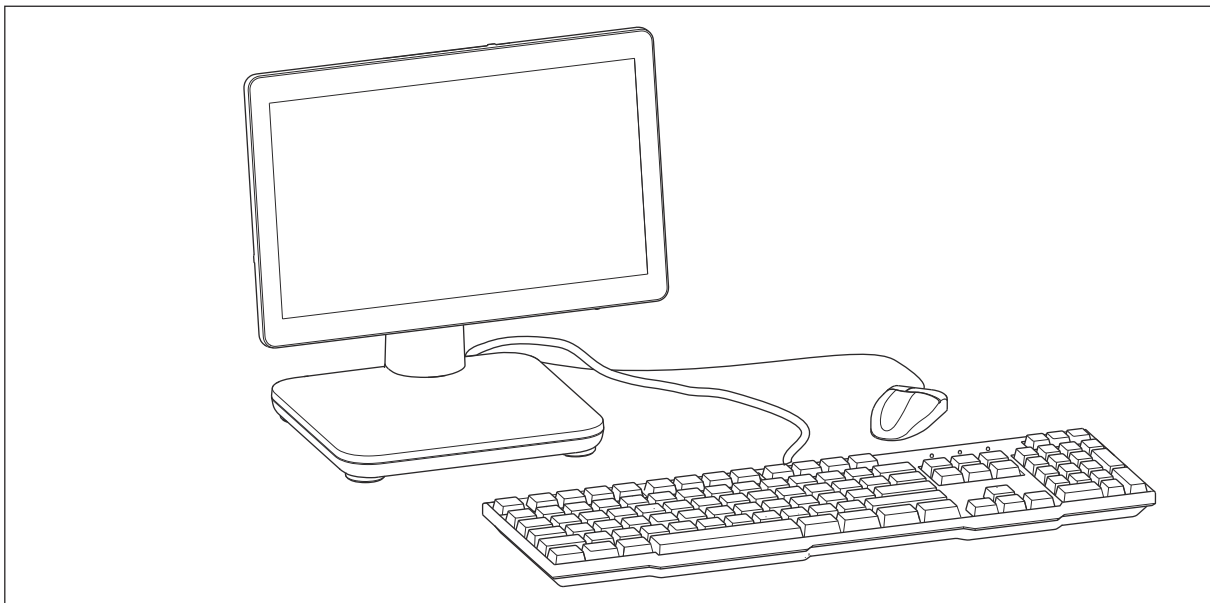
English (EN)

3.2.8 Gripper Tower

The Gripper Tower is used to place the gripper in location T0 of the epMotion worktable. The gripper is placed on the Gripper Tower. The gripper mandrels are located in the holes of the Gripper Tower.

You can place a tray with epT.I.P.S. Motion Reloads on the Gripper Tower.

The gripper transports the tray with epT.I.P.S. Motion Reloads to a TipHolder 73 or a TipHolder TM-4-compatible.

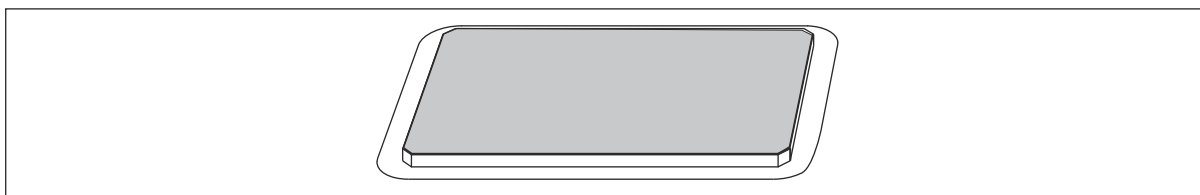
3.2.9 MultiCon PC

The MultiCon PC is used to control the epMotion. The MultiCon PC has a touch screen.

Information on operation and the interfaces can be found in the manufacturer's original operating manual which is enclosed.

3.3 Optional components

3.3.1 Thermal module



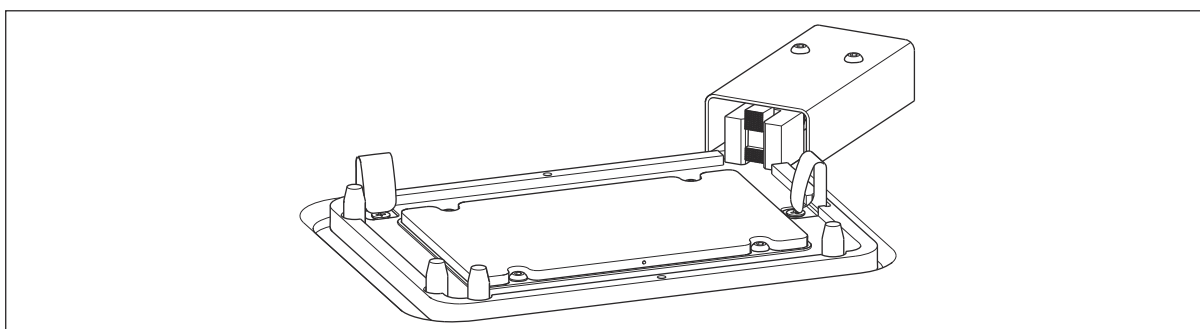
Depending on the model, your epMotion can be equipped with a thermal module.

Thermal modules temper liquids in a temperature range of 0 °C – 110 °C.



Information on setting the thermal module and a description of all functions can be found in the software manual.

3.3.2 Eppendorf ThermoMixer Module



Depending on the model, your epMotion can be equipped with an Eppendorf ThermoMixer module.

The Eppendorf ThermoMixer module tempers and mixes liquids and suspensions.

The Eppendorf ThermoMixer module works in a temperature range of 4 °C – 95 °C. The lowest temperature that the Eppendorf ThermoMixer module reaches is 15 °C below ambient temperature. If the ambient temperature is 20 °C, the Eppendorf ThermoMixer module reaches a minimum of 5 °C.

3.3.3 CleanCap upgrade set

The CleanCap upgrade set is an optional feature of the epMotion and includes an air filter system and a UV lamp.

3.3.3.1 Air filter system

The air filter system cleans the air in the epMotion workspace. The air filter system reduces the number of particles, e.g., dust or germs.

Product description

epMotion® 5073

English (EN)

3.3.3.2 UV lamp

The UV lamp decontaminates the worktable. The UV lamp is controlled with the software.



The radiant flux of the UV lamp decreases with age. Have the UV lamp replaced by an authorized service technician every 2 years.

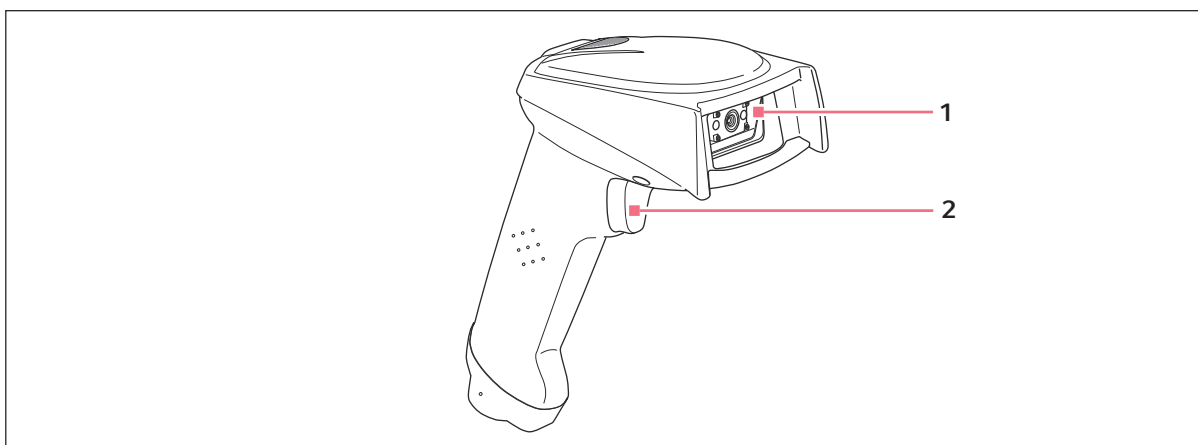
3.3.4 Barcode reader

Fig. 3-2: Model of a barcode reader

1 Window

2 Key

You can use the barcode reader to track and document your samples via IDs.

The barcode reader is connected to a USB interface on the MultiCon PC.

Plates have an ID. The ID of a well is generated automatically from the ID of the plate and the identification of the well. Racks do not have an ID. Each tube in a rack has an ID.

The barcode reader has 2 settings:

- Manual entry: To scan an ID, press the key on the barcode reader.
- Automatic entry: To scan an ID, hold the barcode reader against the ID. The barcode reader detects the ID automatically.

4 Functional description

4.1 Optical sensor

Surface detection

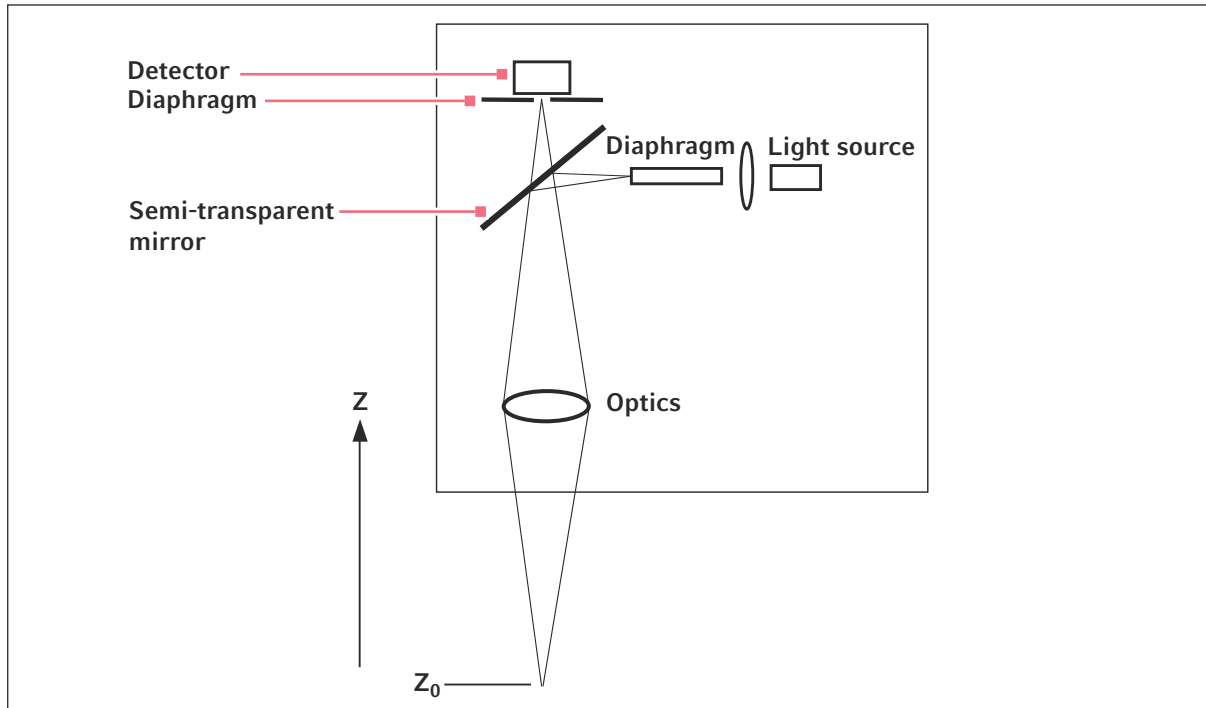


Fig. 4-1: Optical sensor principle

The optical sensor detects the intensity of the reflected light. Height z_0 is determined at the point of highest intensity. This enables the detection of the filling level in a tube or the presence of labware.

The surface of the liquid must be aligned $90^\circ \pm 3^\circ$ to the optical axis.



- The surfaces of liquids can be highly curved due to the physical properties of the liquid and the tube or due to the tube geometry. The optical sensor cannot detect the filling level in highly curved surfaces. In this case, the user must enter the liquid volume in epBlue.
- The optical sensor has a detection limit for the filling level of tubes. The detection limit depends on the tube geometry. As a rule, filling levels from 3 mm can be detected.

Functional description

epMotion® 5073

English (EN)

Level measurement in the labware

- The optical sensor measures the filling level in labware locations. There are 2 options for this:
 - In all positions used.
 - In the first position, in the last position and in 8 randomly determined positions.
- The optical sensor cannot measure the filling level in the following labware:
 - 384-well plates
 - Qiagen Rotor-Disc 72, Qiagen Rotor-Disc 100
 - Liquid waste system

Pipette tip recognition

- The optical sensor determines the number and positions of the pipette tips.
- If there are too few pipette tips on the epMotion worktable, epBlue will prompt you to refill pipette tips.

Checking the labware on the worktable

- The optical sensor scans the code on the labware.
- epBlue checks whether the labware on the epMotion worktable matches the labware on the epBlue worktable.
- If a required labware is not available on the epMotion worktable, epBlue will prompt you to position the labware.
- The optical sensor checks all the locations in which labware is positioned. The optical sensor does not check any locations which are empty in the application.
- The location B0 on the epMotion worktable is not fully detected by the optical sensor.



Information on setting the optical sensor and a detailed description of all functions can be found in the software manual.

4.2 Air filter system

A fan continuously draws air from the surrounding area and guides it through the air filter system. The filtered airflow is guided into the epMotion workspace.



Contamination impairs the function of the air filter system. Have the air filter replaced annually by an authorized service technician.

4.3 Transport of labware

The labware on the epMotion worktable is transported with the gripper.

Labware transported by the gripper

Plates are placed on the epMotion worktable, on other plates, on a height adapter, a thermoadapter or a thermoblock

- PCR plates of the skirted and semiskirted type
- Microplates

- Deepwell plates
- A plate of Thermoblock PCR 96 OC
- Top plate of a plate stack

Pipette tips

- epT.I.P.S. Motion Racks
- epT.I.P.S. Motion Safe Racks

Thermoblocks with plate or without plate

Thermoracks, also with inserted reaction vessels

Reservoir 400 mL

Labware not transported by the gripper

Single reaction vessels

Plates

- PCR plates of the unskirted type
- Complete plate stacks
- Plates on thermoblock, except for Thermoblock PCR 96 OC

Pipette tips

- Stacked epT.I.P.S. Motion Racks
- Stacked epT.I.P.S. Motion Safe Racks

Racks

- Rack for 24 tubes
- Rack for 96 conical tubes
- ReagentRack
- Thermorack rotor/tubes

ReservoirRack

- Complete ReservoirRack
- ReservoirRack modules

Adapters

- TipHolder
- Height adapter
- Thermoadapter
- Magnetic adapter

Reservoirs

4.4 Operation of the dispensing tools

Dispensing tools are piston-stroke pipettes. If the piston moves downward in the dispensing tool, liquid will be dispensed from the pipette tip. If the piston moves upward in the dispensing tool, liquid will be aspirated into the pipette tip. The piston is moved by a motor in the tool holder.

Dispensing tools are air-cushioned. There is an air cushion between the piston and the liquid.

Functional description

epMotion® 5073

English (EN)

On eight-channel dispensing tools, all 8 channels move simultaneously.

You can dispense liquids in the *Pipette*, *Multidispense* and *Multiaspirate* modes.

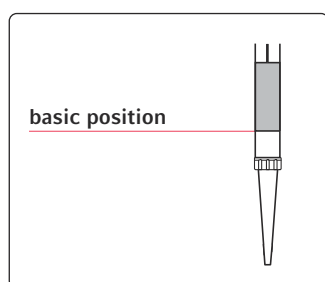


Information on setting the dispensing mode and a description of all functions can be found in the software manual.

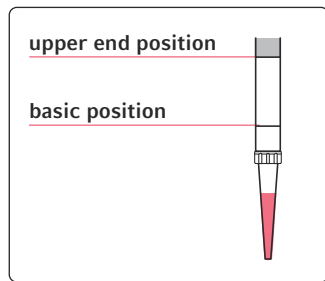
4.4.1 Dispensing mode

4.4.1.1 Pipette dispensing mode

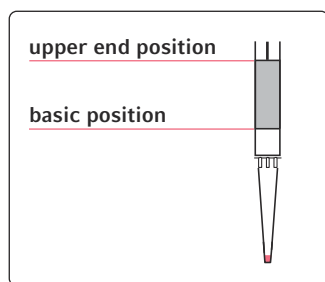
In *Pipette* mode, a defined volume is aspirated and fully dispensed in one step.



The piston is in the basic position.

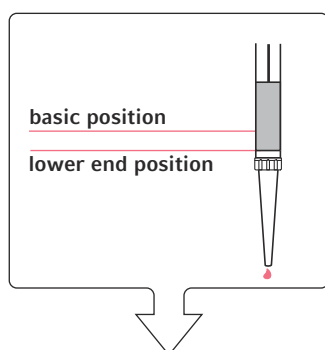


In order to aspirate the volume, the piston moves from the basic position to the upper end position.



To dispense the volume, the piston moves from the upper end position to the basic position in one step.

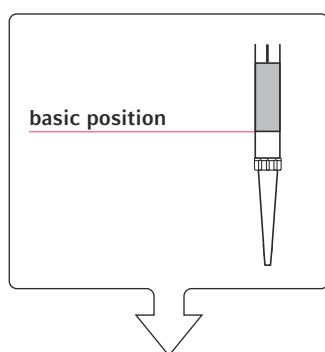
When the piston is in the basic position, there is still a remaining volume in the pipette tip. The remaining volume is part of the volume of this pipetting procedure.



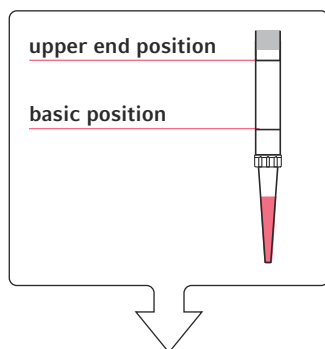
The piston moves to the lower end position (remaining stroke). The remaining volume is dispensed into the destination position.

4.4.1.2 Multidispense dispensing mode

In *Multidispense* mode, a volume is aspirated and dispensed in defined dispensing steps.

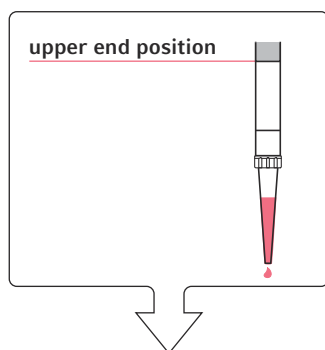


The piston is in the basic position.



In order to aspirate the volume, the piston moves from the basic position to beyond the upper end position.

More volume is aspirated than is needed for the dispensing steps.



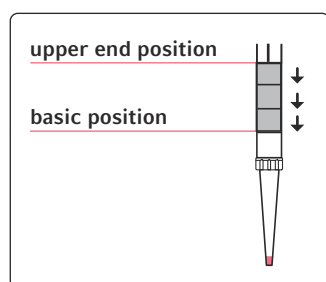
The piston is moved to a defined position. For this, the piston moves to the upper end position (reverse stroke).

Volume is dispensed into the source position.

Functional description

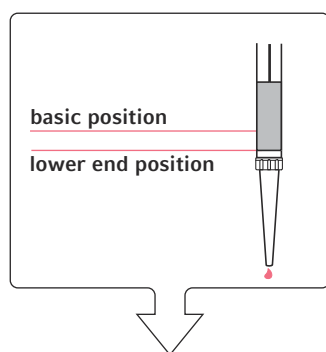
epMotion® 5073

English (EN)



The piston moves from the upper end position to the basic position in defined dispensing steps. The same volume is dispensed with each dispensing step.

When the piston is in the basic position, there is still a remaining volume in the pipette tip. The remaining volume is not part of the volume for the dispensing steps.



The piston moves to the lower end position (remaining stroke). The remaining volume is dispensed. If the pipette tip is replaced before each liquid aspiration, the remaining volume is dispensed into the waste container. If the pipette tip is not replaced before each liquid aspiration, the remaining volume is dispensed into the source position.

Calculating the volume aspiration in the *Multidispense* dispensing mode

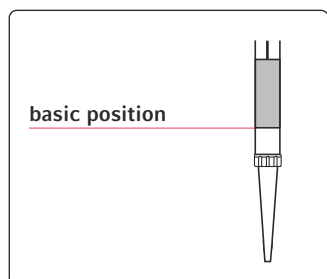
A 96-well plate should be filled with 10 µL of water per position by dispensing. The TM 50-8 eight-channel dispensing tool is used. The volume is taken from a reservoir. The pipette tips are not replaced before a new volume aspiration.

Sum of the volumes for dispensing:

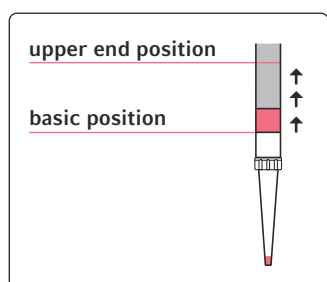
- $96 \times 10 \text{ µL}$ for 96-well plate: 960 µL
- $8 \times 5.8 \text{ µL}$ reverse stroke: 46.4 µL
- $8 \times 2.5 \text{ µL}$ remaining stroke: 20 µL
- Total: **1026.4 µL**

4.4.1.3 Dispensing mode Multiaspirate

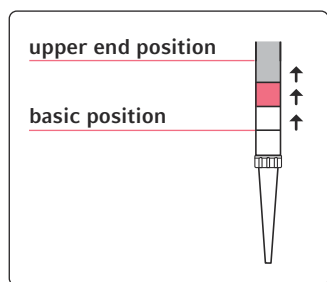
In *Multiaspirate* mode, a volume is aspirated in defined steps and fully dispensed in one step.



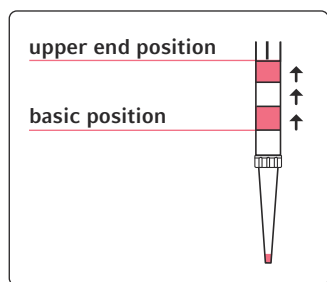
The piston is in the basic position.



To aspirate the defined volume, the piston moves upwards a bit from the home position.



The dispensing tool moves to tube height. To avoid liquids dripping from the pipette tip, the piston moves up a defined distance. Air is aspirated into the pipette tip.

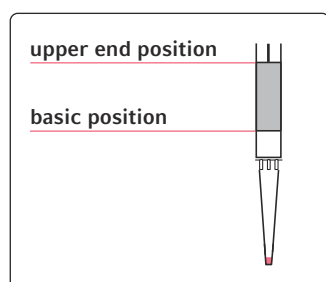


The dispensing tool moves downward and is immersed into the liquid. To aspirate the defined volume, the piston moves upwards a bit from the home position.

Functional description

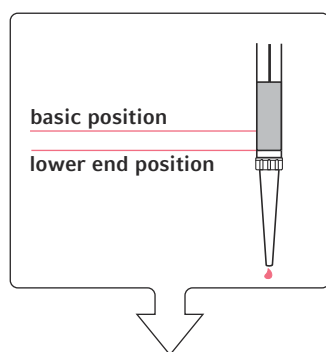
epMotion® 5073

English (EN)



To dispense the volume, the piston moves from the upper end position to the basic position in one step.

When the piston is in the basic position, there is still a remaining volume in the pipette tip. The remaining volume is part of the volume of this pipetting procedure.



The piston moves to the lower end position (remaining stroke). The remaining volume is dispensed into the destination position.

4.4.2 Mixing liquids



NOTICE! Contamination

Foaming and low viscous liquids can contaminate the dispensing tool if the mixing speed is too high.

- Use pipette tips with filters.
- Test the mixing parameters using demineralized water.
- Set a low mixing speed for foaming and low-viscosity liquids.



NOTICE! Sample loss

If you set the speed too high or overfill the labware, liquid will splash out of the labware during operation and contaminate other samples and the device.

- Observe the maximum speed of the labware.
- Observe the maximum filling volume of the labware.

You can mix liquids by pipetting several times.

A mixing cycle consists of an upward movement and a downward movement of the piston in the dispensing tool.

During mixing, you can specify the aspiration and dispensing level of the liquid. Use a fixed level if the volume in the vessel is smaller than the working volume. If the volume in the vessel is larger than the working volume, the vessel may overflow.

During the mixing process, the pipette tip is immersed in the liquid. The remaining volume is dispensed above the liquid level after mixing.

 The liquid types with defined mixing speeds are stored in the software. To determine mixing speeds yourself, carry out tests in advance.

4.5 Bottom tolerance

The bottom tolerance is the minimum distance between the vessel base and the lower end of the pipette tip.

The bottom tolerance compensates any manufacturing variations of the labware and ensures the safe movement of the pipette tip in the tube.

The pipette tip moves down inside the tube until it has reached the bottom tolerance. The pipette tip cannot aspirate any volume that is within the bottom tolerance. The remaining volume remains in the tube.

Standard for bottom tolerance:

- General labware: 1 mm
- 30 mL and 100 mL reservoirs: 2.5 mm
- 96-well PCR plates: 0.2 mm

You can change the bottom tolerance. Decreasing the bottom tolerance also reduces the remaining volume.

- Do not decrease the bottom tolerance on uneven plates.
- Check the set bottom tolerance when replacing pipette tips, plates, or tubes.

 You can pipette below the bottom tolerance. A detailed description of the function can be found in the software manual.

4.6 Liquid aspiration

The epMotion offers several options for aspirating liquid.

Make sure that only the pipette tip is immersed into the tube. If the dispensing tool is immersed into the vessel, the dispensing tool can become contaminated. This risk of contamination is particularly high if you are working with 10 µL and 50 µL pipette tips in high or large tubes.

Examples:

- 10 µL pipette tips in a 30 mL reservoir.
- 10 µL pipette tips in 1.5 mL and 2 mL size tubes.

4.6.1 Liquid aspiration with a constant immersion depth (*Default*)

Liquid aspiration with a constant immersion depth is set as the default in the software.

Parameters:

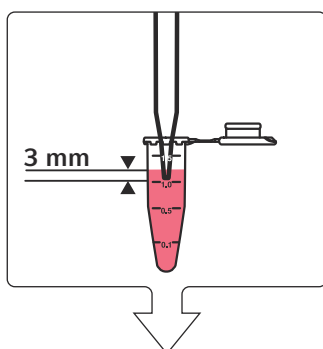
- The immersion depth of the pipette tip corresponds to the liquid type.
- The reduced immersion depth of the pipette tip is 0.7 mm.

Functional description

epMotion® 5073

English (EN)

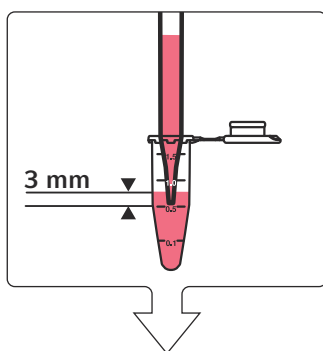
- The pipette tip moves down during liquid aspiration.
- The bottom tolerance of the labware is 1 mm by default and can be changed for each labware.



Start position

The pipette tip is immersed in the liquid.

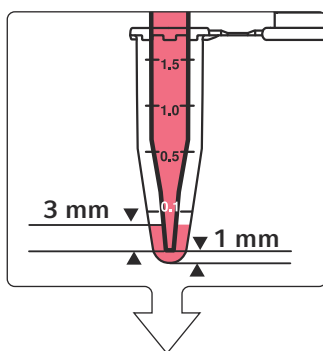
The immersion depth of the pipette tip is defined in the liquid type, e.g. 3 mm.



Movement 1

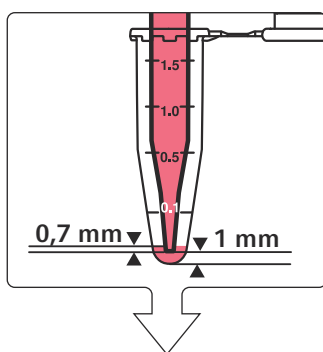
The pipette tip aspirates liquid. The filling level in the tube falls, the pipette tip moves down simultaneously.

The immersion depth of the pipette tip remains constant.



Movement 2

The pipette tip moves down until it reaches the bottom tolerance of 1 mm.



End position

The pipette tip continues to aspirate liquid. The immersion depth of the pipette tip is reduced, e.g. from 3 mm to 0.7 mm.

Liquid aspiration ends when the pipette tip is level with the bottom tolerance of 1 mm and has an immersion depth of 0.7 mm.

The remaining volume stays in the tube.

Remaining volume = bottom tolerance + immersion depth. In the example, this is 1.7 mm.

Liquid aspiration with a constant immersion depth can be activated in the software using the *Default* option. Refer to the software manual for more information.

i If the liquid is aspirated up to the remaining volume, the curvature of the liquid level can lead to errors during dispensing.

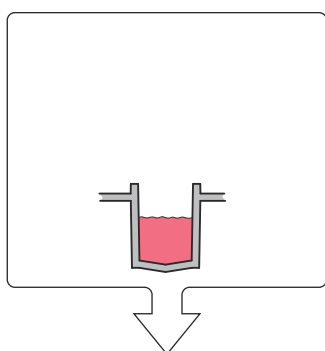
4.6.2 Liquid aspiration from the vessel base (*Aspirate from bottom*)

Parameters:

- The pipette tip is immersed to the level of the bottom tolerance.
- The position of the pipette tip does not change during liquid aspiration.
- The bottom tolerance of the labware is 1 mm by default and can be changed for each labware.

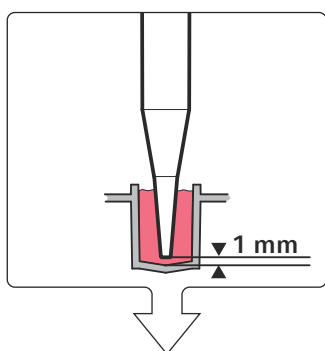
Liquid aspiration from the vessel base is recommended in the following cases:

- For tubes ≤ 0.5 mL, 96-well plates and 384-well plates.
- For plates with different filling levels in the locations.
- For tubes with low filling volumes.



Start position 1

The tube is filled no further than the working volume.



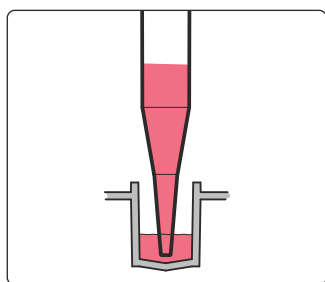
Start position 2

The pipette tip is immersed in the liquid as far as the bottom tolerance, e.g. 1 mm. The filling level in the tube rises no further than the filling volume.

Functional description

epMotion® 5073

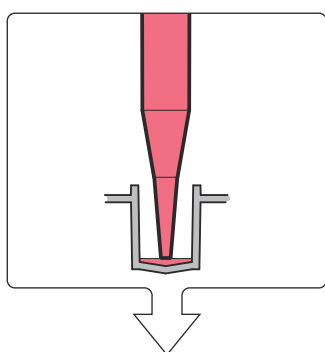
English (EN)



Movement

The pipette tip aspirates liquid, the filling level in the tube falls.

The pipette tip does not change its position.



End position

Liquid aspiration ends when the pipette tip is level with the bottom tolerance of 1 mm.

The remaining volume with a height of 1 mm remains in the tube.

Liquid aspiration from the vessel base can be activated in the software using the *Aspirate from bottom* option. Refer to the software manual for more information.



If the liquid is aspirated up to the remaining volume, the curvature of the liquid level can lead to errors during dispensing.

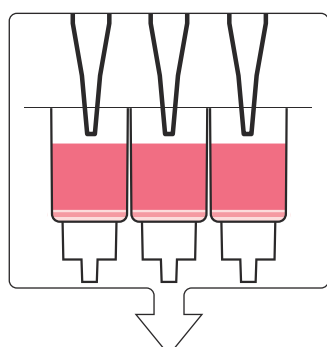
4.6.3 Liquid aspiration from a filter plate (*Elution from filter*)

Parameters:

- The pipette tip is immersed up to the filter.
- The pipette tip moves down during liquid aspiration.

Liquid aspiration from a filter plate is recommended in the following case:

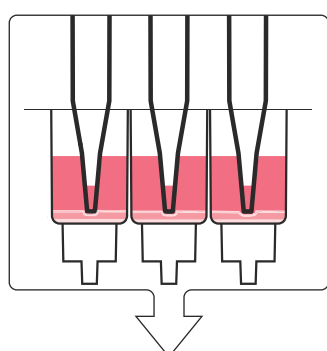
- To aspirate liquid from the supernatant of filter plates or filter tubes. The liquid must be in the source position.



Start position

The pipette tip moves into the tube and begins to aspirate the liquid at the same time.

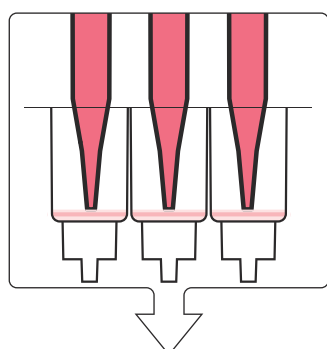
When the pipette tip moves into the tube, the piston of the dispensing tool also moves up from the basic position.



Movement

The pipette tip moves down until it touches the filter. The pipette tip gently pushes the filter down. The liquid collects in the depression.

The pipette tip aspirates liquid from the filter plate.



Aspiration of the remaining volume

The pipette tip aspirates almost all of the liquid from the filter plate.

The liquid aspiration is ended when the piston of the dispensing tool is in the upper end position.

Liquid aspiration from a filter plate can be activated in the software using the *Elution from filter* option. Refer to the software manual for more information.

4.6.4 Liquid aspiration from a defined position



NOTICE! Sample loss

If the immersion depth of the pipette tip is not set correctly, sample loss can occur, e.g., due to liquid displacement.

- Use the *Surface Teaching* function to check that the position of the pipette tip is correct.
- Carry out a test run to check that the position of the pipette tip and the immersion depth are correct.

The pipette tip is in a defined position in the tube. The position of the pipette tip is determined from the vessel base or from the liquid level.

During liquid aspiration, the pipette tip can perform the following movements:

- *Default*: During liquid aspiration, the pipette tip moves down smoothly with a constant immersion depth.
- *Custom*: The pipette tip moves a defined distance.
- *Fix*: The pipette tip remains in a defined position.

Liquid aspiration from a defined position is recommended in the following cases:

- For liquids with different phases.
- For liquid aspiration above a pellet.

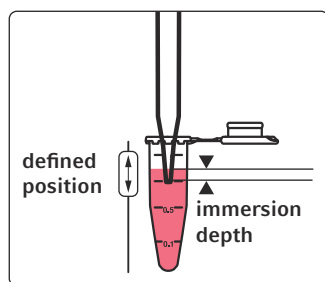


The filling volume of each tube is defined in the application.

The bottom tolerance is defined in the labware properties.

Other values for liquid aspiration are defined in the liquid type, e.g. aspiration speed.

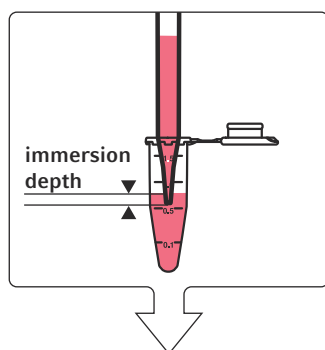
4.6.4.1 Liquid aspiration with a constant immersion depth (*Aspirate from defined height > Default*)



Start position

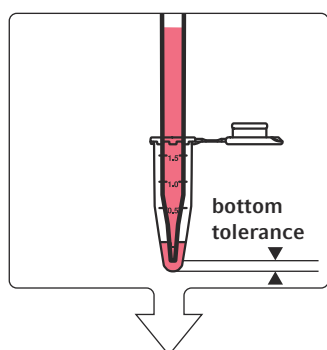
The user defines the position of the pipette tip in the tube.

The immersion depth of the pipette tip in the liquid is calculated using the defined position.



Movement

The pipette tip aspirates liquid. The pipette tip moves with the liquid level according to the liquid type settings.



End position

The pipette tip moves down until it has reached the bottom tolerance.

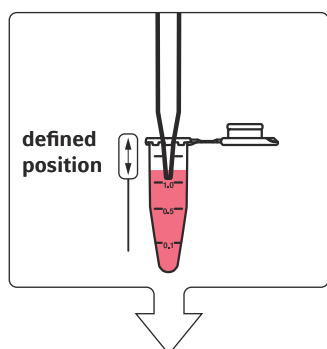
The pipette tip continues to aspirate liquid. The immersion depth of the pipette tip is reduced, e.g. from 2 mm to 0.7 mm.

Liquid aspiration ends when the pipette tip is level with the bottom tolerance and has an immersion depth of 0.7 mm. The remaining volume stays in the tube. Remaining volume = bottom tolerance + immersion depth.

Liquid aspiration with a constant immersion depth can be activated in the software using the *Aspirate from defined height > Default* option. Refer to the software manual for more information.

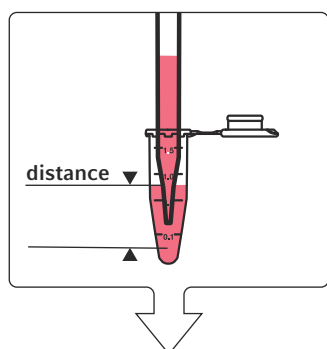
Perform a test run to check that the immersion depth is correct.

4.6.4.2 Liquid aspiration over a defined distance (*Aspirate from defined height > Custom*)



Start position

The user defines the position of the pipette tip in the tube.

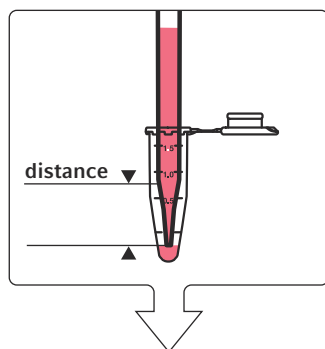


Movement

The user defines which distance the pipette tip travels. The pipette tip can move up or down.

The pipette tip travels the defined distance and aspirates liquid during this process. The filling level in the tube falls.

The immersion depth of the pipette tips changes in line with the defined distance and the liquid type settings, e.g. aspiration speed.



End position

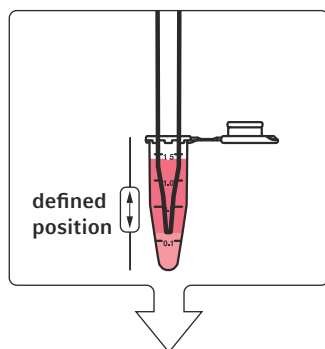
The movement of the pipette tip ends when the pipette tip has traveled the defined distance.

Liquid aspiration is ended when the pipette tip has aspirated the defined amount of fluid.

Liquid aspiration on a defined distance can be activated in the software using the *Aspirate from defined height > Custom* option. Refer to the software manual for more information.

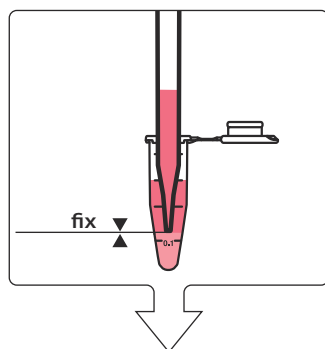
Perform a test run to check that the immersion depth is correct.

4.6.4.3 Liquid aspiration from a defined position (*Aspirate from defined height > Fix position*)



Start position

The user defines the position of the pipette tip in the tube.



Movement and end position

The pipette tip aspirates liquid. The filling level in the tube falls. The pipette tip does not change its position.

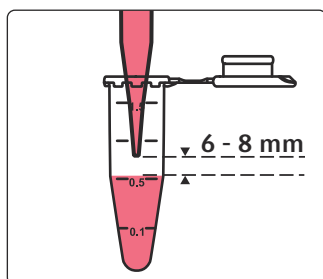
The immersion depth of the pipette tip reduces in line with the aspirated amount of fluid.

The pipette tip aspirates liquid until the defined amount of fluid has been aspirated.

Liquid aspiration from a defined position can be activated in the software using the *Aspirate from defined height > Fix position* option. Refer to the software manual for more information.

Perform a test run to check that the immersion depth is correct.

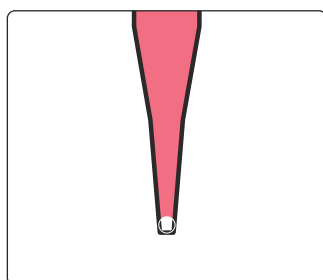
4.6.5 Transporting the liquid



Before transport, the pipette tip moves to a defined position above the liquid level, e.g., 6 mm.

The position of the pipette above the surface of the liquid is defined in the liquid type.

The distance corresponds to the position in which the pipette tip dispenses the liquid in a free jet.



Once the pipette has reached the position, the liquid is retracted into the pipette tip. An area filled with air is created in the lower part of the pipette tip.

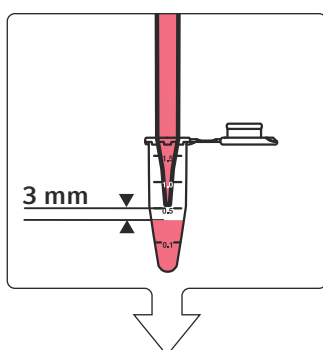
The liquid does not drip during transport. If the liquid was aspirated from a filter plate, bubbles may form at the lower end of the pipette tip during transport. The bubbles are of different sizes.

4.7 Liquid dispensing

The epMotion provides several options to dispense liquid from the pipette tip.

4.7.1 Liquid dispensing in a free jet (*Default*)

Liquid dispensing in a free jet is set as the default in the software.

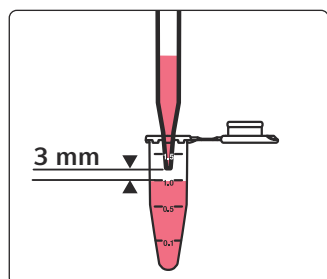


Start position

The pipette tip moves to a defined position above the surface of the liquid. The location is defined in the liquid type.

The example shows the liquid type water. Here the distance is 3 mm.

For the liquid type Protein C, the distance is 5 mm. This setting takes into account the tendency of concentrated protein solutions to form foam.

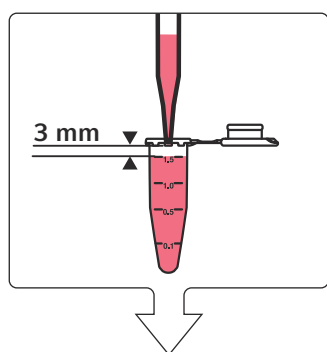


Movement

The pipette tip dispenses the liquid into the tube in a free jet.

The filling level in the tube rises, the pipette tip moves up simultaneously.

The distance between the pipette tip and the liquid level remains constant.



End position

The pipette tip moves up no further than the edge of the tube.

Liquid dispensing ends when the pipette tip has dispensed the defined amount of liquid. The tube can be filled up to the filling volume.

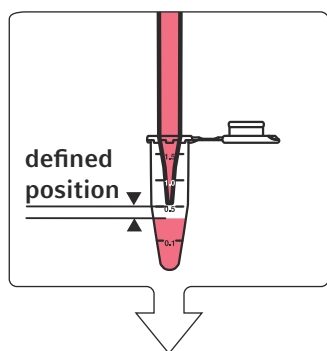
Free jet liquid dispensing can be activated in the software using the *Default* function. Refer to the software manual for more information.

4.7.2 Liquid dispensing with contact to the surface (*Default*)

For certain liquid types and the dispensing tool for 10 µL, liquid dispensing with contact to the surface replaces free jet dispensing. Liquid is dispensed onto the surface of the liquid or the surface of the tube. Eppendorf SE recommends *contact dispensing* for dispensing volumes of <1 µL.

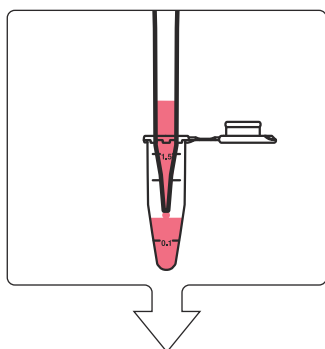
Prerequisites:

- Dispensing tool TS 10 or TM 10-8
- A suitable dispensing volume
- A suitable liquid type



Start position

The pipette tip moves to a defined location. The distance between the pipette tip and the surface is very small. The location is defined in the liquid type.



Dispensing position

The pipette tip places a drop on the surface. The contact with the surface causes the drop to separate from the pipette tip.

The drop can be placed on the surface of a liquid (wet contact dispensing) or the surface of a tube (dry contact dispensing).

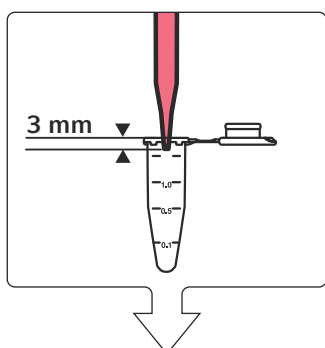
This form of liquid dispensing can be activated in the software using the *Default* function. Refer to the software manual for more information.

4.7.3 Liquid dispensing at the level of the vessel edge (*Dispense from top*)

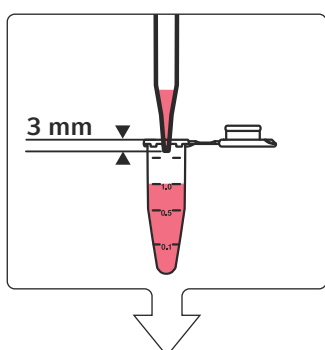
Liquid dispensing at the level of the vessel edge minimizes the risk of contaminating the pipette tip.

Liquid dispensing at the level of the vessel edge is recommended in the following cases:

- Quick dispensing.
- Liquid dispensing in tubes with small diameters, e.g. 384-well plates, capillaries.
- Liquid dispensing in plates with very different filling levels in the locations.



The pipette tip is 3 mm – 4 mm below the vessel edge.



The pipette tip dispenses the liquid into the tube in a free jet.

The filling level in the tube rises, the position of the pipette tip does not change.

Liquid dispensing ends when the pipette tip has dispensed the defined amount of liquid. The tube can be filled up to the maximum filling volume.

Liquid dispensing at the level of the vessel edge can be activated in the software using the *Dispense from top* function. Refer to the software manual for more information.

4.7.4 Liquid dispensing from a defined position

The pipette tip is in a defined position in the tube. The position of the pipette tip is determined from the vessel base or from the liquid level.

The pipette tip can dispense the liquid above a liquid, into a liquid or onto the vessel base.

During liquid dispensing, the pipette tip can perform the following movements:

- During liquid dispensing, the pipette tip moves uniformly upwards with a constant immersion depth.
- The pipette tip moves for a defined distance.
- The pipette tip remains in the selected position.

Liquid dispensing from a defined height is recommended in the following cases:

- Above a liquid
 - Liquid dispensing into plates. The locations of the plate have different filling levels.
 - Liquid dispensing into HPLC vials.
- Into a liquid (wet contact dispensing)
 - Dispensing of low-volume, highly viscous solutions which are difficult to release from the pipette tip
 - For protein crystallization
 - Liquid dispensing into hanging-drop cell-culture plates
- Onto the vessel base (dry contact dispensing)
 - Liquid dispensing onto a Punch on the vessel base
 - Liquid dispensing onto Microarrays

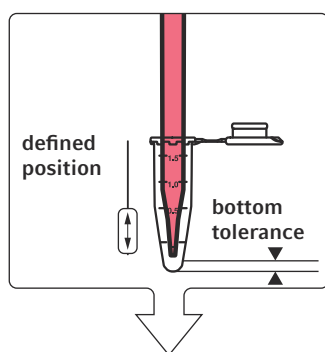


The filling volume of each vessel is defined in the application.

The bottom tolerance is defined in the labware properties.

Other values for liquid aspiration are defined in the liquid type, e.g. aspiration speed.

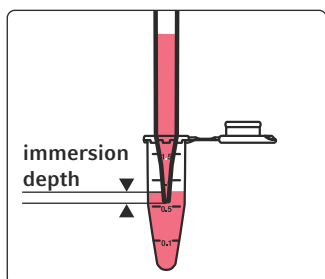
4.7.4.1 Liquid dispensing with a constant immersion depth (*Dispense from defined height > Default*)



Start position

The user defines the position of the pipette tip in the tube.

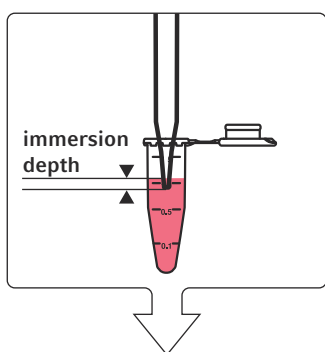
The pipette tip can be positioned below the bottom tolerance.



Movement

The pipette tip dispenses liquid. The filling level in the vessel rises, the pipette tip moves uniformly upwards.

The immersion depth remains constant.



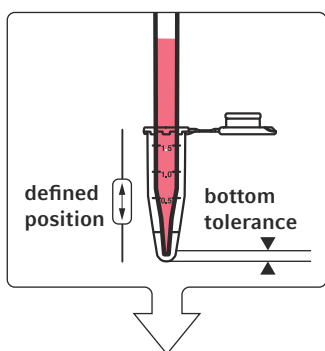
End position

Liquid dispensing ends when the pipette tip has dispensed the defined amount of liquid. The tube can be filled up to the filling volume.

You can activate liquid aspiration from a defined position in the software using the function *Dispense from defined height > Default*. Refer to the software manual for more information.

Perform a test run to check that the immersion depth is correct.

4.7.4.2 Liquid dispensing on a defined distance (*Dispense from defined height > Custom*)



Start position

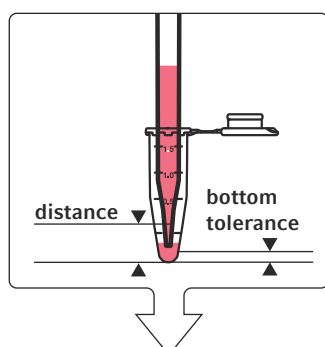
The user defines the position of the pipette tip in the tube.

The pipette tip can be positioned below the bottom tolerance.

Functional description

epMotion® 5073

English (EN)

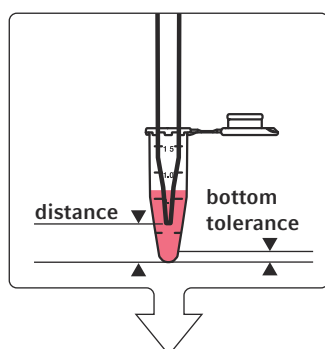


Movement

The user defines which distance the pipette tip travels. The pipette tip can move up or down.

The pipette tip travels the defined distance and dispenses liquid during this process. The filling level in the vessel rises.

The immersion depth of the pipette tips changes in line with the defined distance and the liquid type settings, e.g. the dispensing speed.



End position

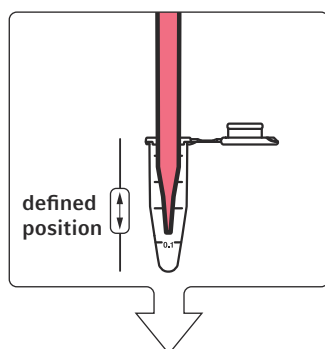
The movement of the pipette tip ends when the pipette tip has traveled the defined distance.

Liquid dispensing ends when the pipette tip has dispensed the defined amount of liquid. The tube can be filled up to the filling volume.

You can activate liquid aspiration from a defined position in the software using the function *Dispense from defined height > Custom*. Refer to the software manual for more information.

Perform a test run to check that the immersion depth is correct.

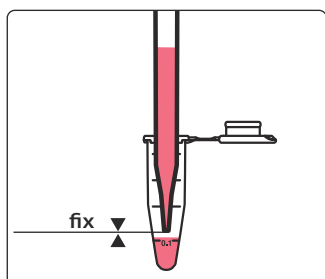
4.7.4.3 Liquid dispensing from a defined position (*Dispense from defined height > Fix*)



Start position

The user defines the position of the pipette tip in the tube.

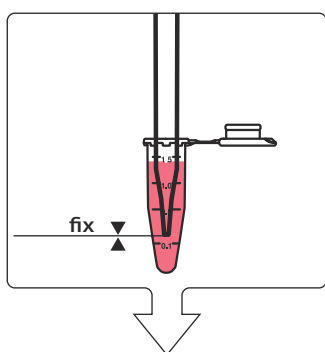
The pipette tip can be positioned below the bottom tolerance.



Movement

The pipette tip dispenses liquid. The filling level in the vessel rises. The pipette tip does not change its position.

The immersion depth of the pipette tips may increase when the filling level rises.



End position

Liquid dispensing ends when the pipette tip has dispensed the defined amount of liquid. The tube can be filled up to the filling volume.

You can activate liquid aspiration from a defined position in the software using the function *Dispense from defined height > Fix*. Refer to the software manual for more information.

Perform a test run to check that the immersion depth is correct.

5 Labware – tubes, plates and pipette tips

The term labware refers to consumables and accessories for the epMotion. Consumables include pipette tips, tubes and plates.

There is a definition in epBlue for labware that you place on the epMotion worktable. The definition contains data on the geometry, temperature control, volume and bottom tolerance of labware.

The epMotion works with labware from different manufacturers. The software manual describes how to integrate labware from other manufacturers into the epBlue software.

5.1 Pipette tips

5.1.1 Overview

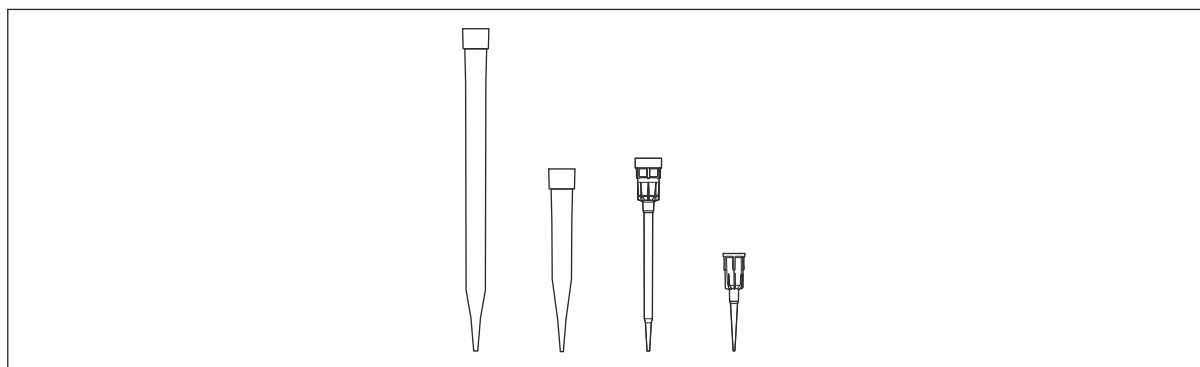


Fig. 5-1: epT.I.P.S. Motion 1 000 µL, 300 µL, 50 µL, 10 µL

epT.I.P.S. Motion are pipette tips for use in the epMotion.

The pipette tips are located in trays. Trays are part of racks and SafeRacks. Trays are available separately as Reloads. The Reload trays are placed on a TipHolder.

The trays have a code. The optical sensor detects the size of the pipette tips based on the code. The optical sensor also detects whether the pipette tips have a filter. The optical sensor does not detect whether the pipette tips are in racks, SafeRacks or in the TipHolder.

Component	Material
Pipette tips	Polypropylene (PP)
Pipette tip filters	Polyethylene (PE)
Trays	Polypropylene (PP)
Racks	Polypropylene (PP)
Rack protective film	Polyethylene (PE)

epT.I.P.S. Motion in Racks, SafeRacks and Reloads must be placed with the bottom facing down during storage. This ensures that the pipette tips hang in the trays.

5.1.2 epT.I.P.S. Motion Racks

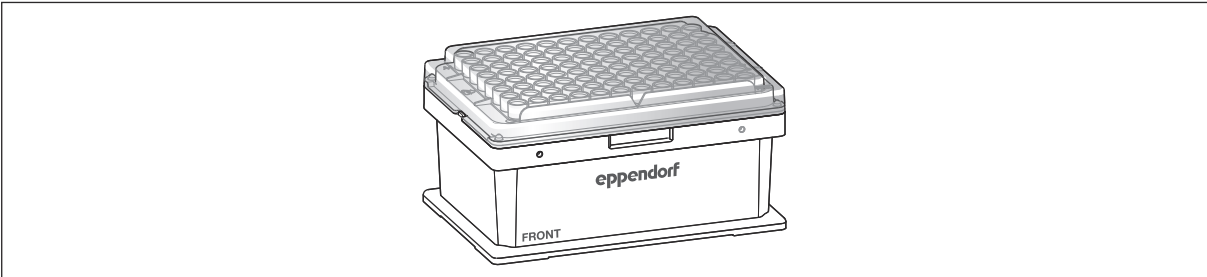


Fig. 5-2: epT.I.P.S. Motion Rack

epT.I.P.S. Motion Racks consist of 96 epT.I.P.S. Motion pipette tips located in a rack. epT.I.P.S. Motion Racks are intended for single use.

Pipette tip size	Dispensing tool	Rack color
10 µL	TS 10, TM 10-8	dark gray
50 µL	TS 50, TM 50-4, TM 50-8	light gray
300 µL	TS 300, TM 300-4, TM 300-8	yellow
1000 µL	TS 1000, TM 1000-4, TM 1000-8	dark blue

epT.I.P.S. Motion Racks	Purity grade
Pipette tips with filter	PCR clean PCR clean und Sterile
Pipette tips without filter	Eppendorf Quality Sterile

5.1.3 epT.I.P.S. Motion SafeRack

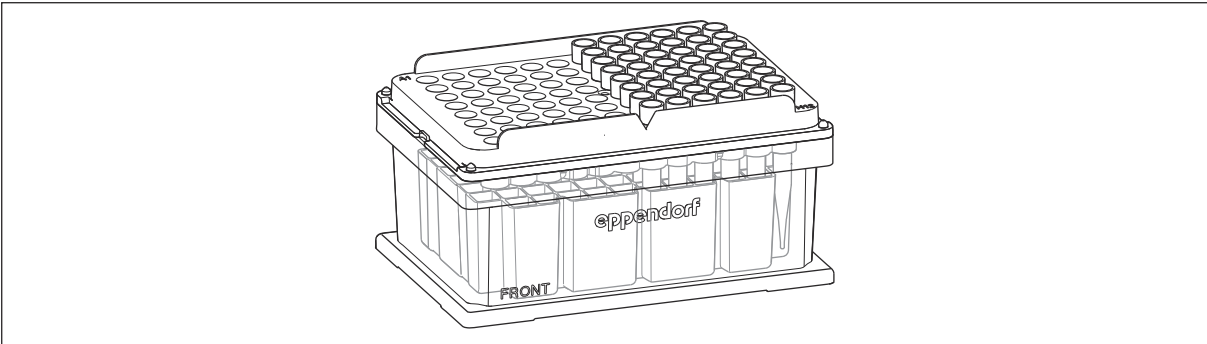


Fig. 5-3: epT.I.P.S. Motion SafeRack

epT.I.P.S. Motion SafeRacks consist of 96 epT.I.P.S. Motion pipette tips located in a SafeRack. epT.I.P.S. Motion SafeRacks are suitable for applications where pipette tips are used multiple times. For example, aspirating buffer in multiple wash steps.

The SafeRack has a compartment to separate pipette tips. During an application, used pipette tips are returned to the SafeRack. This compartment prevents residual liquid from contaminating neighboring pipette tips.

To prevent sample contamination due to reuse of pipette tips, the software assigns each pipette tip to a defined source position.



Use epT.I.P.S. Motion SafeRacks for a maximum of 6 usage cycles. One usage cycle consists of aspirating, dispensing and ejecting the tip.

Pipette tip size	Dispensing tool	SafeRack color
50 µL	TS 50, TM 50-4, TM 50-8	light gray
300 µL	TS 300, TM 300-4, TM 300-8	yellow
1000 µL	TS 1000, TM 1000-4, TM 1000-8	dark blue

epT.I.P.S. Motion SafeRack	Purity grade
Pipette tips with filter	PCR clean
Pipette tips without filter	Eppendorf Quality

5.1.4 epT.I.P.S. Motion Reloads

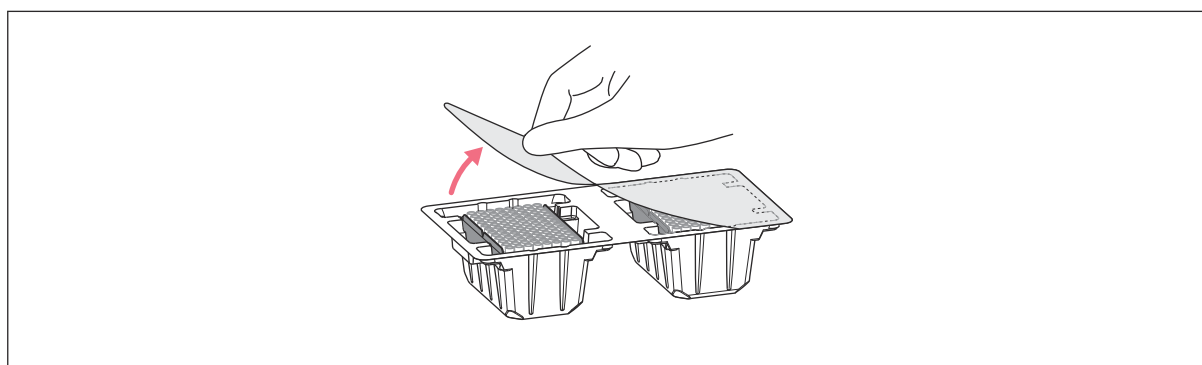


Fig. 5-4: epT.I.P.S. Motion Reloads with packing

epT.I.P.S. Motion Reloads consist of 96 epT.I.P.S. Motion pipette tips located in a tray. epT.I.P.S. Motion Reloads are intended for single use.

The trays are placed in reusable TipHolders. Since no racks are required, waste is reduced.

Pipette tip size	Dispensing tool	Rack color
10 µL	TS 10, TM 10-8	dark gray
50 µL	TS 50, TM 50-4, TM 50-8	light gray
300 µL	TS 300, TM 300-4, TM 300-8	yellow
1000 µL	TS 1000, TM 1000-4, TM 1000-8	dark blue

epT.I.P.S. Motion Reloads	Purity grade
Pipette tips with filter	PCR clean PCR clean und Sterile
Pipette tips without filter	Eppendorf Quality

5.1.5 Stacking Racks and SafeRacks

To store a large number of epT.I.P.S. Motion on the epMotion worktable, you can stack Eppendorf SE Racks and SafeRacks.

You can stack two boxes on top of each other. Stacks must not exceed a total height of 147 mm.



In applications with epT.I.P.S. Motion 1000 µL, Racks, SafeRacks and TipHolder with Reloads cannot be stacked.

epT.I.P.S. Motion	Pipette tip size	Height of box with lid	Position in stack
Racks	10 µL, 50 µL, 300 µL	64.9 mm	Top and bottom
SafeRacks	10 µL, 50 µL, 300 µL	64.9 mm	Top and bottom

The optical sensor does not perform the following checks on stacks:

- Check whether the pipette tips are in a rack or SafeRack
- Detect the number of pipette tips
- Check whether the pipette tips have a filter

Stacked boxes must be completely filled with pipette tips.

The protective film on the boxes must be removed before equipping the epMotion worktable. The bottom box of the stack must be closed with a lid. You can manually remove the lid of the top box.

The gripper transports the top box of a stack. The gripper does not transport stacks. The gripper cannot transport a box over a stack.

The gripper transports the bottom lid of a stack to a location or to the waste system. A maximum of five lids can be stacked in one location.

5.2 Tubes

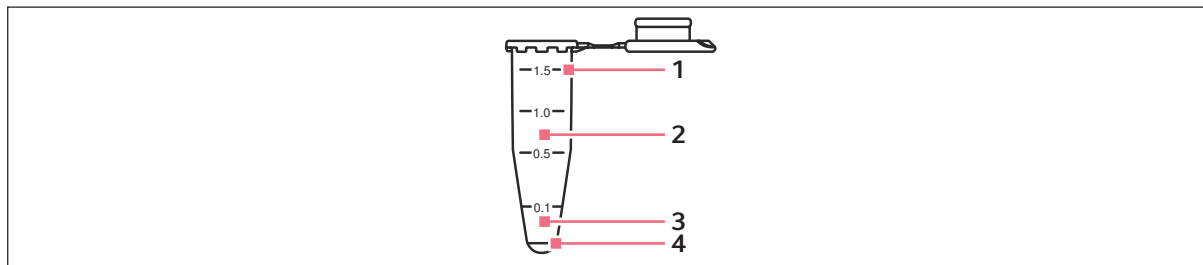


Fig. 5-5: Tube with lid

- | | |
|------------------|-------------------------------------|
| 1 Filling volume | 3 Detection limit of optical sensor |
| 2 Working volume | 4 Remaining volume |

Tubes must be placed in racks. You can use any tube that fits into an epMotion rack.

Tubes that you can place in a rack:

- Safe-Lock tubes
- Standard tubes 3810X
- PCR tubes
- Conical tubes
- Centrifuge tubes
- Cryogenic tubes

Individual tubes are not transported with the gripper.

Level measurement with the optical sensor is more difficult with 0.2 mL tubes and 0.5 mL tubes.

To temper tubes, use thermoracks or ReservoirRack modules.

5.3 Plates

5.3.1 PCR plates

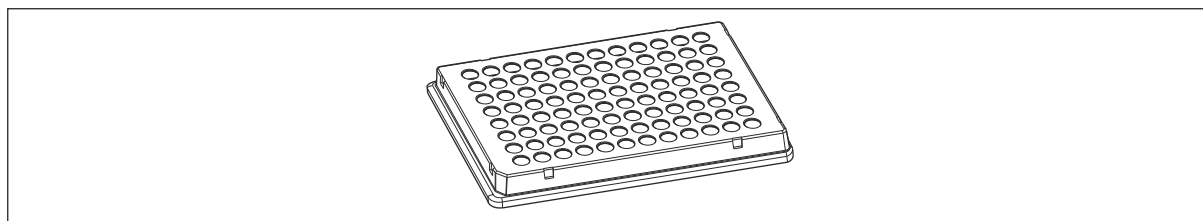


Fig. 5-6: 96-well PCR plate

The following PCR plates are available for the epMotion:

- Skirted, semi-skirted, unskirted 96-well PCR plates
- Skirted 384-well PCR plates

For 96-well PCR plates, level measurement with the optical sensor is not recommended. For 384-well PCR plates, level measurement with the optical sensor is not possible.

You can stack plates of the same type on the worktable. The top plate of stacked plates is transported. The gripper does not grip or transport unskirted PCR plates.

Table 2: Use of thermoblocks

96-well PCR plates, semi-skirted	Thermoblock PCR 96 OC, Thermoblock PCR 96
96-well PCR plates, unskirted	Thermoblock PCR 96

Table 3: Placement and transport of PCR plates

	Thermoblock	Adapter	Worktable
96-well PCR plates, skirted	Manual placement is possible. The gripper can grip plates placed on a thermoblock. The gripper can transport the plate individually. The gripper can transport the plate and thermoblock together.	Manual placement is possible. The gripper can grip plates placed on an adapter. The gripper transports the plate. Adapters are not transported.	Placement is possible manually or with the gripper. The gripper transports the plate.
96-well PCR plates, semi-skirted	Manual placement is possible. The gripper can grip plates placed on a thermoblock. The gripper can transport the plate individually. The gripper can transport the plate and thermoblock together.	Manual placement is possible. The gripper can grip plates placed on an adapter. The gripper transports the plate. Adapters are not transported.	Placement on the worktable is not possible. The plate cannot be placed in a location without a thermoblock or adapter.
96-well PCR plates, unskirted	Manual placement on the thermoblock. The gripper transports the plate with the thermoblock.	Manual placement is possible. The gripper cannot grip the plate on the adapter. Adapters are not transported.	Placement on the worktable is not possible. The plate cannot be placed in a location without a thermoblock or adapter.

5.3.2 Deepwell plates

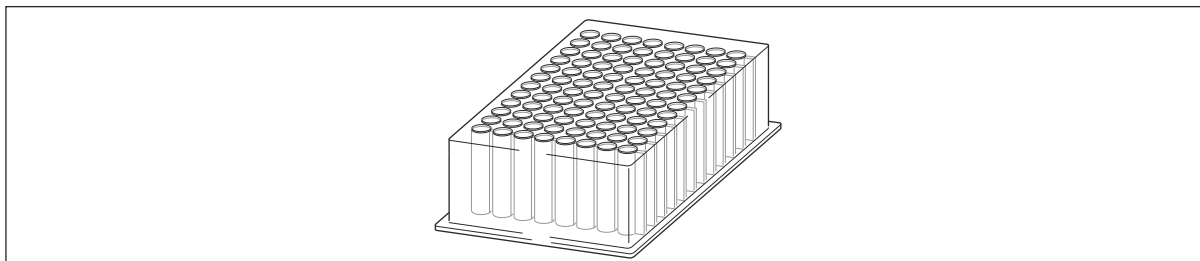


Fig. 5-7: Deepwell plate with 96 wells

You can place the plates directly on a worktable location. You can place the plates on suitable adapters.

For transport, the gripper grips the plates on the frame. The top plate of stacked plates is transported.

A maximum of two Eppendorf Deepwell plates can be stacked on one location.

A thermoadapter is available for Eppendorf Deepwell Plates 96/1000 μL . A thermoblock is available for Eppendorf Deepwell Plates 96/2000 μL .

5.3.3 Microplates

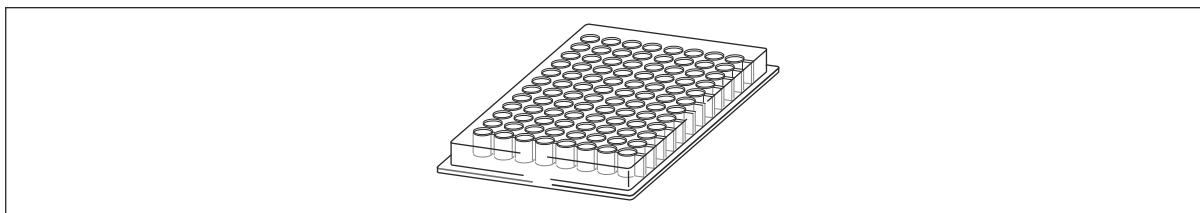


Fig. 5-8: Microplate with 96 wells

You can place the plates directly on a worktable location. You can place the plates on suitable adapters.

For transport, the gripper grips the plates on the frame.

For microplates with 384 wells, level measurement with the optical sensor is not possible. For microplates with 96 wells, level measurement with the optical sensor is not recommended.

You can stack plates of the same type on the worktable. The top plate of stacked plates is transported.

5.3.4 Tube plates

Tube plates are plates with individual tubes. Tube plates are available in various tube layouts. Tube plates are treated like normal plates.

5.4 Reservoirs

5.4.1 Reservoir 10 mL

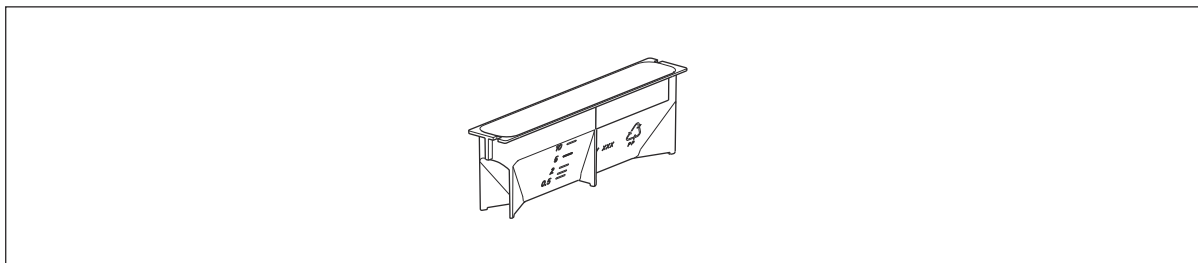


Fig. 5-9: Reservoir 10 mL

Reservoirs provide liquids.

Reservoirs are made of Polypropylene.

Reservoir 10 mL can be used with all pipette tips.

Reservoir 10 mL has a smooth bottom.

Reservoir 10 mL can be tempered when it is inserted into the ReservoirRack with ReservoirRack module TC 10 mL.

5.4.2 Reservoir 30 mL

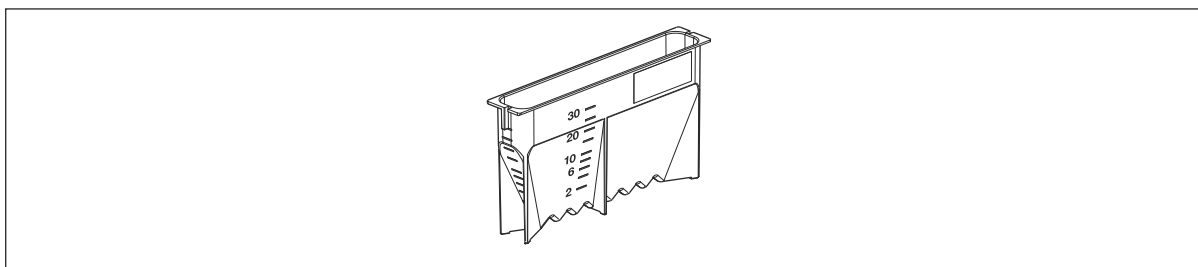


Fig. 5-10: Reservoir 30 mL

Reservoirs provide liquids.

Reservoirs are made of Polypropylene.

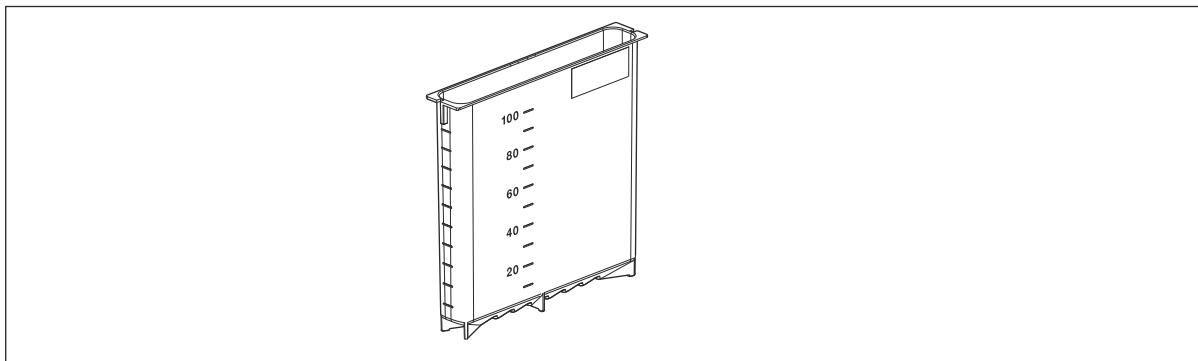
Reservoir 30 mL can be used with all pipette tips. Reservoir 30 mL is particularly suitable for eight-channel dispensing tools.

Reservoir 30 mL has a ribbed bottom. If the bottom tolerance has been reduced, the information about the remaining volume is not accurate.

Reservoir 30 mL is very narrow at the bottom. If the bottom tolerance is reduced, the reservoir can be lifted using the pipette tips.

Reservoir 30 mL can be tempered when it is inserted into the ReservoirRack with ReservoirRack module TC 30 mL.

5.4.3 Reservoir 100 mL



Reservoirs provide liquids.

Reservoirs are made of Polypropylene.

Reservoir 100 mL has a ribbed bottom. If the bottom tolerance has been reduced, the information about the residual volume is not accurate.

Reservoir 100 mL is particularly suitable for eight-channel dispensing tools.

The eight-channel dispensing tools TM 10-8, TM 50-8 and TM 300-8 cannot be immersed to the bottom. A higher remaining volume remains in the reservoir.

Reservoir 100 mL can be tempered when it is inserted into the ReservoirRack with ReservoirRack module TC 100 mL.

5.4.4 Reservoir 400 mL

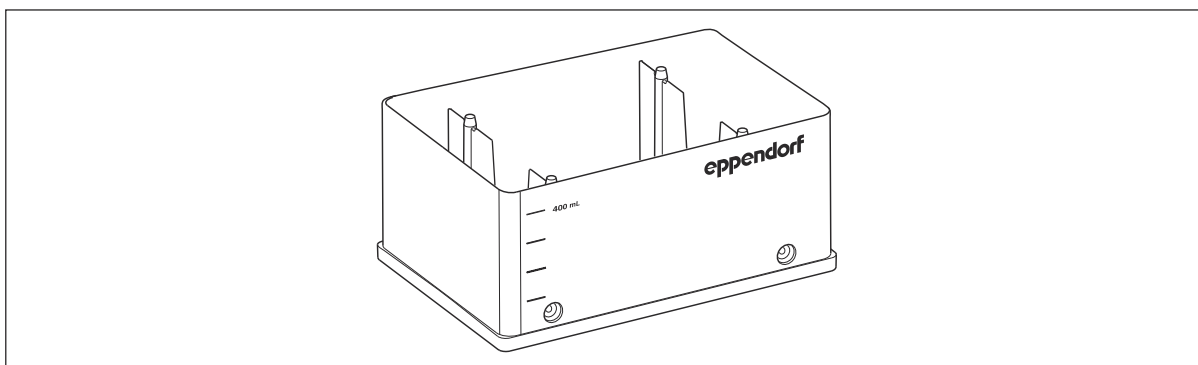


Fig. 5-11: Reservoir 400 mL

The remaining volume of the 400 mL reservoir is approx. 10 mL.

5.5 Waste bags

Waste bags hold used pipette tips and empty trays. Waste bags are available for standard waste and biohazardous waste.

6 Labware accessories

The term labware refers to consumables and accessories for the epMotion. Accessories include adapters, blocks and racks.

There is a definition in epBlue for labware that you place on the epMotion worktable. The definition contains data on the geometry, temperature control, volume and bottom tolerance of labware.

The epMotion works with labware from different manufacturers. The software manual describes how to integrate labware from other manufacturers into the epBlue software.

6.1 TipHolder

6.1.1 TipHolder

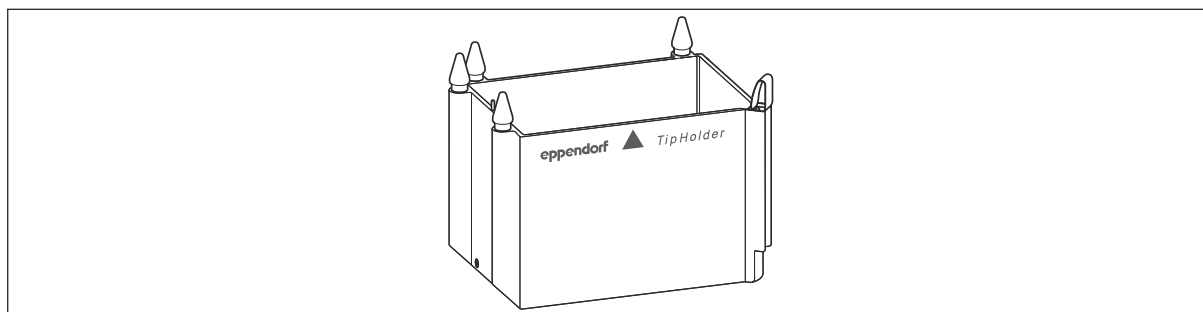


Fig. 6-1: TipHolder

The TipHolder is an adapter that holds epT.I.P.S. Motion Reloads.

TipHolders are not transported with the gripper.

6.1.2 TipHolder 73

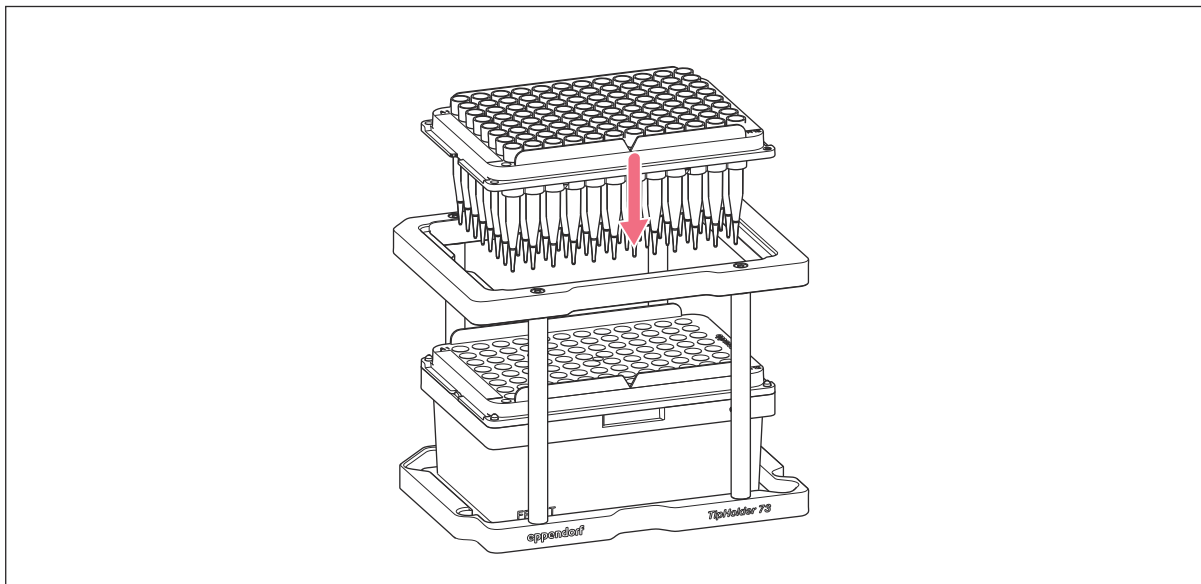


Fig. 6-2: TipHolder 73

The TipHolder 73 allows additional epT.I.P.S. Motion to be made available on the epMotion worktable.

The TipHolder 73 is suitable for epT.I.P.S. Motion in the sizes 10 µL, 50 µL, 300 µL.

The TipHolder 73 can be used with single-channel and eight-channel dispensing tools.

Information on how to place the TipHolder 73 on the epMotion worktable can be found in the Operation chapter.

6.1.3 TipHolder TM-4-compatible

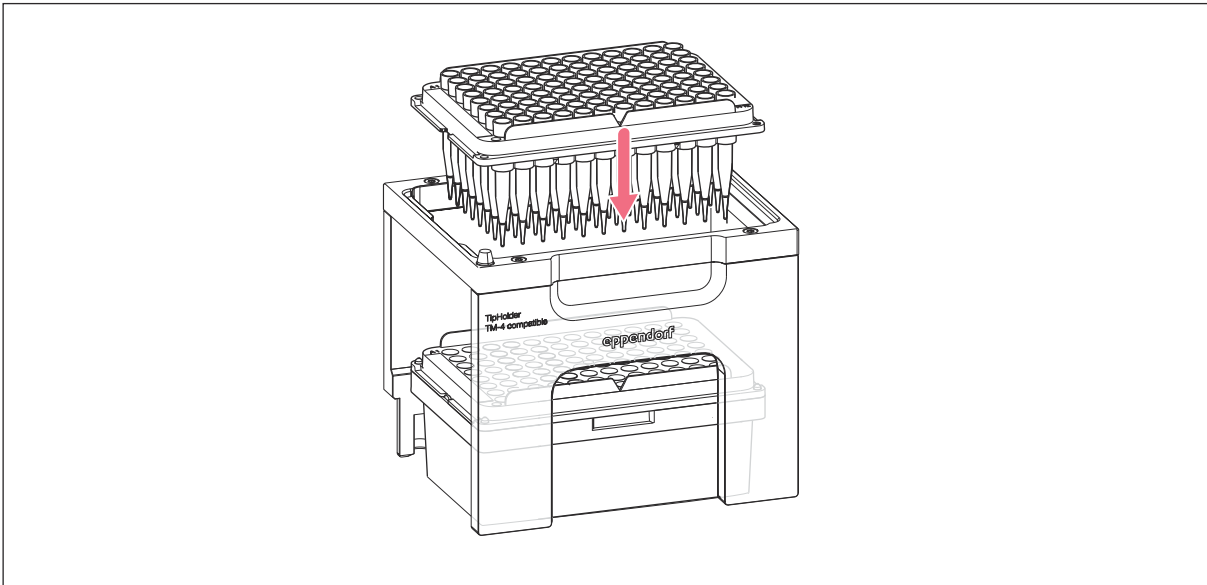


Fig. 6-3: TipHolder TM-4-compatible

The TipHolder TM-4-compatible allows additional epT.I.P.S. Motion to be made available on the epMotion worktable.

The TipHolder TM-4-compatible is suitable for epT.I.P.S. Motion in the sizes 10 µL, 50 µL, 300 µL.

The TipHolder TM-4-compatible can be used with single-channel, four-channel and eight-channel dispensing tools.

Information on how to place the TipHolder TM-4-compatible on the epMotion worktable can be found in the Operation chapter.

6.1.4 Using TipHolder 73 and TipHolder TM-4-compatible in one application

You can use the TipHolder 73 and TipHolder TM-4-compatible in one application.

The dispensing tools must be compatible with the corresponding TipHolder.

	Single-channel dispensing tool	Four-channel dispensing tool	Eight-channel dispensing tool
TipHolder 73	x	-	x
TipHolder TM-4-compatible	x	x	x

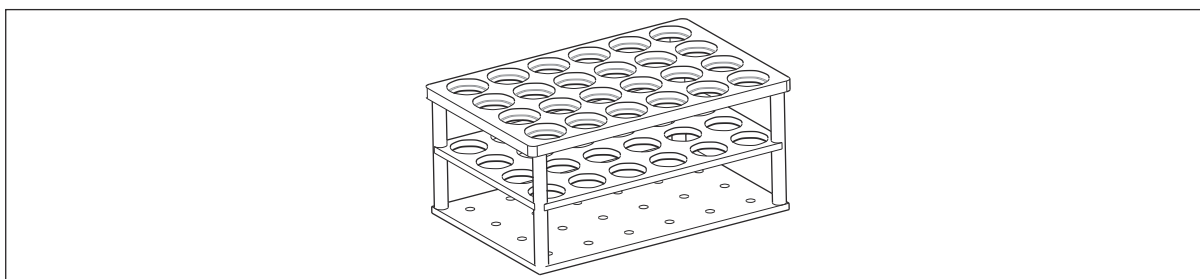
TipHolder 73 and TipHolder TM-4-compatible must be equipped with epT.I.P.S. Motion pipette tips of different sizes or different types.

Example

Dispensing tool	Pipette tips	TipHolder
Dispensing tool TM 300-8	epT.I.P.S. Motion 300 µL with filter	TipHolder 73
Dispensing tool TM 300-4	epT.I.P.S. Motion 300 µL without filter	TipHolder TM-4-compatible

6.2 Racks

6.2.1 Rack for 24 tubes



The rack for 24 tubes is a holder for holding individual tubes.

The racks have the same footprint as plates. Racks can be positioned at any location.

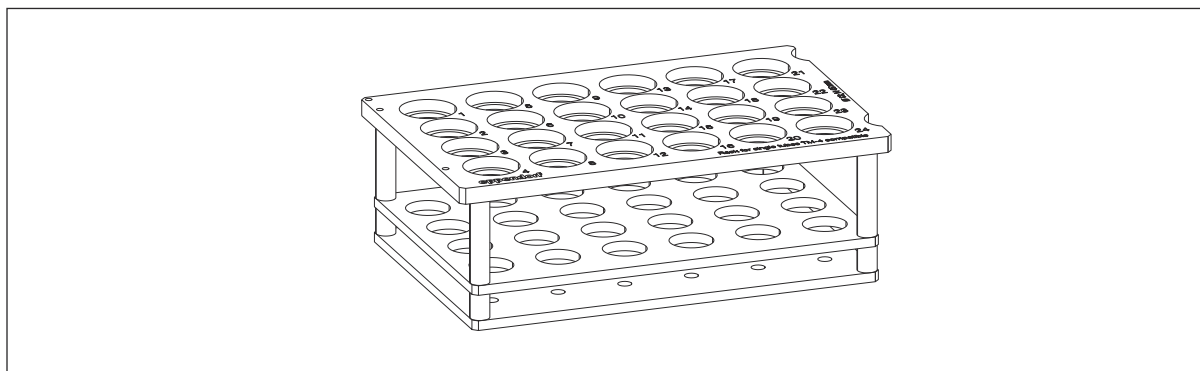
The racks are coded. The optical sensor uses the code to detect whether the rack is correctly positioned.

The bores for the tubes are numbered.

Racks for 24 tubes are suitable for tubes with a diameter of 12 mm – 17 mm. The racks are available in 2 heights and in various designs.

Racks can be used with single-channel dispensing tools.

6.2.2 Rack for 24 tubes TM-4-compatible



The rack for 24 tubes TM-4-compatible is a holder for holding individual tubes.

Racks for 24 tubes TM-4-compatible have the same footprint as plates. Racks for 24 tubes TM-4-compatible can be positioned at any location.

Racks for tubes TM-4-compatible are suitable for tubes with a diameter of 13 mm and a maximum length of 60 mm.

The rack for tubes TM-4-compatible can be used with single-channel and four-channel dispensing tools.

6.2.3 Rack 0.5/1.5/2.0 mL

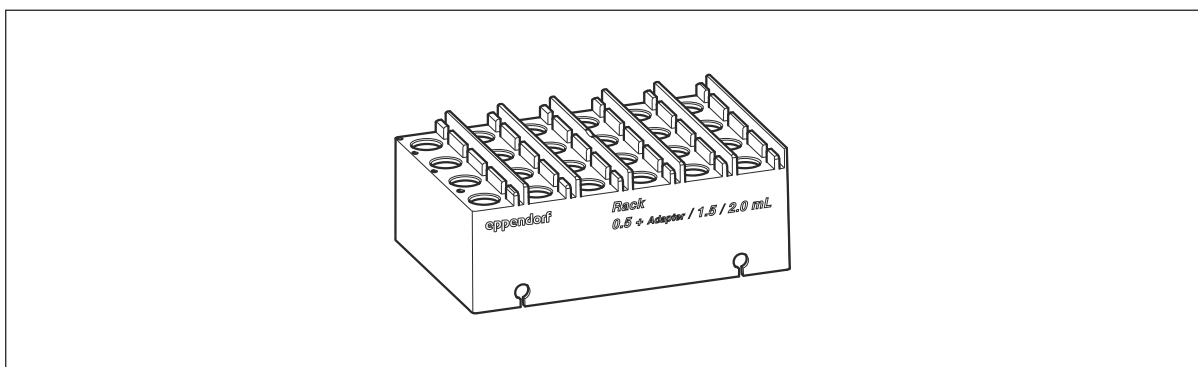


Fig. 6-4: Rack 0.5/1.5/2.0 mL

The rack 0.5/1.5/2.0 mL is a holder for holding individual tubes.

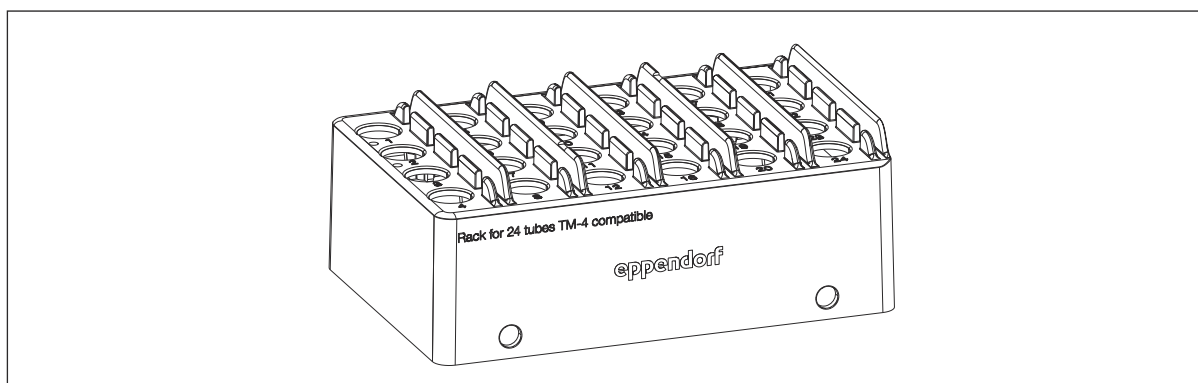
The rack 0.5/1.5/2.0 mL has 24 bores for tubes with a volume of 1.5 mL and 2 mL. If you use adapters, you can use tubes with a volume of 0.5 mL.

The rack 0.5/1.5/2.0 mL has lid holders. The lid holders are located to the right of the bore for the tube. The lid holders clamp the tube lids vertically.

Rack 0.5/1.5/2.0 mL can be used with single-channel dispensing tools.

Rack 0.5/1.5/2.0 mL is transported with the gripper.

6.2.4 Rack for tubes TM-4-compatible



The rack for tubes TM-4-compatible is a holder for holding individual tubes.

The rack for tubes TM-4-compatible has 24 bores for tubes with a volume of 1.5 mL or 2 mL. If you use adapters, you can use tubes with a volume of 0.5 mL.

The rack for tubes TM-4-compatible has lid holders. The lid holders are located to the right of the bore for the tube. The lid holders clamp the tube lids vertically.

The rack for tubes TM-4-compatible can be used with single-channel and four-channel dispensing tools.

The rack for tubes TM-4-compatible is transported with the gripper.

6.2.5 Rack for 96 conical tubes

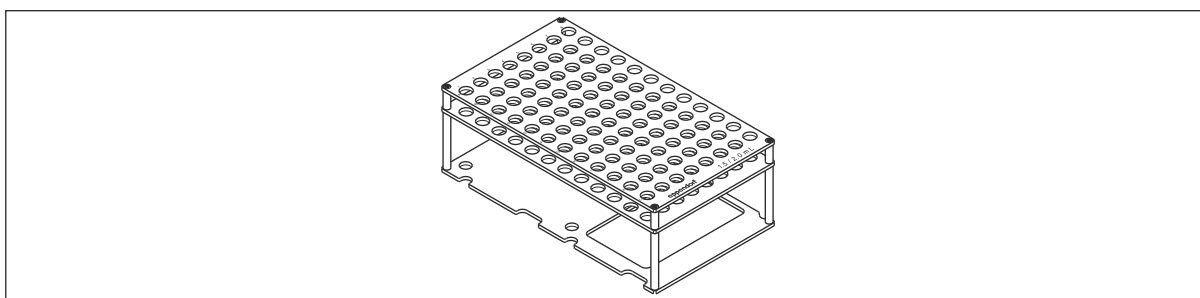


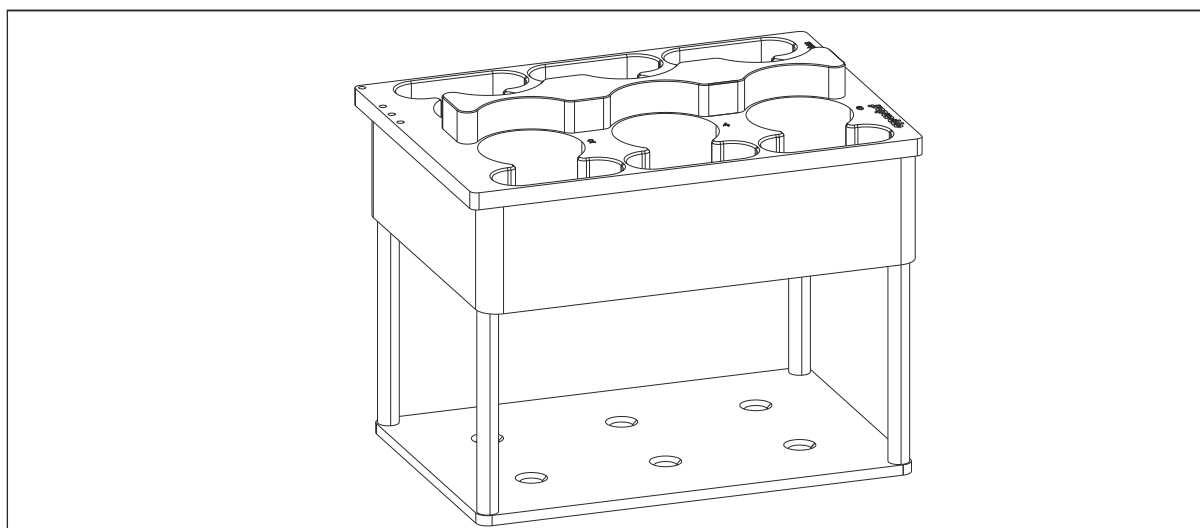
Fig. 6-5: Rack for 96 conical tubes

The rack for 96 conical tubes is a holder for holding individual tubes.

The rack for 96 conical tubes occupies 2 locations on the worktable.

The rack holds 96 tubes without lids, each with a capacity of 1.5 mL or 2 mL. The rack holds 48 tubes with attached lids, such as Safe-Lock tubes.

6.2.6 Rack for conical tubes



The rack for conical tubes is a holder for holding individual tubes.

The rack for conical tubes is suitable for 6 conical tubes with screw caps or SnapTec lids and with a volume of 25 mL or 50 mL.

The lid holders for SnapTec lids are located on the outside of the rack. The lid holders clamp the tube lids vertically.

The rack for conical tubes is compatible with single-channel dispensing tools.

6.2.7 Rack LC

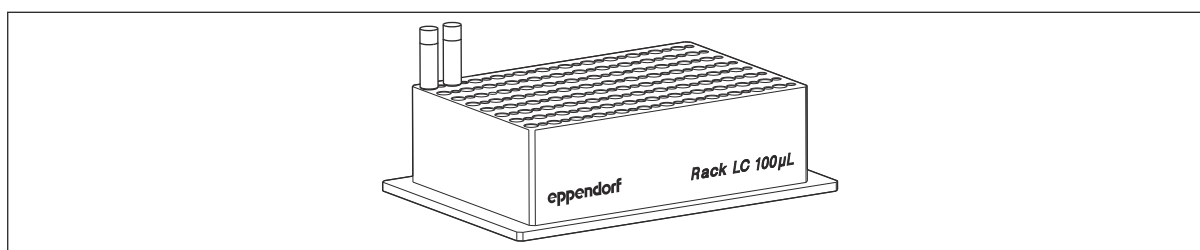


Fig. 6-6: Rack LC, size 100 µL

The Rack LC is a holder for holding capillaries.

The Rack LC holds the following capillaries:

- 96 LightCycler capillaries with a volume of 20 µL
- 96 LightCycler capillaries with a volume of 1000 µL

The Rack LC has bores for each capillary size. The bores are arranged alternately.

The Rack LC is labeled on both long sides. One side is labeled Rack LC µL, the other side is labeled Rack LC 100 µL.

i Use only capillaries of one size for an application.

6.2.8 Rack for ILMN tubes

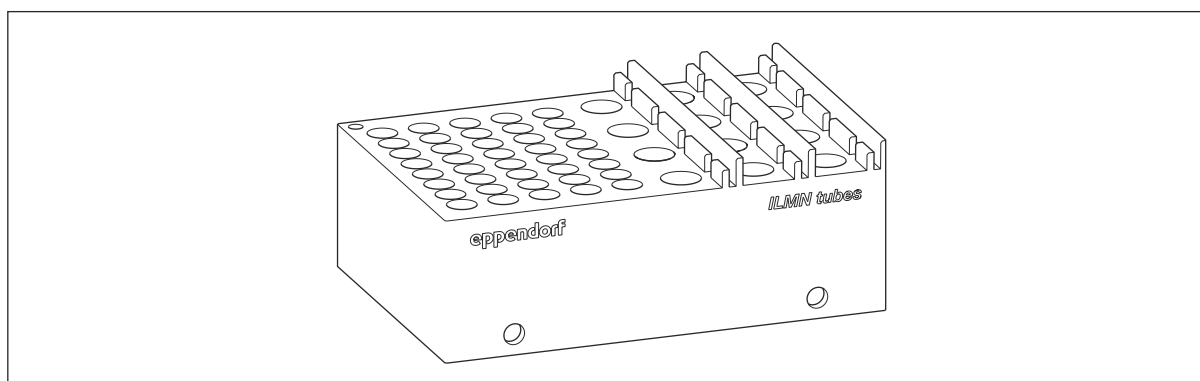


Fig. 6-7: Rack for ILMN tubes

The rack for ILMN tubes is a holder for holding individual tubes.

The rack for ILMN tubes holds tubes of different sizes:

- Columns 1 – 5: Placement of 40 tubes with a diameter of 8.4 mm, e.g., Illumina Index tubes i5/i7 or tubes 1.10 mL Tubes Internal Thread from Micronic.
- Columns 6 – 8: Placement of 12 tubes with a diameter of 11.2 mm, e.g., Eppendorf Safe-Lock Tubes 1.5 mL and 2 mL

The rack for ILMN tubes is transported with the gripper.

6.3 ReservoirRack

6.3.1 ReservoirRack

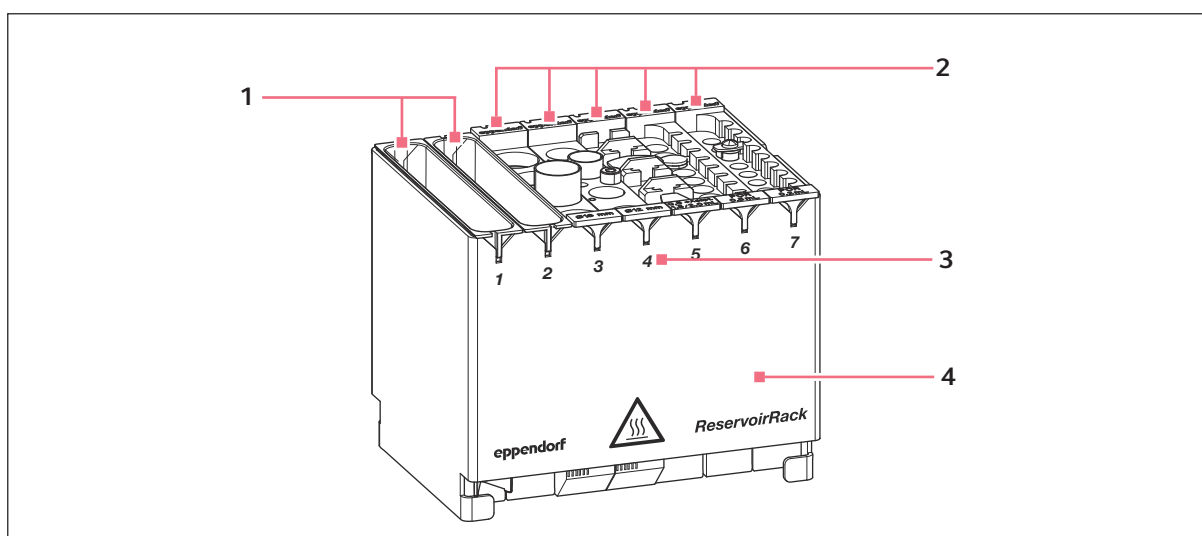


Fig. 6-8: Equipped ReservoirRack

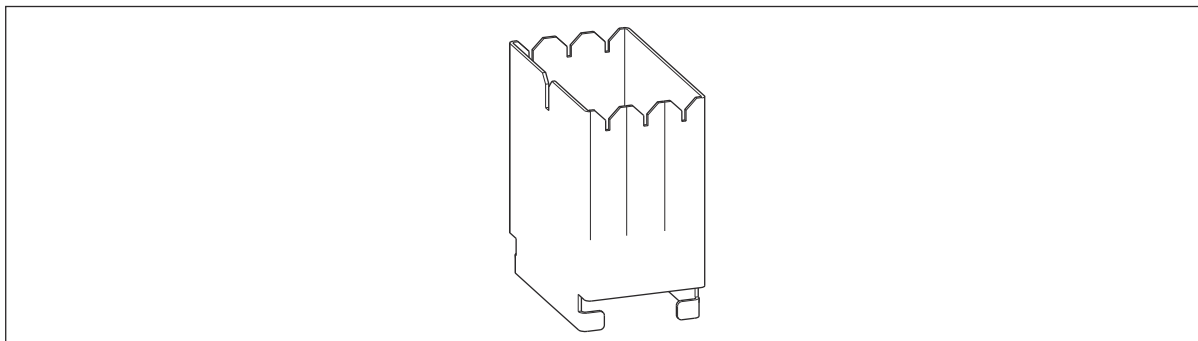
- | | |
|------------------------|-------------------------|
| 1 Reservoir | 3 ReservoirRack columns |
| 2 ReservoirRack module | 4 ReservoirRack |

The ReservoirRack holds reservoirs and ReservoirRack modules. The ReservoirRack columns are numbered.

The ReservoirRack module holds a maximum of 7 reservoirs or 7 different ReservoirRack modules. ReservoirRacks can be equipped in any order.

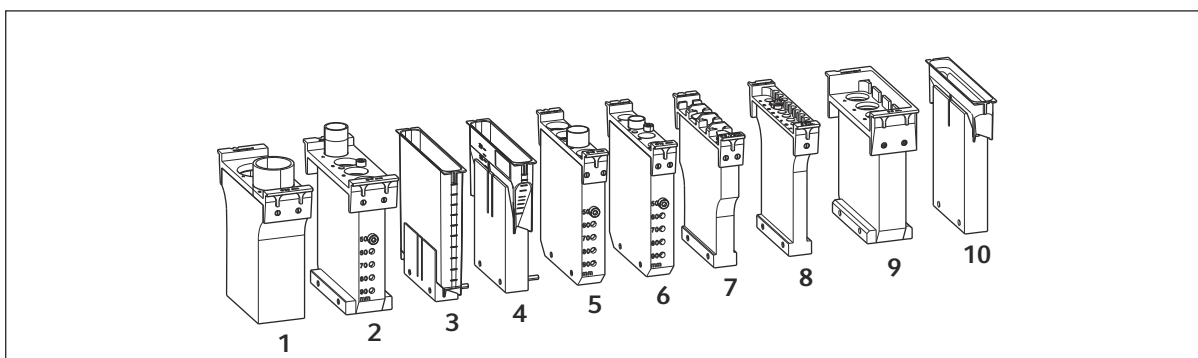
The ReservoirRack cannot be placed on the Eppendorf ThermoMixer module.

6.3.2 ReservoirRack 3



You can equip the ReservoirRack 3 with a maximum of 3 ReservoirRack modules or reservoirs.
If you use reservoirs, you can use the ReservoirRack 3 as a waste container for liquid waste.

6.3.3 ReservoirRack modules TC

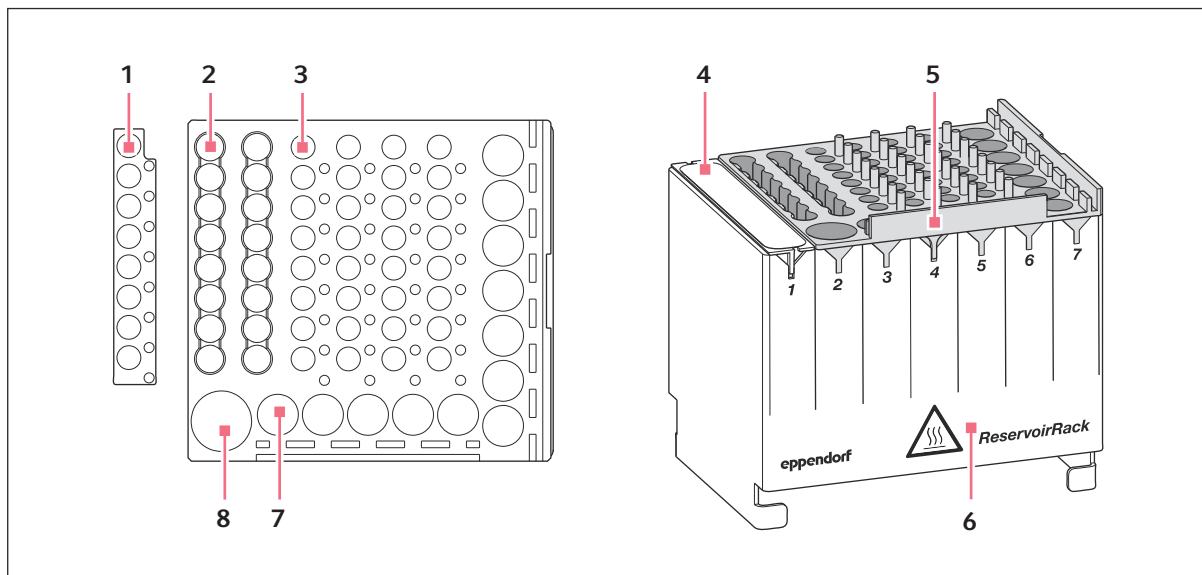


- | | |
|--------------------------|--|
| 1 For 2 tubes Ø 29 mm | 6 For 4 tubes Ø 12 mm |
| 2 For 4 tubes Ø 17 mm | 7 For 4 Safe-Lock tubes 1.5 mL/2 mL with an adapter for 0.5 mL |
| 3 For 1 reservoir 100 mL | 8 For 8 PCR tubes 0.2 mL |
| 4 For 1 reservoir 30 mL | 9 For 4 Eppendorf Tubes 5 mL |
| 5 For 4 tubes Ø 16 mm | 10 For 1 reservoir 10 mL |

A ReservoirRack module is equipped with tubes or a reservoir. The ReservoirRack module is inserted into a ReservoirRack.

The ReservoirRack modules TC are temperature-controlled.

6.3.4 ReservoirRack modules PCR



- | | | | |
|---|--|---|--|
| 1 | Positions for PCR tubes 0.2 mL | 5 | ReservoirRack module PCR |
| 2 | Positions for ILMN tubes 1.0 mL | 6 | ReservoirRack |
| 3 | Positions for PCR tubes 0.2 mL or PCR strips | 7 | Positions for tubes 0.5 mL, 1 mL, 1.5 mL, 2 mL |
| 4 | Reservoir (optional) | 8 | Position for tube with screw cap 5 mL |

A ReservoirRack module PCR can occupy positions 2–7 of a ReservoirRack.

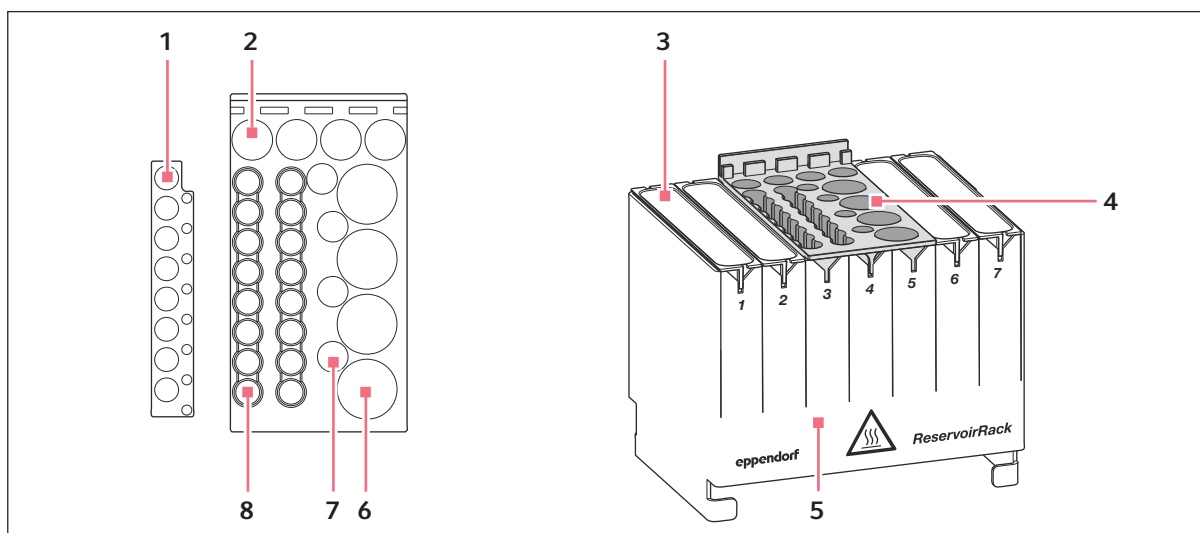
The optical sensor can measure the filling level of the tubes used. The optical sensor can scan the code on the labware.

A ReservoirRack module PCR holds the following tubes:

- 1 tube with screw cap 5 mL
- 12 tubes 1.5/2.0 mL
- 12 tubes 0.5 mL with adapter
- 32 PCR tubes 0.2 mL
- 4 PCR strips
- 16 PCR tubes 0.2 mL or
- 16 ILMN tubes 1.0 mL

ReservoirRack modules PCR are autoclavable.

6.3.5 ReservoirRack modules NGS



- | | | | |
|---|--|---|---|
| 1 | Positions for PCR tubes 0.2 mL | 5 | ReservoirRack |
| 2 | Positions for tubes 0.5 mL, 1.5 mL, 2.0 mL | 6 | Positions for tubes with screw cap 5 mL |
| 3 | Reservoir (optional) | 7 | Positions for ILMN tubes 1.0 mL |
| 4 | ReservoirRack module NGS | 8 | Positions for ILMN tubes 1.0 mL |

A ReservoirRack module NGS occupies 3 positions of a ReservoirRack. Position 7 must not be occupied by a ReservoirRack module NGS.

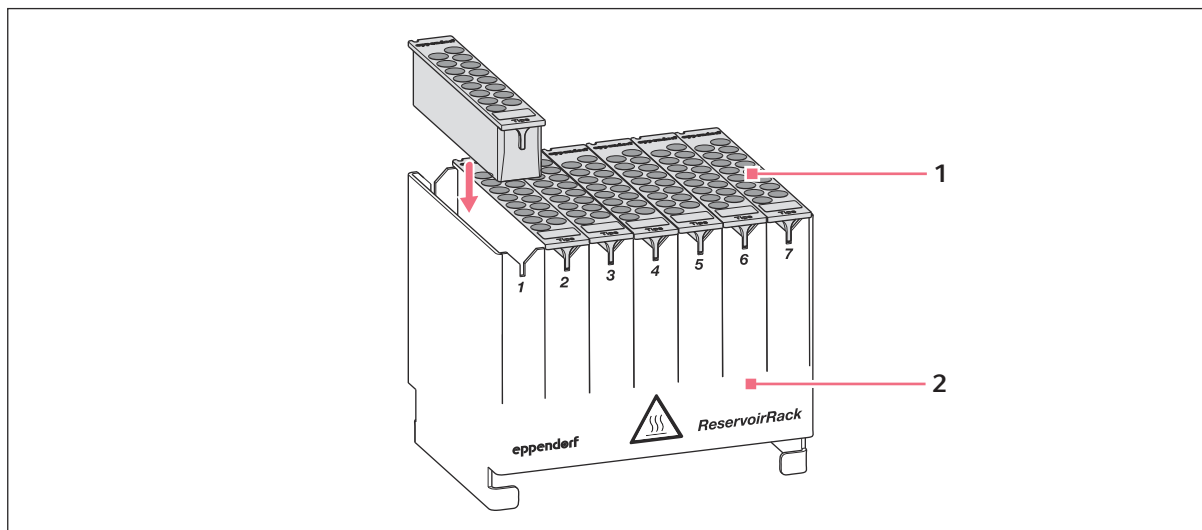
The optical sensor can measure the filling level of the tubes used. The optical sensor cannot scan the code on the labware.

The ReservoirRack module NGS can hold the following tubes:

- 4 tubes 5 mL
- 4 tubes 1.5 mL, 2.0 mL
- 4 tubes 0.5 mL with adapter
- 4 ILMN tubes 1 mL
- 16 PCR tubes 0.2 mL
- 16 ILMN tubes 1.0 mL

ReservoirRack modules NGS are autoclavable.

6.3.6 ReservoirRack modules Tips



1 ReservoirRack module Tips

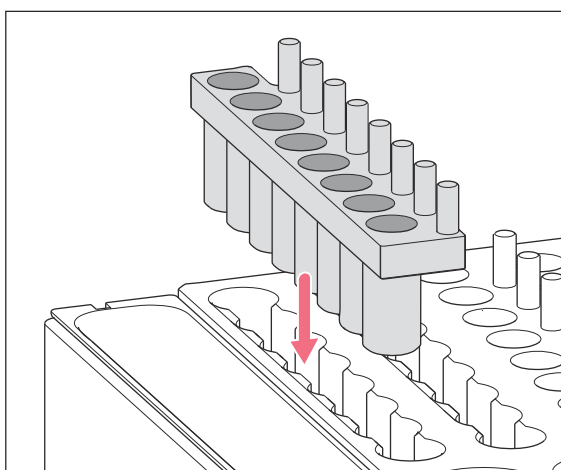
2 ReservoirRack

A ReservoirRack module Tips holds 16 identical epT.I.P.S. Motion pipette tips. ReservoirRack modules Tips are available for every size of epT.I.P.S. Motion.

A ReservoirRack can be filled with differently equipped ReservoirRack module Tips.

ReservoirRack modules Tips are autoclavable.

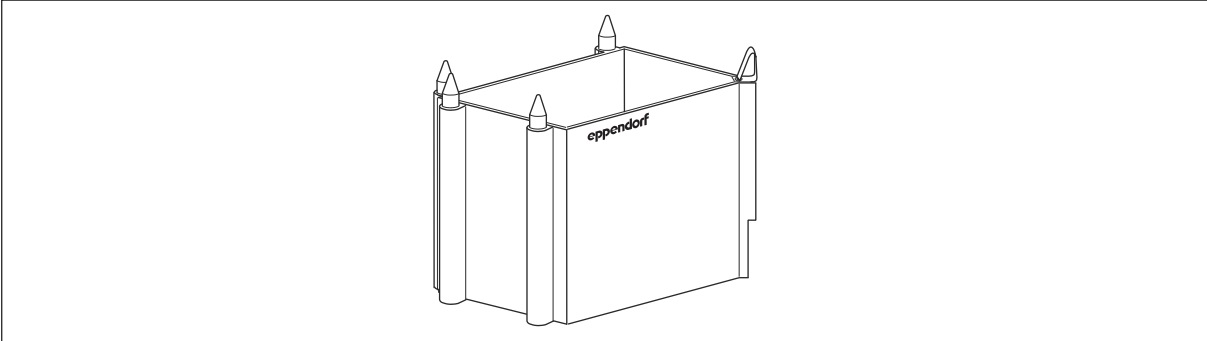
6.3.7 Strip adapter



Strip adapters are used to increase the number of positions for PCR tubes 0.2 mL. Strip adapters can be inserted into the ReservoirRack module NGS and the ReservoirRack module NGS PCR.

The strip adapter is autoclavable.

6.4 Height adapter



Height adapters are used to compensate the different heights of the labware. The tool holder does not need to compensate the height differences of the labware and remains at one height. The shorter paths of this tool holder enable the application to run more quickly.

The height of the adapter is listed on the adapter. The total height of the adapter and labware must not be more than 147 mm.

Height adapters are not transported with the gripper.

Table 4: Available height adapters

Adapter	Used with
40 mm	• epT.I.P.S. Motion Racks with a size of 50 µL and 300 µL
55 mm	• DWP plates • 400 mL reservoir • Thermoblock with PCR plate
85 mm	• Virtually all MTP plates with 6 – 384 wells • Virtually all PCR plates with 96 – 384 wells • Thermoblock für PCR plates with PCR plate

6.5 Magnetic adapter

6.5.1 Magnum FLX magnetic adapter 96-well plates



WARNING! Magnetic field

Magnetic fields can impair the functioning of pacemakers and defibrillators. Pacemakers may be reset.

- Keep a distance of at least 20 cm from the magnet.
- Warn people with a pacemaker about the strong magnetic field.

**WARNING! Allergy risk**

The magnets of the magnetic adapter contain nickel. Direct skin contact with nickel can trigger allergic reactions.

- Avoid direct skin contact with the magnetic adapter.
- After direct skin contact, wash affected areas with water and soap.
- Users with a known nickel allergy must avoid handling the magnetic adapter.

**CAUTION! Crushing**

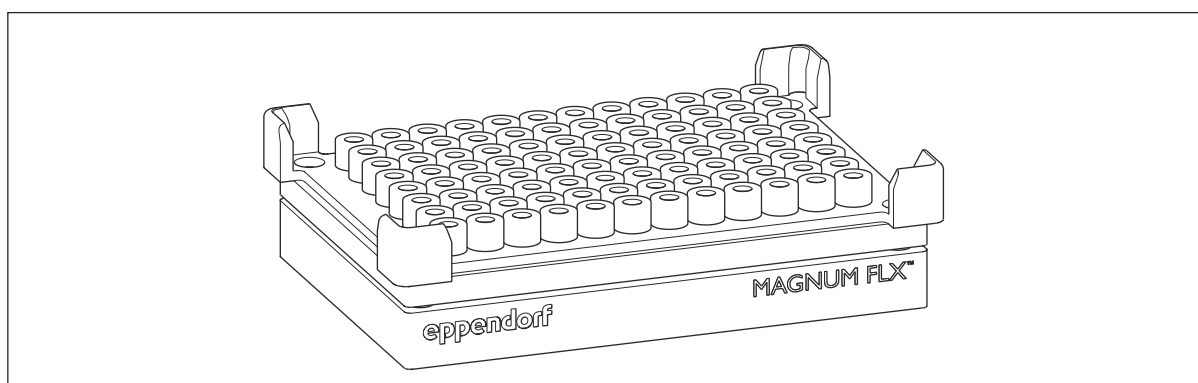
The magnetic adapter has a strong magnetic field. If the distance between a magnetic adapter and other magnetizable materials is less than 10 cm, they will attract each other quickly and strongly. You can crush your skin and fingers.

- Make sure that there is a minimum distance of 10 cm between the magnetic adapter and other magnetizable materials.
- Wear protective gloves.

**NOTICE! Damage to the device and accessories**

The magnetic adapter generates a strong magnetic field, which can damage other electronic devices such as computers, CRT-based monitors, hard disks, data carriers, mechanical watches, EC and credit cards, or hearing aids. Nearby metal objects can be attracted to the magnetic adapter.

- Do not place electronic devices or metal objects near the magnetic adapter.



The Magnum FLX magnetic adapter 96-well plates is used for fast and efficient settling of magnetic particles from liquid columns up to 40 mm in height. It can be used for working volumes >10 µL.

The Magnum FLX magnetic adapter 96-well plates is a ring magnet plate. The Magnum FLX magnetic adapter 96-well plates is used to isolate magnetic beads in a suspension and to remove washing liquid.

Labware containing a bead suspension is placed on the magnetic adapter. The magnetic adapter has 96 strong ring magnets. The ring magnets cause the beads to settle on the tube inner wall after an incubation period. The beads form a ring at magnet level. The sample supernatant is aspirated below the bead ring using a pipette tip without aspirating the beads.

The following plates can be inserted in the Magnum FLX magnetic adapter 96-well plates:

- Deepwell plates
- Plates with round bottoms and V-bottoms
- PCR plates (skirted, semi-skirted, unskirted)

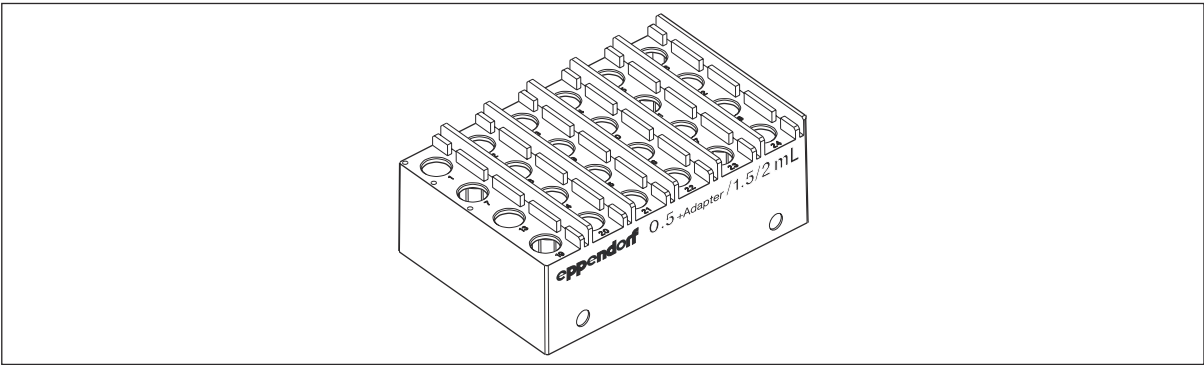
i If warped labware is placed on the magnetic adapter, the magnetic beads may end up on the magnetic adapter.

The Magnum FLX magnetic adapter 96-well plates must not be tempered.

The gripper is not used to transport the Magnum FLX magnetic adapter 96-well plates. Plates that are on the magnetic adapter are transported with the gripper.

6.6 Thermorack

6.6.1 Thermorack 0.5/1.5/2.0 mL



The thermorack 0.5/1.5/2.0 mL has 24 bores for tubes with a volume of 1.5 mL and 2 mL. If you use adapters, you can use tubes with a volume of 0.5 mL.

The thermorack 0.5/1.5/2.0 mL has lid holders. The lid holders are located to the right of the bore for the tube. The lid holders clamp the tube lids vertically.

The thermorack 0.5/1.5/2.0 mL is temperature-controlled and intended for use on thermal modules. You can cool thermoracks in a laboratory refrigerator.

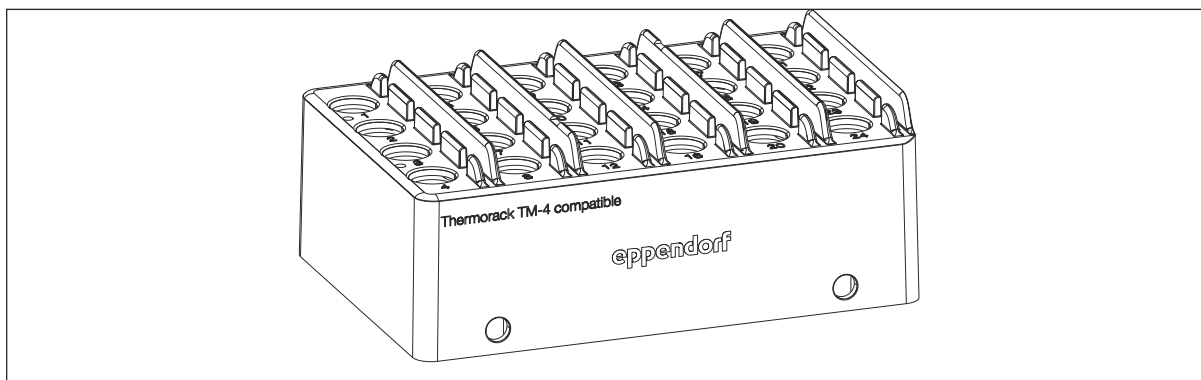
The thermorack 0.5/1.5/2.0 mL can be used with single-channel dispensing tools.

The thermorack 0.5/1.5/2.0 mL is transported with the gripper.

Table 5: Guidance values for temperature control of thermorack 0.5/1.5/2.0 mL

Thermorack	Equipping	Filling volume per tube	Heating time from 0 °C to 10 °C
Thermorack 0.5/1.5/2.0 mL	Safe-Lock tube 1.5 mL	1000 µL	~ 30 min

6.6.2 Thermorack TM-4-compatible



The Thermorack TM-4-compatible has 24 bores for tubes with a volume of 1.5 mL and 2 mL. If you use adapters, you can use tubes with a volume of 0.5 mL.

The thermorack TM-4-compatible has lid holders. The lid holders are located to the right of the bore for the tube. The lid holders clamp the tube lids vertically.

The thermorack TM-4-compatible is temperature-controlled and intended for use on thermal modules. You can cool the thermorack TM-4 compatible in a laboratory refrigerator.

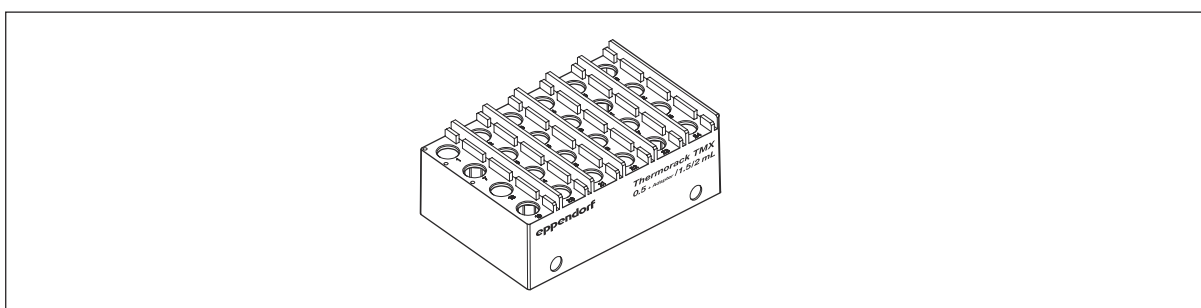
The thermorack TM-4-compatible can be used with single-channel and four-channel dispensing tools.

The thermorack TM-4-compatible is transported with the gripper.

Table 6: Guidance values for temperature control of thermorack TM-4-compatible

Thermorack	Equipping	Filling volume per tube	Heating time from 0 °C to 10 °C
Thermorack TM-4-compatible	Safe-Lock tube 1.5 mL	1000 µL	~ 30 min

6.6.3 Thermorack TMX



The Thermorack TMX is lighter than a normal thermorack and allows higher speeds when mixing.

The Thermorack TMX has a lower heat capacity, but a fast heat transfer. The Thermorack TMX quickly reaches the target temperature. Without temperature control, the Thermorack TMX only maintains the target temperature for a short time.

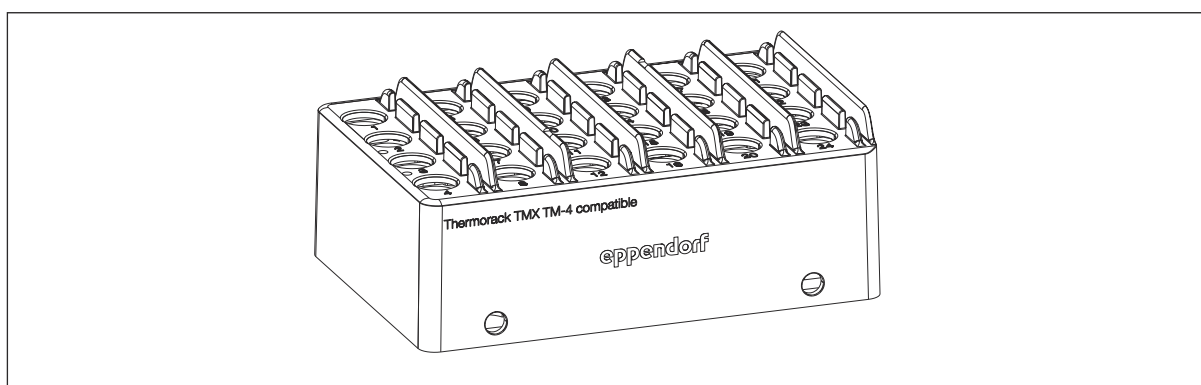
You can insert tubes with a volume of 2.0 mL and 1.5 mL into the Thermorack TMX. If you use adapters, you can use tubes with a volume of 0.5 mL.

The Thermorack TMX is intended for use on the Eppendorf ThermoMixer module. You can cool the thermorack TMX in a laboratory refrigerator.

The Thermorack TMX can be used with single-channel dispensing tools.

The Thermorack TMX can be transported with the gripper.

6.6.4 Thermorack TMX TM-4-compatible



The Thermorack TMX TM-4-compatible is lighter than a normal thermorack and allows higher speeds when mixing.

The Thermorack TMX TM-4-compatible has a lower heat capacity, but a fast heat transfer. The Thermorack TMX TM-4 compatible quickly reaches the target temperature. Without temperature control, the Thermorack TMX TM-4 compatible only maintains the target temperature for a short time.

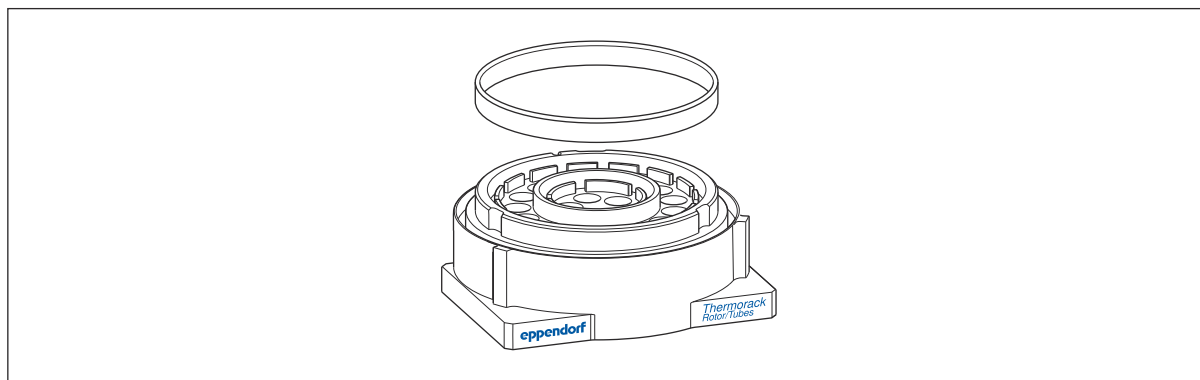
The Thermorack TMX TM-4-compatible has 24 bores for tubes with a volume of 1.5 mL and 2 mL. If you use adapters, you can use tubes with a volume of 0.5 mL.

The Thermorack TMX TM-4-compatible is intended for use on the Eppendorf ThermoMixer module. You can cool the thermorack TMX TM-4 compatible in a laboratory refrigerator.

The Thermorack TMX TM-4-compatible can be used with single-channel and four-channel dispensing tools.

The Thermorack TMX TM-4-compatible can be transported with the gripper.

6.6.5 Thermorack Rotor/Tubes



The Thermorack Rotor/Tubes can be tempered on a thermal module in the epMotion. The Thermorack Rotor/Tubes shortens the time it takes for samples to reach the target temperature.

The epMotion can fill the tubes on the Thermorack Rotor/Tubes with sample material and remove sample material from the tubes. The epMotion can fill the Qiagen Rotor-Disc positions with sample material. The epMotion cannot remove sample material from the Qiagen Rotor-Disc positions.

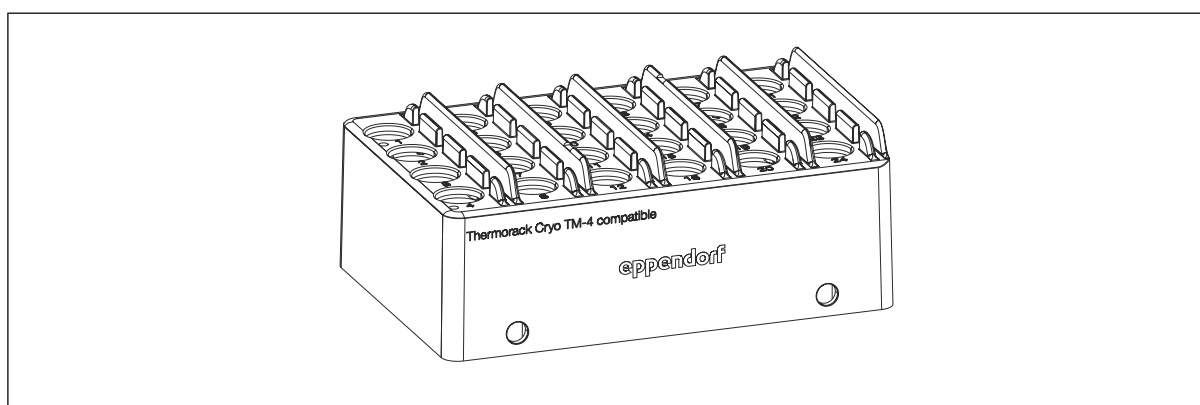
The following labware can be used in the Thermorack Rotor/Tubes:

- A Qiagen Rotor-Disc 72 or a Qiagen Rotor-Disc 100
- In addition, a maximum of 20 tubes 1.5 mL/2.0 mL from Eppendorf or a maximum of 20 screw cap tubes 1.5 mL from Sarstedt

You can cool the Qiagen Rotor-Disc in a laboratory refrigerator.

The scope of delivery includes a ring. The ring fixes the Qiagen Rotor-Disc on the Thermorack Rotor/Tubes.

6.6.6 Thermorack Cryo TM-4-kompatibel



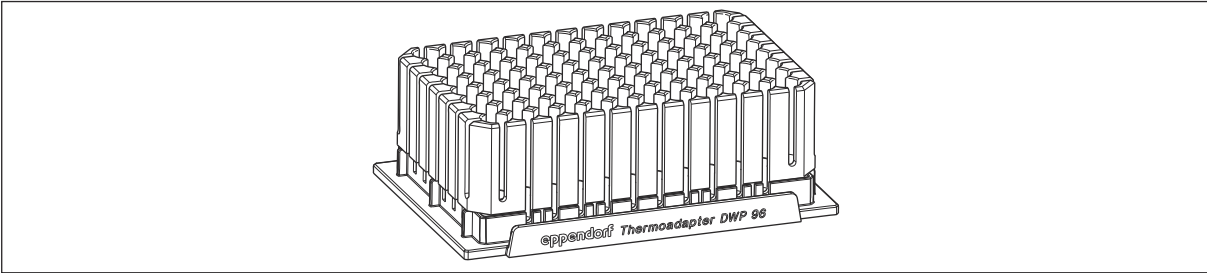
The Thermorack Cryo TM-4-compatible has 24 bores for cryogenic tubes with a diameter of 12.5 mm. If you use adapter sleeves, you can use tubes with a volume of 0.5 mL.

The Thermorack Cryo TM-4-compatible is temperature-controlled and intended for use on the Eppendorf ThermoMixer module. The maximum speed is 1000 rpm.

The Thermorack Cryo TM-4-compatible can be used with single-channel and four-channel dispensing tools.

6.7 **Thermoadapter**

6.7.1 **Thermoadapter for PCR**



Thermo adapters for PCR are temperature-controlled adapters.

Thermo adapters for PCR can be tempered on the thermal module.

Thermo adapters are not transported by the gripper. The gripper can remove a plate from the thermo adapter or place it on the thermo adapter.

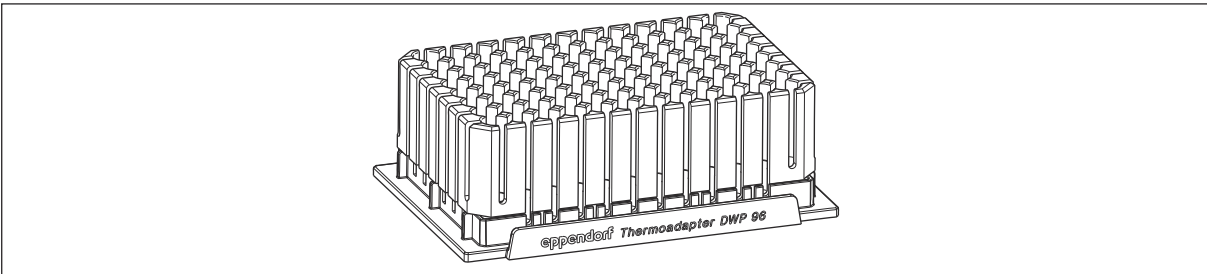
Thermo adapters for PCR are suitable for the following plates:

- PCR plates, 96 wells, skirted
- PCR plates, 384 wells, skirted

Table 7: Guideline values for temperature control of thermo adapters

Thermo adapter	Equipping	Filling volume per tube	Temperature control duration from 0 °C to 10 °C
Thermo adapter PCR 96	96-well twin.tec PCR plate	150 µL	~ 14 min
Thermo adapter PCR 384	384-well twin.tec PCR plate	25 µL	~ 10 min

6.7.2 **Thermoadapter DWP 96**



The Thermo adapter DWP 96 is a temperature-controlled adapter.

The Thermo adapter DWP 96 is suitable for Eppendorf Deepwell Plates 96/1000 µL.

The Thermo adapter DWP 96 can be tempered on the thermal module.

Thermoadapters are not transported by the gripper. The gripper can remove a plate from the thermoadapter or place it on the thermoadapter.

6.7.3 Thermoadapter Frosty

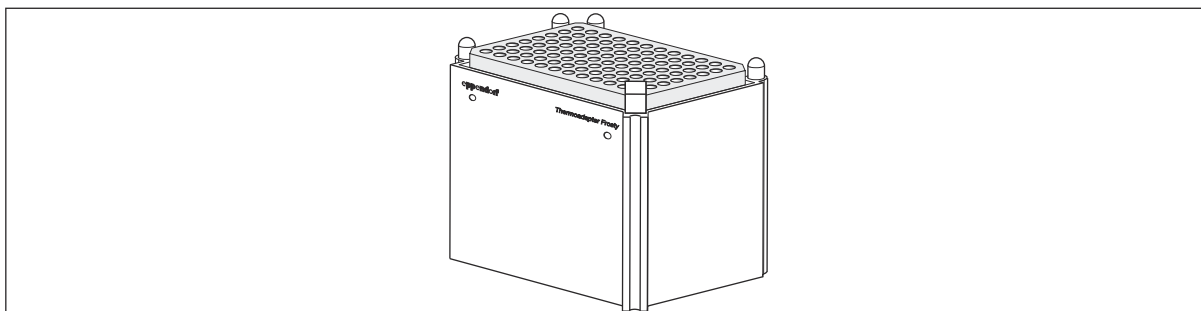
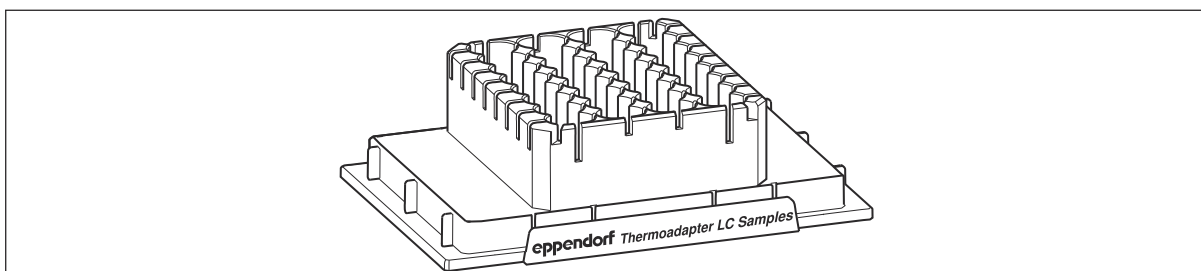


Fig. 6-9: Thermoadapter Frosty

The Thermoadapter Frosty is a modified height adapter for cooling samples.

The Thermoadapter Frosty contains a PCR-Cooler. A skirted PCR plate can be placed on the Thermoadapter Frosty. The PCR-Cooler cools the samples in this plate.

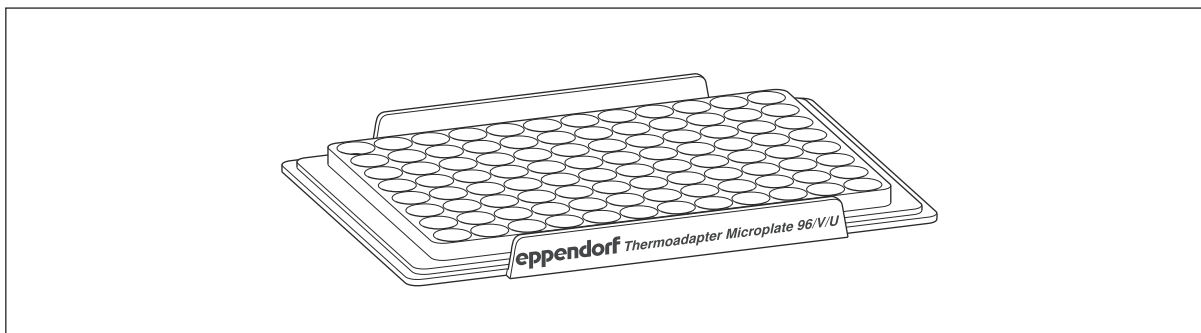
6.7.4 Thermoadapter LC Samples



The Thermoadapter LC Samples is a tube holder for the automatic filling of MagNA Pure LC Sample Cartridges. Thermoadapters and cartridges are a fixed combination for the epMotion.

The Thermoadapter LC Samples can be tempered up to 70 °C.

6.7.5 Thermoadapter Microplate 96/V/U



The Thermoadapter Microplate 96/V/U is not permanently connected to a plate.

The following labware can be inserted into the Thermoadapter Microplate 96/V/U:

- Microplate 96/V
- Microplate 96/U

The Thermoadapter Microplate 96/V/U can be tempered on the Eppendorf ThermoMixer module and the thermal module.

The Thermoadapter Microplate 96/V/U is not transported with the gripper. Microplates can be placed into or removed from the adapter using the gripper.

6.8 Thermoblock

6.8.1 Overview

A thermoblock is a temperature-controlled adapter into which plates are inserted.

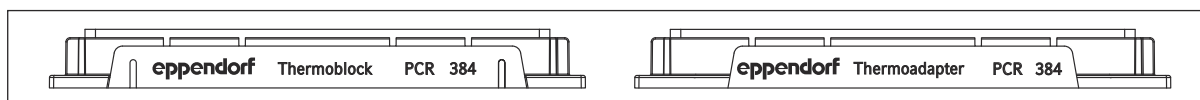
A thermoblock can be tempered on a thermal module. The thermoadapter can be cooled in a laboratory refrigerator.

The thermoblock is transported by the gripper.

epBlue distinguishes between 2 types of thermoblocks:

- *Thermoblocks*: Thermoblock and labware are available as separate labware definitions.
- *Thermoblocks with Plates*: Thermoblock and labware are combined in a labware definition. The thermoblock is not available as a separate labware definition.

6.8.2 Comparing thermoblocks and thermoadapters

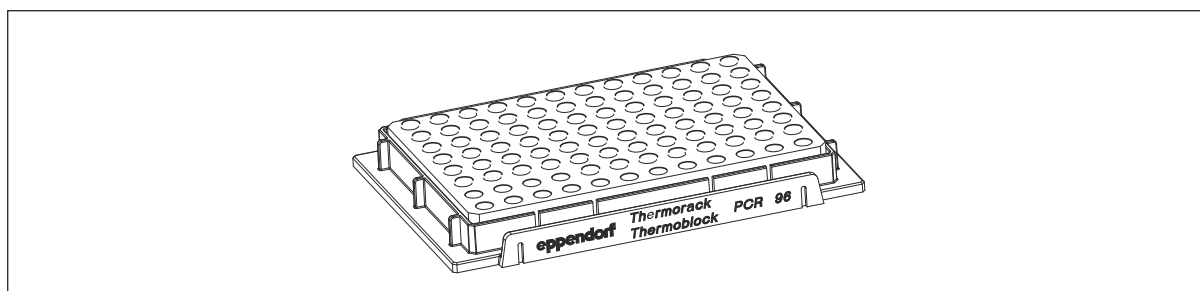


Thermoblocks and thermoadapters are available for some plates, e.g., for 384-well PCR plates.

Thermoadapters and thermoblocks also have different bar lengths. Thermoadapters have shorter bars than thermoblocks.

Thermoblocks feature gripping grooves for the gripper.

6.8.3 Thermoblock PCR 96



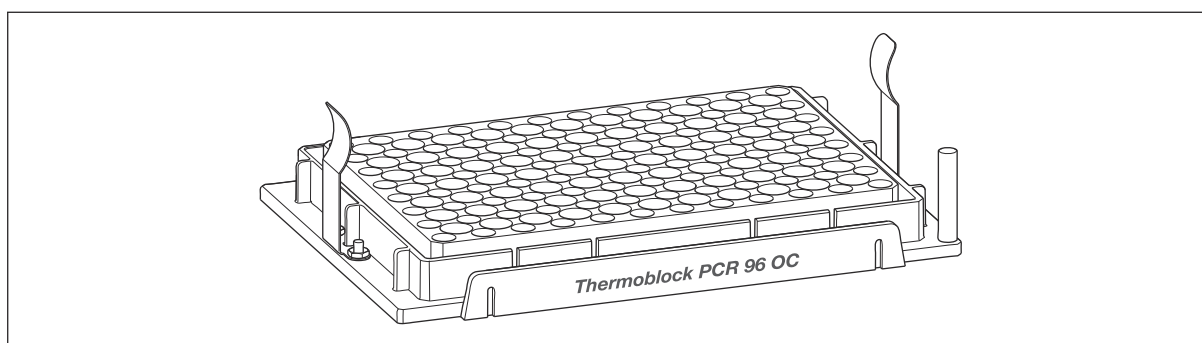
You can use the following labware in the Thermoblock PCR 96:

- 96 tubes 0.2 mL without lids
- PCR tubes 0.5 mL
- a 96-well PCR plate, semi-skirted

In epBlue, thermoblock and labware are combined. The thermoblock is not available as a separate labware definition.

Thermoblock	Plate firmly connected to the thermoblock	Filling volume per tube	Temperature control duration from 0 °C to 10 °C
Thermoblock PCR 96	96-well twin.tec PCR plate	150 µL	~ 14 min

6.8.4 Thermoblock PCR 96 OC



The Thermoblock PCR 96 OC (OC = Orientation Control) is designed to safely open sealed plates. To safely open a plate, a pipette tip pierces the seal. Clamps hold the plate and prevent the retracting pipette tip from lifting the plate. Information on the parameters for opening sealed plates can be found in the software manual.

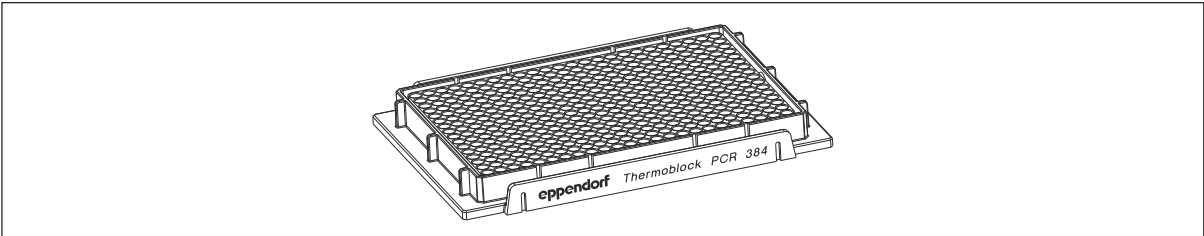
In epBlue, the Thermoblock PCR 96 OC is not permanently combined with a labware. The thermoblock is available as a separate labware definition.

You can use semi-skirted plates, which have a beveled corner at the bottom right, in the Thermoblock PCR 96 OC.

The Thermoblock PCR 96 OC has a pin at the bottom right. Plates are inserted so that their beveled corner is at the bottom right. This ensures that position A1 of the plate is at the top left. The Thermoblock PCR 96 OC makes it easier to work with plates whose labels are not legible.

The Thermoblock PCR 96 OC is suitable for high speeds. The maximum speed is 1700 rpm. To prevent the wells from overflowing, pay attention to the filling volume of the plate when setting the mixing speed.

6.8.5 Thermoblock PCR 384

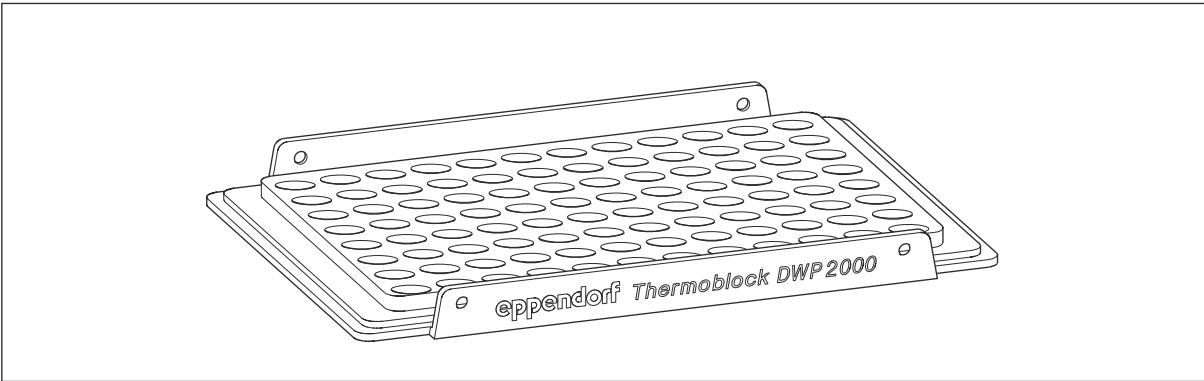


Semi-skirted 384-well twin.tec PCR plates can be inserted into the Thermoblock PCR 384.

In epBlue, thermoblock and labware are combined. The thermoblock is not available as a separate labware definition.

Thermoblock	Plate firmly connected to the thermoblock	Filling volume per tube	Temperature control duration from 0 °C to 10 °C
Thermoblock PCR 384	384-well twin.tec PCR plate	25 µL	~ 10 min

6.8.6 Thermoblock DWP 2000



Eppendorf Deepwell Plates 96/2000 µL can be inserted into the Thermoblock DWP 2000.

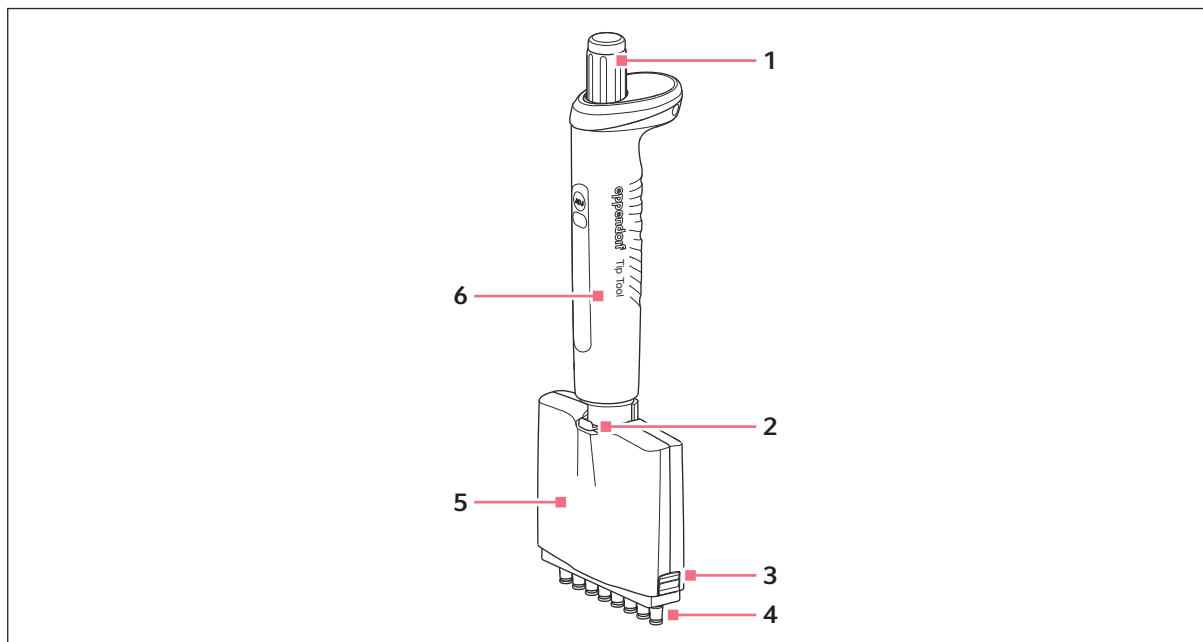
In epBlue, the thermoblock is not permanently combined with a labware. The thermoblock is available as a separate labware definition.

6.9 Tip Tool

6.9.1 Features

You can use the Tip Tool to equip the ReservoirRack module with unused epT.I.P.S. Motion pipette tips. The Tip Tool can hold 8 pipette tips from a column of racks and trays.

6.9.2 Product overview

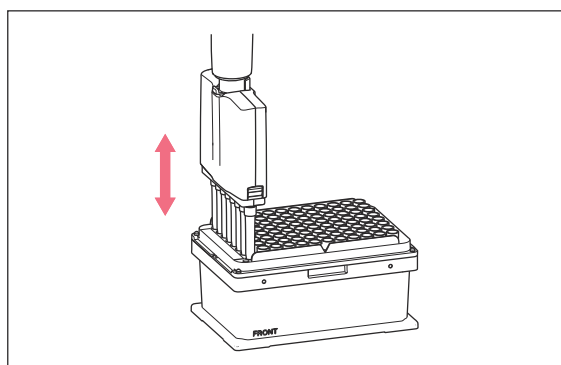


- | | |
|-----------|--------------|
| 1 Ejector | 4 Tip cones |
| 2 Lever | 5 Lower part |
| 3 Latch | 6 Upper part |

6.9.3 Taking up pipette tips

Prerequisites:

- The pipette tips are located in a rack.



1. Place the Tip Tool vertically from above onto the pipette tips.
2. Slightly press the Tip Tool onto the pipette tips.
3. Guide the Tip Tool with the pipette tips upward.

6.9.4 Ejecting pipette tips

1. Hold the Tip Tool with the attached pipette tips over the corresponding positions of the ReservoirRack module.
2. Press the ejector.

The pipette tips are ejected.

7 Installation

The epMotion may only be installed and put into operation by an authorized service technician.

7.1 Checking connection requirements

All prerequisites must be met before the device can be installed and put into operation.

Checking the electrical connection

1. Check whether the electrical connection meets the following requirements:

- The mains/power connection matches the details on the name plate.
- An earth/grounded socket with a PE conductor is available.
- The earth/grounded socket is always freely accessible.
- A residual current circuit breaker is available and accessible.

7.2 Checking the location

All requirements must be met before the device can be installed and put into operation. Information on ambient conditions, dimensions, and weights can be found in the "Technical Data" chapter.

1. Check that the location meets the following conditions:

- The ambient conditions correspond to the information in the [Chapter 15.5 "Ambient conditions" on page 126](#) Technical Data chapter
- The location is protected against direct sunlight
- The location is protected from UV radiation
- The location is protected against heat sources, sparks and open fire
- The location has a sufficient air volume and air exchange
- The minimum distance from the device to other devices and walls is 6 cm
- The device can be operated safely and conveniently at this location

2. Check that the workplace meets the following conditions:

- The lab bench is fixed
- The lab bench is designed for the weight of the device
- The lab bench has a horizontal, level work surface
- The lab bench has a non-skid surface
- The lab bench is vibration-free

7.3 Checking the delivery package

1. Check that the supplied components match the specifications of the delivery package.
2. If any parts are missing, contact your Eppendorf partner.

7.3.1 Scope of delivery

The epMotion 5073 is available in different versions. Your device has been equipped according to your specifications.

Delivery package epMotion 5073I

Quantity	Description
1	Automated pipetting system epMotion 5073I incl. MultiCon PC, software epBlue, keyboard, mouse, system for solid and liquid waste 100 V – 240 V, 50 Hz/60 Hz

Delivery package epMotion 5073t

Quantity	Description
1	Automated pipetting system epMotion 5073t incl. MultiCon PC, Eppendorf ThermoMixer module, software epBlue, keyboard, mouse, system for solid and liquid waste 100 V – 240 V, 50 Hz/60 Hz

Delivery package epMotion 5073t NGS Solution

Quantity	Description
1	Automated pipetting system epMotion 5073t incl. MultiCon PC, Eppendorf ThermoMixer module, software epBlue, keyboard, mouse, system for solid and liquid waste 100 V – 240 V, 50 Hz/60 Hz
1	Enhanced Feature Set 1 License for additional epBlue functions: Calculation of the number of samples; automatic tool selection; start at command; e-mail notification, requires service visit and epBlue > 40.6
1	TS 50 single-channel dispensing tool
1	TS 300 single-channel dispensing tool
1	TM 300-8 eight-channel dispensing tool
1	Gripper
1	Gripper Tower
1	Thermoblock PCR 96 OC
1 piece per package	Thermoadapter for PCR 96

Quantity	Description
1	ReservoirRack
1	ReservoirRack module NGS
2	TipHolder TM-4-compatible
1	Magnum FLX magnetic adapter
1 piece per package	Box for epT.I.P.S. Motion Reloads 10 µL/50 µL/300 µL
1 piece per package	Clip for epT.I.P.S. Motion Reloads
1 package	epT.I.P.S. Motion Reloads with filter, 50 µL
1 package	epT.I.P.S. Motion Reloads with filter, 300 µL
1 package	twin.tec PCR plate 96, semi-skirted
1 package	Reservoir for ReservoirRack module, 30 mL
1 package	Safe-Lock tubes 1.5 mL/2 mL
1 package	5.0 mL Eppendorf Tubes
1 package	Waste bag for standard material 50 pcs.

Accessories for all versions of the epMotion 5073

Quantity	Description
1	Cable to connect the MultiCon PC to the epMotion 5073
1	Mains/power cord consistent with the country of order or country of destination
1	USB Ethernet adapter to connect the MultiCon PC to a network
1	Transport securing device complete, incl. tools
Optional 1	Thermal module
1	Solid waste system
1	Liquid waste system
1 package	Waste bag for standard material 50 pcs.
1	Protective plate for drawer
1	epMotion 5073 operating manual

Quantity	Description
1	epBlue with MultiCon PC software manual
Optional 1	CleanCap upgrade set With air filter system and UV lamp
Optional 1	Enhanced Feature Set 1 License for additional epBlue functions: calculation of the number of samples; automatic tool selection; start at command; e-mail notification, requires service visit and epBlue > 40.6
Optional 1	Enhanced Feature Set 2 License for epBlue feature: Normalization, requires service visit and epBlue 40.8 or higher
Optional 1	Enhanced Feature Set GxP License for epBlue function: GxP, for support of regulated environments (e.g., according to GLP, GMP, 21 CFR Part 11), requires service visit and epBlue 40.9 or higher

Accessories for epMotion 5073 with epBlue ID

Quantity	Description
1	epBlue ID software
1	Barcode reader with USB cable and table leg

8 Operation

8.1 Switching on the epMotion

Prerequisites:

- The epMotion has been installed and put into operation by an authorized service technician.

1. Close the drawer and the front panel.
2. Switch on the epMotion at the mains/power switch.

The carrier moves to the starting position.

3. Switch on the MultiCon PC.
4. Start the epBlue software.

8.2 Calling the epBlue worktable



NOTICE! Sample loss

Place the labware on the worktable as defined in epBlue for the application. Incorrectly placed labware can cause tools to collide with the labware. A collision can lead to sample loss and tools and labware can be damaged.

- Before starting an application, check whether the labware is correctly placed on the worktable.

1. Open an application.

The epBlue worktable is called.

The arrangement of the labware and the tools can be seen on the epBlue worktable.

8.3 Equipping the epMotion worktable

8.3.1 Positioning the waste system

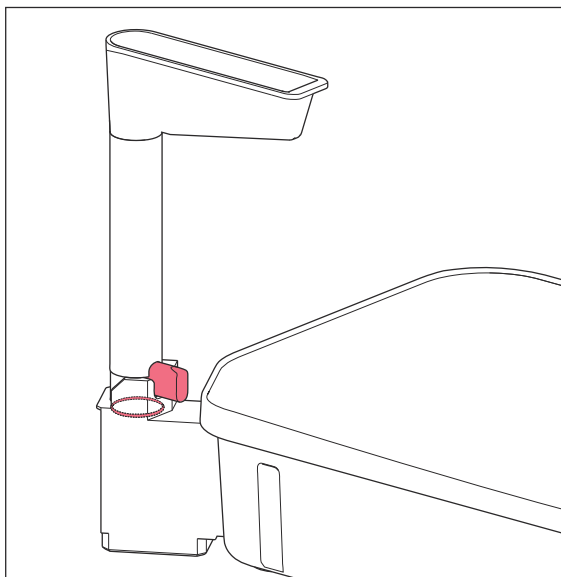
8.3.1.1 Placing the liquid waste system in the drawer



To minimize contamination of the worktable when dispensing liquid waste, use the splash guard.

Prerequisites:

- The solid waste system is not in the drawer.
- The waste tub is empty.



1. Place the tub lid on the waste tub.

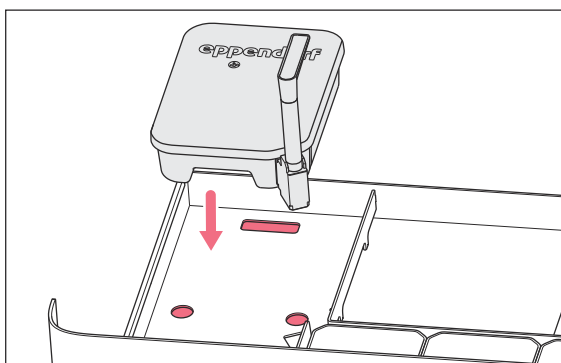
The tub lid must completely enclose the edges of the waste tub.

-  The tub lid prevents liquid waste from leaking and contamination from splashes from the liquid waste.

2. Insert the waste funnel into the built-in pouring lip.

- The funnel lock engages in the built-in pouring lip. The waste funnel can no longer be turned.
- The o-ring is completely recessed into the built-in pouring lip.

-  The o-ring on the waste funnel prevents liquid waste from leaking.



3. Open the drawer.

4. Place the waste tub in the drawer. To do this, grasp the grip recess on the waste tub.

The bulges on the bottom of the waste tub sit in the recesses of the drawer.

5. Check the position of the waste tub. To do this, try to move the waste tub.

If the waste tub does not move, the position is correct.

8.3.1.2 Placing the waste bag in the holder

1. Place the waste bag into the waste bag holder.
2. Stretch the waste bag to the bottom.
3. Fold the excess edge of the waste bag over the edge of the holder.
4. Place the fixing frame on the holder.

8.3.1.3 Positioning the solid waste system



CAUTION! Contamination

If labware is thrown into the full waste bag, it can fall onto the worktable. The labware can contaminate the worktable.

- Check how much waste is generated during the application.
- To empty the waste bag, interrupt the application if necessary.
- Empty the waste bag before starting an application.

Prerequisites:

- The liquid waste system is placed in the drawer.
- The waste bag is fixed in the waste bag holder.

1. Place the solid waste system in the drawer.
 - Align the sloped edge of the solid waste system with the funnel of the liquid waste system.
 - Place the solid waste system between the pins at the bottom of the drawer.
2. Check the position of the solid waste system. To do this, try to move the solid waste system.

If the solid waste system sits firmly in the drawer and does not move, the position is correct.
3. Close the drawer.

8.3.2 Placing dispensing tools

You can place 3 dispensing tools on the epMotion worktable. The order of the dispensing tools can be selected freely.



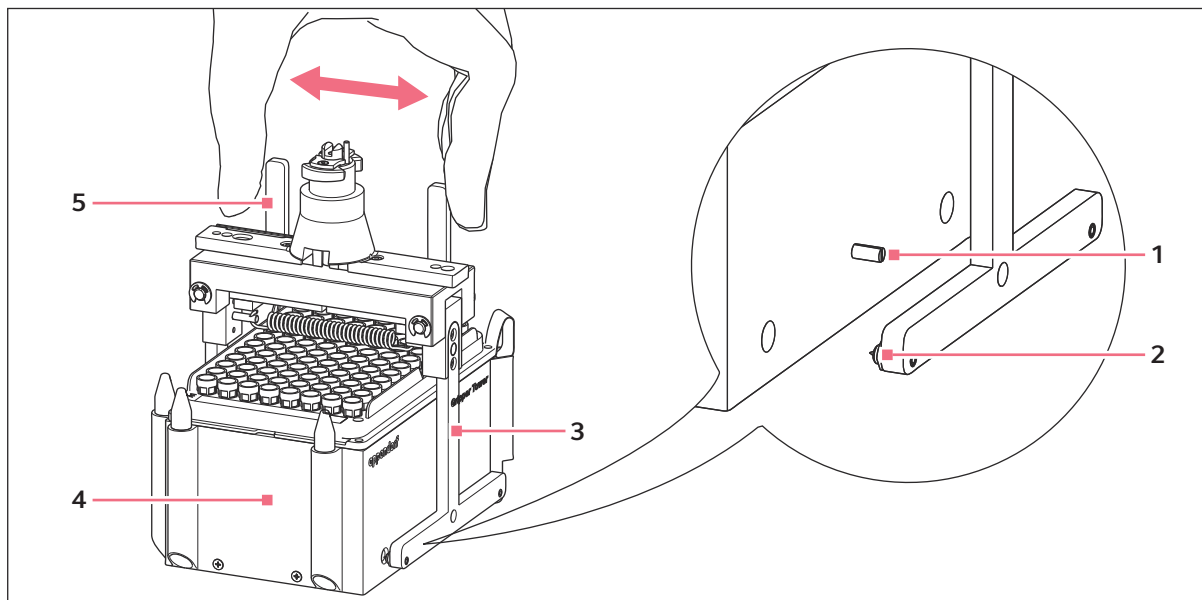
NOTICE! Damage to the tool

If you damage or contaminate the gold contacts of the tool, the tool will become defective.

- Do not touch the gold contacts.

1. Place the dispensing tools with the gold edge on the right at the rear in the holders T1 to T3.

8.3.3 Placing the gripper on the Gripper Tower



- | | |
|------------------------------------|------------------------------|
| 1 Pin for holding the gripper arms | 4 Gripper Tower |
| 2 Mandrels | 5 Upper end of a gripper arm |
| 3 Gripper arm | |



CAUTION! Risk of hand injury

There are 2 pointed mandrels on the inside of each gripper arm. You can prick yourself on the mandrels.

- Hold the gripper from above.
- Do not touch the mandrels.

1. Position the Gripper Tower so that the pin is on the right-hand side.
2. Press the upper ends of the gripper arms together.
The gripper arms will open.
3. Place the gripper on the Gripper Tower.
 - The mandrels engage in the holes of the Gripper Tower.
 - The pin engages in the recess of the right-hand gripper arm.

8.3.4 Positioning the gripper



CAUTION! Risk of hand injury

There are 2 pointed mandrels on the inside of each gripper arm. You can prick yourself on the mandrels.

- Hold the gripper from above.
- Do not touch the mandrels.

1. Place the gripper at location T0 so that the gold edge of the gripper faces the rear of the device.

8.3.5 Positioning pipette tips



NOTICE! Sample loss

The optical sensor checks the start position and the end position of the pipette tips in the rack. The optical sensor does not recognize whether pipette tips are missing in the middle of the rack. If pipette tips are missing, the application is carried out incorrectly and will need to be canceled.

- Do not remove any pipette tips from the rack.

1. Remove the protective film around the pipette tips.
2. If you are using epT.I.P.S. Motion Reloads, place the tray on the TipHolder.
The notch in the tray is on the labeled side of the TipHolder.
3. Place the labware on a location with the writing facing forward.
4. Position the labware so that the retention clip presses the labware against the positioning pins.

The labware rests against the positioning pins of the location.

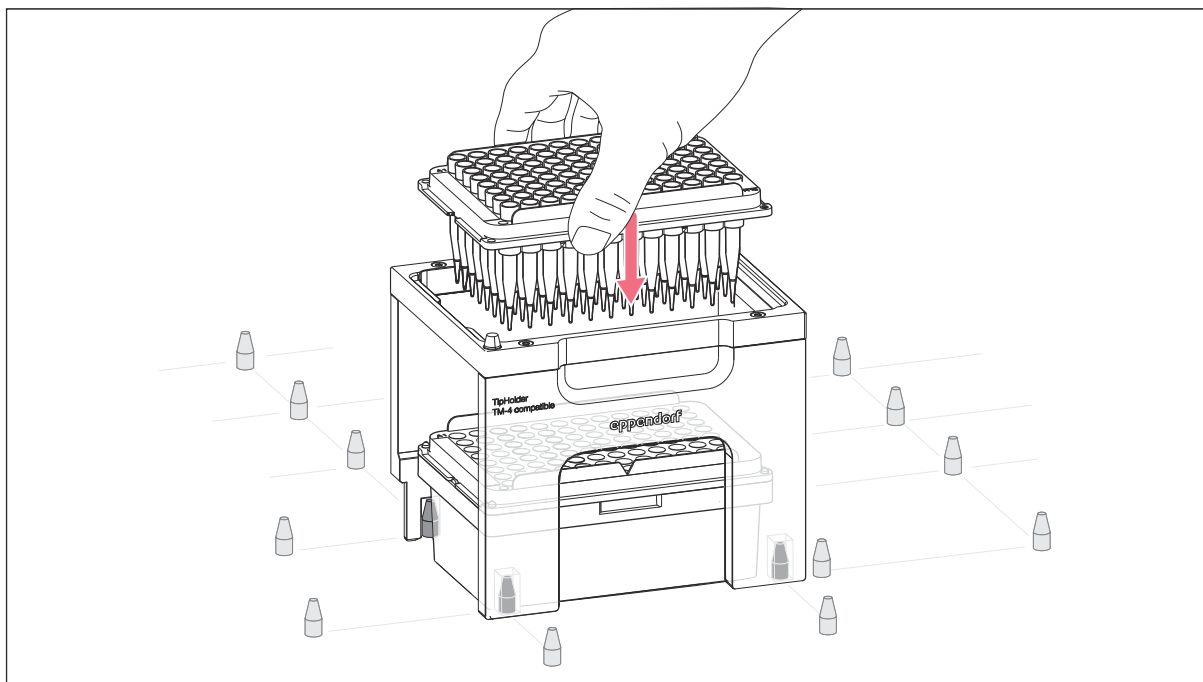
8.3.6 Placing TipHolder 73 and TipHolder TM-4-compatible

You can only place 1 TipHolder in row 73.

If you use TipHolder 73 and TipHolder TM-4-compatible in one application, you can place TipHolder 73 and TipHolder TM-4-compatible next to each other.



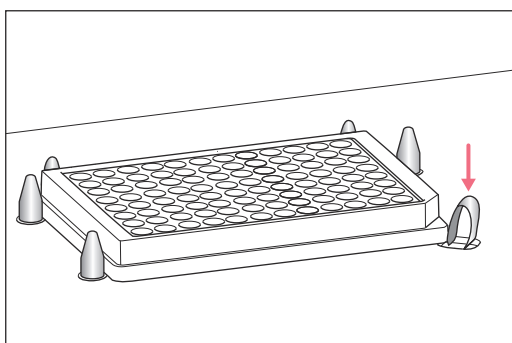
Equip the 2 locations of the TipHolder 73 and of the TipHolder TM-4-compatible with pipette tips of the same size and type.



1. Place a rack with epT.I.P.S. Motion in a location on the epMotion worktable.
2. Put the TipHolder over the positioning pins at the location.
The rack is located within the TipHolder 73 or TipHolder TM-4-compatible.
3. Place a tray with epT.I.P.S. Motion Reloads in the top location of the TipHolder 73 or TipHolder TM-4-compatible.

8.3.7 Positioning plates

Plate position A1 is located on the epMotion worktable at the rear left.



1. Position the plate so that the retention clip presses the plate against the positioning pins.
 - The plate rests against the positioning pins of the location.
 - The plate has no play.

8.3.8 Placing tubes in racks



NOTICE! Damage to components

If you use tubes with lids and position the lids incorrectly, the lids can block the tube opening. The tool can collide with the lid and be damaged.

- Position the tube lids in such a way that the tube opening is not covered.
- Use racks with a lid holder.

1. Open the caps of the tubes.
2. Place the tubes vertically in the racks.
3. Lock the attached lids in the lid holders on the rack.

8.3.9 Equipping a rack for 96 conical tubes

1. If you are equipping the rack with tubes that have attached lids, leave every other row of the rack free.
2. Make sure that the lids do not cover the openings of adjacent tubes.

8.3.10 Positioning racks

1. Align the rack so that the writing faces forward.
2. Position the rack so that the retention clip presses the rack against the positioning pins.
 - The rack rests against the positioning pins of the location.
 - The rack has no play.

8.3.11 Equipping the ReservoirRack

8.3.11.1 Connecting the ReservoirRack module to the adjacent module

The ReservoirRack modules for the 10 mL, 30 mL and 100 mL reservoirs cannot be placed separately in the ReservoirRack. These ReservoirRack modules must be connected to the adjacent ReservoirRack module.

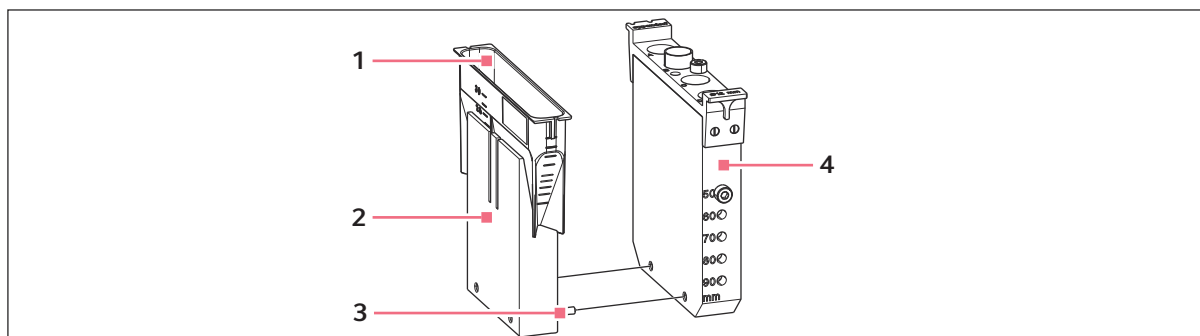


Fig. 8-1: Connecting the ReservoirRack module TC for the 30 mL reservoir to the adjacent module

- | | |
|--|-------------------|
| 1 30 mL reservoir | 3 Connecting bar |
| 2 ReservoirRack modules TC for 30 mL reservoir | 4 Adjacent module |

On one side of the ReservoirRack modules for the 10 mL, 30 mL and 100 mL reservoirs there are 2 connecting bars.

1. Insert the 2 connecting bars into the adjacent module.

8.3.11.2 Adjusting the height of the vessels

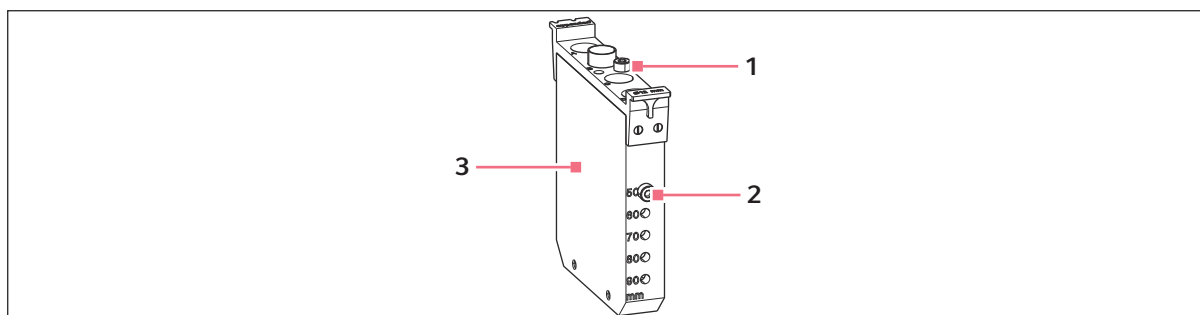


Fig. 8-2: Setting the ReservoirRack module to the height of the tube

- | | |
|--|------------------------|
| 1 Positioning screw in rest position | 3 ReservoirRack module |
| 2 Positioning screw at a height of 50 mm | |

You can position micro test tubes at heights of 50 mm, 60 mm, 70 mm, 80 mm and 90 mm in each ReservoirRack module. There is one hole at the front and one at the rear of the ReservoirRack module at each of these heights.

1. Screw the two positioning screws into the holes at the required height.

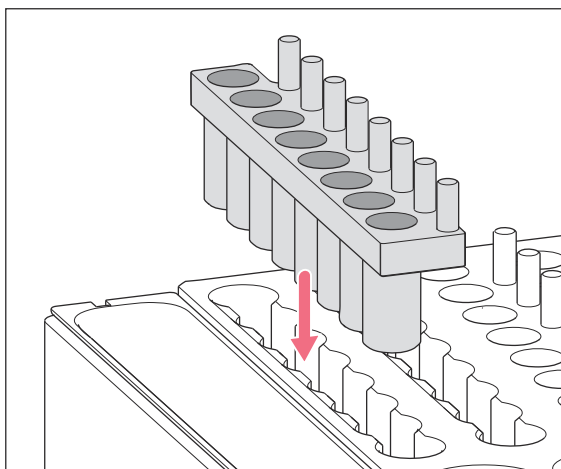
8.3.11.3 Equipping ReservoirRacks

Location 1 and location 7 are not tempered as well as the other locations of the ReservoirRack.

1. Place ReservoirRack modules in the ReservoirRack with the code facing the rear.
2. Insert the reservoirs into the ReservoirRack facing any direction.

8.3.11.4 Inserting the strip adapter

The strip adapter can be inserted into the ReservoirRack module NGS and the ReservoirRack module PCR.



1. Make sure that the positions of the ILMN tubes are not occupied.
2. Insert the strip adapter into the positions for the ILMN tubes so that the notch is at the front and the pins are on the right.

8.3.12 Positioning the ReservoirRack



You cannot place the ReservoirRack on locations A and B0.

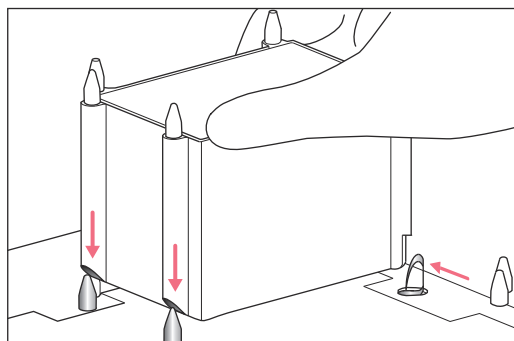
You can only place the ReservoirRack 3 on location A5 on the epMotion 5075t.

Prerequisites:

- The ReservoirRack is equipped.

1. Fit the ReservoirRack over the positioning pins of the location.

8.3.13 Positioning the height adapter



1. Fit the height adapter over the positioning pins of the location.

8.3.14 Positioning the Thermorack Rotor/Tubes

The Thermorack Rotor/Tubes occupies 2 locations on the epMotion worktable. The location directly behind the thermorack cannot be equipped with labware.

1. Equip the Thermorack Rotor/Tubes.
2. Place the Thermorack Rotor/Tubes on a location in row C.
3. Place the ring onto the Qiagen Rotor-Disc.

8.3.15 Preparing the Thermoadapter Frosty

1. To cool the PCR-Cooler, place it upside in the laboratory refrigerator or in the ULT upright freezer at -20 °C.
2. Insert the PCR-Cooler into the Thermoadapter Frosty.
3. Place a PCR plate on the Thermoadapter Frosty.

i If the temperature of 7 °C is exceeded, the PCR-Cooler will change color. The color changes from violet to pink or from dark blue to light blue. The color in the recesses of the PCR-Cooler is the decisive factor for the temperature of the samples.

8.3.16 Positioning the thermoadapter

1. Position the thermoadapter so that the retention clip presses the thermoadapter against the positioning pins.
 - The thermoadapter rests against the positioning pins of the location.
 - The thermoadapter has no play.

8.3.17 Equipping the Thermoblock PCR 96 with 0.2 mL tubes

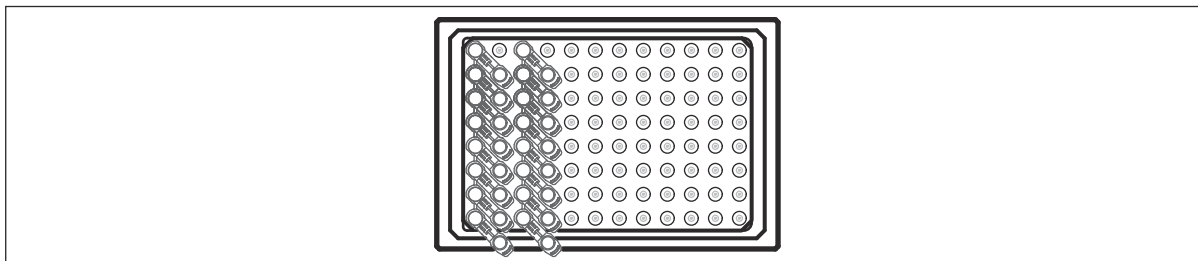


Fig. 8-3: Tube lid rotated 45° to the surface of the thermoblock

1. Position the micro test tubes in columns. Leave every other column empty for the tube lids.
A maximum of 48 micro test tubes with lids can be positioned in the thermoblock.

8.3.18 Equipping the Thermoblock PCR 96 OC

Prerequisites:

- The plate is a semi-skirted plate with a beveled corner.

1. Check whether the clamps on the Thermoblock PCR 96 OC are bent.
2. If the clamps are bent, replace them with spare clamps.
3. Place the plate on the thermoblock with the beveled corners facing down to the right.
4. Check that the plate is correctly positioned in the thermoblock.

The plate is held firmly by the clamps.

The plate sits firmly in the bores in the thermoblock.

8.3.19 Equipping the thermal module



For target temperatures above 100 °C, only use labware made of metal, polypropylene (PP) or polycarbonate (PC).



CAUTION! Burns

The thermal module and the labware reach temperatures of over 100 °C. You can burn yourself when touching the parts.

- Only touch the thermal module and the labware when they have cooled down.

1. Place a plate on the thermoadapter or thermoblock.

Thermoblocks and thermoadapters optimally temper plates with uneven bottoms, e.g., PCR plates.

2. Place the thermoadapter or thermoblock with the plate on the thermal module.

8.3.20 Equipping the Eppendorf ThermoMixer module



CAUTION! Burns

The ThermoMixer module and the labware reach temperatures of over 100 °C. You can burn yourself when touching the parts.

- Only touch the ThermoMixer module and the labware when they have cooled down.

1. Place a plate on the thermoadapter or thermoblock.

Thermoblocks and thermoadapters optimally temper plates with uneven bottoms, e.g., PCR plates.

2. Place the thermoadapter or thermoblock with the plate on the Eppendorf ThermoMixer module.

The plate is fixed to the Eppendorf ThermoMixer module during the application.

8.4 Running an application



Detailed information on how to run an application can be found in the software manual.

8.4.1 Carrying out a test run

Before you execute an application for the first time, carry out a test run.



Carry out the test run with a liquid which has similar physical properties to the liquid that is to be used in the application.

If there are air bubbles in the tubes, the optical sensor will measure incorrectly. Check if there are any air bubbles in the tubes before starting the application. Remove air bubbles by gently tapping the labware on the work surface.

1. Open the application.
2. Fill the labware with defined volumes.
3. Place the labware and tools on the epMotion worktable.
4. Prepare the application run as described in the software manual.
5. Perform *Surface Teaching* under the following conditions:
 - If you pipette below the bottom tolerance.
 - Each time you use a new batch of pipette tips or labware as they have production-related tolerances.
6. Start the application.
7. Check whether the application is running without errors.

Dispensing is precise and correct.

No liquid sprays out of the tubes. Contamination is unlikely.



Information on optimizing dispensing can be found in the software manual.

8.4.2 Performing an application run

Prerequisites:

- The epMotion is ready for operation.
- The application is open, refer to the software manual.
- Labware and tools are placed on the epMotion worktable.
- The application run is prepared in accordance with the *Application Runner* chapter in the software manual.

1. Start the application run.



If you have epBlue with the license for "Enhanced Feature Set 1", you can start the application run at a defined point.

2. Enter the filling volume of the tubes manually, if required.

The epMotion checks whether the required tools are placed on the epMotion worktable.

The optical sensor checks the labware and filling levels, if required.

The application is executed. The software displays the status of the application.

8.4.3 Controlling the application run

8.4.3.1 Stopping the application immediately

You can stop the application immediately, e.g. if there is a risk of a collision.

1. Open the front cover.

The application run is stopped immediately.

The Eppendorf ThermoMixer module is not stopped.

2. Continue or cancel the application run.

8.4.3.2 Interrupting the application run

1. To interrupt the application run, click on the **||** button in the software.

The current movement will be ended.

The application run is stopped.

2. Continue or cancel the application run.

8.4.3.3 Continuing the application run

Prerequisites:

- The labware and tools on the epMotion worktable have not been changed.
 - The filling volumes of the vessels have not been changed.
 - The carrier has not been moved manually.
1. Close the front cover.
 2. To continue the application run, click on the ► button in the software.

8.4.3.4 Canceling the application run



NOTICE! Sample loss

If you use pipette tips in a SafeRack and cancel the application, used pipette tips remain in the SafeRack. Reusing used pipette tips can contaminate samples.

- Dispose of used pipette tips and the SafeRack immediately after canceling the application.

Prerequisites:

- The application run has been stopped or interrupted.
1. To cancel the application run, click on the ✖ button in the software.
The application run is canceled.
The tool holder resets the tool.
The carrier moves to the starting position.
The epMotion is ready for operation.
 2. Close the application in the software.

8.5 Completing your work

8.5.1 Cleaning up the worktable

Complete the following steps after the end of the application.

1. Switch off the air filter system, if necessary.
2. Seal the tubes.
3. Remove the labware from the worktable.
4. Remove and empty the waste system.
5. Decontaminate the device and the labware if necessary.
6. Soak up condensation water on the thermal module or Eppendorf ThermoMixer module with a paper towel.

8.5.2 Disposing of waste bags



WARNING! Contamination

There may be pipette tips containing infectious liquids in the waste bag. People can become contaminated through contact with infectious liquids.

- Wear your personal protective equipment.
- Handle waste bags in accordance with Safety Data Sheets and laboratory regulations.

1. Remove the fixing frame from the waste bag holder.
2. Remove the waste bag from the holder and close it slightly.
3. Autoclave the waste bag.

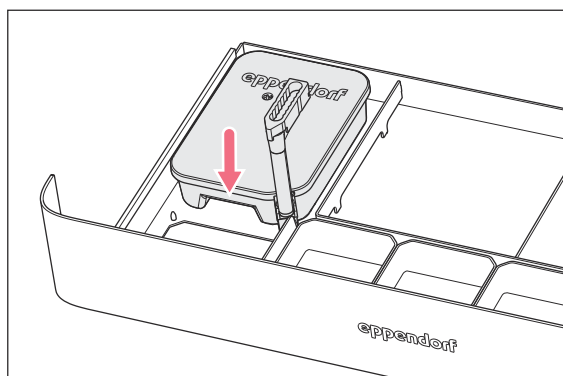
The waste bag must not be tightly sealed during autoclaving.

4. Dispose of the waste bag in accordance with laboratory regulations.

8.5.3 Emptying the liquid waste system

Prerequisites:

- The solid waste system is not in the drawer.

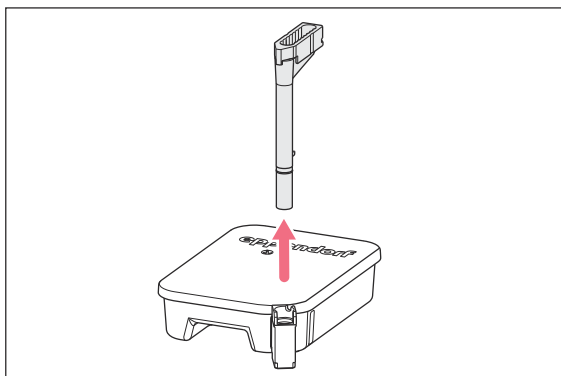


1. Open the drawer.
2. Remove the liquid waste system from the drawer. To do this, grasp the recessed grip of the waste tray.
3. Transport the liquid waste system to the emptying location.

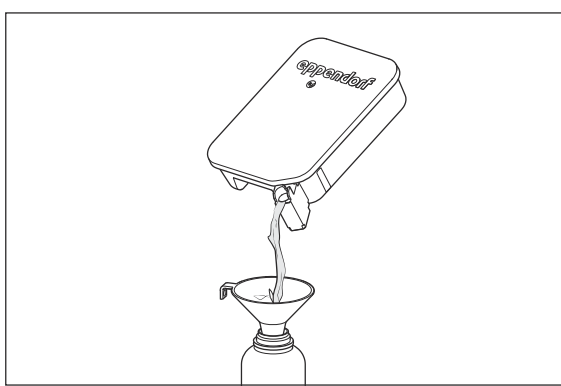


Keep the liquid waste system horizontal. Carefully transport the liquid waste system so that no liquid can run out of the vent hole.

The waste funnel o-ring prevents liquid waste from leaking out.



4. Pull the waste funnel out of the spout.



5. Empty the waste tray via the spout. To do this, carefully tip the waste tray.

8.5.4 Switching off the device

1. Exit the epBlue software.
2. Shut down the MultiCon PC.
3. Switch off the MultiCon PC.
4. Switch off the epMotion at the mains/power switch.

9 Maintenance

9.1 Maintenance

Eppendorf SE recommends having your device inspected and maintained at regular intervals by trained and skilled personnel.

Eppendorf SE offers customized service solutions for preventive maintenance, qualification and calibration of your device. For information, offers and contact options, visit our website www.eppendorf.com/epservices.

9.1.1 Maintenance plan

Interval	Servicing work
As required	Cleaning the device in case of contamination
	Performing a spray decontamination
	Performing a wipe decontamination
	Performing autoclaving
	Carrying out a gravimetric test of the dispensing volume
	Replacing fuses Fuses may only be replaced by an authorized service technician.
Before each use	Decontaminate the Magnum FLX magnetic adapter 96-well plates using a 70 % ethanol solution
	Empty the liquid waste system
	Empty the waste bag
Yearly	Replacing the sealing rings on the dispensing tool
	Replacing the air filter system The air filter system may only be replaced by an authorized service technician.
Every 2 years	Replacing the UV lamp The UV lamp may only be replaced by an authorized service technician.
100,000 full strokes or 200,000 strokes	Servicing the dispensing tools Send the dispensing tool to the authorized service partner.

9.1.2 Replacing sealing rings on multi-channel dispensing tools



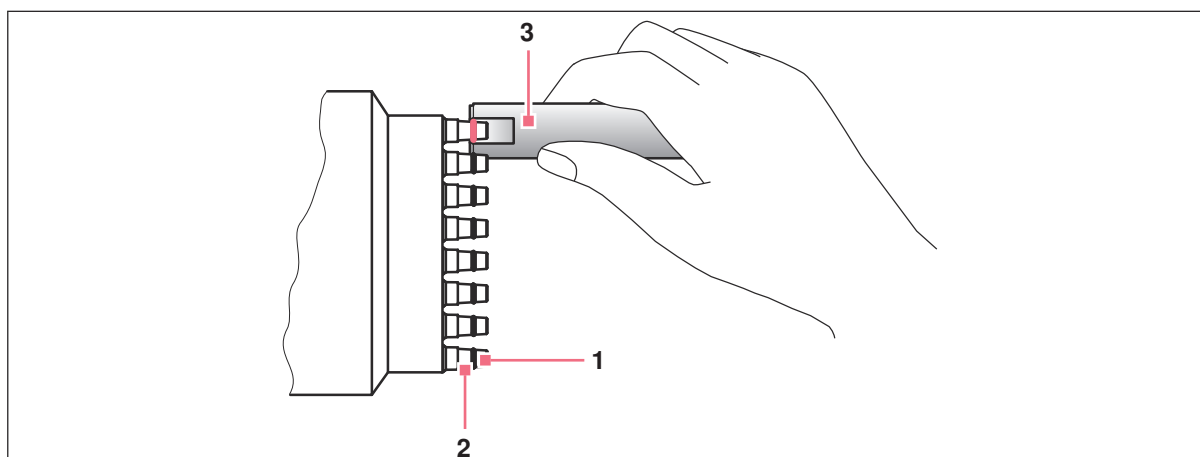
NOTICE! Damage to the tool

If you damage or contaminate the gold contacts of the tool, the tool will become defective.

- Do not touch the gold contacts.

Replace the sealing rings in the following cases:

- The sealing rings are damaged.
- The pipette tips are not inserted in parallel.
- The pipette tips are dripping.



1 Sealing ring

3 Auxiliary tool

2 Tip cone

Tool:

- Mounting aid
- Auxiliary tool

Material:

- New sealing rings
- Cloth
- Water

1. Position the upper edge of the auxiliary tool level with a sealing ring.
2. Use the auxiliary tool to cut the sealing ring.
3. Use your fingers to remove the sealing ring from the tip cone.
4. Moisten a cloth with water.
5. Clean the tip cone with the cloth.
6. Use the mounting aid to attach a new sealing ring to the tip cone.
7. Position the sealing ring in the groove of the tip cone.
8. Replace all sealing rings as described.

9.1.3 Checking the dispensing volume gravimetrically

The physical properties of a liquid affect the dispensing volume, e.g., viscosity, vapor pressure or surface tension. If the density of the liquid used and the density of water differ greatly, check the dispensing volume before application.



If you change the density by 10 %, the volume changes by 0.2 % – 1 %.

Material:

- Labware
- Test liquid

1. Create an application in which 1 dispensing tool fills the destination labware with test liquid.
2. Record the density of the test liquid.
3. Weigh the empty destination labware. Record the weight.
4. Run the application.

The dispensing tool fills the destination labware.

5. Weigh the filled destination labware. Record the weight.
6. Calculate the volume of the test liquid in the destination labware.

Volume = mass: density

7. Calculate the volume dispensed by the dispensing tool.

Volume = mass: density

8. Compare the volume in the destination labware with the volume dispensed by the dispensing tool.
9. If the volume in the destination vessel does not match the volume dispensed by the dispensing tool, repeat the process.
10. If you use purified water as the test liquid and the volumes differ, have the dispensing tool calibrated.
11. Change the dispensing volume if necessary.

9.1.4 Backing up data



NOTICE! Data loss

User accounts, applications, labware and logs are stored in one database. If the database is damaged, data can be lost.

- Regularly back up your data to an external storage medium.



NOTICE! Data loss

If you connect a USB storage medium to the device, malware on it can be transferred to the device and cause data loss and malfunctions.

- Check the USB storage medium with current antivirus software before each use.

Prerequisites:

- You need a USB storage medium to import or back up data.
1. Connect a USB storage medium to one of the USB ports on the MultiCon PC.
The storage medium is ready for operation after 5 seconds.
 2. Execute the desired function in the software.

 Further information can be found in the software manual.

9.1.5 Customer service functions

The customer service functions are available for servicing and checking the device.

 The customer service functions are described in detail in the software manual.

9.2 Cleaning



NOTICE! Damage to the device and accessories

The use of unsuitable cleaning agents or sharp objects may damage the device and its accessories.

- Do not use any aggressive cleaning agents, strong solvents or abrasive polishes.
- Check the compatibility with the materials used.
- Do not clean the device with acetone or organic solvents with a similar effect.
- Do not use any sharp or pointed objects to clean the device.



NOTICE! Damage to components

If disinfectant gets inside the device, it can cause electronic components to corrode. This will impair the function of the device.

- Only spray disinfectant onto a cloth.

9.2.1 Cleaning a contaminated device

Protective equipment:

- Laboratory protective clothing

Material:

- Plastic cleaner
- Deionized water
- Cloth
- Cotton swabs

Prerequisites:

- The device has been disconnected from the mains/power supply.

1. Moisten a cloth with plastic cleaner.
2. Use the cloth to clean the plastic frames and panes.
3. Moisten another cloth with purified water.
4. Use the cloth to clean accessible surfaces and the mains/power cord.
5. Moisten the cotton swab with purified water.
6. Use the cotton swab to clean hard-to-reach surfaces.
7. Allow the device to dry.

9.2.2 Spray decontamination

Decontamination agent	Components to be cleaned
70 % Ethanol	Device • Solid waste system • Liquid waste system Labware and accessories • Racks • Thermoblocks • Thermoadapters • Height adapter • TipHolder • Tip Tool

9.2.2.1 Performing a spray decontamination

Protective equipment:

- Laboratory protective clothing

Material:

- Decontamination agent
- Deionized water
- Cloth
- Cotton swabs

Prerequisites:

- Labware and accessories are outside the device.

1. Spray the surfaces with decontamination agent.

All surfaces are moistened with decontamination agent.

2. Allow the decontamination agent to take effect.
3. Moisten a cloth and a cotton swab with purified water.
4. Use the cloth and cotton swab to remove the decontamination agent.
5. Allow the surfaces to dry.

9.2.3 Wipe decontamination

Decontamination agent	Components to be cleaned
70 % (v/v) Ethanol	Device • Housing • epMotion worktable • Solid waste system • Liquid waste system Control device • MultiCon PC Tools • Dispensing tools • Barcode reader Accessories • Lid, thermal lid • Magnum FLX magnet adapter 96-well plates Labware • Total labware
3 % – 4 % sodium hypochlorite solution	Device • Solid waste system • Liquid waste system Tools • Dispensing tools • Gripper Accessories • Lid, thermal lid • Elution plate adapter • Racks • Thermoblocks • Thermo adapters • Height adapter • TipHolder • Tip Tool

9.2.3.1 Performing wipe decontamination

Protective equipment:

- Laboratory protective clothing

Material:

- Decontamination agent
- Deionized water
- Cloth
- Cotton swabs

Prerequisites:

- The device, MultiCon PC and barcode reader are disconnected from the voltage supply.
- The ejector sleeve of the single-channel dispensing tool has been removed.

1. Moisten a cloth and a cotton swab with decontamination agent.

2. Use the damp cloth to clean all accessible surfaces.

3. Use the cotton swab to clean hard-to-reach surfaces.

All surfaces are moistened with decontamination agent.

4. Allow the decontamination agent to take effect.

5. Moisten a cloth and a cotton swab with purified water.

6. Use the cloth and cotton swab to remove the decontamination agent.

7. Allow the surfaces to dry.

9.2.4 Autoclaving

Decontamination agent	Components to be cleaned
Autoclave at 121 °C and 100 kPa positive pressure	Device • Solid waste system
Autoclaving duration 20 min	Tools • Dispensing tools • Gripper
	Accessories • Lid, thermal lid • Elution plate adapter • Racks • Thermoblocks • Thermodapters • Height adapter • TipHolder • Tip Tool

9.2.4.1 Autoclaving

Protective equipment:

- Laboratory protective clothing

Material:

- Deionized water
- Cloth
- Cotton swabs

Prerequisites:

- The autoclave has been set up with 121 °C and a positive pressure of 100 kPa.
- Tools and accessories are free of decontamination agents.

1. Place the tools and accessories into the autoclave.
2. Make sure that the tools and accessories do not touch the wall of the autoclave.
3. Autoclave for at least 20 min.
4. Remove the tools and accessories from the autoclave.
5. Moisten a cloth and a cotton swab with purified water.
6. Use the cloth and the cotton swab to clean the surfaces.
7. Allow the surfaces to dry.

9.2.5 UV irradiation

Decontamination agent	Components to be cleaned
UV lamp Irradiation period 15 min	Device • epMotion worktable • Thermal modules • Eppendorf ThermoMixer module • Tip Tool

9.2.5.1 Performing UV irradiation

If you have a device with a UV lamp, you can carry out UV irradiation.



WARNING! Burns

The UV lamp emits intensive ultraviolet radiation. Exposure to this radiation will burn skin and eyes.

- Close the front panel of the device before checking the lamp.
- Do not look into the UV lamp.



NOTICE! Damage to the device

UV radiation causes plastic device parts to become brittle and impairs their functionality.

- If you irradiate the device and parts of the device with UV light, have the device serviced annually by an authorized service technician.

Prerequisites:

- The device is ready for use.
- Tools, the waste container and labware have been removed from the epMotion worktable.

1. Close the front pane.
2. Start UV irradiation as described in the software manual.



When you open the front pane, the UV lamp switches off.

9.2.6 Air filtering



WARNING! Contamination

When the air filter system is in operation, a continuous airflow is blown from the device workspace into the surrounding area. The airflow can transport aerosols and contaminate the surrounding area.

- Do not use the air filter system if working with biohazardous substances.
- Before switching on the air filter system, disinfect contaminated surfaces in the device.

Prerequisites:

- The device is ready for use.
- There are no tools or labware in the workspace of the device.
- The epMotion worktable and the side surfaces of the workspace are decontaminated.

1. Close the front pane.
2. Switch on the air filter system with the epBlue software.

9.2.7 Decontaminating the magnetic adapter

Decontaminating the Eppendorf Magnum FLX magnetic adapter with ethanol

Decontaminate the Eppendorf Magnum FLX magnetic adapter with a 70 % ethanol solution before and after each use.

Protective equipment:

- Laboratory protective clothing

Tool:

- Compressed air device

Material:

- Ethanol 70 %
- Deionized water
- Cloth
- Cotton swabs

1. Remove heavy salt deposits with a cotton swab and compressed air.
2. Moisten a cloth and a cotton swab with decontamination agent.
3. Use the cloth to clean easily accessible surfaces.
4. Use the cotton swab to clean hard-to-reach surfaces.

All surfaces are moistened with decontamination agent.

5. Allow the decontamination agent to work.
6. Moisten a cloth and a cotton swab with purified water.
7. Use the cloth and cotton swab to remove the decontamination agent.
8. Dry the surfaces with compressed air or a cloth.

Decontaminating the Eppendorf Magnum FLX magnetic adapter with an ortho-phthalaldehyde-based solution

Protective equipment:

- Laboratory protective clothing

Material:

- Ortho-phthalaldehyde-based solution

1. Decontaminate the magnetic adapter with an ortho-phthalaldehyde-based solution according to the instructions of the decontamination agent manufacturer.
2. Then decontaminate the magnetic adapter with ethanol.

10 Troubleshooting

10.1 Optical sensor error

Error description	Cause	Solution
The optical sensor does not detect the labware.	The plates were inserted the wrong way around.	Insert the plates correctly.
	The plates are not flat on the work-table.	Insert the plates correctly.
The optical sensor does not detect a plastic plate.	The plastic surface is uneven.	Wipe the plates several times with a damp cloth. Perform <i>Location</i> detection with a wet plate.
The optical sensor does not detect the filling level.	The surface of the liquid is not flat or it is strongly curved.	Smooth the surface of the liquid by gently tapping the labware on the bench.
	There are bubbles or foam on the surface of the liquid.	Remove the bubbles or foam.
The optical sensor does not detect the filling level.	The surface of the liquid is strongly curved.	Enter the liquid volume in epBlue.

10.2 Dispensing error

Error description	Cause	Solution
The dispensing tool dispenses incorrectly.	The sealing rings on the dispensing tool are defective.	Replace the sealing rings on the dispensing tool.
The dispensing volume is too high.	During retraction from the source position, the opening of the is in the liquid. There is no air bubble on the lower end of the pipette tip during liquid transport. The actual volume in the source position is higher than the entered volume.	- Measure the volume with the optical sensor. - Enter the correct volume. - Avoid different filling levels in the positions of a plate.
	You added liquid after starting the application without using the <i>set volume</i> command.	Use the <i>set volume</i> command when adding liquids.
	You used the wrong labware.	Only use labware that is defined in the epBlue worktable.

Error description	Cause	Solution
The dispensing volume is too low.	The pipette tip draws in air. There are air bubbles in the pipette tip. The actual volume in the source position is less than the entered volume.	• Measure the volume with the optical sensor. • Enter the correct volume. • Avoid different filling levels in the positions of a plate.
	You used the wrong labware.	• Only use labware that is defined in the epBlue worktable.
Residual liquid remains in the pipette tip.	An incorrect volume was entered for the destination position. After dispensing the volume, liquid is drawn back into the pipette tip from the destination position.	• Use the optical sensor to determine the volume. • Enter the correct volume. • Avoid different filling levels in the positions of a plate.
	You selected the wrong liquid type. Unsuitable dispensing parameters.	• Select the liquid type that matches the liquid. • Optimize the dispensing parameters, refer to the software manual for more information.
	The liquid wets the pipette tip. The liquid tends to foam.	• Replace the pipette tip more often. • Optimize the dispensing parameters, refer to the software manual for more information.

11 Shut down

11.1 Switching off the device

1. Exit the epBlue software.
2. Shut down the MultiCon PC.
3. Switch off the MultiCon PC.
4. Switch off the epMotion at the mains/power switch.

11.2 Disconnecting the device from the voltage supply

Prerequisites:

- The device is switched off.
1. Disconnect the mains/power plug from the earth/grounded socket.
 2. Disconnect the mains/power cord from the device.

12 Transport

12.1 Preparing the device for transport

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-25 °C – 60 °C	10 % – 75 %	30 kPa – 106 kPa
Air freight	-20 °C – 55 °C	10 % – 75 %	30 kPa – 106 kPa

1. Use the original packing and the transport securing devices for transport.

The center of gravity of the device is at the rear.

12.2 Transporting the device

Yellow carrying straps are attached to the device on delivery.

1. Use the yellow carrying straps to lift the device out of or into the packing.

12.3 Shipping the device



Use the original packing and the original transport securing device for transport. If the original packing and transport securing device are no longer available, please ensure that the device is sufficiently protected by replacement packing during storage and further transport. Eppendorf SE is not liable for damage caused by improper replacement packing.



WARNING! Contamination

Shipping or storing a contaminated device may lead to contamination of persons and to damage to health.

- Clean and decontaminate the device before shipping it or putting it into storage.

Material:

- Packing
- Transport securing device

Prerequisites:

- The device has been taken out of operation
- The device has been cleaned and decontaminated

1. Download the decontamination certificate for product returns from the webpage www.eppendorf.com.
2. Complete the decontamination certificate.
3. Attach the transport securing device to the device.
4. Pack the device.

5. Attach the decontamination certificate to the outside of the packing so that it is safe for transport.
6. Ship the device.

13 Storage

	Air temperature	Relative humidity	Atmospheric pressure
In transport packing	-25 °C – 55 °C	10 % – 95 %	70 kPa – 106 kPa
Without transport packing	-5 °C – 45 °C	10 % – 95 %	70 kPa – 106 kPa

14 Disposal

14.1 Legal regulations

EU countries

In EU member states, electrical and electronic equipment must be disposed of in accordance with Directive 2012/19/EU. This directive has been passed into national law by all EU member states.

Electrical and electronic equipment which has been put on the market after August 13, 2005 must be marked in a special way. According to the European standard the following symbol can be used to mark this equipment:



In the EU member states, batteries and rechargeable batteries must be disposed of in accordance with Directive 2006/66/EC. This directive has been passed into national law by all EU member states.

Non-EU countries

Non-EU countries have country-specific standards for the disposal of waste electrical and electronic equipment and the disposal of batteries and rechargeable batteries.

14.2 Preparing for disposal

Preparing disposal according to legal regulations

 For information on the legal regulations that apply in your country, contact your local authority and your Eppendorf partner.

 Dispose of non-decontaminable devices as hazardous waste.

1. Check which legal regulations apply to disposal in your country.
2. Choose a certified waste disposal company or contact your Eppendorf partner.

Removing batteries and rechargeable batteries

1. Check whether your device contains permanently installed batteries or rechargeable batteries.
2. Only remove the batteries and rechargeable batteries that are not permanently installed.
3. Dispose of the removed batteries and rechargeable batteries in accordance with the legal regulations of your country.

Creating a decontamination certificate

Prerequisites:

- The device has been decontaminated.
1. Download a decontamination certificate from our webpage www.eppendorf.com.
 2. Complete the decontamination certificate.

14.3 Handing over the device to the disposal company

1. Inform the disposal company of any hazards posed by the device, e.g., locking devices, flammable substances.
2. Hand over the device and the decontamination certificate to the certified disposal company.

15 Technical data

15.1 Dimensions

Width	680 mm
Depth	623 mm
Depth with drawer pulled out	663 mm
Height with front panel closed	812 mm
Height with front panel open	1260 mm

15.2 Weight

Device without CleanCap upgrade set

epMotion 5073 l	86 kg
epMotion 5073 t	93 kg

CleanCap upgrade set

CleanCap upgrade set	4.5 kg
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15.3 Packing

Device

Width	1200 mm
Depth	800 mm
Height	1250 mm
Weight	30 kg

CleanCap upgrade set for epMotion 5073

Weight	3.25 kg
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15.4 Mains/power supply

Voltage	100 V – 240 V ± 10 %
Frequency	50 Hz – 60 Hz ± 5 %
Mains/power cord	AC 250 V/10 A, 3G 1.0 mm ² C13 connector according to IEC 60320

Power consumption	Standby: 50 W Maximum: 600 W
Fuses at mains input	250 V, 10 AT
Overvoltage category	II
Pollution degree	2
Protection class	1

15.5 Ambient conditions

Operation

Environment	For indoor use only
Ambient temperature	15 °C – 35 °C
Relative humidity	55 % – 75%, non-condensing
Atmospheric pressure	86 kPa – 106 kPa

General transport and airfreight

Air temperature	-25 °C – 60 °C
Relative humidity	10 % – 80 %
Atmospheric pressure	70 kPa – 106 kPa

Storage

Air temperature	-25 °C – 60 °C
Relative humidity	10 % – 80 %
Atmospheric pressure	70 kPa – 106 kPa

15.6 Interfaces

USB	USB 2.0
Ethernet	Ethernet 100 MBit/s

Only connect devices that comply with the DIN EN 62368-1:2016-05 standard to the interfaces.

15.7 Noise level

Device	56 dB(A)
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15.8 Optical sensor

Optical confocal infrared sensor	Non-contact detection of: • Filling level of the labware • Labware code and height • Tools used • Number and position of epT.I.P.S. Motion pipette tips in Eppendorf SE labware
Detection conditions	Surface of the liquid $90^\circ \pm 3^\circ$ to the optical axis Minimum filling level: 3 mm
Detection height	160 mm above the worktable
Focal length	150 mm
Wavelength	1550 nm
Aperture angle	$\pm 4.2^\circ$

15.9 Carrier

Workspace

Width	410.5 mm
Depth	324 mm
Height	219 mm

Positioning accuracy along the X, Y and Z axes

Systematic deviation	± 0.3 mm
Random deviation	± 0.1 mm

15.10 Status display

LED color	LED lighting pattern	Device status
Blue	Lights up	The device is executing an application.
Blue	Flashes	The user has stopped the application or opened the front panel.
Yellow	Lights up	A user intervention is required.
Red	Lights up	The application was canceled due to an error.
Green	Flashes	The application was successfully terminated in the last 5 min.
Green	Lights up	The application was successfully terminated more than 5 min ago.

LED color	LED lighting pattern	Device status
White	Lights up	The device is ready for operation.
White	Flashes	The device starts.

15.11 MultiCon PC

Width	386 mm
Depth	221 mm
Height	369 mm
Weight	With stand: 4.9 kg Without stand: 2.9 kg
Operating system	Windows 10 Enterprise
Memory	RAM: 8 GB Hard disk: 128 GB
Power consumption	76 W

Information on further technical data can be found in the original MultiCon PC operating manual.

15.12 Upgrades

15.12.1 Thermal module

Temperature control	0 °C – 110 °C Adjustable in steps of 1 °C	
Heating rate	9 °C/min	
Cooling rate for cooling below ambient temperature	4 °C /min	
Systematic error	Temperature	Error of measurement
	4 °C	±2 °C
	37 °C	±1 °C
	95 °C	±2 °C
Random error	±0.5 °C	
Temperature control duration	1 min – 120 min	
Power consumption	60 W	

15.12.2 Eppendorf ThermoMixer module

Temperature control	4 °C – 95 °C, adjustable in steps of 1 °C	
Minimum temperature	15 °C below ambient temperature	
Heating rate	5 °C/min	
Cooling rate for cooling above ambient temperature	3 °C/min	
Cooling rate for cooling below ambient temperature	1 °C/min	
Systematic error of the temperature	Temperature 10 °C 37 °C 80 °C	Error of measurement ±2 °C ±1 °C +1 °C, -3 °C
Random error of the temperature	±0.5 °C	
Speed	300 rpm – 2000 rpm	
Speed error of measurement	10 %, measured < 5 %	
Mixing time	30 s – 120 min	
Maximum load	1000 g	
Power consumption	105 W	
Orbit	3 mm	

15.12.3 Air filter system

Filter class according to DIN EN 1822	E 10
Volume flow	80 m ³ /h
Number of filters in the device	2
Replacement interval	1 year

15.12.4 UV lamp

Power consumption	16 W
Voltage	49 V
Main wavelength	254 nm (UV-C)
Radiant flux after 100 h	3.9 W
Radiant intensity at a distance of 1 m	39 µW/cm ²
Irradiation period per cycle	15 min
Number of lamps in the device	1

UV output of the lamp	4.3 W
Replacement interval	2 years

15.12.5 Gripper

Form-fit carrying capacity	2000 g
Force-fit carrying capacity	1200 g

15.12.6 Tip Tool

Width	85 mm
Depth	27 mm
Height	230 mm
Weight	155 g

15.13 Application parameters

15.13.1 Thermal module

The temperature control duration was measured at an ambient temperature of 25 °C in the edge positions of the labware.

First the thermal module was tempered to the target temperature. Then the labware was placed on the thermal module.

Table 8: Temperature control duration of labware with the thermal module

Labware on the thermal module	Water filling volume per well in µL	Cooling from 25 °C to 4 °C		Heating from 25 °C to 37 °C		Heating from 25 °C to 95 °C	
		Temperature setting in °C	min	Temperature setting in °C	min	Temperature setting in °C	min
Thermal module without labware			5		2		8
Thermoadapter with 96-well twin.tec PCR plate skirted	50	3	7	38	5	104	11
Thermoblock with 96-well twin.tec PCR plate skirted	50	3	6	37	4	101	10
Thermoadapter with 384-well twin.tec PCR plate skirted	10	3	5	37	5	103	8

Labware on the thermal module	Water filling volume per well in µL	Cooling from 25 °C to 4 °C		Heating from 25 °C to 37 °C		Heating from 25 °C to 95 °C	
		Temperature setting in °C	min	Temperature setting in °C	min	Temperature setting in °C	min
Thermoblock with 384-well twin.tec PCR plate skirted	10	3	5	37	5	98	7
Thermorack 0.5/1.5/2.0 mL with safe lock tubes 0.5 mL	350	3	24	37	16	101	35
Thermorack 0.5/1.5/2.0 mL with safe lock tubes 1.5 mL	1200	3	30	38	18	104	44
Thermorack 0.5/1.5/2.0 mL with safe lock tubes 2.0 mL	1700	3	25	37	17	100	40

15.13.2 Eppendorf ThermoMixer module

Labware	Maximum speed in rpm
Tubes	1000
Deepwell plates with 96 wells	1200
Deepwell plates with 384 wells	1200
Microplate with 6 wells	1000
Microplates with 96 wells	2000
Microplates with 384 wells	2000
PCR plate with 96 wells	2000
PCR plate with 384 wells	2000
ReservoirRack	Mixing not possible
Thermorack or thermoblock	1000
Thermoblock 96 with a PCR plate semi-skirted for 250 µL	1700
Thermoblock PCR 96 OC	1700
Thermoadapter microplate 96/U/V with Eppendorf microplate 96/V	1600
Thermoadapter microplate 96/U/V with Eppendorf microplate 96/U	1600
Thermoadapter for 96 wells	1000

Labware	Maximum speed in rpm
Thermoadapter for 384 wells	1000
Thermorack TMX	1300

15.13.3 Dispensing tools

15.13.3.1 Error of measurements in dispensing mode Pipette

Dispensing tool	Volume range	Volume	Error of measurement			
			Systematic		Random	
			%	µL	%	µL
TS 10	0.2 µL – 10 µL	0.2 µL	±25	±0.05	±19.8	±0.04
		1 µL	±5	±0.05	±3	±0.03
		5 µL	±2.4	±0.12	±0.5	±0.025
		10 µL	±1.2	±0.12	±0.25	±0.025
TS 50	1.0 µL – 50 µL	1 µL	±15	±0.15	±5	±0.05
		5 µL	±5	±0.25	±3	±0.15
		25 µL	±1.5	±0.375	±0.6	±0.15
		50 µL	±1.0	±0.5	±0.4	±0.2
TS 300	20 µL – 300 µL	20 µL	±4	±0.8	±2.5	±0.5
		30 µL	±3	±0.9	±1.5	±0.45
		150 µL	±1	±1.5	±0.4	±0.6
		300 µL	±0.6	±1.8	±0.3	±0.9
TS 1000	40 µL – 1000 µL	40 µL	±5	±2	±1.5	±0.6
		100 µL	±2	±2	±1.0	±1.0
		500 µL	±1	±5	±0.2	±1.0
		1000 µL	±0.7	±7	±0.15	±1.5
TM 10-8	0.2 µL – 10 µL	1 µL	±7.5	±0.075	±5	±0.05
		5 µL	±2.5	±0.125	±2	±0.1
		10 µL	±2	±0.2	±0.6	±0.06
TM 50-4	1.0 µL – 50 µL	1 µL	±25	±0.25	±10	±0.1
TM 50-8		5 µL	±5	±0.25	±5.0	±0.25
25 µL		±2	±0.5	±1.2	±0.3	
50 µL		±1.2	±0.6	±0.6	±0.3	

Dispensing tool	Volume range	Volume	Error of measurement			
			Systematic		Random	
			%	µL	%	µL
TM 300-4 TM 300-8	20 µL – 300 µL	20 µL	±10	±2.0	±4.0	±0.8
		30 µL	±10	±3.0	±3.5	±1.05
		150 µL	±2.5	±3.75	±0.8	±1.2
		300 µL	±1.5	±4.5	±0.5	±1.5
TM 1000-4 TM 1000-8	40 µL – 1000 µL	40 µL	±6	±2.4	±2.5	±1.0
		100 µL	±3	±3	±1.5	±1.5
		500 µL	±1.5	±7.5	±0.3	±1.5
		1000 µL	±0.8	±8.0	±0.15	±1.5

15.13.3.2 Test conditions

Test conditions and test evaluations are based on DIN EN ISO 8655-6.

The errors of measurement for the volumes ≥ 1 µL were determined under the following conditions:

- Water in accordance with DIN EN ISO 8655-6
- Ambient temperature 20 °C – 25 °C, ± 0.5 °C
- epT.I.P.S. Motion pipette tips with the purity grade Eppendorf Quality
- Free-jet dispensing
- Six-digit balance

The error of measurement for the volume 0.2 µL was determined by liquid dispensing in *contact dispensing* mode.

15.13.3.3 Volume aspiration in dispensing mode *Multidispense*

The aspirated volume depends on the dispensing tool. The epBlue software automatically calculates the volume to be aspirated.

Dispensing tool	Volume per channel for reverse stroke	Volume per channel for remaining stroke
Single-channel dispensing tool TS 10	1.8 µL	0.8 µL
Single-channel dispensing tool TS 50	5.8 µL	2.5 µL
Single-channel dispensing tool TS 300	16.7 µL	3.7 µL
Single-channel dispensing tool TS 1000	50.3 µL	35.2 µL
Four-channel dispensing tool TM 50-4	5.8 µL	2.5 µL
Four-channel dispensing tool TM 300-4	45.2 µL	5.0 µL

Dispensing tool	Volume per channel for reverse stroke	Volume per channel for remaining stroke
Four-channel dispensing tool TM 1000-4	50.3 µL	35.2 µL
Eight-channel dispensing tool TM 10-8	1.8 µL	0.8 µL
Eight-channel dispensing tool TM 50-8	5.8 µL	2.5 µL
Eight-channel dispensing tool TM 300-8	45.2 µL	5.0 µL
Eight-channel dispensing tool TM 1000-8	50.3 µL	35.2 µL

The reverse stroke and remaining stroke are identical for all liquid types.

16 Ordering information

16.1 Upgrades

16.1.1 Modification kits

Modification kits and upgrade sets may only be installed by an authorized service technician.

Description	Order no.
CleanCap Upgrade Set for epMotion® 5073 includes UV lamp for decontamination and air filter system for pipetting under clean air conditions, for upgrading epMotion® 5073 with SN > 7000 and epBlue version > 40.7. Service visit required for installation. for upgrading epMotion 5073 with SN>7000 and epBlue version >40.7	5073 001 333
Thermal module as of sn. 10,000	5075 757 508

16.1.2 Waste system

Description	Order no.
Liquid Waste System consisting of splash protection, waste funnel, waste tub, tub lid. For use on epMotion® 5075 and epMotion® 5073 with serial no. > 10,000	5075 799 448

16.1.3 Accessories for dispensing tools and gripper

Description	Order no.
Gripper Tower enables positioning epT.I.P.S.® Motion Reload trays in the parking position of the gripper and holds the gripper when it is not in use; only for use with epMotion® 5073 as of serial number 6000	5075 751 895
Holder for 6 dispensing tools	5075 774 003

16.1.4 Software

Description	Order no.
Enhanced Feature Set 1 license for epBlue additional features: Calculated no. of samples; Automatic tool selection; Start at command; Email notification, requires service visit and epBlue >40.6	5075 000 964
Enhanced Feature Set 2 license for epBlue feature: Normalization, requires Service visit and epBlue 40.8 or higher	5075 000 981

Ordering information

epMotion® 5073

English (EN)

Description	Order no.
Enhanced Feature Set GxP licence for epBlue feature: GxP, for support of regulated environments (e.g. according to GLP, GMP, 21 CFR Part 11), requires service visit and epBlue 40.9 or higher	5075 002 744
epBlue ID barcode and tracking software incl. manual barcode scanner modular expansion of epBlue for barcode support. Incl. manual barcode reader with stand. Compatible with epBlue version 40.1 and higher	5075 002 701

16.2 Tool**16.2.1 Dispensing tools**

Description	Order no.
TM 10-8 eight-channel dispensing tool 8-channel 0,2 – 10 µL	5280 000 304
TM 1000-8 eight-channel dispensing tool 8-channel 40 – 1.000 µL	5280 000 258
TM 300-8 eight-channel dispensing tool 8-channel 20 – 300 µL	5280 000 231
TM 50-8 eight-channel dispensing tool 8-channel 1,0 – 50 µL	5280 000 215
TS 10 single channel dispensing tool 1-channel 0,2 – 10 µL	5280 000 100
TS 1000 single channel dispensing tool 1-channel 40 – 1.000 µL	5280 000 053
TS 300 single channel dispensing tool 1-channel 20 – 300 µL	5280 000 037
TS 50 single channel dispensing tool 1-channel 1,0 – 50 µL	5280 000 010

Description	Order no.
TM 1000-4 four-channel dispensing tool 4-channel 40 – 1.000 µL	5280 000 452
TM 300-4 four-channel dispensing tool 4-channel 20 – 300 µL	5280 000 436
TM 50-4 four-channel dispensing tool 4-channel 1 – 50 µL	5280 000 410

16.2.2 Gripper

Description	Order no.
Gripper incl. holder, for transporting plates on the worktable and automatic operation of the vacuum manifold additionally order Gripper Tower 5075 751 895 for 5073 with SN > 6000	5282 000 018

16.3 Labware – tubes, plates and pipette tips

16.3.1 Pipette tips

16.3.1.1 epT.I.P.S. Motion Racks

Description	Order no.
epT.I.P.S.® Motion Pipette Tips without filter Eppendorf Quality, 10 µL, 960 tips (10 racks × 96 tips) Eppendorf Quality, 50 µL, 960 tips (10 racks × 96 tips) Eppendorf Quality, 300 µL, 960 tips (10 racks × 96 tips) Eppendorf Quality, 1,000 µL, 960 tips (10 racks × 96 tips) sterile, 10 µL, 960 tips (10 racks × 96 tips) sterile, 50 µL, 960 tips (10 racks × 96 tips) sterile, 300 µL, 960 tips (10 racks × 96 tips) sterile, 1,000 µL, 960 tips (10 racks × 96 tips) with filter PCR clean, 10 µL, 960 tips (10 racks × 96 tips) PCR clean, 50 µL, 960 tips (10 racks × 96 tips)	 0030 014 383 0030 014 405 0030 014 448 0030 014 480 0030 015 185 0030 015 207 0030 015 223 0030 015 240 0030 014 391 0030 014 413

Ordering information

epMotion® 5073

English (EN)

Description	Order no.
PCR clean, 300 µL, 960 tips (10 racks × 96 tips)	0030 014 456
PCR clean, 1,000 µL, 960 tips (10 racks × 96 tips)	0030 014 499
PCR clean and sterile, 10 µL, 960 tips (10 racks × 96 tips)	0030 015 193
PCR clean and sterile, 50 µL, 960 tips (10 racks × 96 tips)	0030 015 215
PCR clean and sterile, 300 µL, 960 tips (10 racks × 96 tips)	0030 015 231
PCR clean and sterile, 1,000 µL, 960 tips (10 racks × 96 tips)	0030 015 258

16.3.1.2 epT.I.P.S. Motion SafeRacks

Description	Order no.
epT.I.P.S.® Motion as SafeRack tips	
without filter	
Eppendorf Quality, 50 µL, 960 tips (10 racks × 96 tips)	0030 014 600
Eppendorf Quality, 300 µL, 960 tips (10 racks × 96 tips)	0030 014 626
Eppendorf Quality, 1,000 µL, 960 tips (10 racks × 96 tips)	0030 014 642
with filter	
PCR clean, 50 µL, 960 tips (10 racks × 96 tips)	0030 014 618
PCR clean, 300 µL, 960 tips (10 racks × 96 tips)	0030 014 634
PCR clean, 1,000 µL, 960 tips (10 racks × 96 tips)	0030 014 650

16.3.1.3 epT.I.P.S. Motion Reloads

Description	Order no.
epT.I.P.S.® Motion as Reload System	
without filter	
Eppendorf Quality, 0.5 – 50 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 421
Eppendorf Quality, 5 – 300 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 464
Eppendorf Quality, 10 – 1,000 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 502
Eppendorf Quality, 10 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 545
with filter	
PCR clean, 0.5 – 50 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 430
PCR clean, 5 – 300 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 472
PCR clean, 10 – 1,000 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 510
PCR clean and sterile, 0.5 – 50 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 529
PCR clean and sterile, 5 – 300 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 537
PCR clean, 10 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 553

Description	Order no.
PCR clean and sterile, 10 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 561
PCR clean and sterile, 10 – 1,000 µL, ACT, 2,304 tips (24 trays × 96 tips)	0030 014 570

16.3.2 Plates



All twin.tec plates are available with an ID on request. Information about other plates can be found in our catalog and on our website www.eppendorf.com

Description	Order no.
Eppendorf twin.tec® 96 real-time PCR Plate semi-skirted, 250 µL	
PCR clean, blue, wells white, 25 plates	0030 132 530
PCR clean, white, wells white, 25 plates	0030 132 548
Eppendorf twin.tec® PCR Plate 384 skirted, 45 µL	
PCR clean, colorless, 25 plates	0030 128 508
PCR clean, yellow, 25 plates	0030 128 516
PCR clean, green, 25 plates	0030 128 524
PCR clean, blue, 25 plates	0030 128 532
PCR clean, red, 25 plates	0030 128 540
Eppendorf twin.tec® PCR Plate 96 semi-skirted, 250 µL	
PCR clean, colorless, 25 plates	0030 128 575
PCR clean, yellow, 25 plates	0030 128 583
PCR clean, green, 25 plates	0030 128 591
PCR clean, blue, 25 plates	0030 128 605
PCR clean, red, 25 plates	0030 128 613
skirted, 150 µL	
PCR clean, colorless, 25 plates	0030 128 648
PCR clean, yellow, 25 plates	0030 128 656
PCR clean, green, 25 plates	0030 128 664
PCR clean, blue, 25 plates	0030 128 672
PCR clean, red, 25 plates	0030 128 680
Eppendorf twin.tec® PCR Plate 96 LoBind® semi-skirted, 250 µL	
PCR clean, colorless, 25 plates	0030 129 504

Ordering information

epMotion® 5073

English (EN)

Description	Order no.
Eppendorf twin.tec® microbiology PCR Plate 96 semi-skirted, 250 µL PCR clean, colorless, 10 plates PCR clean, blue, 10 plates	 0030 129 326 0030 129 334
PCR-Cooler 0.2 mL Pink Blue	 3881 000 023 3881 000 031
PCR-Cooler 0.2 mL Starter Set 1 pink, 1 blue	 3881 000 015

16.3.3 Reservoirs

Description	Order no.
epMotion® reservoir 10 mL small-volume container for reagent presentation on the epMotion®, can only be inserted with the Reservoir Rack; production batch testing, certified 10 mL, PCR clean, 10 × 5 reservoirs in the bag, polypropylene (PP)	 0030 126 521
epMotion® reservoir 100 mL large-volume container for reagent presentation on the epMotion®, can only be inserted with the Reservoir Rack; production batch testing, certified 100 mL, PCR clean, 10 × 5 reservoirs in the bag, polypropylene (PP)	 0030 126 513
epMotion® reservoir 30 mL large-volume container for reagent presentation on the epMotion®, can only be inserted with the Reservoir Rack; production batch testing, certified 30 mL, PCR clean, 10 × 5 reservoirs in the bag, polypropylene (PP)	 0030 126 505
epMotion® reservoir 400 mL large-volume container for reagent presentation on the epMotion® 10 reservoirs, 400 mL each, autoclavable, polypropylene (PP)	 5075 751 364

16.3.4 Waste bag

Description	Order no.
Waste bags for waste bag holder of epMotion® 5070/5073/5075 with SN < 10000 and epMotion® 5073 with SN > 10000. Up to 7 L capacity, ideal for disposing non-hazardous waste, autoclavable, PP material, thickness 50 µm, transparent, 50 bags.	5075 751 780
Waste bags biohazard for waste bag holder of epMotion® 5070/5073/5075 with SN < 10000 and epMotion® 5073 with SN > 10000. Up to 7 L capacity, ideal for disposing biohazardous waste, autoclavable, PP material, thickness 50 µm, transparent, 50 bags.	5075 751 763

16.4 Labware accessories

16.4.1 Boxes and clips

Description	Order no.
Box for epT.I.P.S.® Motion 1,000 µL Reload	0030 014 677
Box for epT.I.P.S.® Motion 10/50/300 µL Reload	0030 014 669
Clip for epT.I.P.S.® Motion Reloads	5075 751 070

16.4.2 TipHolder

Description	Order no.
TipHolder for epT.I.P.S.® Motion Reloads	5075 751 399
TipHolder TM-4 compatible TipHolder compatible with 1-, 4- and 8-channel dispensing tools. Space for one epT.I.P.S.® Box in lower area and an epT.I.P.S.® Reload Rack in upper area, autoclavable. requires epMotion with SN > 10,000 and epBlue version 50.2 or higher	5075 752 158
TipHolder 73 enables positioning epT.I.P.S.® Motion Reload trays above a rack of epT.I.P.S.® Motion and thus doubles the tip capacity in an ANSI/SLAS position reusable and autoclavable, compatible with 1- and 8-channel dispensing tools, epBlue 40.7 or higher required	5075 751 879

Ordering information

epMotion® 5073

English (EN)

16.4.3 Racks for single tubes

Description	Order no.
Rack for 96 screw cap tubes 1,5/2,0 mL	5075 791 005
for 24 HPLC tubes Ø 12 mm × 40 mm max. length	5075 792 125
Rack LC 20 µL/100 µL for up to 96 × 20 µL or 100 µL LightCycler capillaries for use with Centrifuge 5804/5804 R or 5810/5810 R and other devices, set of 2	5075 795 000
Rack Smart for holding one tube rack of SmartCycler® reaction tubes	5075 790 009
Rack for 24 tubes for 24 Safe-Lock tubes, no tempering 1,5/2,0 mL	5075 751 275
0,5/1,5/2,0 mL	5075 751 453
Rack for single test tubes for presenting Eppendorf reaction vessels, glass or plastic tubes, not temperable Ø 16 mm × 100 mm max. length	5075 760 002
Ø 17 mm × 100 mm max. length	5075 761 009
Ø 13 mm × 100 mm max. length	5075 762 005
Ø 12 mm × 100 mm max. length	5075 763 001
Ø 17 mm × 60 mm max. length	5075 775 000
Ø 16 mm × 60 mm max. length	5075 776 006
Ø 14 mm × 100 mm max. length	5075 792 001
Ø 15 mm × 100 mm max. length	5075 792 028
Ø 15 mm × 60 mm max. length	5075 792 044
Ø 14 mm × 60 mm max. length	5075 792 060
Ø 13 mm × 60 mm max. length	5075 792 087
Ø 12 mm × 60 mm max. length	5075 792 109
Rack ILMN tubes Rack for single tubes, 40 × Ø 8.4 mm and 12 × Ø 11.2 mm, transportable, autoclavable	5075 751 747
Rack for Conical Tubes Rack for the use of up to 6 × 25 mL or 50 mL conical tubes with screw cap or SnapTec Compatible with 1-channel dispensing tools, not temperature-controlled.	5075 752 174

Description	Order no.
Rack for 24 tubes TM-4 compatible Rack for the use of up to 24 x 1.5 mL or 2.0 mL Safe-Lock Tubes Compatible with single-channel and four-channel dispensing tools, not temperature-controlled, can also be used for 0.5 mL tubes with adapter sleeves	5075 752 107
Rack for single tubes TM-4 compatible Rack for the use of up to 24 Eppendorf reaction tubes, glass or plastic tubes Ø 13 mm x 60 mm max. length. Compatible with 1-channel and 4-channel dispensing tools, not temperature-controlled	5075 775 204

16.4.4 ReservoirRacks and ReservoirRack modules

ReservoirRacks

Description	Order no.
Reservoir Rack 3 for max. three 30 mL or 100 mL reservoirs, only for 5075t, 5075m	5075 754 070
ReservoirRack for presenting 10 mL, 30 mL and 100 mL reagent reservoirs. Up to 7 reservoirs or Reservoir Rack modules can be presented.	5075 754 002

ReservoirRack modules

Description	Order no.
Reservoir Rack Module NGS for use with epMotion® ReservoirRacks, for distributing samples and reagents for NGS-specific applications, space for 20 x ILMN tubes, 4 x Eppendorf Tubes® 5.0 mL, 4 x Eppendorf Tubes 1.5 mL	5075 751 917
Reservoir Rack Module PCR for use with epMotion® ReservoirRacks, for distributing samples and reagents for PCR, space for 48 x PCR tubes 0.2 mL incl. 2 x strip adapters 0.2 mL, (alternatively, space sufficient for 16 index tubes and up to 32 x PCR tubes 0.2 mL), 12 x Eppendorf Tu	5075 751 933
Reservoir Rack Module Tips for use with epMotion® ReservoirRacks, for providing up to 16 epT.I.P.S.® Motion per module and up to 7 modules per ReservoirRack (112 tips in total), set consisting of 7 modules	5075 751 950
ReservoirRack Module TC for use in epMotion® ReservoirRacks, temperable 8 x PCR tubes 0.2 mL	5075 799 049

Ordering information

epMotion® 5073

English (EN)

Description	Order no.
4 × Safe-Lock tubes 0.5/1.5/2.0 mL	5075 799 081
4 × reaction vessels Ø 12 mm	5075 799 103
4 × reaction vessels Ø 16 mm	5075 799 120
1 × reservoir 30 mL	5075 799 146
4 × reaction vessels Ø 17 mm	5075 799 162
2 × reaction vessels Ø 29 mm	5075 799 189
1 × reservoir 100 mL	5075 799 260
4 × Eppendorf Tubes® 5.0 mL	5075 799 340
1 × reservoir 10 mL	5075 799 421

16.4.5 Height adapter

Description	Order no.
epMotion® height adapter for leveling labware, enables faster plate processing	
85 mm	5075 751 003
55 mm	5075 752 000
40 mm, for pipette tips	5075 755 009

16.4.6 Magnetic adapter

Description	Order no.
Eppendorf Magnum FLX® Magnet Adapter universal ring magnet plate for rapid magnetic bead separation. Supports most 96-well plates (standard, PCR, deepwell)	5075 751 836

16.4.7 Thermoracks

Description	Order no.
Adapter sleeves to retrofit the 1.5/2.0 mL thermoracks for use with 0.5 mL vessels 25 Stück	5075 772 000
Thermorack for 24 Safe-Lock tubes, temperable 0,5/1,5/2,0 mL	5075 769 000
1,5/2,0 mL	5075 771 004
für 24 Cryo-Gefäße	5075 777 055

Description	Order no.
Thermorack CB for holding up to 384 x 0.1 mL strip tubes in the Corbett Research Rotor-Gene 3000	5075 767 031
Thermorack Cryo TM-4 compatible rack for the use of up to 24 x 1.5 mL or 2.0 mL Safe-Lock Tubes compatible with 1-channel and 4-channel dispensing tools, temperature-controlled, can be used up to 1,000 rpm on the TMX, can also be used for 0.5 mL tubes with adapter sleeves	5075 752 131
Thermorack Rack TM-4 compatible rack for the use of up to 24 x 1.5 mL or 2.0 mL Safe-Lock Tubes compatible with 1-channel and 4-channel dispensing tools, for up to 1,000 rpm on the TMX, can also be used for 0.5 mL tubes with adapter sleeves	5075 752 115
Thermorack Rotor/Tubes for temperature controlled pipetting of Qiagen® Rotor-Disc® 72/100 and 20 tubes 1.5/2.0 mL	5075 751 526
Thermorack TMX for 24 Safe-Lock Tubes 0,5 mL/1,5 mL/2,0 mL for 24 Safe-Lock Tubes, temperable 1,5/2,0 mL	5075 751 160 5075 751 186
Thermorack TMX TM-4 rack for the use of up to 24 x 1.5 mL or 2.0 mL Safe-Lock Tubes compatible with 1-channel and 4-channel dispensing tools, temperature-controlled, can be used up to 1,300 rpm on the TMX, can also be used for 0.5 mL tubes with adapter sleeves	5075 752 123

16.4.8 Thermoadapter

Description	Order no.
Thermoadapter DWP 96 for Deepwell Plates 96/1000	5075 751 054
Thermoadapter Frosty combination of height adapter and PCR-Cooler, for cooling skirted PCR plates	5075 789 000
Thermoadapter LC Sample for MagNA Pure LC sample cartridge	5075 751 305
Thermoadapter for Microplate 96/V/U for holding and temperature control of Eppendorf Microplates with V or U bottom	5075 751 577

Ordering information

epMotion® 5073

English (EN)

Description	Order no.
Thermoadapter for PCR	
for temperature control of PCR plates, 96 wells, skirted	5075 787 008
for temperature control of PCR plates, 384 wells, skirted	5075 788 004

16.4.9 Thermoblocks

Description	Order no.
Thermoblock DWP 2000	
for 2 mL Eppendorf Deepwell Plates 96/2000	5075 751 330
Thermoblock PCR 96 OC	
for temperature control and safe piercing of sealed, semi-skirted PCR plates with orientation control	5075 751 666
Thermoblock for PCR	
for temperature control of 96 vessels 0.2 mL or one PCR plate 96 wells	5075 766 000
for temperature control of PCR plate 384 wells	5075 767 007

16.4.10 Labware accessories

Description	Order no.
Tip Tool	
tool for exclusively transferring epT.I.P.S.® Motion from racks and trays to the ReservoirRack modules for tips, incl. wall mount for safe storage of the tool	5285 000 000

16.5 Measuring devices

Description	Order no.
Byonoy Luminescence 96 Automate	
Plate reader for luminescence measurements in 96-well plates on the deck of an epMotion 5073 and 5075 (all versions)	5075 752 190
Byonoy Absorbance 96 Automate	
Plate reader for absorbance measurements in 96-well plates on the deck of an epMotion 5073 and 5075 (all versions)	
Wavelengths: 450, 490, 562, 600, 620, 750 nm. Not available in Europe	5075 752 212

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Air filter system

The air filter system prevents particles such as dust and germs from the surrounding area from entering the workspace of the epMotion.

Application

Program for a specific application. An application includes the procedure and the equipping of the worktable.

Autoclaving

Physical method of sterilization. Thermal process used to kill microorganisms and inactivate viruses and enzymes. This process does not completely destroy the DNA. The objects to be autoclaved are stored in a pressure vessel with water vapor at 121 °C, 1000 hPa (1 bar) positive pressure for 20 min.

Bottom tolerance

Minimum distance of the pipette tip to the vessel base. The bottom tolerance is stored in the software and can be changed. The factory-set bottom tolerance is 1 mm. For the reservoir 30 mL, the factory-set bottom tolerance is 2.5 mm.

CleanCap upgrade set

The CleanCap upgrade set includes an air filter system and an UV lamp for decontamination and pipetting under clean air conditions.

Contact dispensing

Liquid dispensing with contact to a surface. The pipette tip places a drop on a surface. The contact with the surface causes the drop to separate from the pipette tip. Liquid dispensing onto a liquid level is called wet contact dispensing. Liquid dispensing onto the surface of a vessel is called dry contact dispensing.

Destination labware

Rack or plate that is the destination of a liquid transfer.

Destination position

Position in the labware that is the destination of a liquid transfer.

Dispensing mode

Liquids can be dispensed using the Pipette, Multidispense and Multiaspirate dispensing modes:

- In Pipette dispensing mode, a defined volume is aspirated and fully dispensed in one step.
- In Multidispense dispensing mode, a volume is aspirated and dispensed in defined dispensing steps.
- In Multiaspirate dispensing mode, a volume is aspirated in defined steps and fully dispensed in one step.

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Dispensing tool

Electronically controlled piston-stroke pipette. The dispensing tool is used to aspirate liquids into the pipette tip and dispense them. Single-channel dispensing tools, four-channel dispensing tools and eight-channel dispensing tools for volume ranges from 0,2 µL – 1000 µL are available.

Dry contact dispensing

Liquid dispensing with contact to the vessel surface. The pipette tip places a drop on the surface of a vessel. The contact with the surface of the vessel causes the drop to separate from the pipette tip.

epBlue

software for creating applications and managing applications and labware. The epBlue software is used to control the epMotion.

Eppendorf Quality

This purity grade describes the basic quality features of Eppendorf consumables. Compliance with these features is ensured by means of defined in-process controls. Representative product samples are taken and checked for compliance with the valid product specifications. The most important in-process controls include visual inspections, article measurement and functional testing, e.g., with regard to micro test tubes, testing for centrifugation stability, wetting behavior and leak tightness.

Eppendorf ThermoMixer module

Module for mixing and tempering liquids and suspensions.

epT.I.P.S. Motion

Pipette tips for the epMotion. epT.I.P.S. Motion are available with and without filter. The abbreviation stands for Eppendorf Totally Integrated Pipetting System.

Filling volume

Maximum capacity of the labware. The filling volume is calculated from the working volume plus the volume of the immersed pipette tip. The epMotion aspirates liquid from the labware until the filling volume is reached.

Free jet dispensing

Liquid dispensing without contact to a surface or target liquid where the pipette tip dispenses the liquid into the air.

Gripper

Tool to transport labware on the worktable.

Height adapter

Adapter for labware with a low height. The height differences between the labware are eliminated by means of a height adapter to decrease tool holder travel and thus reduce the cycle time of the application.

Intermediate labware

Rack or plate which can be the source as well as the intermediate destination of liquid transfers.

Intermediate position

Position of a labware that can be the source as well as the intermediate destination of liquid transfers.

Labware

Racks, vessels, plates, tips, etc. on the worktable.

Location

Area on the worktable for positioning labware.

Optical sensor

The optical sensor detects the filling level in a tube, recognizes pipette tips and checks the labware used on the worktable.

PCR clean

Eppendorf SE purity grade for consumables.

Consumables with this purity grade meet the requirements of Eppendorf Quality and have, in addition, a certified biological purity. To verify that items meet the PCR clean purity grade, items are tested lot-specifically by an external accredited laboratory for the absence of human DNA, DNase, RNase and PCR inhibitors within the respective detection limits.

The lot-specific certificates of these tests are available on our website

<http://www.eppendorf.com/certificates>.

Position

Location of an individual vessel or well in a plate.

Procedure

A sequence of commands that are executed one after the other. Part of an application.

Rack

Holder for vessels or pipette tips.

Random error

Measure for the scattering (standard deviation) of the measured values around the average value.

Remaining volume

Volume in a position that is not aspirated by the pipette tip. This may be caused by the following:

- Minimum immersion depth of the pipette tip into the liquid
- Minimum distance of the pipette tip to the vessel base (bottom tolerance)
- Tube geometry

Under standard conditions, the remaining volume has a filling height of 1.7 mm (minimum immersion depth 0.7 mm + bottom tolerance 1 mm).

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Reservoir

Container for storing liquids. The dispensing tool aspirates liquid from the reservoir and dispenses the liquid into the plates. Reservoirs are hung in a ReservoirRack or placed directly on the worktable.

SafeRack

Rack in which the epT.I.P.S. Motion pipette tips are stored free from contamination. The SafeRack has a partition to separate pipette tips. The partition prevents the contamination of adjacent pipette tips with residual liquid. Pipette tips in a SafeRack can be re-used.

Source labware

Rack or plate as source for liquid transfers.

Source position

Position in a labware that is only used as the source for liquid transfers.

Status display

Word or symbol in the graphical user interface showing the status of a device or a connected module or component.

Sterile

Sterile is an Eppendorf SE purity grade for consumables. Sterile meets the requirements for standard products, e.g., precision, accuracy, wetting behavior, leak tightness. Sterile also meets the requirements for sterility and freedom from pyrogens.

Systematic error

Deviation of the average value of the dispensed volumes from the selected volume.

Thermal module

Plate that serves to temper labware. The thermal module is installed on the worktable.

Thermoadapter

Temperature-controlled tube holder or plate holder. The thermoadapter is not transported using the gripper.

Thermoblock

Temperature-controlled plate holder. The thermoblock is transported with the gripper.

There are two types of thermoblocks for epBlue:

- *Thermoblocks*: Thermoblocks and plates are available as separate labware definitions.
- *Thermoblocks with Plates*: Thermoblock and plate are combined in one labware definition. The thermoblock is not available as a separate labware definition.

Thermorack

Temperature-controlled rack

Vacuum unit

A module that uses negative pressure to suck liquid from a filter plate. The vacuum unit consists of a vacuum manifold and vacuum pump.

Wet contact dispensing

Liquid dispensing with contact to the liquid level. The pipette tip places a drop on a liquid level. The contact with the surface causes the drop to separate from the pipette tip.

Working volume

Capacity of the labware. The working volume is calculated from the filling volume minus the volume of the immersed pipette tip. The epMotion fills the labware up to the working volume.

Worktable

epMotion work surface. Labware and tools are placed on the work surface. The worktable is represented in the epBlue software.

Worktable light

Illuminates the work surface of the epMotion.

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