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epMotion® 96
epMotion® 96xl

Operating manual

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1 Operating instructions

1.1 Using this manual

- Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- This operating manual is part of the product. Thus, it must always be easily accessible.
- Enclose this operating manual when transferring the device to third parties.
- You will find the current version of the operating manual for all available languages on our website under www.eppendorf.com/manuals.

1.2 Danger symbols and danger levels

1.2.1 Danger symbols

The safety instructions in this manual have the following danger symbols and danger levels:

	Biohazard		**Electric shock**
	Risk of crushing		**Hazard point**
	Material damage		

1.2.2 Danger levels

DANGER	*Will* lead to severe injuries or death.
WARNING	*May* lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 Symbols used

Depiction	Meaning
1. 2.	Actions in the specified order
▸	Actions without a specified order
•	List
Text	Display text or software text
ⓘ	Additional information

2 Safety

2.1 Intended use

The semi-automated pipetting system (including device, accessories, consumables and software) is designed for use in laboratories for research and development, for industrial and routine work as well as for training and education. Areas of application include, among others, life sciences, biotechnology or chemistry.

The epMotion 96 semi-automated pipetting system covers a volume range from 0.5 µL to 300 µL. The epMotion 96xl pipetting system covers a volume range from 5 µL to 1000 µL.

The pipetting system complies with the requirements of the EU directives and standards specified in the declaration of conformity. The product is for research use only and not approved by the FDA.

The pipetting system is intended exclusively for indoor use and may only be operated by qualified personnel with appropriate training.

2.2 Warnings for intended use

CAUTION! Poor safety due to incorrect accessories and spare parts.
The use of accessories and spare parts other than those recommended by Eppendorf may impair the safety, functioning and precision of the device. Eppendorf cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment.

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

NOTICE! Spilled liquid can cause damage to the device.

- Switch off the device.
- Disconnect the mains/power plug.
- Collect the spilled liquid. Observe the specifications for the liquid in the material safety data sheets.

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

- When handling infectious liquids and pathogenic germs, observe the national regulations, the biological safety level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- Wear your personal protective equipment.
- Consult the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, in its respectively current valid version).

2.3 Warning signs on the device

Warning symbol	Meaning
	Read the operating manual

2.4 User profile

The device and accessories may only be operated by trained and skilled personnel.

Before using the device, read the operating manual carefully and familiarize yourself with the device's mode of operation.

2.5 Information on product liability

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

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables which are not recommended by Eppendorf.
- The device is maintained or repaired by people not authorized by Eppendorf.
- The user makes unauthorized changes to the device.

3 Product description

3.1 Delivery package

Quantity	Description
1	Semi-automatic pipetting unit
1	Loading frame
1	Adapter for 384-well plate
1	Mains/power cord
1	Operating manual
1	Tool for docking station
1	Certificate of conformity

3.2 Features

The epMotion 96 is a semi-automatic pipetting unit for aspirating, dispensing or mixing liquids. The pipetting device has 96 individual channels for pipette tips. This allows filling of a 96-well plate in one step or a 384-well plate in four steps. The plates must be positioned manually.

A software is used to set, control and monitor the aspiration and dispensing of the liquids. The software is installed on a commercially available **iPod touch**.

The iPod touch communicates with the pipetting device via a wireless connection. The wireless connection does not require the iPod to be placed inside the docking station. The docking station is only used for charging the iPod touch.

The iPod touch is not included in the delivery package of the epMotion 96.

3.3 Product overview

3.3.1 epMotion 96 – epMotion 96xl

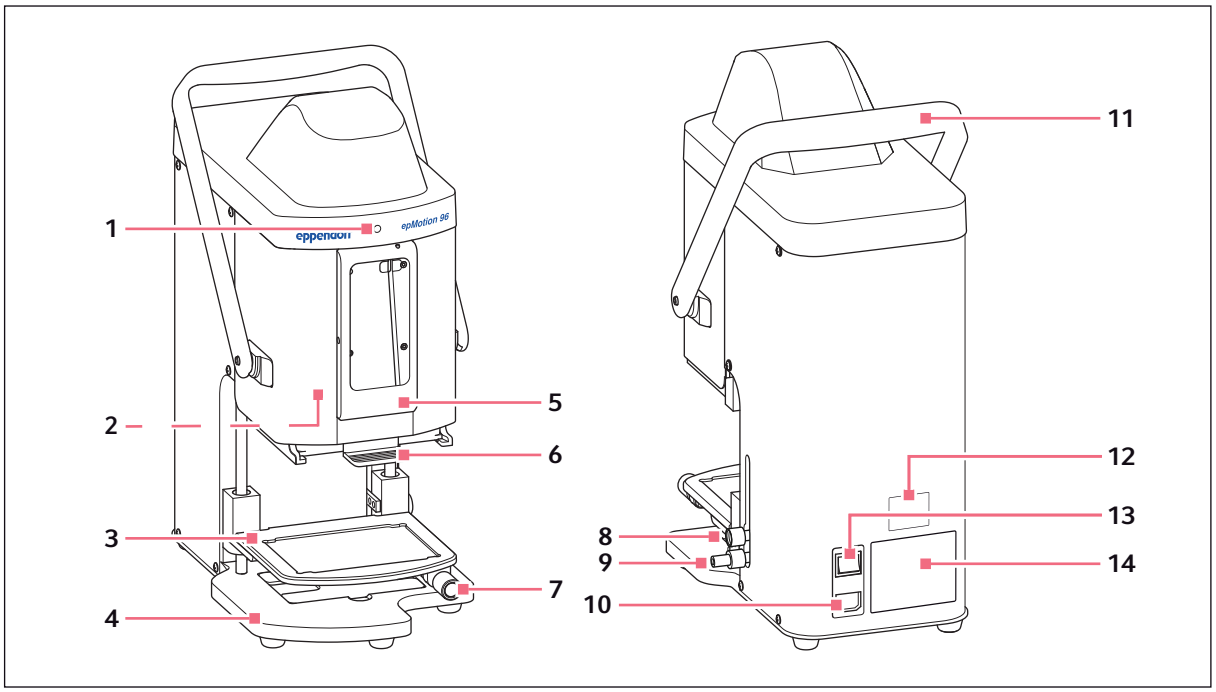


Fig. 3-1: Front view and rear view

1 Status lamp
Green - pipetting device is ready
Blue - pipetting device is working
Red - pipetting device has stopped and is waiting for confirmation

2 Switch for firmware update

3 Lifting table

4 Base
With adapter for 384-well plate

5 Docking station
For Apple iPod touch

6 Loading frame
For tray with epT.I.P.S. Motion Reloads

7 Locking handle
Fixing the lifting table in the working position

8 Locking handle
Fixing the upper stop for the lifting table
Fixing the stop for automatic dispensing

9 Locking handle
Fixing the lower stop for the lifting table

10 Mains/power connection
With bracket for micro fuses

11 Lever
For locking or unlocking the loading frame

12 Network name plate

13 Mains/power switch On/Off

14 Name plate

3.3.2 epMotion 96 and epMotion 96xl with 2-position slider

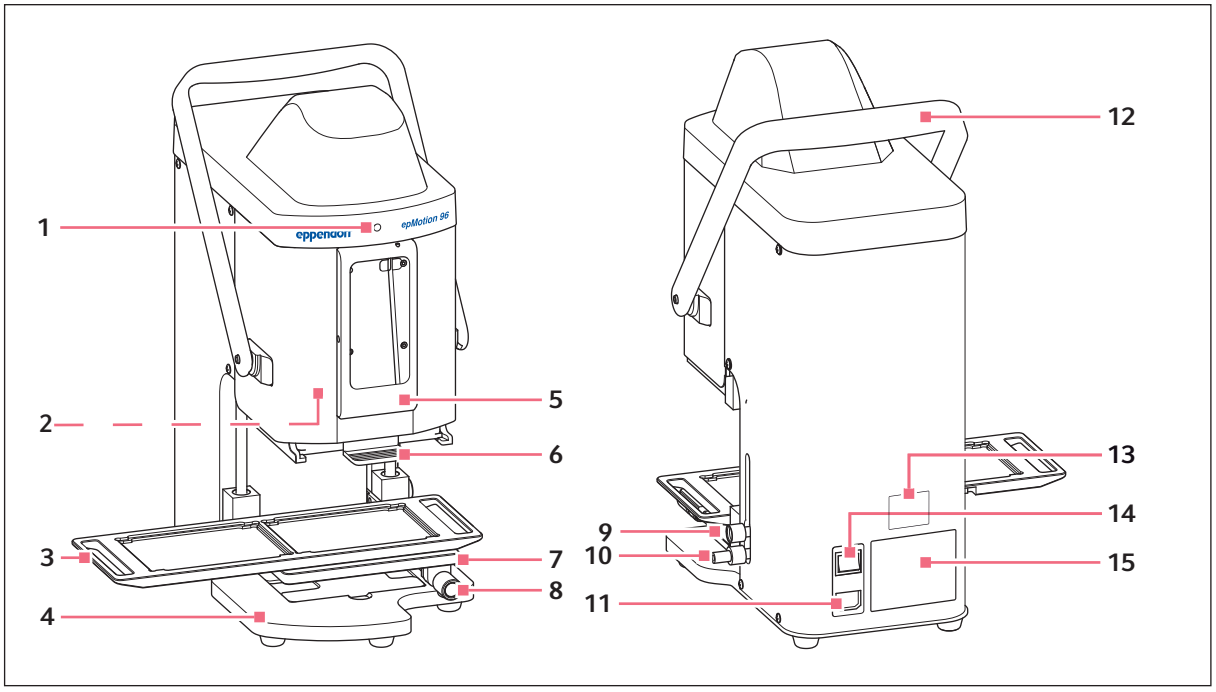


Fig. 3-2: Front view and rear view

1 Status lamp
Green - pipetting device is ready
Blue - pipetting device is working
Red - pipetting device has stopped and is waiting for confirmation

2 Switch for firmware update

3 2-position slider

4 Base
With adapter for 384-well plate

5 Docking station
For Apple iPod touch

6 Loading frame
For tray with epT.I.P.S. Motion Reloads

7 Lifting table

8 Locking handle
Fixing the lifting table in the working position

9 Locking handle
Fixing the stop for the lifting table
Fixing the stop for automatic dispensing

10 Locking handle
Fixing the lower stop for the lifting table

11 Mains/power connection
With bracket for micro fuses

12 Lever
For locking or unlocking the loading frame

13 Network name plate

14 Mains/power switch On/Off

15 Name plate

3.3.3 Docking station

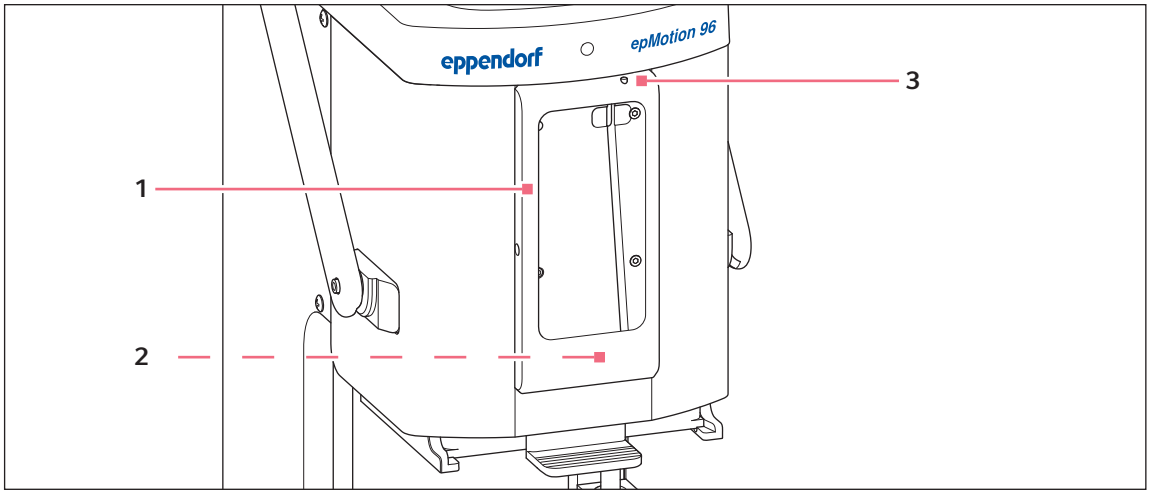


Fig. 3-3: Docking station with frame

1 Frame
Fixing the iPod

2 Port for iPod touch
For model numbers A1421, A1509 or A1574

3 On/Off switch and standby switch

3.3.4 Switch for firmware update

The switch is only required for updating the pipetting system firmware.

If the position is activated, the current firmware will be deleted and need to be reinstalled!

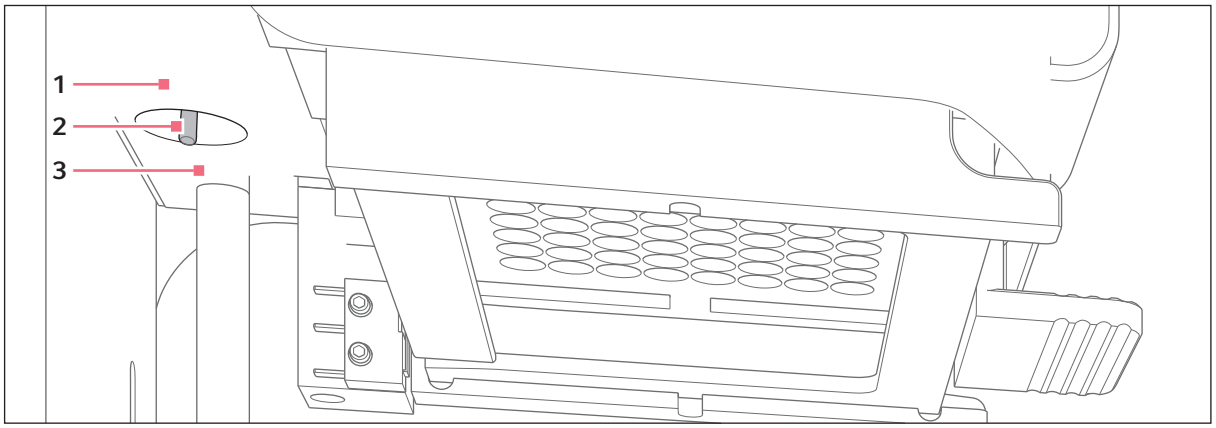


Fig. 3-4: Switch for firmware update

1 ***LOAD*** **position**
Switch is active

2 **Switch**

3 ***RUN*** **position**
Switch is inactive

3.3.5 Lifting table

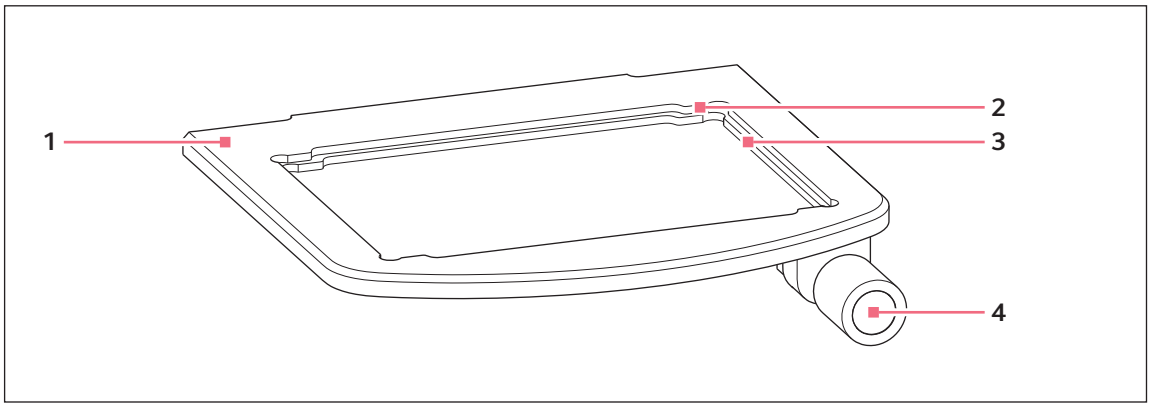


Fig. 3-5: Lifting table

1 **Lifting table**

2 **Finger hole for 384-well- plate**
Use 384-well plate only with adapter

3 **Finger hole for 96-well plate**

4 **Locking handle**

3.3.6 Lifting table with 2-position slider

The source vessel and the destination vessel can be positioned on the lifting table at the same time. The 2-position slider can be moved forwards and backwards horizontally on the lifting table.

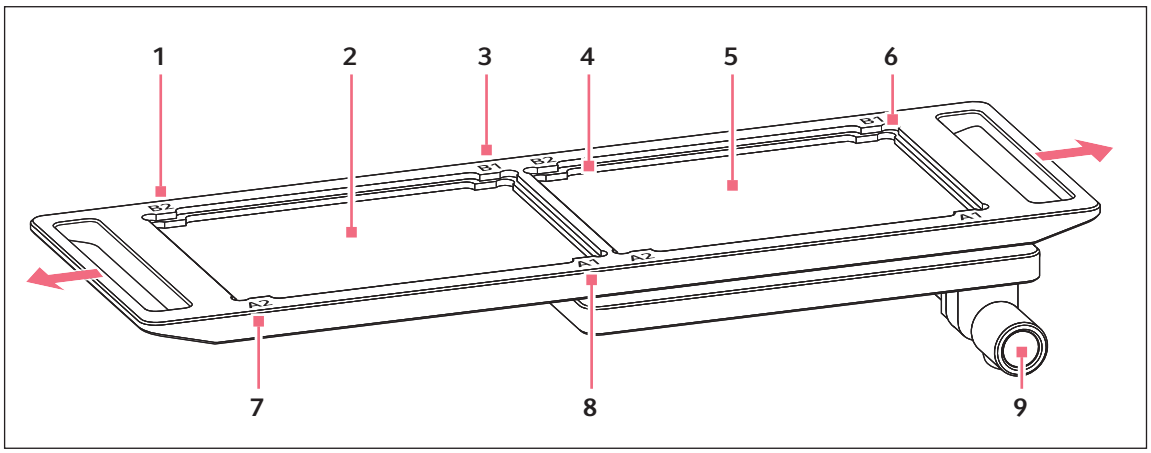


Fig. 3-6: 2-position slider

1 **B 2**
Position markings for 384-well plate (matches the B2 well)

2 **Position for source vessel**

3 **B 1**
Position markings for 384-well plate (matches the B1 well)

4 **Finger hole for 96-well plate**

5 **Position for destination vessel**

6 **Finger hole for 384-well- plate**
Use 384-well plate only with adapter

7 **A 1**
Position markings for 384-well plate (matches the A1 well)

8 **A 2**
Position markings for 384-well plate (matches the A2 well)

9 **Locking handle**

3.3.7 Adapter for 384-well plate

The adapter is inserted into the finger hole in the lifting table. It can be used to insert a 384-well plate and to fill it completely in 4 steps.

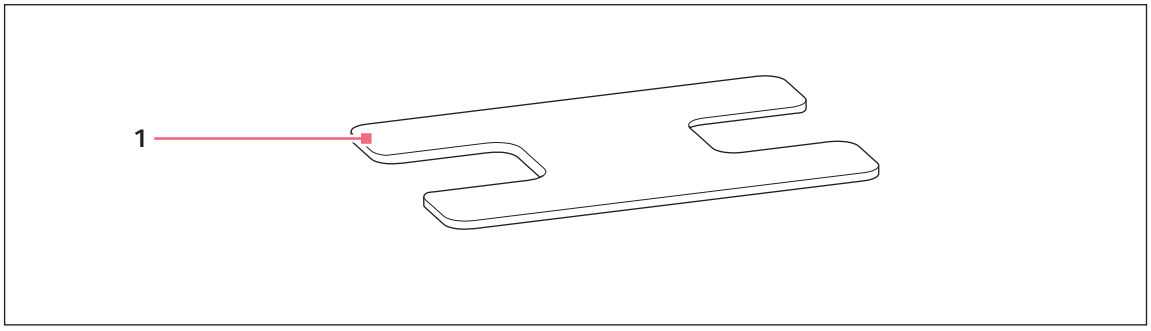


Fig. 3-7: Adapter

1 Adapter
Lifting table insert for 384-well plates

3.3.8 Loading frame

A tray with 96 pipette tips is inserted into the loading frame. The software detects the size that has been inserted from the coding of the trays.

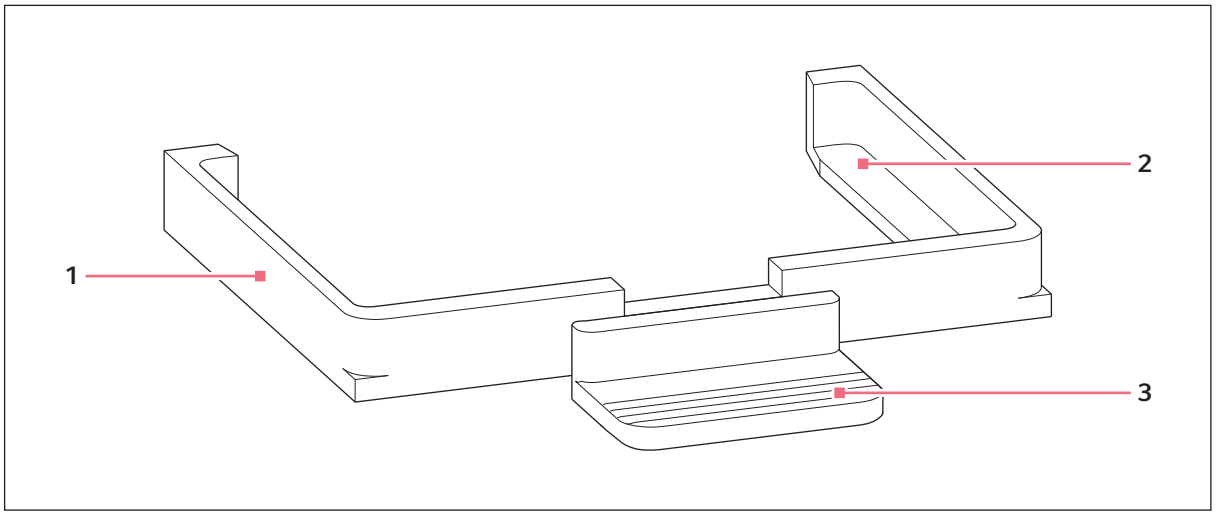


Fig. 3-8: Loading frame

1 Loading frame

2 Holder for tray with pipette tips
epMotion 96: epT.I.P.S. Motion Reloads
50 µL or 300 µL
epMotion 96xl: epT.I.P.S. Motion Reloads
300 µL or 1000 µL

3 Handle

3.4 Pipette tips

We recommend using epT.I.P.S. Motion Reloads. The pipette tips are available with various degrees of purity, with and without filters. The system can recognize the size of the pipette tip from the coding on the tray.

NOTICE! Damage to the device due to incorrectly equipped trays.
The device detects the tip size from the coding of the tray. Incorrect equipping of the trays can lead to contamination of the pipetting head.

- Only use trays that were equipped by the manufacturer.
- Do not equip the trays manually.
- Only use the recommended pipette tip sizes.

NOTICE! Dispensing error due to incorrect handling of pipette tips.
Tips become deformed and change size during autoclaving.

- Do not autoclave pipette tips. Use pipette tips specified as Sterile, if necessary.
- Do not stack racks that contain pipette tips.

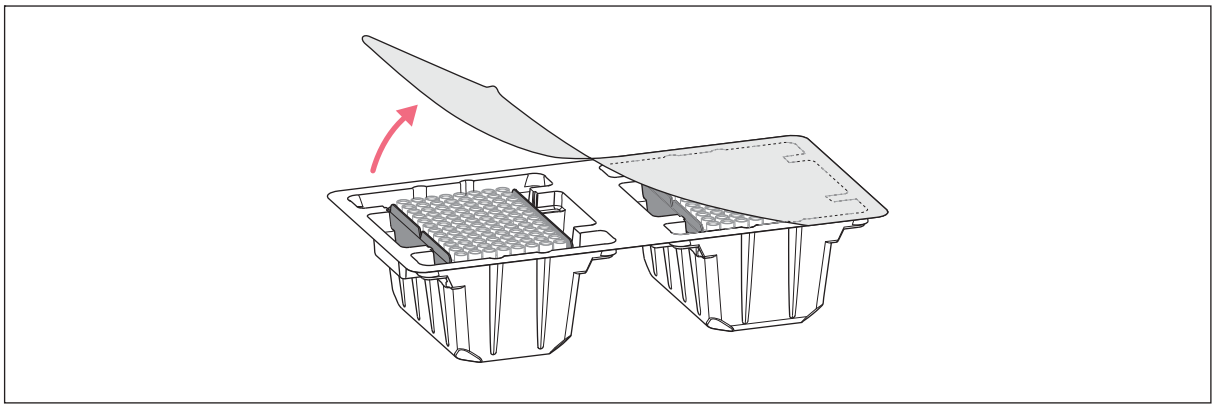


Fig. 3-9: Pipette tips in the tray – epT.I.P.S. Motion Reloads

3.4.1 Pipette tips for epMotion 96

NOTICE! Damage to the device due to incorrect size of pipette tips.
A tray with pipette tips which are smaller than 50 µL will cause damage to the device. Excess liquid enters the dispensing head, damages the mechanism and leads to measurement errors.

- Use trays with pipette tips of the sizes 50µL or 300 µL only.
- If any liquid has entered the device, switch off the device.
- Contact the authorized Service.

Pipette tip	Sizes	Use	Plate depth for liquid aspiration
epT.I.P.S. Motion Filter Reloads	50 µL	Liquids that require the pipette to be protected from contamination by aerosols.	max. 37 mm
	300 µL		max. 34 mm
epT.I.P.S. Motion Reloads	50 µL	Liquids without any special risks.	max. 37 mm
	300 µL		max. 34 mm

3.4.2 Pipette tips for epMotion 96xl

Pipette tip	Sizes	Use	Plate depth for liquid aspiration
epT.I.P.S. Motion Filter Reloads	300 µL	Liquids that require the pipette to be protected from contamination by aerosols.	max. 34 mm
	1000 µL		max. 75 mm
epT.I.P.S. Motion Reloads	300 µL	Liquids without any special risks.	max. 34 mm
	1000 µL		max. 75 mm

3.5 Plates

Plate	Size	Use
Microplate	96 or 384 wells	Preloading and aspirating liquids (e.g. assays for plate reader)
Deepwell plate	96 or 384 wells	Preloading and aspirating liquids (e.g. for culturing organisms | cell cultures)
PCR plate	96 or 384 wells	Preloading and aspirating liquids (e.g. for PCR applications)
Reservoir	1, 8, or 12 chambers	Preloading liquids

3.6 Name plate

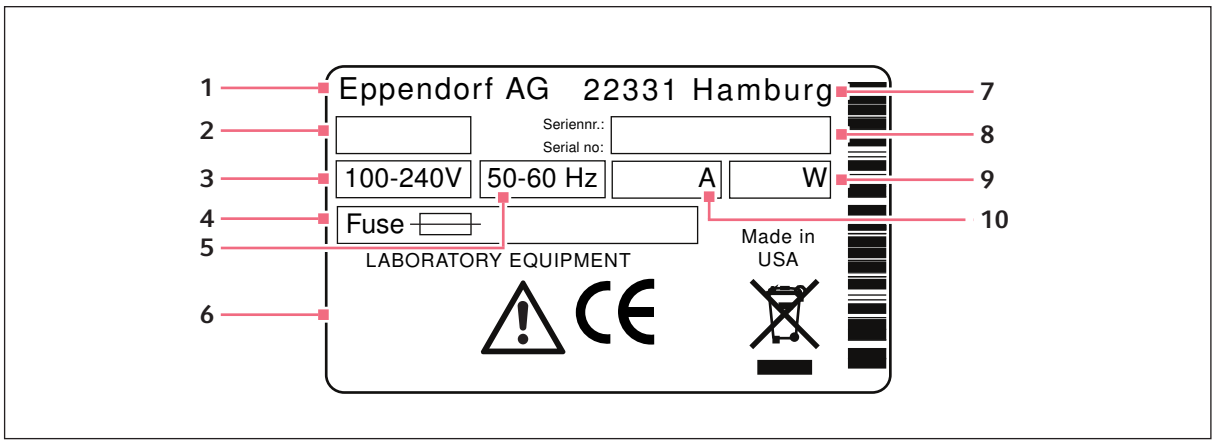


Fig. 3-10: Name plate

1 Manufacturer
2 Device ID
3 Voltage
4 Micro fuse
5 Frequency
6 Labeling and approvals
7 Address of manufacturer
8 Serial number
9 Power consumption
10 Current consumption

3.6.1 Network name plate

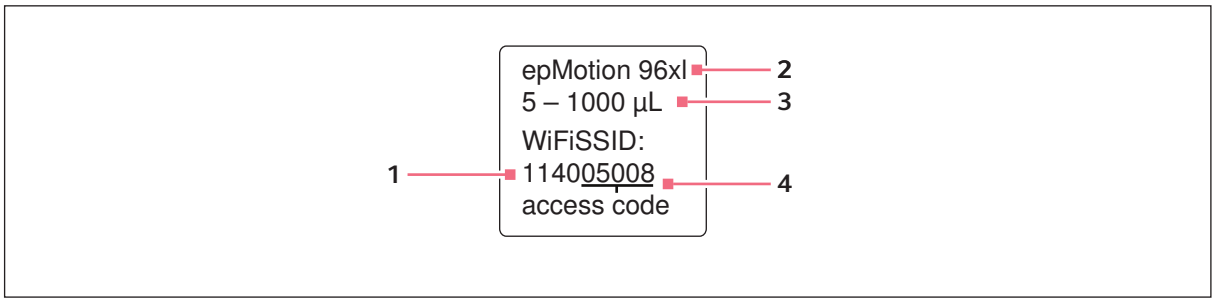


Fig. 3-11: Label with network name

1 Network name
SSID - Service Set Identifier
2 Device type
3 Nominal volume
4 Access code

4 Installation

4.1 Preparing installation

CAUTION! Risk of injury from lifting and carrying heavy loads.
The device is heavy. Lifting and carrying the device can lead to back injuries.

- Only lift and transport the device with a sufficient number of helpers.
- Use a transport aid for transporting the device.

Keep the packaging and the transport securing devices for later transport or storage.

Do not operate the device if there is visible damage to the device itself and/or to its packaging.

1. Check the packaging for damage.
2. Carefully remove the device from the packaging.
3. Check that everything is included in the delivery.
4. Check the device for damage.

4.1.1 Complaints about damages

- Contact customer service.

4.1.2 Incomplete delivery

- Contact customer service.

4.2 Selecting the location

Select the location for the device according to the following criteria:

- Mains/power connection in accordance with the name plate.
- A bench with a horizontal and even work surface which is designed to support the weight of the device.
- A mat or table that is cushioned against vibrations.
- The location is protected from direct sunlight and drafts.

The mains/power switch and cutting unit of the mains/power line must be easily accessible during operation (e.g., residual current circuit breaker).

4.2.1 epMotion 96 – single lifting table

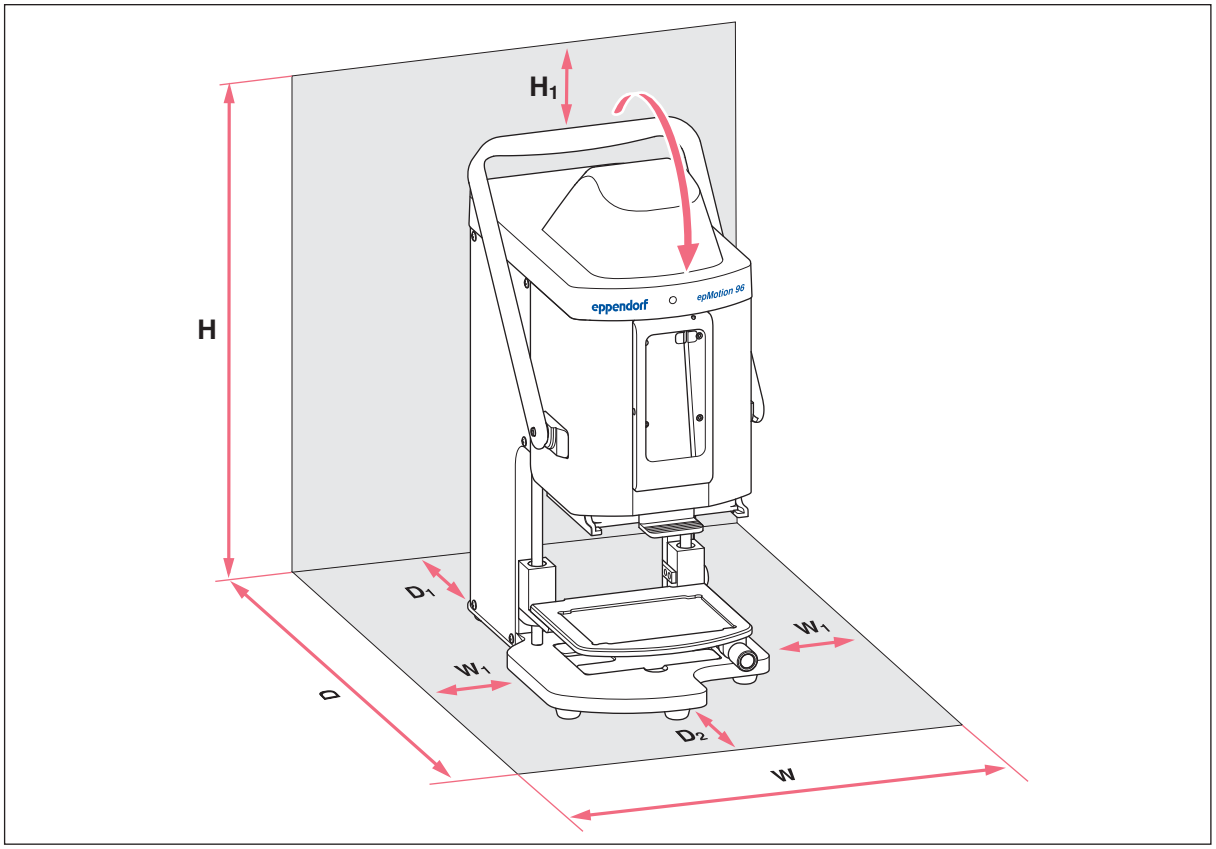


Fig. 4-1: Footprint of an epMotion 96 with a single lifting table

W 335 mm
215 + 2 × W_1

W1
60 mm

D 594 mm
344 + D_1 + D_2

D1
100 mm

D2
150 mm

H 570 mm
525 + H_1

H1
45 mm

W Width

D Depth

H Height

4.2.2 epMotion 96 – 2-position slider

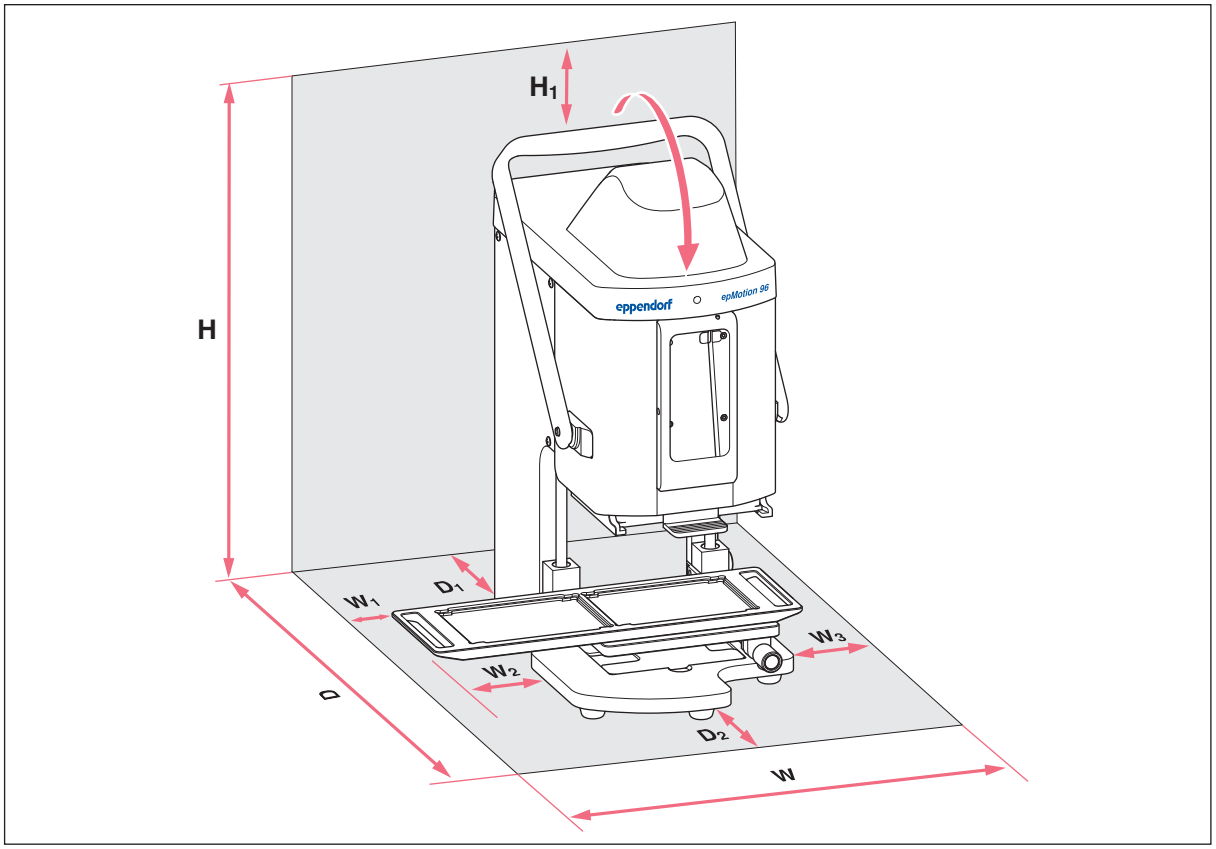


Fig. 4-2: Footprint of an epMotion 96 with 2-position slider

W 601 mm
215 + 2 × W_2

W1
60 mm

W2
133 mm

W3
193 mm
$W_1 + W_2$

D 594 mm
344 + D_1 + D_2

D1
100 mm

D2
150 mm

H 570 mm
525 + H_1

H1
45 mm

W Width

D Depth

H Height

4.2.3 epMotion 96xl – single lifting table

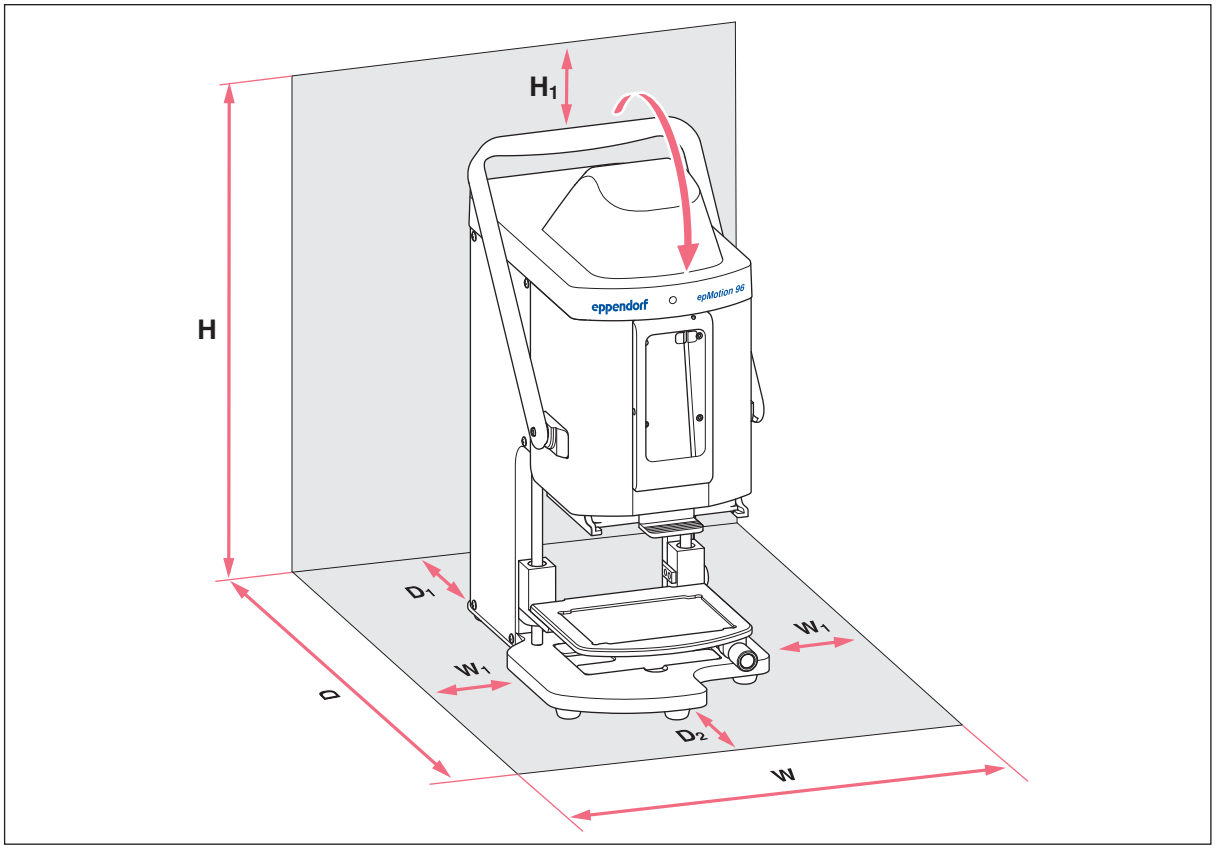


Fig. 4-3: Footprint of an epMotion 96xl with a single lifting table

W 335 mm
215 + 2 × W_1

W1
60 mm

D 594 mm
344 + D_1 + D_2

D1
100 mm

D2
150 mm

H 621mm
576 + H_1

H1
45 mm

W Width

D Depth

H Height

4.2.4 epMotion 96xl – 2-position slider

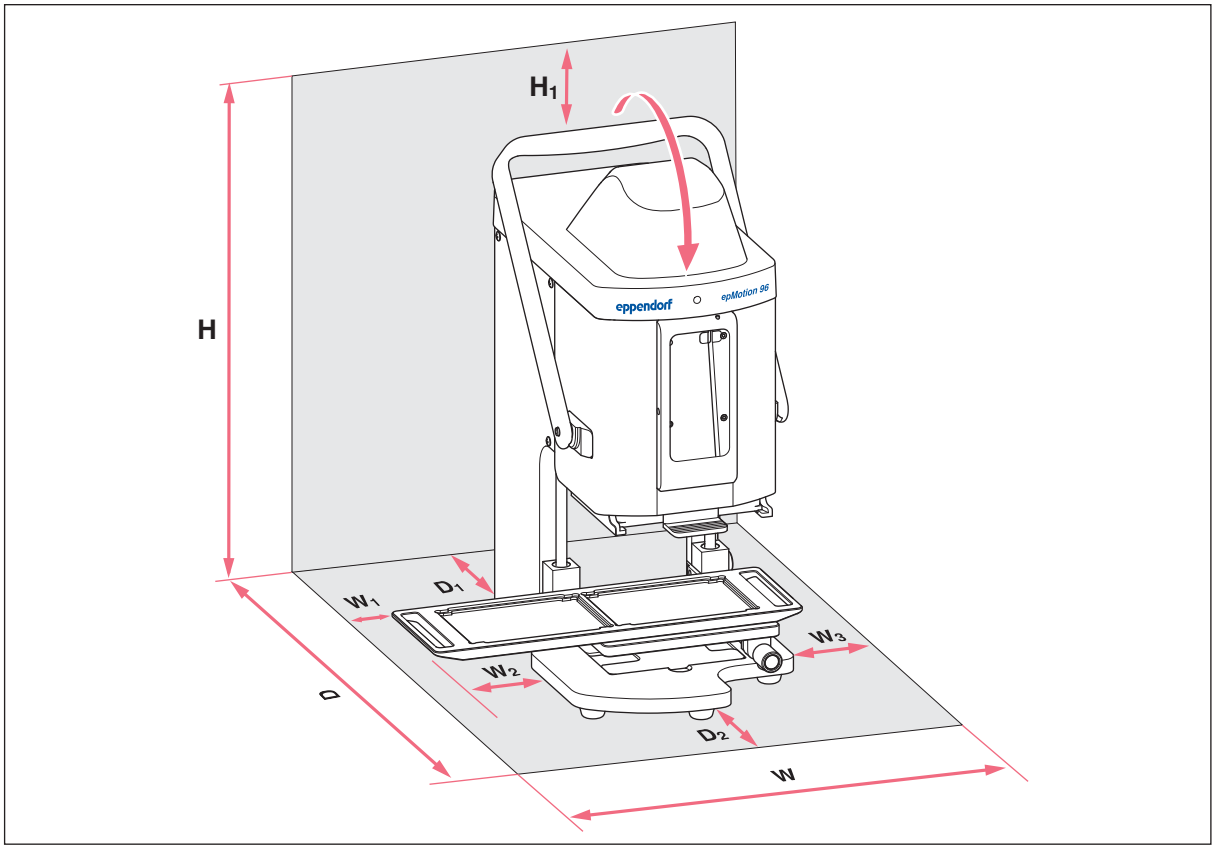


Fig. 4-4: Footprint of an epMotion 96xl with 2-position slider

W 601 mm
215 + 2 × W_2

W1
60 mm

W2
133 mm

W3
193 mm
$W_1 + W_2$

D 594 mm
344 + D_1 + D_2

D1
100 mm

D2
150 mm

H 621mm
576 + H_1

H1
45 mm

W Width

D Depth

H Height

4.3 Connecting the device

WARNING! Risk from incorrect voltage supply.

- Only connect the device to voltage supplies which correspond with the electrical requirements on the name plate.
- Only use sockets with a protective earth (PE) conductor and a suitable mains/power cord.

WARNING! Electric shock due to damage to device or mains/power cord.

- Only switch on the device if the device and the mains/power cord are undamaged.
- Only use devices that have been properly installed or repaired.
- In case of danger, disconnect the device from the mains supply. Disconnect the mains/power plug from the device or the earth/grounded socket. Use the isolating device intended for this purpose (e.g., the emergency switch in the laboratory).

NOTICE! Damage to electronic components due to condensation.
Condensate can form in the device after it has been moved from a cool environment to a warmer environment.

- After installing the device, wait for at least 12 h. Only then connect the device to the mains/power line.

Prerequisites

- The device is switched off.
- Electrical connection data according to the name plate.

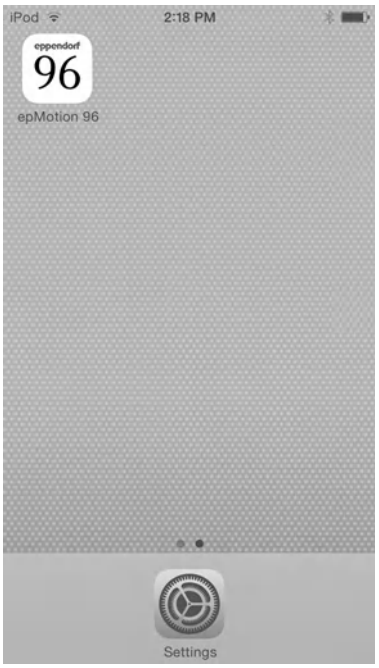
- Plug in the power cable supplied with the device.

4.4 Installing the software

The epMotion 96 software can be installed directly via the iPod. To do this, the iPod needs to be connected to the internet using a wireless connection. Alternatively, the software may be installed using a USB connection with the computer and the iTunes program.

Prerequisites

- Apple iPod touch with model number A1421, A1509 or A1574 is available.
- iOS 7.0 or higher is installed on the device.
- An Apple Store account is available.
- An internet connection is established.



1. Start the *App Store*.
2. Enter epMotion 96 into the search field.
3. Select free download.
4. Select installation.
5. Enter the Apple ID password.
   The epMotion 96 icon is shown on the display.

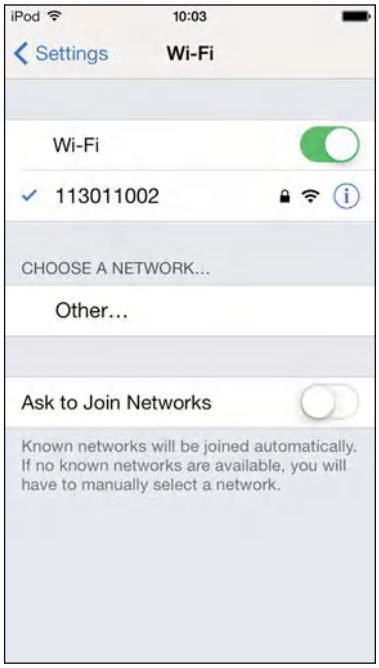
4.5 Setting up the iPod

The iPod needs to be set up once for the wireless connection to the pipetting device. This requires entering the network name and a password.

4.5.1 Activating the wireless connection

Prerequisites

- The device is switched on.
- Network name (see network name plate).

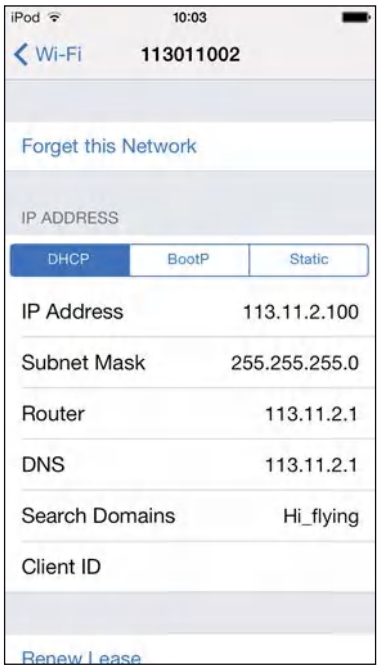


1. Open the *Settings* menu.
2. Select the *Wi-Fi* menu item.
3. Tap the *Wi-Fi* switch and move it to the right.
   The switch is now displayed in green.
   The wireless connection is activated.
   The available networks are displayed.
4. Select the network name of the pipetting device.
5. In order to close the *Settings* menu, tap the *Home* button.

4.5.2 Configuring the network

Prerequisites

- Network name (see network name plate).
- Wireless connection is activated.



1. Open the *Settings* menu.
2. Select the network for the pipetting device.
3. Select *DHCP* mode.
   The network data is set automatically.
4. Enter the last 5 digits of the network name as the password.
   The status bar indicates the wireless connection.
   The network connection is established automatically.

4.5.3 Deactivating the automatic display deactivation

The iPod automatically switches off the display. This function can be deactivated for the operation of the device.

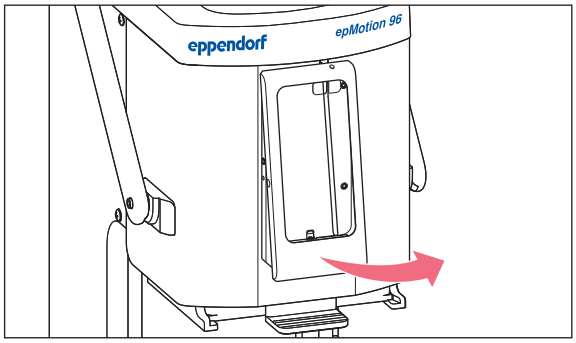
1. Open the *Settings* menu.
2. Select the *General* menu.
3. Select *Auto-Lock* and choose the setting *Never*.

4.6 Placing the iPod in the docking station

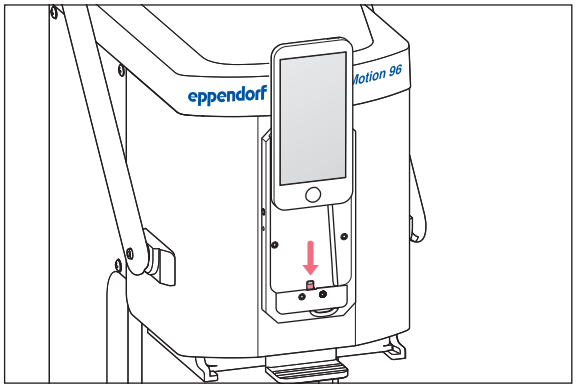
Once placed into the docking station, the iPod's battery is charged automatically. Data connection and data transmission is through a wireless connection.

Prerequisites

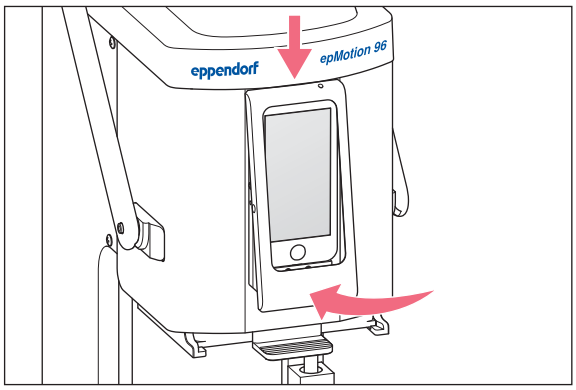
- The tools for the docking station are available.



1. Remove the screws from the frame.
2. Remove the frame.



3. Insert the iPod straight from the top and push it onto the connector.
4. Attach the frame.



5. Attach the frame.
6. Insert and tighten the screws.
   The iPod is charged via the docking station.
   The iPod is protected against theft.

5 Software

5.1 Touchscreen

Selecting a mode, setting parameters and executing functions is done via the touchscreen. Set parameters are displayed in the corresponding status fields.

5.1.1 Layout of the touchscreen

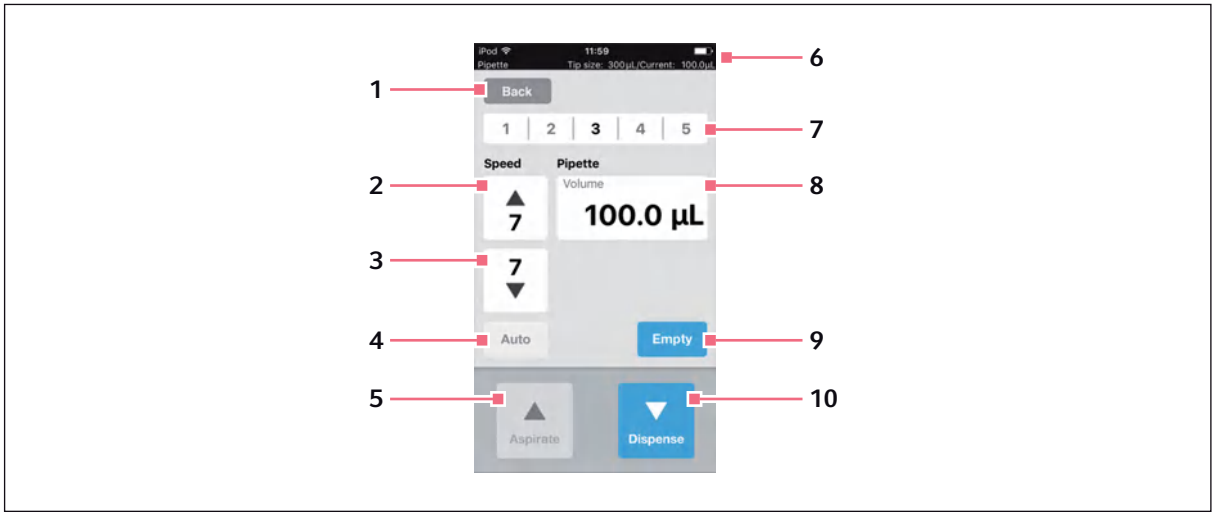


Fig. 5-1: Layout and elements of the touchscreen – example mode *Pipette*

1 ***Back*** **button**
Selects the previous view

2 **Speed for liquid aspiration**
Levels 1 – 9

3 **Speed for liquid dispensing**
Levels 1 – 9

4 **Function for automatic pipetting**

5 ***Aspirate*** **button**
Aspirating liquid

6 **Status line**
Wireless connection, time, battery life operating mode, size of the pipette tips, current volume

7 **Saved parameter profile**
Profiles 1 – 5

8 **Parameter**

9 ***Empty*** **button**
Empty pipette tips

10 ***Dispense*** **button**
Dispense liquid

5.2 Overview of the operating modes

There are predefined operating modes available for standard applications.

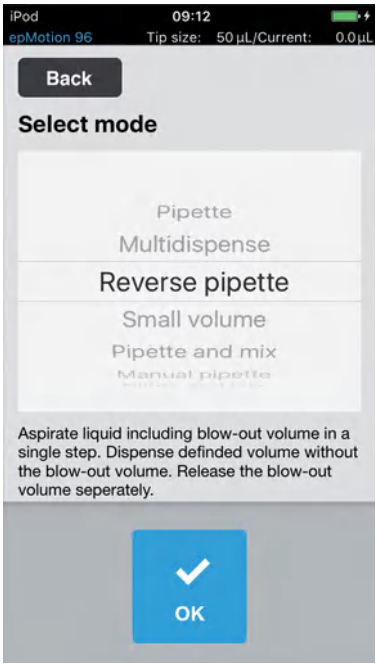


Fig. 5-2: Screen for the selection of the operating mode.

Operating mode	Use
Pipette	Aspirate liquid in one step and dispensing liquid in one step.
Multidispense	Aspirate liquid in one step and dispensing liquid in several steps.
Reverse pipette	Aspirate a larger volume of liquid by using blow out (blow volume). Dispense a defined amount of liquid without blow volume. Dispense the blow volume by separate blow out.
Small volume	Aspiration of a large volume of liquid in the first step, followed by the aspiration of an air gap and then aspiration of the target liquid. When the target liquid is dispensed, the system liquid remains in the tip.
Pipette and mix	Dispense liquid and mix it afterwards.
Manual pipette	Manually determine the liquid volume for aspiration and dispensing.
Dilute and mix	Aspirate a large amount of diluent and a small amount of concentrated liquid. Diluent and concentrated liquid are mixed during aspiration.
Multiaspirate	Aspirate liquid in several steps and dispense liquid in one step.
Run program	Select and run a predefined program run.
Settings	Set the system properties.

5.2.1 Selecting the operating mode

1. Tap on mode selection and scroll up or down through the list.
2. Confirm the mode with *OK*.
   The screen with the selected mode is displayed.

5.3 Operating controls of the software

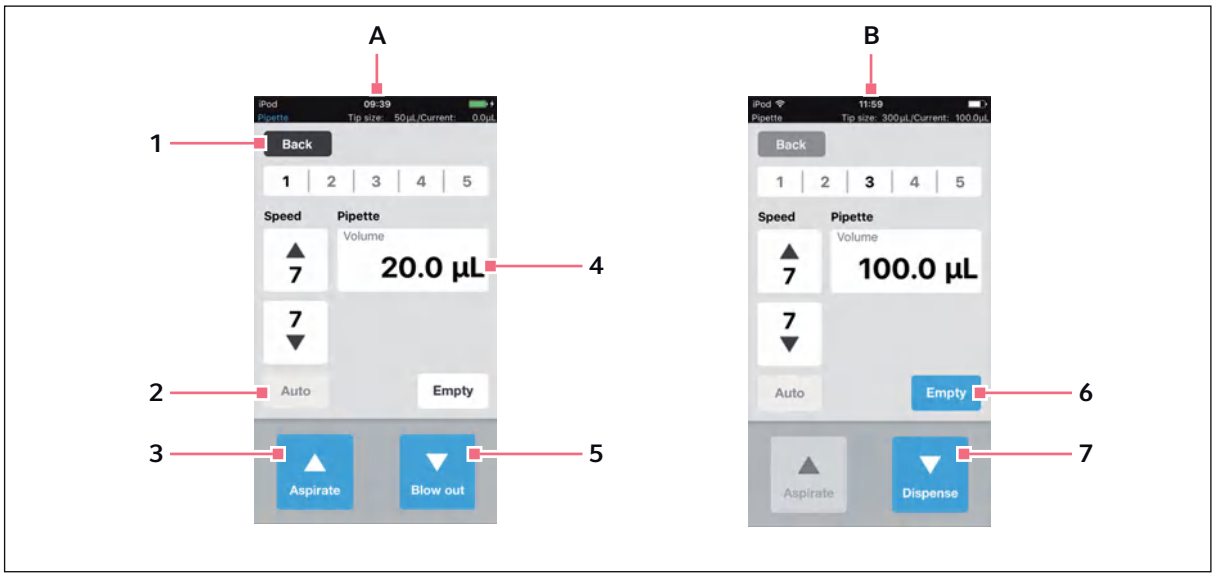


Fig. 5-3: Operating controls of the software

A View after selecting the operating mode

B View after liquid aspiration

1 *Back* button
Active button
Go back to previous view

2 *Auto* button
Inactive button

3 *Aspirate* button
Active button

4 *Volume* parameter
Editable parameter

5 *Blow out* button
Active button

6 *Empty* button
Active button

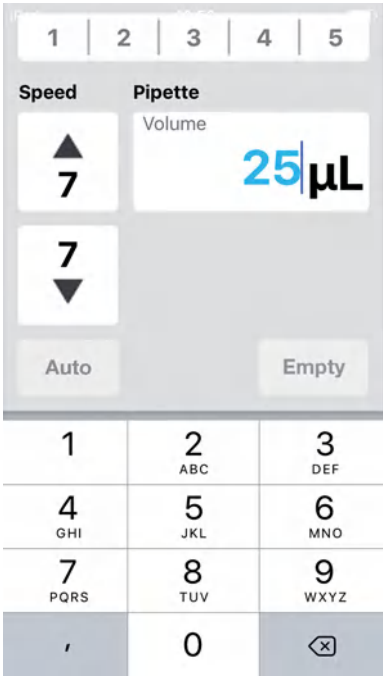
7 *Dispense* button
Active button

5.4 Entering or changing parameters

5 predefined parameter profiles are stored in each operating mode. The parameter profiles can be overwritten with user-specific values and saved.

5.4.1 Changing the parameters

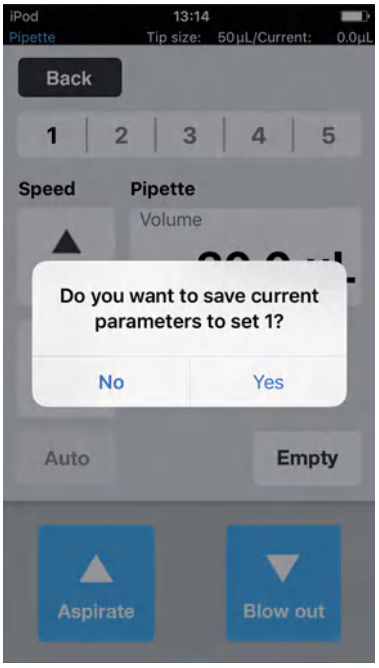
Parameters can be changed using the iPod keypad.



1. Tap the parameter and hold.
   The key pad will fade in.
2. Change the parameter value.
3. Tap on a blank section of the display.
   The keypad is grayed out.
   The changed value is saved.

5.4.2 Saving the parameter profile

Several parameter profiles can be saved in each operating mode.

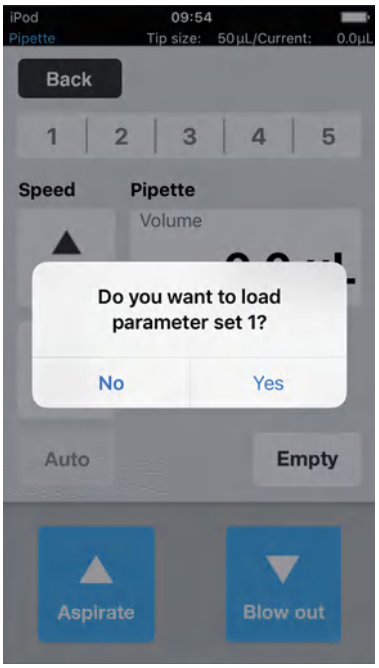


1. Select the mode.
2. Set the parameters for the mode.
3. Tap the the desired number for the parameter profile and keep pressing it.
4. Confirm the prompt with *Yes*.
   The parameter profile is saved.
   The number with the stored parameter profile is displayed in black.

5.4.3 Loading a parameter profile

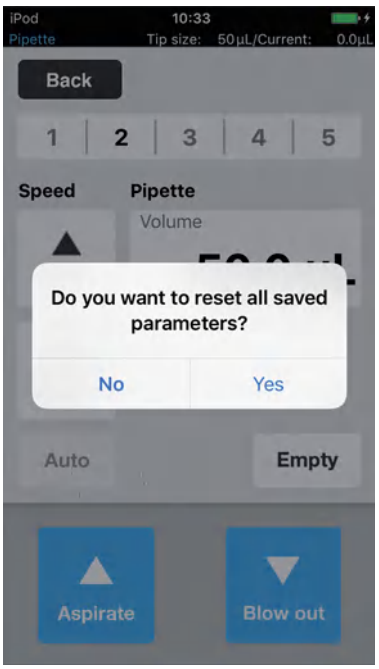
Prerequisites

- A saved parameter profile is available.



1. Tap the number of the parameter profile.
2. Confirm the prompt with *Yes*.
   The parameter profile is loaded and displayed.
   The number of the saved parameter profile is displayed in black.

5.4.4 Resetting all parameter profiles



1. Keep the *Back* key pressed.
2. Confirm the prompt with *Yes*.
   All user-specific changes in this operating mode will be deleted.
   The predefined parameter profiles are available.

6 Operation

6.1 Switching the device on and off

WARNING! Electric shock due to damage to device or mains/power cord.

- Only switch on the device if the device and the mains/power cord are undamaged.
- Only use devices that have been properly installed or repaired.
- In case of danger, disconnect the device from the mains supply. Disconnect the mains/power plug from the device or the earth/grounded socket. Use the isolating device intended for this purpose (e.g., the emergency switch in the laboratory).

6.1.1 Switching the device on

Prerequisites

- There are no pipette tips in the device.

1. Switch on the device at the mains/power switch.

   The device performs a self test.
   The device is ready for operation if the status light is green.
   The iPod touch is charged.
   The software can be started (see p. 38).

6.1.2 Switching the device off

1. Switch off the device at the mains/power switch.
2. Switch off the iPod touch.

   All device components and the docking station are switched off.

6.2 Starting the software

6.2.1 Starting the software

Prerequisites

- The device is switched on.
- The epMotion 96 software is installed.

1. Tap the *epMotion 96* icon.
2. Confirm the start screen with *OK*.
   The operating mode selection is displayed.

6.2.2 Exiting the software

It is not possible to exit the software directly using a button.

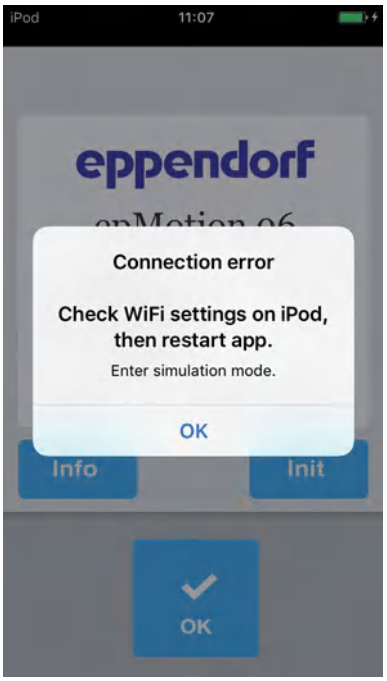
1. Tap the *Home* button of the iPod twice.
2. Tap the software screen and swipe it upwards out of the window.
   The software is exited.

6.2.3 Starting the simulation mode

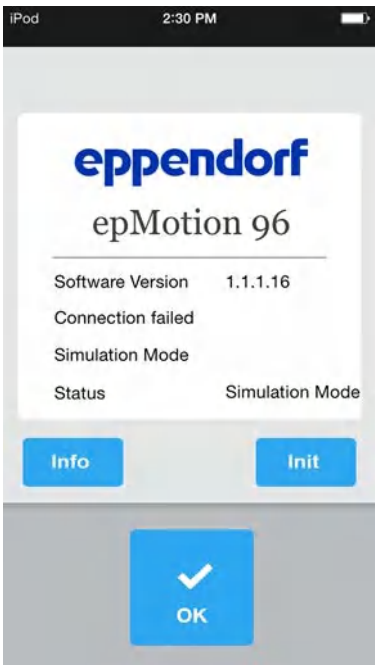
Prerequisites

- The device is switched off.

The software can be started in simulation mode when the device is switched off. All the settings can be viewed and changed. The execution of the modes is not possible.



1. Tap the *epMotion 96* icon.
2. Confirm the error message with *OK*.
   The software starts in simulation mode.
   The *Simulation Mode* mode is displayed.



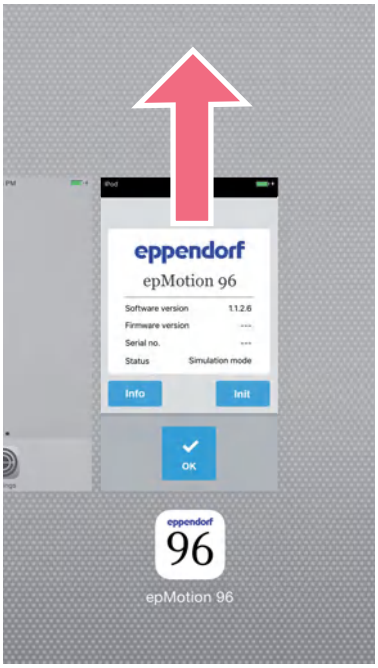
3. Start the simulation mode using *OK*.
   All functions and modes are executable and can be operated.
   There is no wireless connection.
   No data is transferred to the pipetting device.

6.2.4 Changing from simulation mode to work mode

1. Switch on the device.
2. Wait until a wireless connection has been established.
3. Press the *Init* key.
   The simulation mode is exited.
   The *Connected* mode is displayed.

6.2.5 Exiting the simulation mode

It is not possible to exit the software directly using a button.



1. Tap the *Home* button of the iPod twice.
2. Swipe the software screen upwards out of the window.
   The simulation mode is exited.
   The software is exited.

6.3 Inserting pipette tips

CAUTION! Risk of getting caught between lever and housing.
If you grip the lever from the side, your fingers may get caught between the lever and the housing.

- Always grip the lever at the top in the center when locking or unlocking pipette tips.

NOTICE! Dispensing error due to incorrect handling of pipette tips.
Tips become deformed and change size during autoclaving.

- Do not autoclave pipette tips. Use pipette tips specified as Sterile, if necessary.
- Do not stack racks that contain pipette tips.

NOTICE! Damage to the device due to incorrect size of pipette tips.
A tray with pipette tips which are smaller than 50 µL will cause damage to the device. Excess liquid enters the dispensing head, damages the mechanism and leads to measurement errors.

- epMotion 96 – only use trays with 50 µL or 300 µL pipette tips.
- epMotion 96xl – only use trays with 300 µL or 1000 µL pipette tips.
- If any liquid has entered the dispensing head, switch off the device.
- Contact the authorized Service.

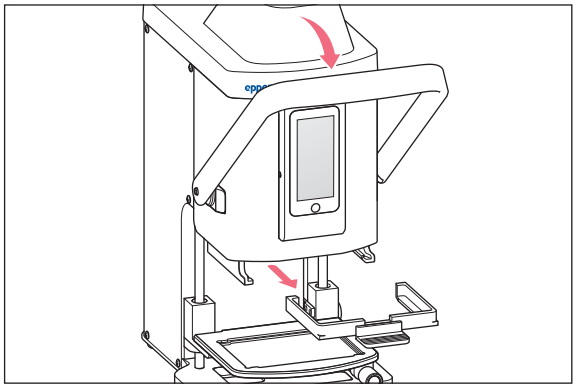
NOTICE! Damage to the device due to incorrectly equipped trays.
The device detects the tip size from the coding of the tray. Incorrect equipping of the trays can lead to contamination of the pipetting head.

- Only use trays that were equipped by the manufacturer.
- Do not equip the trays manually.
- Only use the recommended pipette tip sizes.

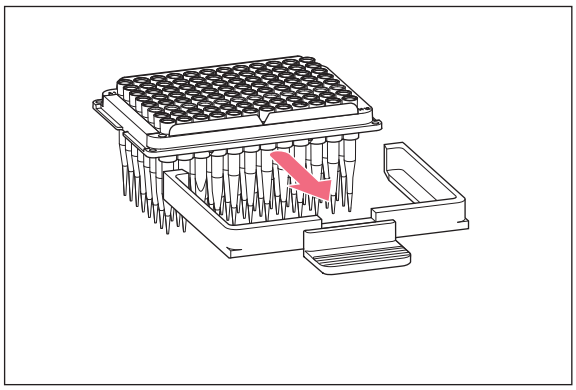
When ejecting the pipette tips, liquid will drip from the pipette tips.
Make sure that the pipette tips are completely empty before replacing them.

Prerequisites

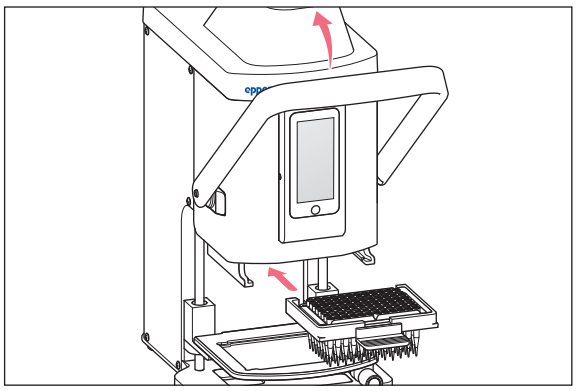
- The lifting table is in the basic position.
- The pipette tips (epT.I.P.S. Motion Reloads) are available.



1. Pull the lever of the pipetting device to the front.
2. Pull out the loading frame.



3. Insert the tray with pipette tips into the loading frame.
   The notch on the tray must point in the direction of the loading frame handle.



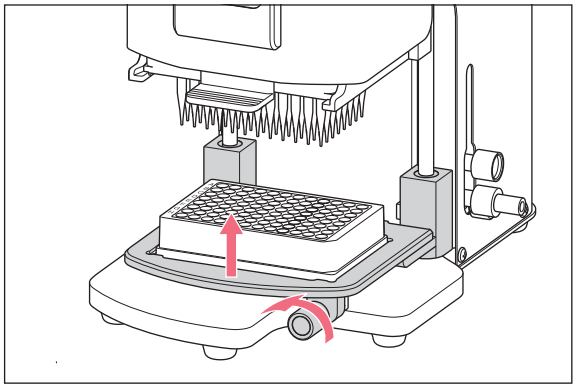
4. Insert the loading frame with the tray into the pipetting unit.
5. Push the lever of the pipetting device backwards.
   The pipette tips are attached and locked.
   The status bar of the software indicates the volume of the pipette tips.

6.4 Moving the lifting table

6.4.1 Moving the lifting table into working position

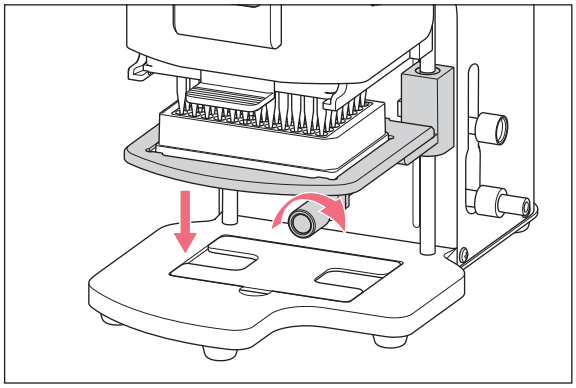
Prerequisites

- The pipette tips are inserted.



1. Loosen the locking handle.
2. Move the lifting table upwards into working position.
3. Tighten the locking handle.
   Liquid can be aspirated.
   Liquid can be dispensed.
   Stop can be set.

6.4.2 Moving the lifting table into the basic position



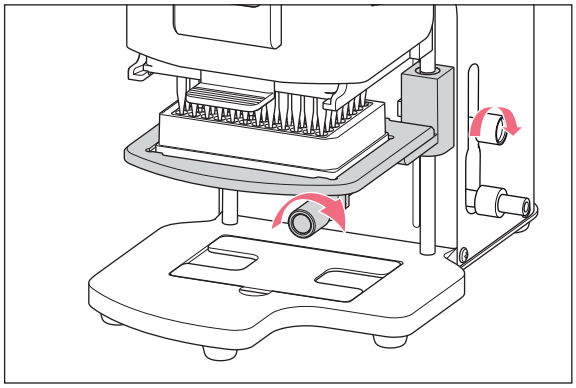
1. Hold the lifting table and loosen the locking handle.
2. Move the lifting table into the basic position.
   Source vessel or destination vessel can be replaced.
   Pipette tips can be inserted.

6.4.3 Setting the upper stop for the lifting table

The stop defines the end position of the lifting table in the working position. It makes sense to use the stop when loading several plates. In the *Multidispense* and *Multiaspirate* modes the stop can be used for the semi-automatic liquid aspiration and liquid dispensing.

Prerequisites

- The stop is in the basic position.



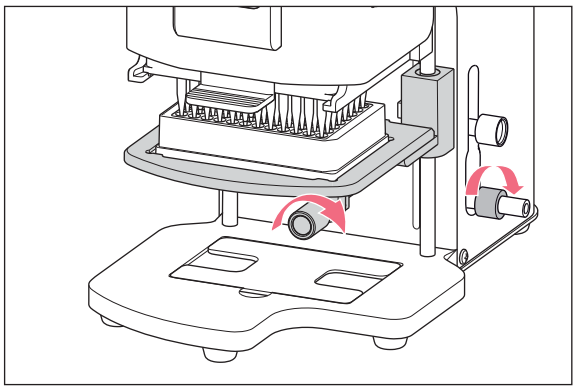
1. Move the lifting table into working position.
2. Tighten the locking handle on the lifting table.
3. Tighten the locking handle for the stop.
   The working position is fixed.

6.4.4 Setting the lower stop for the lifting table

The stop defines the lower end position of the lifting table in the working position. It reduces the traveling distance of the lifting table and thus enables working faster.

Prerequisites

- The stop is in the basic position.

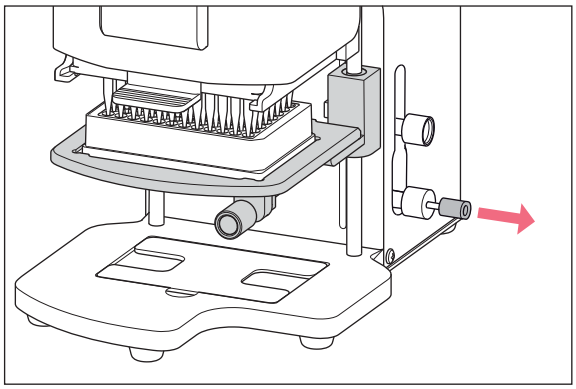


1. Move the lifting table into working position.
2. Tighten the locking handle on the lifting table.
3. Tighten the locking handle for the lower stop.

6.4.5 Unlock the lower stop

Prerequisites

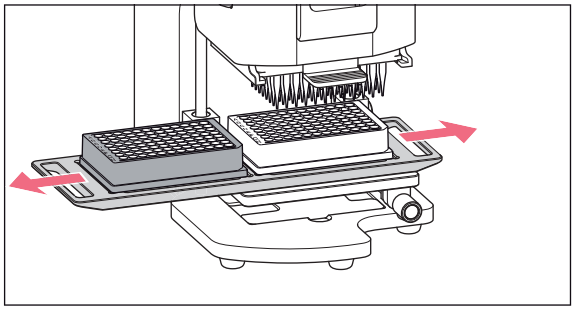
- The lower stop is set.



1. Pull the lock out.
   The lower stop is unlocked.
   The lifting table can be moved in the basic position.

6.5 Moving the 2-position slide

The 2-position slide moves horizontally on the lifting table. A source vessel and a destination vessel can be positioned simultaneously. The handling of the lifting table is identical to that of the lifting table without 2-position slide.



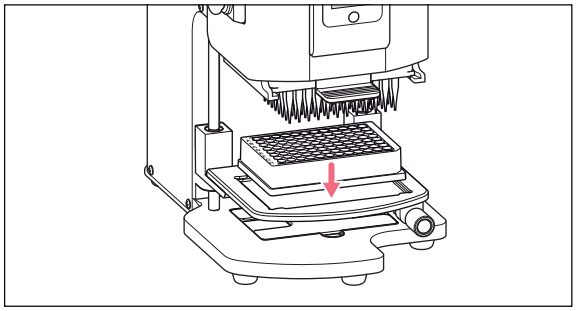
1. Move the 2-position slide over the locking point.
2. Move the 2-position slide horizontally from the source vessel to the destination vessel.
   The 2-position slide engages in the end position.

6.6 Inserting the plate

6.6.1 Inserting a 96-well plate

Prerequisites

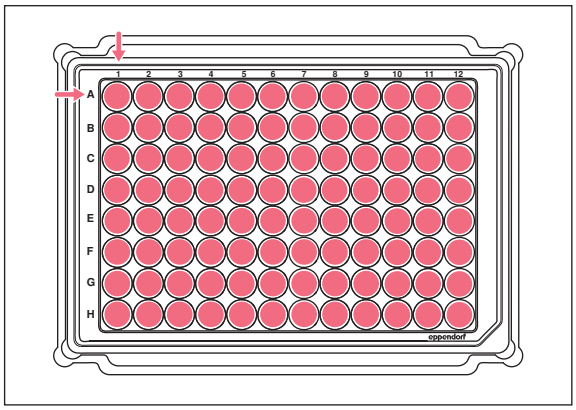
- The lifting table is in the basic position.
- Adapter for 384-well plate is located in the base.



1. Insert the 96-well plate into the lifting table.

6.6.2 Filling the 96-well plate

A 96-well plate can be filled in one step.

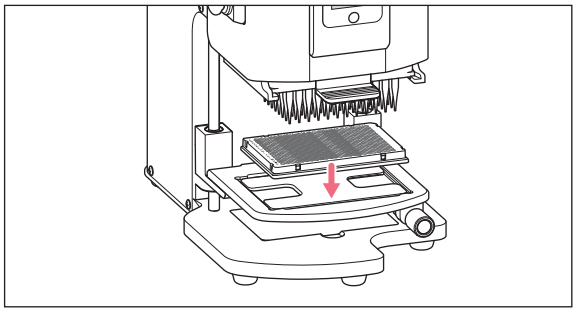


1. Move the lifting table into the working position.
2. Tighten the locking handle.
3. Select the operating mode und fill the plate.

6.6.3 Inserting a 384-well plate

Prerequisites

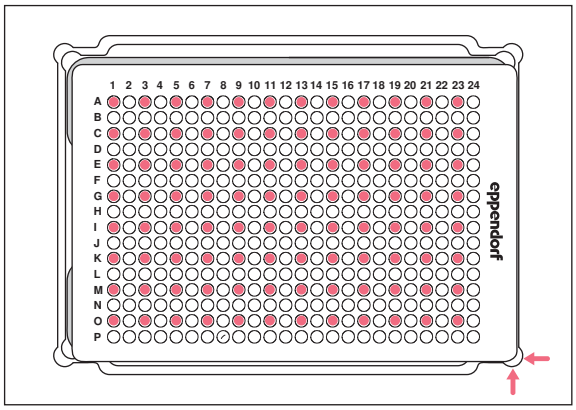
- The lifting table is in the basic position.



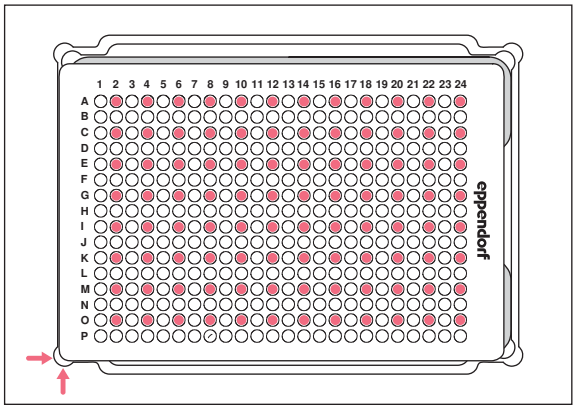
1. Lift the lifting table and take the adapter out of the base.
2. Insert the adapter into the lifting table.
3. Insert the 384-well plate in the lower right-hand corner.

6.6.4 Filling the 384-well plate

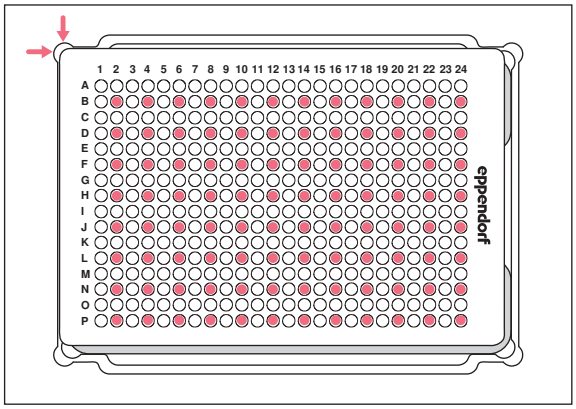
In order to fill a 384-well plate completely, the plate must be positioned consecutively in each corner of the lifting table.



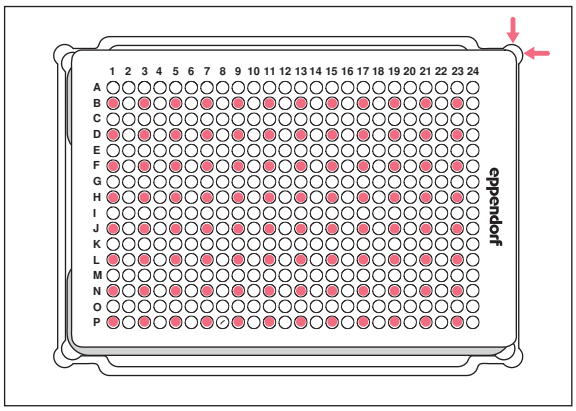
1. Place the 384-well plate in the bottom right position.
2. Move the lifting table into the working position. Every other column (1, 3, 5, ...) and every other row is filled, starting with A1 (A, C, E, ...).



3. Move the lifting table into basic position.
4. Place the 384-well plate in the bottom left position.
5. Move the lifting table into working position. Every other column (2, 4, 6, ...) and every other row is filled, starting with A2 (A, C, E, ...).



6. Move the lifting table into basic position.
7. Place the 384-well plate in the top left position.
8. Move the lifting table into the working position.
   Every other column (2, 4, 6, ...) and every other row is filled, starting with B2 (B, D, F, ...).



9. Move the lifting table into basic position.
10. Place the 384-well plate in the top right position.
11. Move the lifting table into the working position.
    Every other column (1, 3, 5, ...) and every other row is filled, starting with B1 (B, D, F, ...).
    All 384-wells are now filled.

6.7 Aspirating liquid – single lifting table

This chapter describes the general procedure for aspirating liquid. The chapters of the individual operating modes describe the specific work steps for each mode.

Prerequisites

- The device is switched on.
- The software has been started.
- The pipette tips are inserted.

1. Place the source vessel on the lifting table.
2. Select the operating mode.
3. Set the aspiration volume.
4. Move the lifting table into the working position until the pipette tips are immersed into the liquid.
5. Tighten the locking handle on the lifting table.
6. Press *Aspirate*.

   Liquid is aspirated.
   A destination vessel can be filled.

6.8 Dispensing liquid – single lifting table

This chapter describes the general procedure for dispensing liquid. The chapters of the individual operating modes describe the specific work steps for each mode.

Prerequisites

- The lifting table is in the basic position.
- The destination vessel is available.

1. Place the destination vessel on the lifting table.
2. Loosen the locking handle on the lifting table.
3. Move the lifting table into the working position until the openings of the pipette tips are positioned below the rim of the vessel.
4. Tighten the locking handle on the lifting table.
5. Press the *Dispense* button.
6. Loosen the locking handle.
7. Move the lifting table upwards until the pipette tips are immersed in the liquid.
   Adherent liquid droplets are stripped off.
8. Move the lifting table into the basic position.

6.9 Dispensing small liquid volumes – 0.5 µL to 10 µL

Prerequisites

- Pipette tips 50 µL
- A destination vessel with preloaded liquid is available.

When dispensing small amounts of liquid, the sample liquid has to dispensed directly into the preloaded liquid or onto the surface of the liquid. Dispensing into a dry destination vessel is not possible.

1. Fill the pipette tips with sample liquid.
2. Set the dispensing speed to 9.
3. Adjust the height of the lifting table so that the pipette tips touch the liquid in the destination vessel.
4. Dispense the sample liquid into the preloaded liquid.
5. Move the lifting table slowly down.

6.10 Aspirating and dispensing nonaqueous liquids

Nonaqueous liquids have properties that will affect the dispensing result.

Nonaqueous liquids include:

- liquids with a high vapor pressure
- liquids with a low surface tension (e.g., detergents)
- viscose liquids
- suspensions with magnetic particles (beads)

Prerequisites

- The smallest possible size of pipette tips has been selected.

1. Select the *Reverse pipette* operating mode.
2. Pre-wet pipette tips.
3. Set the speed of liquid aspiration to 4.
4. Set the speed of liquid dispensing to 5.
5. Perform liquid aspiration and liquid dispensing quickly.

6.11 Aspirating and dispensing liquid – 2-position slide

This chapter describes the general procedure for aspirating liquid. The chapters of the individual operating modes describe the specific work steps for each mode.

Prerequisites

- The device is switched on.
- The software has been started.
- The pipette tips are inserted.

1. Place the source vessel and the destination vessel on the lifting table.
2. Select the operating mode.
3. Set the aspiration volume.
4. Set the parameters.
5. Move the 2-position slide horizontally and position the source vessel under the pipette tips.
6. Move the lifting table into the working position until the pipette tips are immersed into the liquid.
7. Tighten the locking handle on the lifting table.
8. Press *Aspirate*.

   Liquid is aspirated.
   A destination vessel can be filled.
9. Loosen the locking handle on the lifting table.
10. Move the lifting table into basic position.
11. Move the 2-position slide horizontally and position the destination vessel under the pipette tips.
12. Move the lifting table into the working position until the openings of the pipette tips are positioned below the rim of the vessel.
13. Tighten the locking handle on the lifting table.
14. Press the *Dispense* button.
15. Loosen the locking handle.
16. Move the lifting table upwards until the pipette tips are immersed in the liquid.

    Adherent liquid droplets are stripped off.
17. Move the lifting table into basic position.

6.12 *Blow out* Function – dispensing residual liquid

In the following modes the residual liquid is included in the dispensing volume:
- *Pipette*
- *Pipette and mix*
- *Manual pipette*
- *Dilute and mix*

In the following modes the residual liquid is not included in the dispensing volume:
- *Multidispense*
- *Reverse pipette*
- *Small volume*

Prerequisites
- The *Blow out* button is active (it is displayed instead of *Dispense*).
- A destination vessel is available.

1. Move the lifting table to the operating position and fix it using the locking handle.
2. Press the *Blow out* button.
   Pipette tips are emptied.
3. Strip off any liquid droplets at the pipette tips.
4. Move the lifting table into the basic position.
5. Confirm the prompt with *OK*.

6.12.1 Skipping the *Blow out* function

In the following modes, this function may be canceled or skipped:
- *Pipette*
- *Pipette and mix*
- *Manual pipette*
- *Dilute and mix*

1. Press *Back*.
   Quit method w/o blow out? appears.
2. Confirm with *Yes*.
   Blow out is skipped.
   Residual liquid will not be dispensed into the destination vessel.

6.13 *Empty* Function – dispensing liquid completely

1. Move the lifting table to the operating position and fix it using the locking handle.
2. Press the *Empty* button.
   Pipette tips are emptied completely.

6.14 *Pipette* mode – dispensing liquid

Aspirate liquid in one step and dispense liquid in one step.

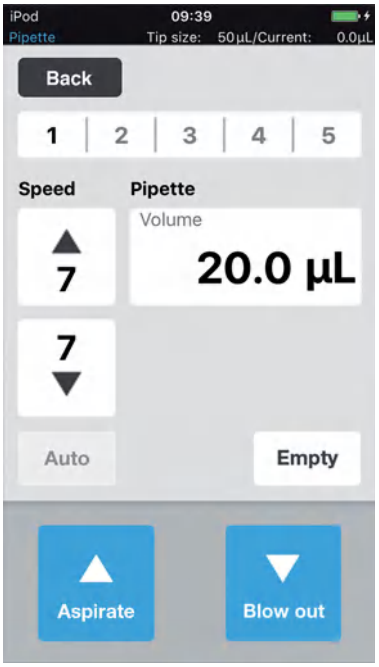


Fig. 6-1: *Pipette* mode

6.14.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Volume	Set the aspiration volume in µL.	0.5 – 300

6.14.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Volume	Set the aspiration volume in µL.	5 – 1000

6.14.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Place the source vessel on the lifting table and move the lifting table into working position.
2. Set the aspiration volume and the speed levels.
3. Press *Aspirate*.

6.14.4 Dispensing liquid

Prerequisites

- Liquid has been aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Press *Dispense*.

6.15 *Multidispense* – multiple dispensing of liquid

Aspirate liquid in one step and dispense liquid in several steps.The *Auto* function activates the automatic dispensing of liquids.

Fig. 6-2: *Multidispense* mode

6.15.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Dispense vol.	Set the dispensing volume in µL.	0.5 – 300
Dispense steps	Set the number of steps for dispensing.	1 – 99

6.15.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Dispense vol.	Set the dispensing volume in µL.	5 – 1000
Dispense steps	Set the number of steps for dispensing.	1 – 99

6.15.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Place the source vessel on the lifting table and move the lifting table into working position.
2. Set the dispensing volume and the number of steps for dispensing.
3. Set the speed levels.
4. Press *Aspirate*.

6.15.4 Dispensing liquid

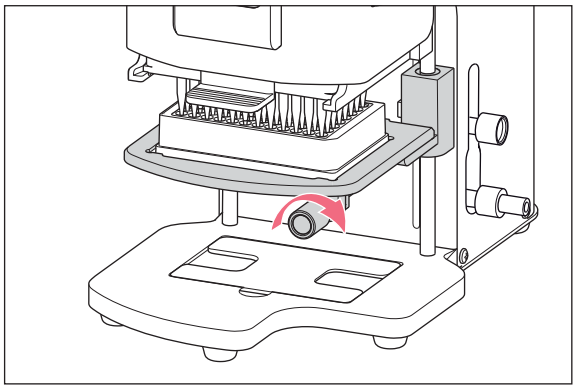
Prerequisites

- Liquid has been aspirated.
- Destination vessels are available.

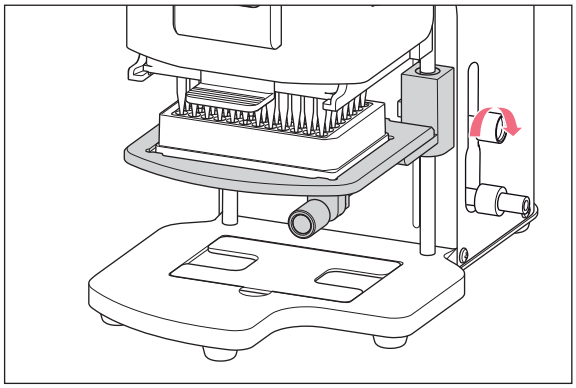
1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Press *Dispense*.
3. Move the lifting table into the basic position.
4. Change or reposition the destination vessel.

6.15.5 Dispensing liquid semiautomatically

It is advisable to use the *Auto* function when filling a single 384-well plate or several 96-well plates in succession.



1. Press the *Auto* button.
2. Set the dispensing volume.
3. Set the number of steps for dispensing.
4. Aspirate liquid from a source vessel.
5. Place the destination vessel on the lifting table.
6. Move the lifting table into working position and keep it in this position.



7. Tighten the locking handle for the stop.
8. Lower the lifting table.
9. Move the lifting table against the stop and keep it in this position.
   Liquid dispensing is triggered.
   The number of the remaining dispensing steps is displayed.
10. Move the lifting table into the basic position.
11. Change or reposition the destination vessel.

6.16 Mode *Reverse pipette* – aspirating a greater volume of liquid

More liquid aspiration by using blow out (blow volume). Dispense a defined amount of liquid without blow volume. Dispense the blow volume by separate blow out.

Reverse pipetting is advantageous for liquids with a high protein content (e.g. plasma, serum) and liquids with high viscosity. Reverse pipetting is not required for pipetting aqueous solutions.

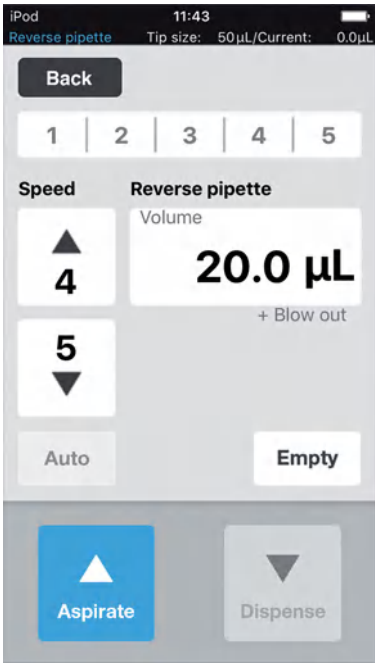


Fig. 6-3: *Reverse pipette* mode

6.16.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Volume	Set the dispensing volume in µL.	0.5 – 300
Blow out	Fixed volume based on the size of the pipette and the sample volume. It is aspirated with the sample volume.	

Parameter	Pipette tip	Sample volume	Range of values
Blow out	50 µL	50 µL	12 µL
	300 µL	≤ 270 µL	30 µL
		≥ 270 µL	22 µL

6.16.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Volume	Set the dispensing volume in µL.	5 – 1000
Blow out	Fixed volume based on the size of the pipette and the sample volume. It is aspirated with the sample volume.	

Parameter	Pipette tip	Sample volume	Range of values
Blow out	300 µL	50 µL	12 µL
	1000 µL	50µL	50 µL
		50µL	50 µL

6.16.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Place the source vessel on the lifting table and move the lifting table into working position.
2. Set the aspiration volume and the speed levels.
3. Press *Aspirate*.

6.16.4 Dispensing liquid

Prerequisites

- Liquid has been aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Press *Dispense*.
3. Press *Empty*
   Liquid dispensing is completed.

6.16.5 Multiple dispensing of liquid

1. Place the source vessel with the sample liquid on the lifting table.
2. Press *Aspirate*.
   The sample liquid is aspirated again.
3. Place the destination vessel on the lifting table and move the lifting table into working position.
4. Press *Dispense*.
   The liquid is dispensed.
5. Press *Empty*
   Liquid dispensing is completed.

6.17 Mode *Small volume* – Dispensing very small liquid volumes

In the first step, aspirate a large liquid volume of a system liquid (neutral liquid, e.g. water), followed by the aspiration of an air cushion and then the aspiration of the target liquid. When the target liquid is dispensed, the system liquid remains in the tip.

The system liquid reduces the compressible air cushion. This enables the dispensing of small volumes with a large pipette tip.

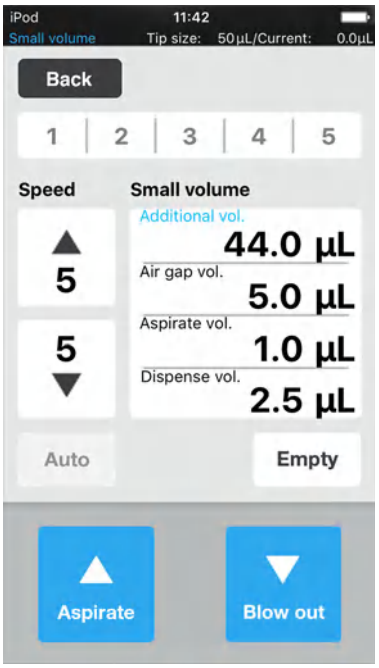


Fig. 6-4: *Small volume* mode

6.17.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Additional vol.	Set the volume of the system liquid in µL.	0.5 – 300
Air gap vol.	Set the air cushion volume in µL.	0.5 – 300
Aspirate vol.	Set the sample volume in µL.	0.5 – 300
Dispense vol.	Set the dispensing volume in µL.	0.5 – 300

6.17.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Additional vol.	Set the volume of the system liquid in µL.	5 – 1000
Air gap vol.	Set the air cushion volume in µL.	5 – 1000
Aspirate vol.	Set the sample volume in µL.	5 – 1000
Dispense vol.	Set the dispensing volume in µL.	5 – 1000

6.17.3 Example – Dispensing 1 µL of target liquid

Prerequisites

- Pipette tips 50 µL
- Target liquid 1 µL

1. Aspirate 45 µL of system liquid.
2. Aspirate 5 µL of air.
3. Aspirate 1 µL of target liquid.
4. Set the dispensing volume to 2.5 µL

   The minimum permissible dispensing volume corresponds to the volume of the target liquid.
   The maximum permissible dispensing volume corresponds to the volume of the sum of air cushion and target liquid.
5. Dispense target liquid with a total volume of 2.5 µL into the destination vessel.

   1 µL of target liquid and 1.5 µL of air are dispensed.

6.17.4 Aspirating liquid

Prerequisites

- Source vessel with system liquid is available.
- Source vessel with sample liquid is available.

1. Set the aspiration volume of the system liquid.
2. Set the aspiration volume of the air cushion.
3. Set the aspiration volume of the sample liquid.
4. Set the dispensing volume.
5. Set the aspiration speed.
6. Set the dispensing speed.
7. Place the source vessel with the system liquid on the lifting table.
8. Move the lifting table into working position.
9. Press *Aspirate*.

   The system liquid is aspirated (large volume, not compressible).
10. Move the lifting table into the basic position.

11. Press *Aspirate*.

    The air cushion is aspirated (small compressible volume).

12. Place the source vessel with the sample liquid on the lifting table.
13. Move the lifting table into working position.
14. Press *Aspirate*.

    The sample liquid is aspirated.

6.17.5 Dispensing liquid

Prerequisites

- System liquid, air cushion and sample liquid are aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Press *Dispense*.

   The sample liquid is dispensed.
   The residual liquid is pushed out with the air cushion.

6.17.6 Multiple dispensing of liquid

1. Press *Aspirate*.

   The air cushion is aspirated again.

2. Place the source vessel with the sample liquid on the lifting table.
3. Press *Aspirate*.

   The sample liquid is aspirated again.

4. Place the destination vessel on the lifting table and move the lifting table into working position.
5. Press *Dispense*.

   The sample liquid is dispensed.
   The residual liquid is pushed out with the air cushion.

6. Press *Empty*

   Liquid dispensing is completed.

6.18 Mode *Pipette and mix* – Dispensing and mixing liquid

Aspirating liquid in one step, dispensing liquid in one step and mixing liquid automatically.

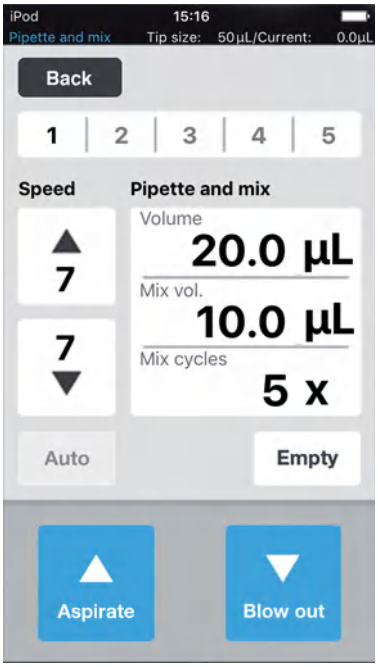


Fig. 6-5: *Pipette and mix* mode

6.18.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Volume	Set the aspiration volume in µL.	0.5 – 300
Mix vol.	Set the mixing volume in µL.	0.5 – 300
Mix cycles	Set the number of mixing cycles.	1 – 99

6.18.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Volume	Set the aspiration volume in µL.	5 – 1000
Mix vol.	Set the mixing volume in µL.	5 – 1000
Mix cycles	Set the number of mixing cycles.	1 – 99

6.18.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Place the source vessel on the lifting table and move the lifting table into working position.
2. Set the aspiration volume and the speed levels.
3. Press *Aspirate*.

6.18.4 Dispensing and mixing liquid

Prerequisites

- Liquid has been aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Set the mixing volume for the mixing cycles.
3. Press *Dispense*.

   The set liquid volume is dispensed.
   The mixing volume is automatically aspirated and dispensed.

6.19 Mode *Manual pipette* – Aspirating and dispensing liquid manually

Manually determine the liquid volume for aspiration and dispensing.

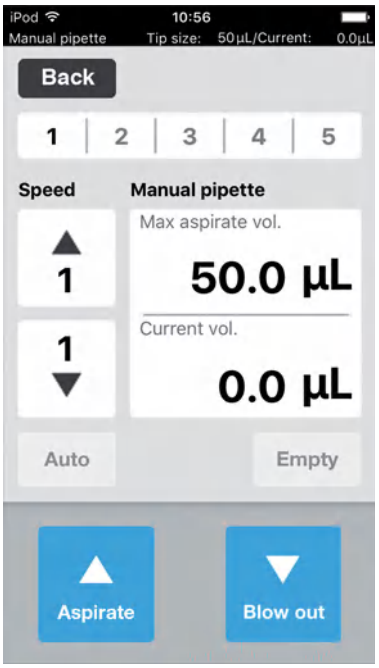


Fig. 6-6: *Manual pipette* mode

6.19.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Max. aspirate vol.	Set the dispensing volume in µL.	0.5 – 300
Current vol.	Current volume is displayed.	0 – 300

6.19.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Max. aspirate vol.	Set the dispensing volume in µL.	5 – 1000
Current vol.	Current volume is displayed.	0 – 1000

6.19.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Place the source vessel on the lifting table and move the lifting table into working position.
2. Set the aspiration volume and the speed levels.
3. Keep the *Aspirate* key pressed.
   Liquid is aspirated until the *Aspirate* key is released or the set aspiration volume is reached.

6.19.4 Dispensing liquid

Prerequisites

- Liquid has been aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Keep the *Dispense* key pressed.
   Liquid is dispensed until the *Dispense* key is released or the liquid volume is exhausted.

6.20 Mode *Dilute and mix* – Diluting and mixing liquids

The application is suitable for diluting samples and reagents using an appropriate dilution solution. Aspirate diluent, aspirate air, aspirate concentrated liquid and mix while dispensing.

Fig. 6-7: *Dilute and mix* mode

6.20.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Diluent vol.	Set the aspiration volume for the diluent in µL.	0.5 – 300
Air gap vol.	Set the air cushion volume in µL.	0.5 – 300
Concentrate vol.	Set the aspiration volume of the concentrate in µL.	0.5 – 300
Mix vol.	Set the mixing volume in µL.	0.5 – 300
Mix cycles	Set the number of mixing cycles.	1 – 99

6.20.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Diluent vol.	Set the aspiration volume for the diluent in µL.	0.5 – 1000
Air gap vol.	Set the air cushion volume in µL.	5 – 1000
Concentrate vol.	Set the aspiration volume of the concentrate in µL.	5 – 1000
Mix vol.	Set the mixing volume in µL.	5 – 1000
Mix cycles	Set the number of mixing cycles.	1 – 99

6.20.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Set the speed levels.
2. Set the liquid volume for the diluent.
3. Set the air cushion volume.
4. Set the liquid volume for the concentrate.
5. Place the source vessel with the dilution solution onto the lifting table and move the lifting table into working position.
6. Press *Aspirate*.

   Diluent is aspirated.
7. Move the lifting table into the basic position.
8. Press *Aspirate*.

   Air cushion is aspirated.
9. Put the source vessel with the concentrate onto the lifting table and move the lifting table into working position.
10. Press *Aspirate*.

    Concentrate is aspirated.
    Destination vessel can be filled.

6.20.4 Diluting and mixing liquids

Prerequisites

- Liquids and air cushions are aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Set the mixing cycles.
3. Press *Dispense*.

   Liquids are dispensed and mixed automatically.

6.21 Mode *Multiaspirate* – Multiple aspiration of liquid

Aspirate liquid in several steps and dispense liquid in one step.The *Auto* function activates the automatic aspiration of liquids.

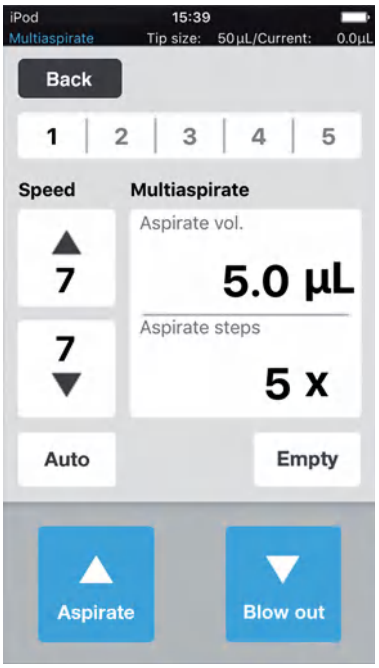


Fig. 6-8: *Multiaspirate* mode

6.21.1 Parameters for epMotion 96

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Aspirate vol.	Set the aspiration volume in µL.	0.5 – 300
Aspirate steps	Set the number of aspiration steps.	1 – 99

6.21.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
Speed aspirate	Set the speed of liquid aspiration.	1 – 9
Speed dispense	Set the speed of liquid dispensing.	1 – 9
Aspirate vol.	Set the aspiration volume in µL.	5 – 1000
Aspirate steps	Set the number of aspiration steps.	1 – 99

6.21.3 Aspirating liquid

Prerequisites

- A source vessel is available.

1. Place the source vessel on the lifting table and move the lifting table into working position.
2. Set the aspiration volume and the speed levels.
3. Set the number of aspiration steps.
4. Lower the lifting table.
5. Move the lifting table against the stop and keep it in this position.
   The liquid aspiration is triggered.
6. Change or reposition the source vessel.

6.21.4 Dispensing liquid

Prerequisites

- Liquid has been aspirated.
- A destination vessel is available.

1. Place the destination vessel on the lifting table and move the lifting table into working position.
2. Press *Dispense*.

6.22 *Run program* mode – creating and saving a program run

Several operating modes can be selected, configured and saved to be run as a program run. Use this mode in order to run pre-defined operations. The pipette tips can be changed in the program run between operating modes.

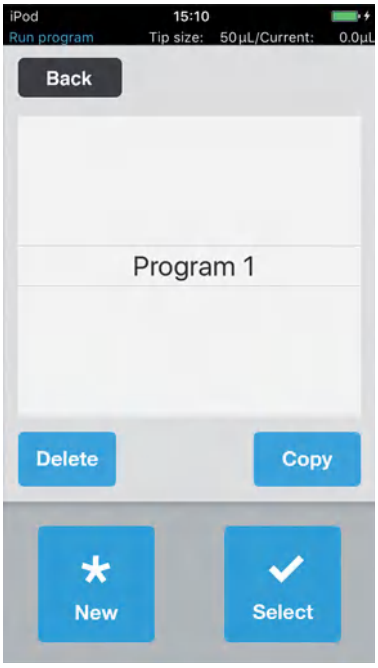
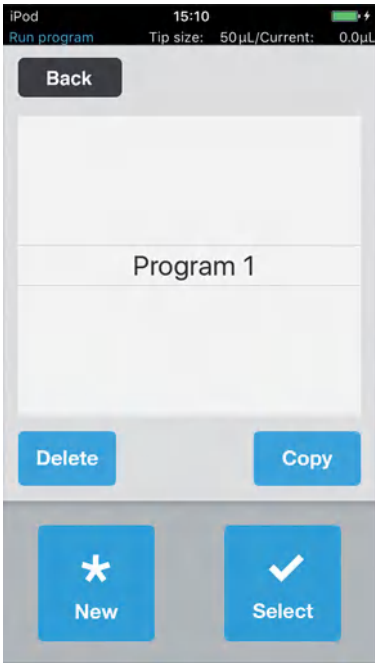


Fig. 6-9: *Run program* mode

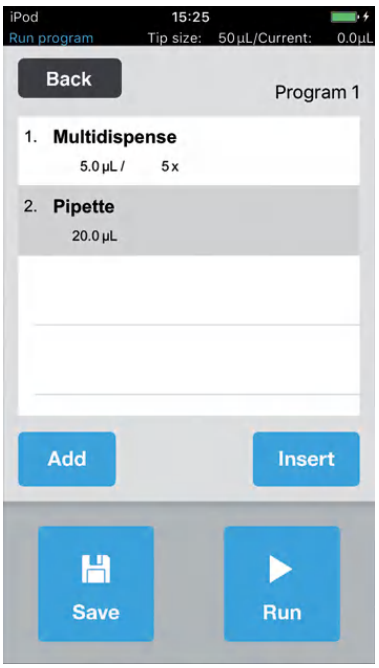
Parameter	Value
Delete	Delete the selected program.
Copy	Copy the selected program.
New	Create a new program.
Select	Open the selected program.

6.22.1 Creating and storing a program run



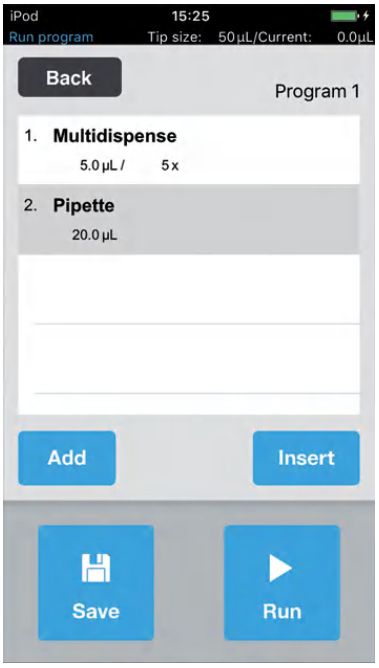
1. Press *New*.
2. Enter the program name.
   The program editor opens.
3. Add modes.
4. Press *Save*.
   The program run is saved.

6.22.2 Editing a program run – adding a mode at the end



1. Press *Add*.
2. Select a mode and confirm with *Select*.
3. Choose the parameters for the selected mode and confirm with *Back*.
4. Press *Save*.
   The program run is saved.

6.22.3 Editing a program run – inserting a mode

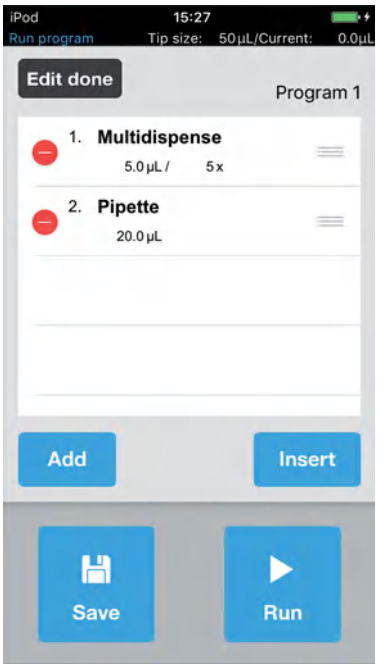


1. Select the mode before which the new mode is to be inserted.
2. Press *Insert*.
3. Select a mode and confirm with *Select*.
4. Choose the parameters for the selected mode and confirm with *Back*.
5. Press *Save*.
   The program run is saved.

6.22.4 Editing a program run – changing the parameters of a mode

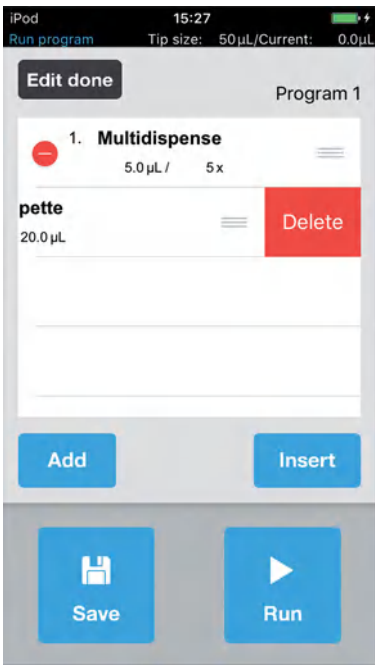
1. Select a mode and keep the selected entry pressed.
   The parameter view of the mode is displayed.
2. Change the parameters.
3. Use *Previous* or *Next* to change the parameters of the previous or the next mode.
4. Press *Back* to return to the program list view.
5. Press *Save*.
   The program run is saved.

6.22.5 Changing the order within a program run



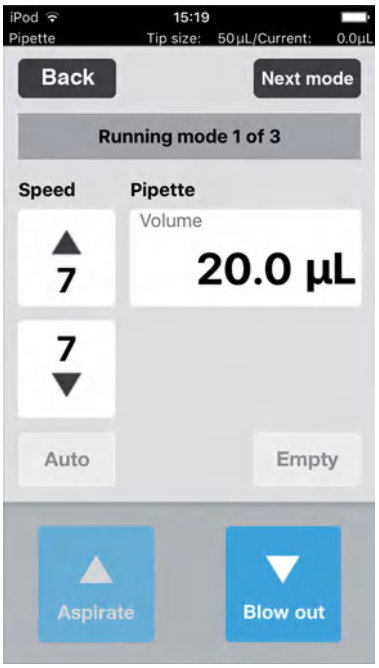
1. Select the mode in the program run and tap it twice.
2. Select the mode and use the tag to the right of the program run to move it up or down.
3. Press *Edit done*.
4. Press *Save*.
   The program run is saved.

6.22.6 Deleting a mode from a program run



1. Select the mode in the program run and tap it twice.
2. Select a mode and press the icon on the left.
3. Press *Delete*.
4. Press *Edit done*.
5. Press *Save*.
   The program run is saved.

6.22.7 Selecting and running a program run



1. Select a saved program and confirm with *Select*.
2. Start the program run by pressing *Run*.
   The program run starts with the first operating mode that has been saved.
   The number of steps in the program is displayed.
3. Press the *Blow out* button several times if the next program step is *Reverse pipette*.
4. Press *Next mode* to start the next step in the program.

6.23 Mode *Settings* – Setting the system properties

Setting the device and software properties.

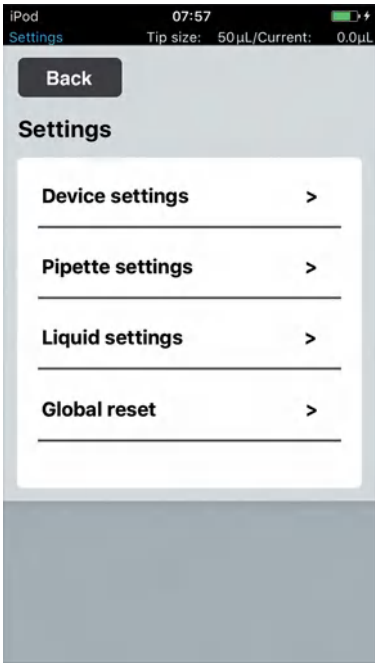


Fig. 6-10: *Settings* mode

Parameter	Value
Device settings	Display device information and set device properties.
Pipette settings	Set the pipetting properties.
Liquid settings	Adjust the pipetting to the liquid properties.
Global reset	Reset the user-specific parameters to the factory settings. Liquid properties which are are saved in the *Liquid settings* menu are not reset.

6.24 *Device settings* – Setting the device properties

Setting the device and software properties.

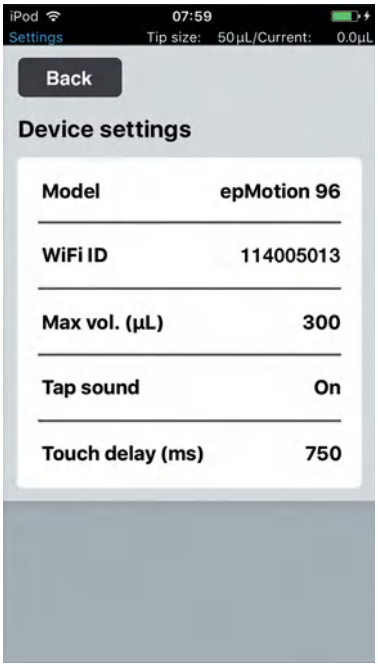


Fig. 6-11: *Device settings* – Example for epMotion 96

Parameter	Value
Model	Display the model designation.
WiFi name	Display the network name.

Parameter	Value	Standard	Range of values
Tap sound	Switch the signal tone on or off.	*On*	*On/Off*
Touch delay	Time span between activation and execution of the function.	750 ms	200 – 3000

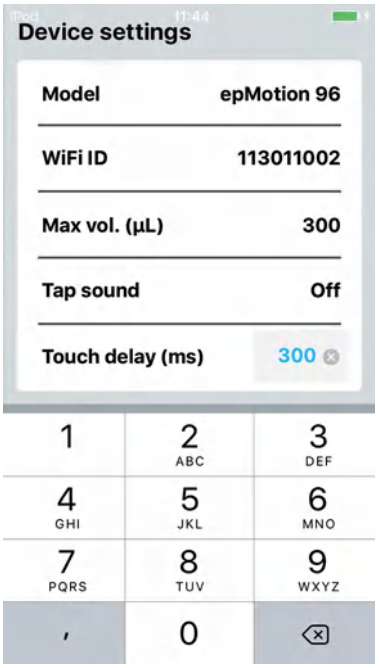
6.24.1 *Tap sound* – Switching on the tap sound

- Tap the *Touch delay* value.
  The value changes to *Off*.

6.24.2 *Tap sound* – Switching off the tap sound

- Tap the *Touch delay* value.
  The value changes to *On*.

6.24.3 *Touch delay* – Setting the touchscreen delay



1. Touch and hold *Touch delay*.
2. Enter the value in milliseconds.
   The value is adopted and saved automatically.

6.25 *Pipette settings* – Setting the pipetting properties

Changes in pipetting properties are only adopted after a reinitialization.

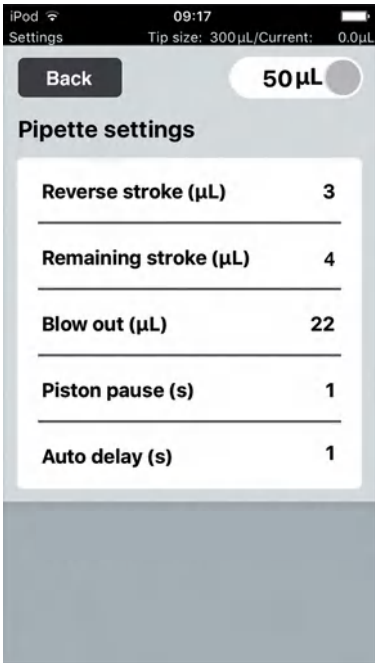


Fig. 6-12: *Pipette settings* – Example for epMotion 96

6.25.1 Parameters for epMotion 96

Parameter	Value	Pipette tips	Standard	Range of values
Reverse stroke	Set the additional liquid aspiration volume in µL.	50 µL	6 µL	0 – 6
		300 µL	6 µL	0 – 6
Remaining stroke	Set the residual volume in µL for liquid aspiration in the *Multidispense* mode.	50 µL	4 µL	–
		300 µL	12 µL	–
Blow out	Set the air volume in µL for dispensing the residual liquid.	50 µL	22 µL	–
		300 µL	22 µL	–
Piston pause	Set the delay time between pipetting operations in seconds.	–	1 s	0 – 4
Auto delay	Set the delay time for automatic liquid dispensing in seconds (*Multidispense* and *Multiaspirate* modes).	–	1 s	0 – 5

6.25.2 Parameters for epMotion 96xl

Parameter	Value	Pipette tips	Standard	Range of values
Reverse stroke	Set the additional liquid aspiration volume in µL.	300 µL	12 µL	0 – 12
		1000 µL	12 µL	0 – 12
Remaining stroke	Set the residual volume in µL for liquid aspiration in the *Multidispense* mode.	300 µL	12 µL	–
		1000 µL	20 µL	–
Blow out	Set the air volume in µL for dispensing the residual liquid.	300 µL	22 µL	–
		1000 µL	74 µL	–
Piston pause	Set the delay time between pipetting operations in seconds.	–	1 s	0 – 4
Auto delay	Set the delay time for automatic liquid dispensing in seconds (*Multidispense* and *Multiaspirate* modes).	–	1 s	0 – 5

6.26 *Liquid settings* – Setting the liquid properties

In the liquid properties, the calibration correction and the volume range can be defined for certain liquids (e.g. glycerol) with physical properties (density or vapor pressure) which are different from those of water. This increases the precision and accuracy when pipetting such liquids. The values that are to be set depend on the physical properties of the liquid and the ambient conditions (temperature, atmospheric pressure, humidity). The values that are to be set must be determined experimentally.

The preset values in *Standard* are used for verifying the device and they are suitable for water and diluted aqueous solutions.

It is not possible to change the *Standard* liquid type.

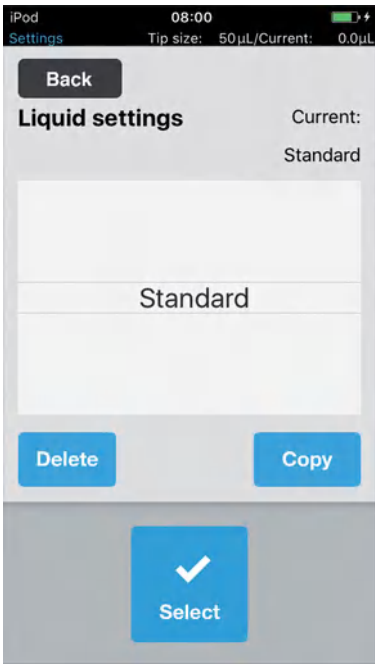


Fig. 6-13: *Liquid settings*

6.26.1 Parameters for epMotion 96

Parameter	Value	Pipette tip	Range of values
Pipette tip	Size of the pipette tips in µL.	50 µL	–
		300 µL	–
Input new name	Name of the liquid (alphanumerical).	–	1 – 21
Volume range	Defined volume range in µL.	50 µL	0 – 50
		300 µL	0 – 300
Calibration adj.	Calibration value in %.	–	-10 – +10

6.26.2 Parameters for epMotion 96xl

Parameter	Value	Pipette tip	Range of values
Pipette tip	Size of the pipette tips in µL.	300 µL	–
		1000 µL	–
Input new name	Name of the liquid (alphanumerical).	–	1 – 21
Volume range	Defined volume range in µL.	300 µL	0 – 300
		1000 µL	5 – 1000
Calibration adj.	Calibration value in %.	–	-10 – +10

6.27 *Global reset* – Resetting all settings

This function is used to reset all user-specific changes to standard settings to the factory settings.

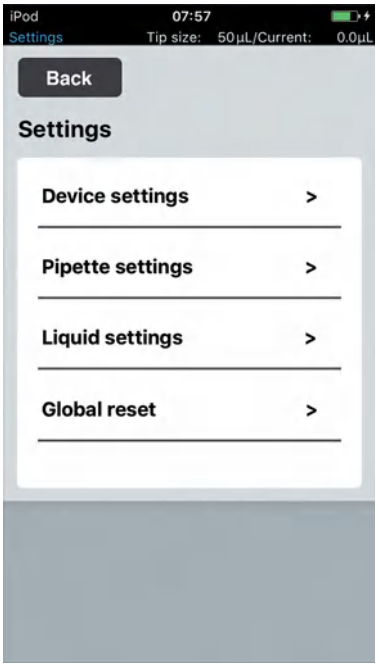


Fig. 6-14: *Global reset* mode

1. Press *Global reset*.
2. Confirm the prompt with *Yes*.

   All user-specific settings are reset.
   The setting in *Liquid settings* is set to the *Standard* value.
   All the liquid settings that were set up remain unchanged.

7 Troubleshooting

7.1 General errors

7.1.1 Pipette tips

Problem	Cause	Solution
Pipette tips are not detected.	• Tray with pipette tips is turned the wrong way by 180°.	▸ Insert the tray with the notch pointing to the loading frame handle.
Liquid drips from the pipette tips.	• Wrong pipette tips.	▸ Check pipette tips. ▸ Use epT.I.P.S. Motion Reloads 50 µL, 300 µL or 1000 µL.
	• Pipette tips are not correctly attached to the tip cones.	▸ Unlock pipette tips. ▸ Check the spacing. ▸ Remove foreign objects. ▸ Lock pipette tips.
	• O-rings are damaged.	▸ Contact authorized service personnel.
	• Nonaqueous liquid with other physical properties than water (e.g., high vapor pressure).	▸ Aspirate and dispense liquid (see *Aspirating and dispensing nonaqueous liquids on p. 49)*.
Pipette tips are not detected.	• Tray with pipette tips is turned the wrong way by 180°.	▸ Insert the tray with the notch pointing to the loading frame handle.

7.1.2 Wi-Fi connection

Problem	Cause	Solution
Connection error	• The device is switched off.	▸ Switch on the device. ▸ Close and restart the software.
	• No Wi-Fi connection.	▸ Open *Settings* on the iPod touch. ▸ Activate *Wi-Fi*. ▸ Close and restart the software.
	• Wi-Fi connection not set up correctly.	▸ Open *Settings* on the iPod. ▸ Open *Wi-Fi* and check the network settings. ▸ Close and restart the software.
	• No Wi-Fi connection. • iPod touch is too far from the device.	▸ Position the iPod touch closer to the device or insert it into the docking station.
Display freezes.	• Wi-Fi is overloaded. • No free Wi-Fi channel available. • Obsolete operating system	▸ Perform a firmware update (see p. 81). ▸ Assign a Wi-Fi channel (see p. 85).

7.1.3 Liquid volume

Problem	Cause	Solution
Pipetting volume is larger than ...	• The set liquid volume is too large.	▸ Reduce the liquid volume.
	• The pipette tips are too small.	▸ Use pipette tips with 300 µL or 1000 µL.
No tips installed	• No pipette tips attached.	▸ Attach epT.I.P.S. Motion Reloads 50 µL, 300 µL or 1000 µL.
	• Pipette tips not detected. • Pipette tips not correctly locked.	▸ Push the lever all the way back.

7.1.4 File name

Problem	Cause	Solution
File name to long	• File name is too long. • Program cannot be saved.	▸ Choose a file name with a maximum of 21 characters.
File name already exists	• File name already exists. • Program cannot be saved.	▸ Choose a different file name.

7.1.5 Sensors

Problem	Cause	Solution
Lower sensor triggered	• Sensor for piston movement was triggered.	▸ Switch the device off and back on again. ▸ If the error persists, contact authorized service.
Upper sensor triggered	• Device error. • Sensor for piston movement was triggered.	▸ Switch the device off and back on again. ▸ If the error persists, contact authorized service.

8 Maintenance

8.1 Replacing fuses

DANGER! Electric shock.

- Switch off the device and disconnect the power plug before starting maintenance or cleaning work.

The fuse holder is located between the mains connection socket and the mains power switch. The fuses may only be replaced with the same type of fuse.

1. Disconnect the mains plug.
2. Pull the fuse holder out completely.
3. Replace the defective fuse.
4. Insert the fuse holder.

8.2 Updating the software

The software is updated directly via the App Store. A firmware update may be required after a software update. The required firmware version is specified in the informational text for the app in the App Store. If the software version is incompatible with the firmware version of the connected device, a message appears on the iPod touch.

1. Compare the installed firmware version with the latest firmware version.
2. If the latest firmware version is higher, a firmware update is required.

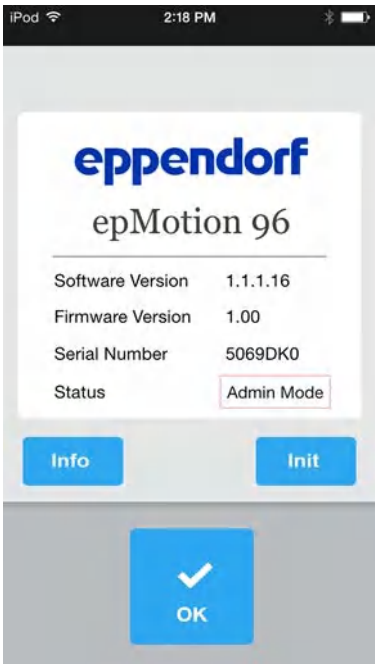
8.3 Updating the firmware

8.3.1 Activating the *Admin* mode

Prerequisites

- The device is switched on.
- Apple iPod touch is switched on.
- A wireless connection is established.

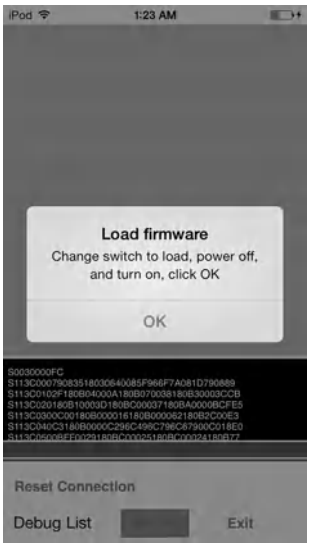
1. Tap the *epMotion 96* icon.
   The start screen appears.



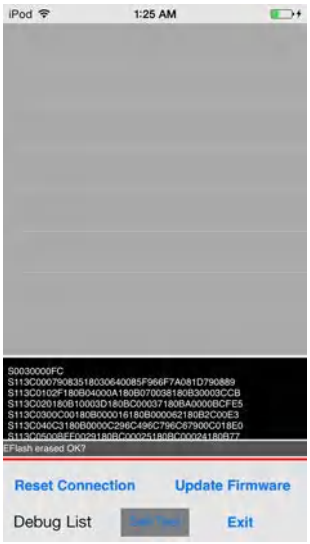
2. Press and hold the *Info* button until the status changes from *Connected* to *Admin Mode*.
3. Press the *Info* button.
   The Service menu appears.

8.3.2 Updating the firmware

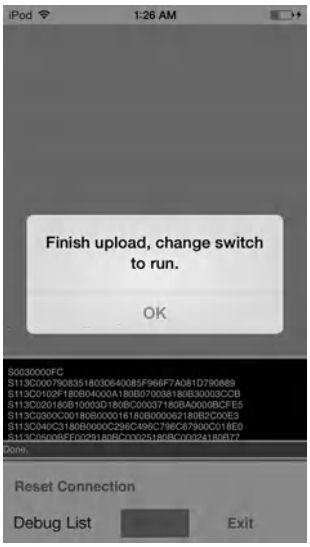
1. Press the *Reset connection* button.



2. Toggle the switch for firmware updates to the left.
   The switch is in the *LOAD* position.
   The switch is active.
3. Switch off the device.
4. Wait until the wireless connection to the Apple iPod touch has been terminated.
5. Switch on the device.
6. Wait until the wireless connection to the Apple iPod touch has been established.
7. Press *OK*.



8. Press the *Update Firmware* button.
   The firmware update is performed.
   A self test is performed.
   If the firmware update and the self test were successful, a message appears.



9. Toggle the switch for firmware updates to the right.
   The switch is in the *RUN* position.
   The switch is inactive.
10. Wait until the status lamp is green.
11. Press *OK*.
12. Press *Exit*.
    The Service menu is exited.

8.3.3 Quitting the Admin mode

- Press the *Init* button.
  The Admin mode is exited.
  The status changes from *Admin Mode* to *Connected*.

8.4 Assigning a Wi-Fi channel

The Wi-Fi module of the epMotion 96 can be set to a fixed Wi-Fi channel.

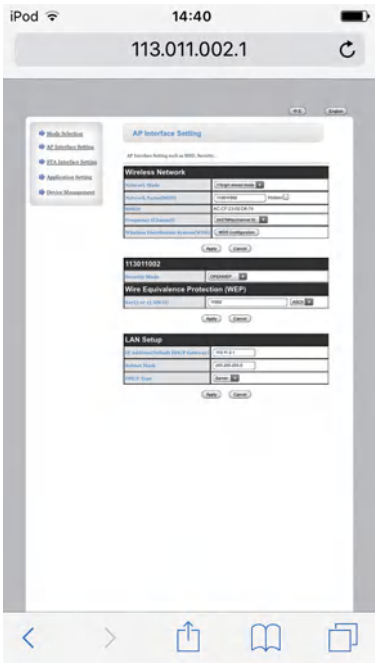
Prerequisites

- The device is switched on.
- Apple iPod touch is switched on.
- A Wi-Fi connection to the device exists.

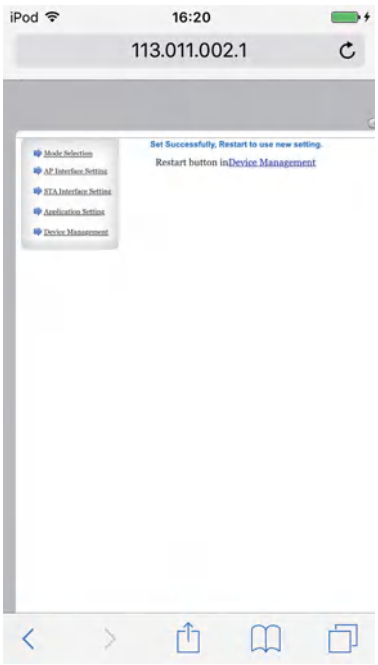
1. Start your Internet browser (iPod touch).
2. Enter the network name (see network name plate) into the address line in the format XXX.XXX.XXX.1.
   The login window appears.

3. Enter *admin* as the user name and password.
   The *Working Mode Configuration* window opens.

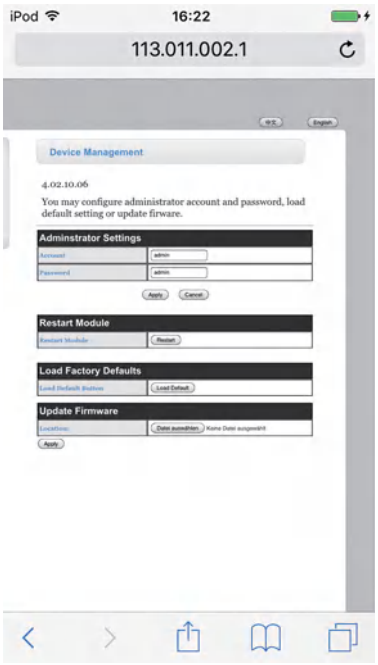
4. Select the *AP Interface Setting* submenu.
   The *AP Interface Setting* window opens.



5. In *Frequency (Channel)*, open the drop-down list and select *2462MHz(channel 11)*.
6. Confirm with *Apply*.
   The setting will be saved.
   Wi-Fi channel 11 has now been set.
   The Wi-Fi module needs to be restarted.



7. Select the submenu *Device Management*.
   The *Device Management* window opens.



8. Press *Restart* .
   The Wi-Fi module restarts.
9. Close your Internet browser.
10. Switch off the device and wait 10 seconds.
11. Switch the device on again.
12. Check the assigned Wi-Fi channel.

8.4.1 Checking the assigned Wi-Fi channel

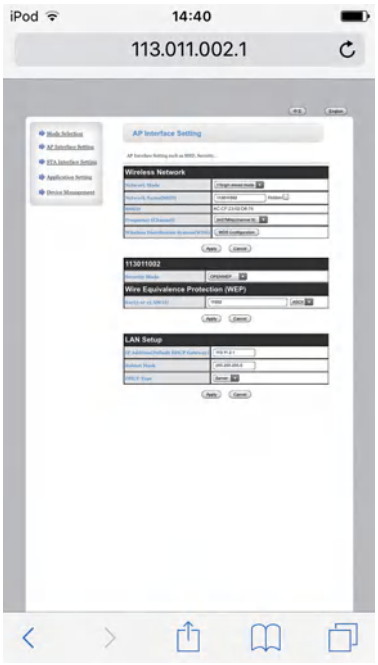
Prerequisites

- The device is switched on.
- Apple iPod touch is switched on.
- A Wi-Fi connection to the device exists.

1. Start your Internet browser (iPod touch).
2. Enter the network name (see network name plate) into the address line in the format XXX.XXX.XXX.1.
   The login window appears.

3. Enter *admin* as the user name and password.
   The *Working Mode Configuration* window opens.

4. Select the *AP Interface Setting* submenu.
   The *AP Interface Setting* window opens.



5. Check the *Frequency (Channel)* entry.
   The currently assigned frequency and the corresponding Wi-Fi channel are displayed in the drop-down list.

8.5 Cleaning

DANGER! Electric shock due to the ingress of liquid.

- Switch off the device and disconnect the power plug before starting cleaning or disinfection work.
- Do not allow any liquids to penetrate the inside of the housing.
- Do not spray clean/spray disinfect the housing.
- Only plug the device back in if it is completely dry, both inside and outside.

NOTICE! Damage from the use of aggressive chemicals.

- Do not use any aggressive chemicals on the device or its accessories, such as strong and weak bases, strong acids, acetone, formaldehyde, halogenated hydrocarbons or phenol.
- If the device has been contaminated by aggressive chemicals, clean it immediately using a mild cleaning agent.

Clean the device at least every 4 weeks.

1. Wipe the painted parts and the aluminum surfaces with a cloth and mild detergent.
2. Polish with a dry cloth.

8.6 Disinfection/Decontamination

DANGER! Electric shock due to the ingress of liquid.

- Switch off the device and disconnect the power plug before starting cleaning or disinfection work.
- Do not allow any liquids to penetrate the inside of the housing.
- Do not spray clean/spray disinfect the housing.
- Only plug the device back in if it is completely dry, both inside and outside.

1. Switch off the device and disconnect it from the mains/power line.
2. Remove all cables and accessory parts from the device.
3. Clean the device with a mild cleaning agent before disinfection.
4. Select a disinfection method that corresponds with the legal provisions and guidelines valid for your area of application.

   Use e.g. alcohol (ethanol, isopropanol) or alcoholic disinfectants.
5. Wipe the surfaces with a lint-free cloth that has been moistened with disinfectant.
6. Disinfect all the parts that are to be sent in with the device.

8.7 Maintaining and replacing O-rings

8.7.1 Maintaining O-rings

If solvents are used, O-rings need regular maintenance.

1. Spray the O-rings with silicone spray.

8.7.2 Replacing O-rings

Individual O-rings can be replaced in the dispensing block.

- O-rings are damaged
- Liquid is aspirated unevenly
- Pipette tips are dripping

Prerequisites

- Device is switched off.
- Mains/power cord has been removed.
- Loading frame has been removed.

1. Lock the lever.
2. Carefully place the device on its left-hand side.
3. Cut the damaged O-ring.
4. Remove the remains of the O-ring.
5. Clean the tip cone with a lint-free cloth.
6. Insert the new O-ring and press it carefully into the groove.

8.8 Service and maintenance

The Eppendorf AG service team is available to service and certify your device.

Eppendorf AG recommends annual servicing of the device.

Service provisions:

- Service
- Operational qualification (OQ) according to manufacturer's specifications
- Electrical safety testing according to country-specific regulations

Information on the services offered can be found on our webpage: www.eppendorf.com/epservices.

9 Technical data

9.1 epMotion 96

9.1.1 Volume

Volume range	0.5 µL – 300 µL
Increment	0.1 µL

9.1.2 Weight/dimensions – single lifting table

Width	215 mm
Depth	344 mm
Height	525 mm
Weight	19670 g

9.1.3 Weight/dimensions – 2-position slider

Width	348 mm
Depth	344 mm
Height	525 mm
Weight	20580 g

9.2 epMotion 96xl

9.2.1 Volume

Volume range	5 µL – 1000 µL
Increment	0.1 µL

9.2.2 Weight/dimensions – single lifting table

Width	215 mm
Depth	344 mm
Height	576 mm
Weight	20220 g

9.2.3 Weight/dimensions – 2-position slider

Width	348 mm
Depth	344 mm
Height	576 mm
Weight	21200 g

9.3 Interfaces

Docking station	Apple Lightning compatible connection

9.4 Power supply

Voltage	100 V – 240 V, AC
Frequency	50 Hz – 60 Hz
Power consumption	175 W
Protection class	I
Overvoltage category	II
Micro fuse	F 3 A/250 V

9.5 Errors of measurement

9.5.1 epMotion 96

Test tip	**Testing volume**	**Error of measurement**	
		Systematic error	**Random error**
		± %	**± %**
50 µL	1 µL	2	< 3
300 µL	5 µL	2	< 3

9.5.2 epMotion 96xl

Test tip	**Testing volume**	**Error of measurement**	
		Systematic error	**Random error**
		± %	**± %**
300 µL	5 µL	2	< 3
1000 µL	10 µL	2	< 3

9.6 Test conditions

The device is tested according to a company-internal SOP.

The SOP is available upon request.

9.7 Ambient conditions

Ambience	Only for use indoors.
Ambient temperature	15 °C – 24 °C
Relative humidity	55 % – 75 %, non-condensing.
Atmospheric pressure	860 hPa – 1060 hPa

10 Transport, storage and disposal

10.1 Storage

	Air temperature	Relative humidity	Atmospheric pressure
In transport packaging	-20 °C – +70 °C	10 % – 80 %	300 hPa – 1060 hPa
Without transport packaging	-20 °C – +70 °C	10 % – 80 %	–

10.2 Decontamination before shipment

If you are shipping the device to the authorized Technical Service for repairs or to your authorized dealer for disposal please note the following:

WARNING! Risk to health from contaminated device

1. Observe the information on the decontamination certificate. You can find it as a PDF document on our webpage (www.eppendorf.com/decontamination).
2. Decontaminate all the parts you would like to dispatch.
3. Include the fully completed decontamination certificate in the package.

10.3 Transport

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-20 °C – +70 °C	10 % – 80 %	300 hPa – 1060 hPa

CAUTION! Risk of injury from lifting and carrying heavy loads.
The device is heavy. Lifting and carrying the device can lead to back injuries.

- Only lift and transport the device with a sufficient number of helpers.
- Use a transport aid for transporting the device.

Carry out the following steps before transport:

1. Remove pipette tips
2. Remove the loading frame and the adapter and pack them separately.
3. Pack the pipetting device in the original packaging.

10.4 Disposal

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

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

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

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following identification:

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

In Germany, this is mandatory from March 23, 2006. From this date, the manufacturer has to offer a suitable method of return for all devices supplied after August 13, 2005. For all devices supplied before August 13, 2005, the last user is responsible for the correct disposal.

11 Ordering information

11.1 epMotion 96

Order no. (International)	Order no. (North America)	Description
5069 000.012	5069000004	**epMotion 96**
5069 000.110	5069000101	**epMotion 96** with 2-position slider

11.2 epMotion 96xl

Order no. (International)	Order no. (North America)	Description
5069 000.217	5069000209	**epMotion 96xl**
5069 000.314	5069000306	**epMotion 96xl** with 2-position slider

11.3 Accessories

Order no. (International)	Order no. (North America)	Description
5069 074.008	5069074008	**Modification kit "2-position slider"**
5069 072.005	5069072005	**Loading frame**
5069 073.001	5069073001	**Adapter for 384-well plates**
		Thermoadapter
5075 787.008	960002199	for PCR plates, 96 wells, skirted
5075 788.004	960002202	for PCR plates, 384 wells, skirted
		Thermoblock
5075 766.000	960002083	for 96 test tubes 0.2 mL, 77 PCR tubes 0.5 mL or a PCR plate with 96 wells
5075 767.007	960002091	for a PCR plate with 384 wells

11.4 Pipette tips

11.4.1 50 µL

- epMotion 96

Order no. (International)	Order no. (North America)	Description
		epT.I.P.S. Motion Filter Reloads 50 µL
		12 × 2 trays with 96 tips each
0030 014.529	0030014529	PCR clean and Sterile
0030 014.430	0030014430	PCR clean
		epT.I.P.S. Motion Reloads 50 µL
		12 × 2 trays with 96 tips each
0030 014.421	0030014421	Eppendorf Quality

11.4.2 300 µL

- epMotion 96
- epMotion 96xl

Order no. (International)	Order no. (North America)	Description
		epT.I.P.S. Motion Filter Reloads 300 µL
		12 × 2 trays with 96 tips each
0030 014.537	0030014537	PCR clean and Sterile
0030 014.472	0030014472	PCR clean
		epT.I.P.S. Motion Reloads 300 µL
		12 × 2 trays with 96 tips each
0030 014.464	0030014464	Eppendorf Quality

11.4.3 1000 µL

- epMotion 96xl

Order no. (International)	Order no. (North America)	Description
		epT.I.P.S. Motion Filter Reloads 1 000 µL
		12 × 2 trays with 96 tips each
0030 014.510	0030014510	PCR clean
		epT.I.P.S. Motion Reloads 1 000 µL
		12 × 2 trays with 96 tips each
0030 014.502	0030014502	Eppendorf Quality

eppendorf

Declaration of Conformity

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

Product name:

epMotion® 96

including accessories

Product type:

Semi- automated electronic pipette

Relevant directives / standards:

2014/35/EU:	EN 61010- 1
	UL 61010A- 1, CAN/CSA C22.2 No. 61010- 1
2014/30/EU:	EN 61326- 1, ETSI EN 301 489- 1 V1.9.2
2011/65/EU:	EN 50581
2014/53/EU:	

Date: July 04, 2016

Management Board

Portfolio Management

ISO 9001 Certified

ISO 13485 Certified

ISO 14001 Certified

5069 900.919- 01

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