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epMotion[®] 96 - epMotion[®] 96xl

Operating manual

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FCC statement

The device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

The device may not cause harmful interference, and the device must accept any interference received, including interference that may cause undesired operation.

Table of contents

1	Operating instructions	9
1.1	Using this manual	9
1.2	Danger symbols and danger levels	9
1.2.1	Danger symbols	9
1.2.2	Danger levels	9
1.3	Symbols used	9
2	Safety	11
2.1	Intended use	11
2.2	Warnings for intended use	11
2.3	Application limits	12
2.4	Symbols on the device	12
2.5	User profile	12
2.6	Information on product liability	12
3	Product description	13
3.1	Delivery package	13
3.2	Features	13
3.2.1	User software and control unit	13
3.2.2	Wi-Fi	13
3.3	Product overview	14
3.3.1	epMotion 96 – epMotion 96xl	14
3.3.2	epMotion 96 and epMotion 96xl with 2-position slider	15
3.3.3	Docking station	16
3.3.4	Switch for firmware update	16
3.3.5	Lifting table	17
3.3.6	Lifting table with 2-position slider	17
3.3.7	Adapter for 384-well plate	18
3.3.8	Loading frame	19
3.4	Pipette tips	19
3.4.1	Pipette tips for epMotion 96	20
3.4.2	Pipette tips for epMotion 96xl	21
3.5	Plates	21
3.6	Name plate	22
3.6.1	Network name plate	22
4	Installation	23
4.1	Preparing installation	23
4.1.1	Complaints about damages	23
4.1.2	Incomplete delivery	23
4.2	Selecting the location	23
4.2.1	epMotion 96 – single lifting table	24
4.2.2	epMotion 96 – 2-position slider	25
4.2.3	epMotion 96xl – single lifting table	26
4.2.4	epMotion 96xl – 2-position slider	27
4.3	Mains/power plug types and earth/grounded sockets	28
4.4	Connecting the device	28
4.5	Installing the user software	29

Table of contents

epMotion® 96 - epMotion® 96xl
English (EN)

4.6	Setting up the control device	30
4.6.1	Activating Wi-Fi	30
4.6.2	Setting up the network	30
4.6.3	Deactivating the automatic display switch-off	31
4.7	Placing the iPod in the docking station	32
4.8	Changing the locking direction	33
5	User software	35
5.1	Touchscreen	35
5.1.1	Layout of the touchscreen	35
5.2	Overview of operating modes	36
5.2.1	Selecting the operating mode	37
5.3	Operating controls for user software	37
5.4	Entering or changing the parameters	38
5.4.1	Changing parameters	38
5.4.2	Saving the parameter profile	38
5.4.3	Loading the parameter profile	39
5.4.4	Resetting all parameter profiles	40
6	Operation	41
6.1	Switching the device on or off	41
6.1.1	Switching on the device	41
6.1.2	Switching off the device	41
6.2	Starting the user software	41
6.2.1	Starting the user software	41
6.2.2	Exiting the user software	42
6.2.3	Using user software in Simulation mode	43
6.2.4	Changing from Simulation mode to Work mode	44
6.2.5	Terminating the Simulation mode	45
6.3	Inserting the pipette tips	45
6.4	Moving the lifting table	47
6.4.1	Moving the lifting table into the working position	47
6.4.2	Moving the lifting table into the home position	48
6.4.3	Adjusting the upper stop for the lifting table	48
6.4.4	Adjusting the lower stop for the lifting table	48
6.4.5	Unlocking the lower stop	49
6.5	Moving the 2-position slider	49
6.6	Inserting the plate	50
6.6.1	Inserting a 96-well plate	50
6.6.2	Filling the 96-well plate	50
6.6.3	Inserting a 384-well plate	51
6.6.4	Filling the 384-well plate	51
6.7	Aspirating liquid – single lifting table	52
6.8	Dispensing liquid – single lifting table	53
6.9	Dispensing small liquid volumes – 0.5 µL to 10 µL	53
6.10	Aspirating and dispensing non-aqueous liquids	54
6.11	Aspirating and dispensing liquid – 2-position slider	54
6.12	Blow out function – Dispensing residual liquid	55
6.12.1	Skipping the Blow out function	56
6.13	Empty Function – dispensing liquid completely	56

6.14	Pipette mode – dispensing liquid	56
6.14.1	Parameters for epMotion 96	57
6.14.2	Parameters for epMotion 96xl	57
6.14.3	Aspirating liquid	57
6.14.4	Dispensing liquid	57
6.15	Multidispense mode – Dispensing liquid in steps of equal measure	58
6.15.1	Parameters for epMotion 96	58
6.15.2	Parameters for epMotion 96xl	58
6.15.3	Aspirating liquid	59
6.15.4	Dispensing liquid	59
6.15.5	Semi-automatic dispensing of liquid	59
6.16	Reverse pipette mode – Aspirating larger volumes of liquid	60
6.16.1	Parameters for epMotion 96	61
6.16.2	Parameters for epMotion 96xl	61
6.16.3	Aspirating liquid	61
6.16.4	Dispensing liquid	61
6.16.5	Dispensing liquid multiple times	62
6.17	Mode Small volume – Dispensing very small liquid volumes	62
6.17.1	Parameters for epMotion 96	63
6.17.2	Parameters for epMotion 96xl	63
6.17.3	Example – Dispensing 1 µL of target liquid	63
6.17.4	Aspirating liquid	63
6.17.5	Dispensing liquid	64
6.17.6	Multiple dispensing of liquid	64
6.18	Pipette and mix mode – Dispensing and mixing the liquid	65
6.18.1	Parameters for epMotion 96	65
6.18.2	Parameters for epMotion 96xl	65
6.18.3	Aspirating liquid	66
6.18.4	Dispensing and mixing liquid	66
6.19	Manual pipette mode – Manually aspirating and dispensing liquid	66
6.19.1	Parameters for epMotion 96	67
6.19.2	Parameters for epMotion 96xl	67
6.19.3	Aspirating liquid	67
6.19.4	Dispensing liquid	67
6.20	Dilute and mix mode – Diluting and mixing liquid	67
6.20.1	Parameters for epMotion 96	68
6.20.2	Parameters for epMotion 96xl	68
6.20.3	Aspirating liquid	69
6.20.4	Diluting and mixing liquid	69
6.21	Mode Multiaspirate – Multiple aspiration of liquid	70
6.21.1	Parameters for epMotion 96	70
6.21.2	Parameters for epMotion 96xl	70
6.21.3	Aspirating liquid	71
6.21.4	Dispensing liquid	71
6.22	Sequential Dispense mode – Dispensing liquid to varying degrees	71
6.22.1	Parameters for epMotion 96	72
6.22.2	Parameters for epMotion 96xl	72
6.22.3	Place the pipette tips in an empty tray	73
6.22.4	Aspirating liquid	73
6.22.5	Dispensing liquid	73

Table of contents

epMotion® 96 - epMotion® 96xl
English (EN)

6.22.6	Example 1 – Sequential liquid dispensing with pipette tips in column 1	74
6.22.7	Example 2 – Sequential liquid dispensing with pipette tips in column 1 and 2	75
6.23	PreWet mode – Pre-wetting the inner wall and pre-saturating the air cushion	76
6.23.1	Parameters for epMotion 96	76
6.23.2	Parameters for epMotion 96xl	76
6.23.3	Aspirating and dispensing the liquid	77
6.24	Run program mode for the connected device.	77
6.24.1	Creating and storing a program run	78
6.24.2	Editing the program run - Adding the mode at the end	79
6.24.3	Editing the program run - Adding a mode	79
6.24.4	Editing the program run - Changing the parameters of a mode.	80
6.24.5	Changing the order of the program run	80
6.24.6	Deleting the mode in the program run	81
6.24.7	Selecting and executing the program run	81
6.25	Run program mode for unconnected devices in simulation mode.	82
6.26	Settings – Setting the system properties	82
6.26.1	Device settings – Setting the device properties	83
6.26.2	Pipette settings – Setting the pipette properties.	84
6.26.3	Parameters for epMotion 96	84
6.26.4	Parameters for epMotion 96xl	85
6.26.5	App settings – Setting up the app	85
6.26.6	Global reset – Resetting all settings	86
6.27	Pipette settings – Setting the pipette properties.	86
6.27.1	Parameters for epMotion 96	87
6.27.2	Parameters for epMotion 96xl	88
7	Troubleshooting	89
7.1	General errors	89
7.1.1	Pipette tips	89
7.1.2	Wi-Fi connection.	89
7.1.3	Liquid volume	90
7.1.4	File name.	91
7.1.5	Sensors	91
8	Maintenance	92
8.1	Service options	92
8.2	Replacing fuses	92
8.3	Updating the user software.	92
8.4	Performing a backup of the settings, programs and logs.	93
8.5	Updating the firmware	93
8.5.1	Activating Admin mode.	93
8.5.2	Updating the firmware	94
8.5.3	Exiting the Admin mode	96
8.6	Assigning a Wi-Fi channel	97
8.6.1	Checking the assigned Wi-Fi channel.	100
8.7	Cleaning	102
8.8	Disinfection/Decontamination.	102

8.9	Maintaining and replacing the o-rings	103
8.9.1	Maintaining the o-rings.	103
8.9.2	Replacing the o-rings	103
8.10	Service and maintenance	103
9	Technical data	104
9.1	epMotion 96	104
9.1.1	Volume	104
9.1.2	Weight/dimensions – single lifting table.	104
9.1.3	Weight/dimensions – 2-position slider	104
9.2	epMotion 96xl	104
9.2.1	Volume	104
9.2.2	Weight/dimensions – single lifting table.	104
9.2.3	Weight/dimensions – 2-position slider	104
9.3	Interfaces.	105
9.4	Power supply.	105
9.5	Errors of measurement	105
9.5.1	epMotion 96	105
9.5.2	epMotion 96xl	105
9.6	Test conditions	105
9.7	Ambient conditions.	106
10	Transport, storage and disposal	107
10.1	Storage	107
10.2	Decontamination before shipment	107
10.3	Transport.	107
10.4	Disposal.	108
11	Ordering information	109
11.1	epMotion 96	109
11.2	epMotion 96xl.	109
11.3	Accessories	109
11.4	Pipette tips and boxes.	109
11.4.1	50 µL	109
11.4.2	300 µL	110
11.4.3	1000 µL	110
	Certificates	111

Table of contents

epMotion® 96 - epMotion® 96xl
English (EN)

1 Operating instructions






1.1 Using this manual

- ▶ Read this operating manual completely before using the device for the first time. Observe the instructions for use of the accessories where applicable.
- ▶ This operating manual is part of the product. Please keep it in a place that is easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ The current version of the operating manual for all available languages can be found on our webpage www.eppendorf.com/manuals.

1.2 Danger symbols and danger levels

1.2.1 Danger symbols


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

	Biohazard		Electric shock
	Risk of crushing		Hazard point
	Material damage		

1.2.2 Danger levels

DANGER	<i>Will</i> lead to severe injuries or death.
WARNING	<i>May</i> 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
<i>Text</i>	Display or software texts
	Additional information

Operating instructions

epMotion® 96 - epMotion® 96xl
English (EN)

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

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



NOTICE! Damage to device due to liquid spills.

- ▶ Switch off the device.
- ▶ Disconnect the mains/power plug.
- ▶ Collect the spilled liquid. Observe the information in the Safety Data Sheet for the liquid.



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

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biosafety level of your laboratory, and the manufacturers' Safety Data Sheets and application notes.
 - ▶ Wear your personal protective equipment.
 - ▶ For comprehensive regulations about handling germs or biological material of risk group II or higher, please refer to the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, in the currently valid version).
-

2.3 Application limits



DANGER! Risk of explosion.



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



DANGER! Risk of explosion.

- ▶ Do not operate the device in areas where work with explosive substances is carried out.

2.4 Symbols on the device

Warning symbol	Meaning
	Read the operating manual
	Certification mark for compliance with "China-RoHS" limit values according to norm SJ/T 11364 <i>Marking for the restriction of the use of hazardous substances in electrical and electronic products</i> , People's Republic of China

2.5 User profile

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

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

2.6 Information on product liability

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

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

3 Product description

3.1 Delivery package

Quantity	Description
1	Semi-automatic pipettor
1	Loading frame
1	Adapter for 384-well plate
1	Country-specific 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 pipettor which is used to aspirate, dispense or mix liquids. The pipettor has 96 individual channels for the pipette tips. These are used to fill a 96-well plate in a single step or a 384-well plate in four steps. The attachment and ejection of the pipette tips, as well as the positioning of the plates, is carried out manually.

3.2.1 User software and control unit

The liquid aspiration and dispensing is adjusted, controlled and monitored with a user software. The user software is available as an app in the App Store and must be installed on a control unit. A Wi-Fi connection is required in order for the control unit to be able to communicate with the pipettor.

Recommended control unit from Apple:

- iPod touch with the model numbers A1421, A1509, A1574 and A2178 – compatible with the docking station

Other possible control units:

- iPhone (from App Version 2.1) – not compatible with the docking station
- iPad – not compatible with the docking station



A control unit is not included in the scope of delivery.

3.2.2 Wi-Fi

The pipettor connects with a local Wi-Fi network for communication with the control unit. The control unit does not need to be in the docking station for this.

Product description

epMotion® 96 - epMotion® 96xl
English (EN)

3.3 Product overview

3.3.1 epMotion 96 – epMotion 96xl

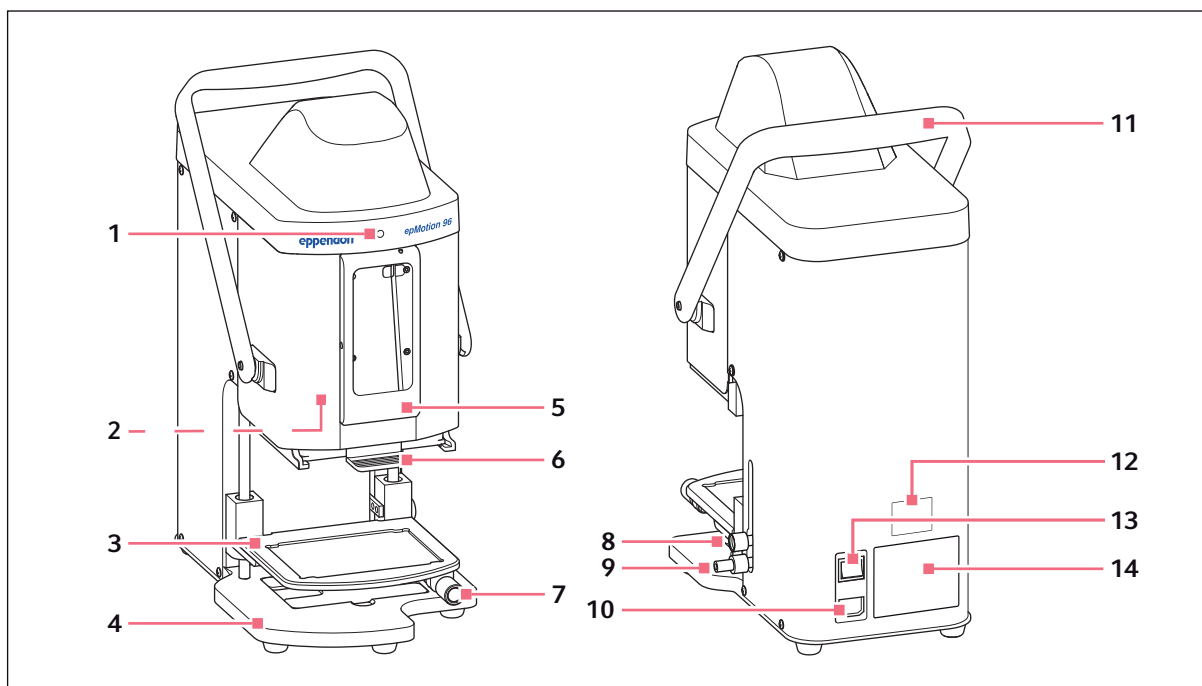


Fig. 3-1: Front view and rear view

1 Status lamp

Green - Pipettor is ready
Blue - Pipettor in operation
Red - Pipettor has stopped, waiting for confirmation
White - Error. Notify Service

2 Switch for firmware update

3 Lifting table

4 Base

With adapter for 384-well plate

5 Docking station

For 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 upper stop for lifting table
Fixing stop for automatic dispensing

9 Locking handle

Fixing lower stop for lifting table

10 Mains/power connection

With holder for micro fuses

11 Lever

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

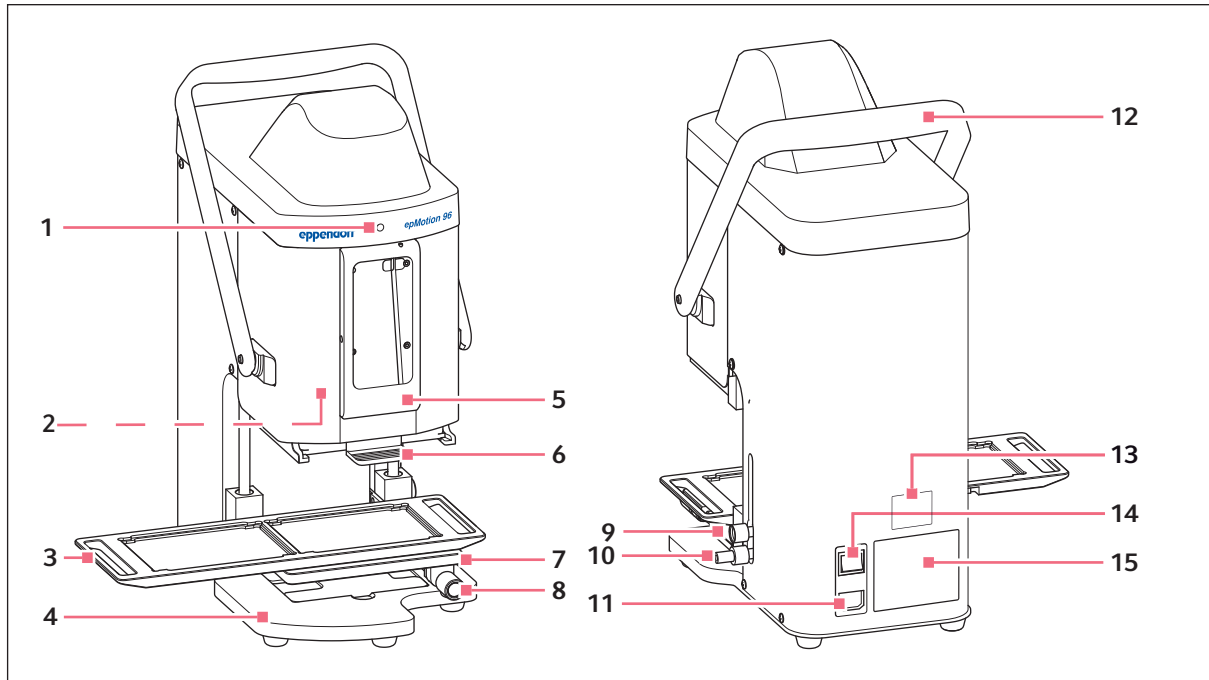


Fig. 3-2: Front view and rear view

- | | |
|--|--|
| <p>1 Status lamp
Green - Pipettor is ready
Blue - Pipettor in operation
Red - Pipettor has stopped, waiting for confirmation
White - Error. Notify Service</p> <p>2 Switch for firmware update</p> <p>3 2-position slider</p> <p>4 Base
With adapter for 384-well plate</p> <p>5 Docking station
For Apple iPod touch</p> <p>6 Loading frame
For tray with epT.I.P.S. Motion Reloads</p> <p>7 Lifting table</p> <p>8 Locking handle
Fixing the lifting table in the working position</p> | <p>9 Locking handle
Fixing stop for lifting table
Fixing stop for automatic dispensing</p> <p>10 Locking handle
Fixing lower stop for lifting table</p> <p>11 Mains/power connection
With holder for micro fuses</p> <p>12 Lever
Locking or unlocking the loading frame</p> <p>13 Network name plate</p> <p>14 Mains/power switch on/off</p> <p>15 Name plate</p> |
|--|--|

Product description

epMotion® 96 - epMotion® 96xl
English (EN)

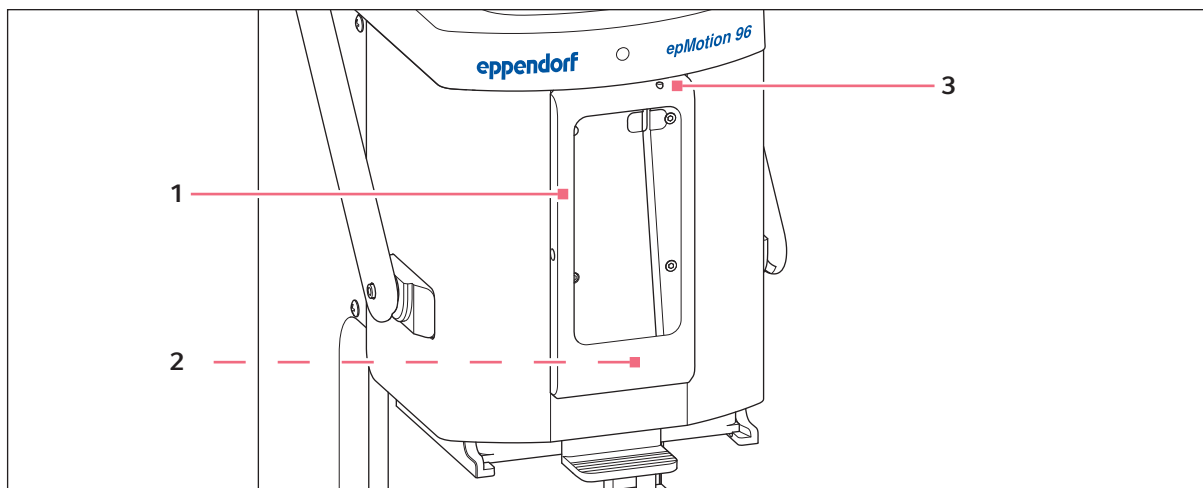
3.3.3 Docking station

Fig. 3-3: Docking station with frame

1 Frame

Fixing the iPod

3 On/off switch and standby switch**2 Port for iPod touch**

For model numbers A1421, A1509, A1574, A2178

3.3.4 Switch for firmware update

The switch is only used to update the firmware of the pipetting system.



When activated, the current firmware is deleted and must be re-installed!

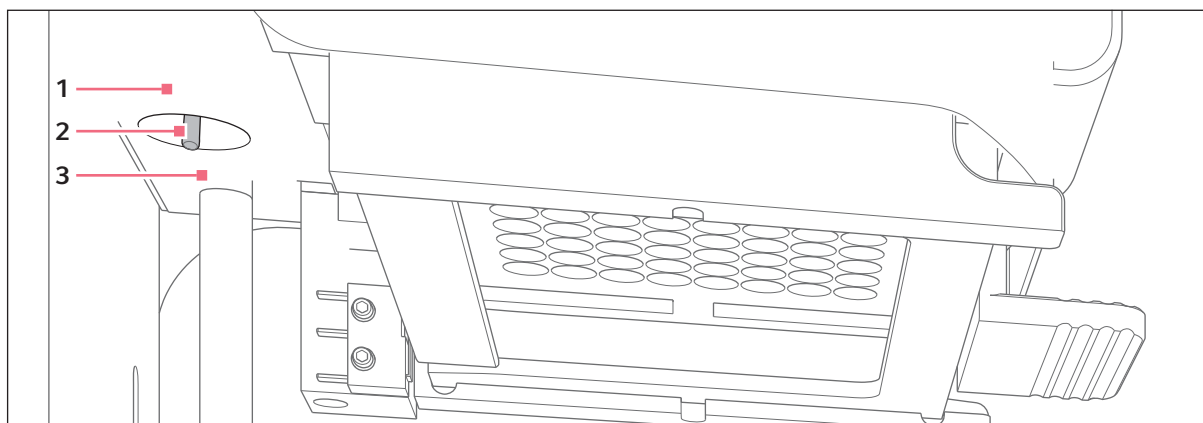


Fig. 3-4: Switch for firmware update

1 PositionLOAD

Switch is active

3 PositionRUN

Switch is inactive

2 Switch

3.3.5 Lifting table

The following standard direction of rotation is already factory-set for the locking handle:

- Releasing the locking handle – turn in a clockwise direction
- Tightening the locking handle – turn in an anti-clockwise direction

i The standard direction of rotation can be changed.

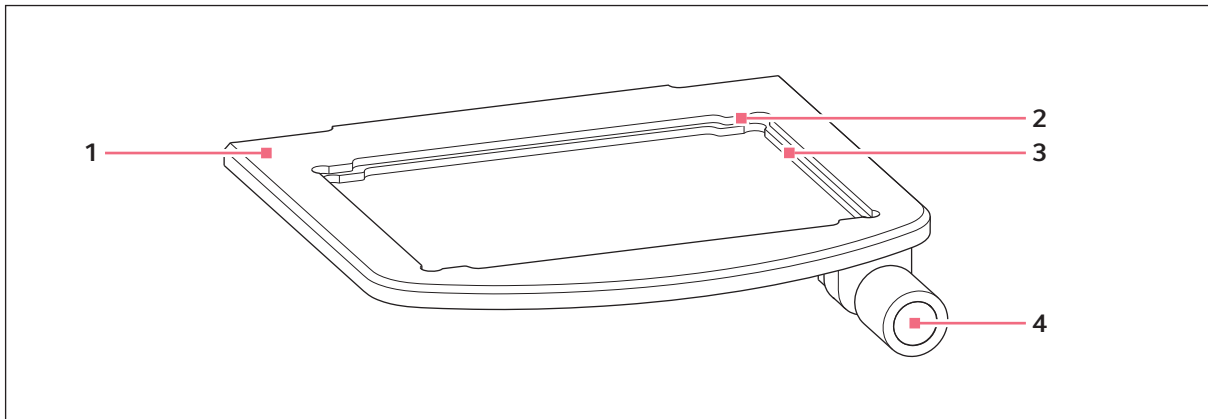


Fig. 3-5: Lifting table

1 Lifting table

2 Recess for 384-well plate

Only use the 384-well plate with an adapter

3 Recess 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 back and forth horizontally on the lifting table.

The 2-position slider comes equipped with a positioning aid for 384-plates. The left-hand side of the 2-position slider has a 4.5-mm grid. The grid is particularly suitable for the *Sequential Dispense* mode.

i The 2-position slider can be ordered as a modification kit. Please contact the authorized service to carry out a conversion.

Product description

epMotion® 96 - epMotion® 96xl
English (EN)

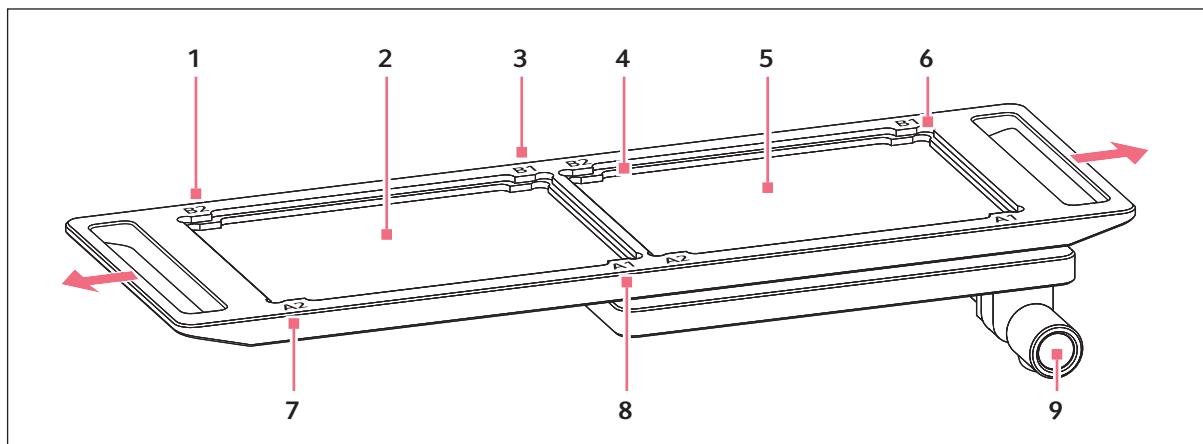


Fig. 3-6: 2-position slider

- | | |
|---|--|
| <p>1 B 2
Position markings for 384-well plate (corresponds to well B2)</p> <p>2 Position for destination vessel</p> <p>3 B 1
Position markings for 384-well plate (corresponds to well B1)</p> <p>4 Recess for 96-well plate</p> <p>5 Position for source vessel</p> | <p>6 Recess for 384-well plate
Only use the 384-well plate with an adapter</p> <p>7 A 1
Position markings for 384-well plate (corresponds to well A1)</p> <p>8 A 2
Position markings for 384-well plate (corresponds to well A2)</p> <p>9 Locking handle</p> |
|---|--|

3.3.7 Adapter for 384-well plate

The adapter is placed in the recess in the lifting table. This is used to hold a 384-well plate, which is completely filled in 4 steps.

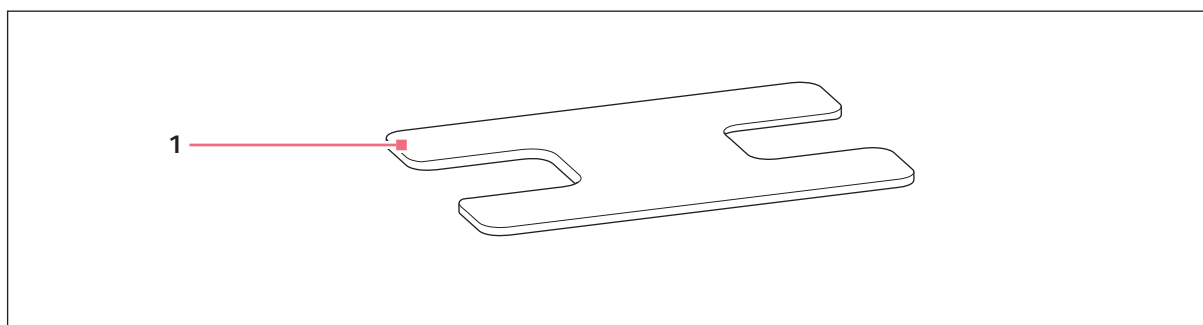


Fig. 3-7: Adapter

- 1 Adapter**
Lifting table insert for 384-well plates

3.3.8 Loading frame

A tray with 96 pipette tips is placed in the loading frame. The software uses the code on the tray to identify the type used.

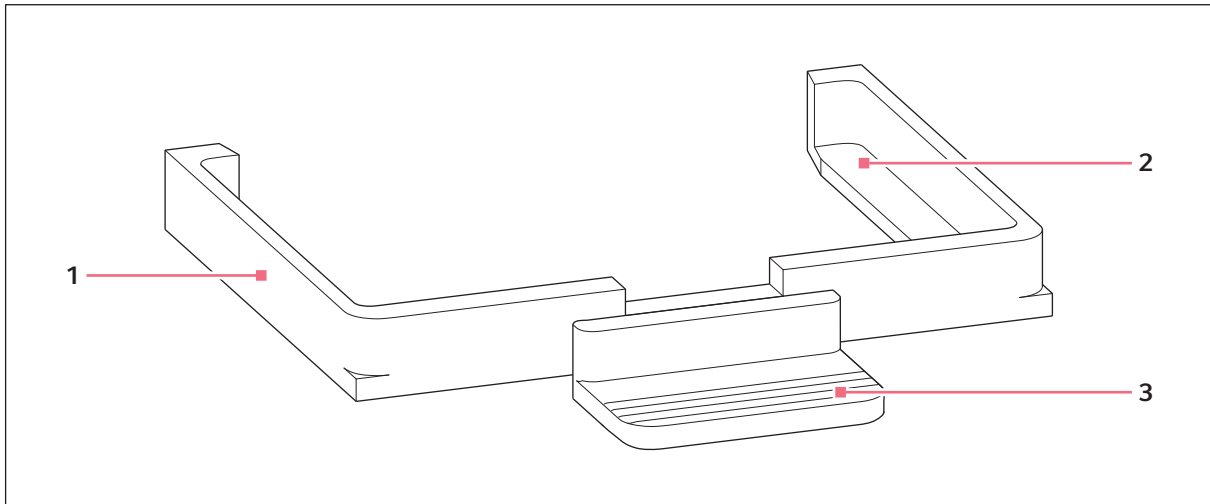


Fig. 3-8: Loading frame

1 Loading frame

3 Handle

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

3.4 Pipette tips

We recommend the use of epT.I.P.S. Motion Reloads. The pipette tips are available with various degrees of purity, with and without filters. The system identifies the size of the pipette tip used from the code on the tray.



NOTICE! Damage to device due to incorrectly equipped trays.

The device detects the tip size from the code on the tray. Incorrectly equipping the trays can lead to contamination of the pipetting head.

- ▶ Only use trays that were equipped by the manufacturer.
- ▶ Only use the recommended tip sizes.

Product description

epMotion® 96 - epMotion® 96xl
English (EN)

**NOTICE! Dispensing errors due to incorrect handling of pipette tips.**

Pipette tips become deformed and change size during autoclaving.

- ▶ Do not autoclave the pipette tips. If necessary, use pipette tips that are specified as sterile.

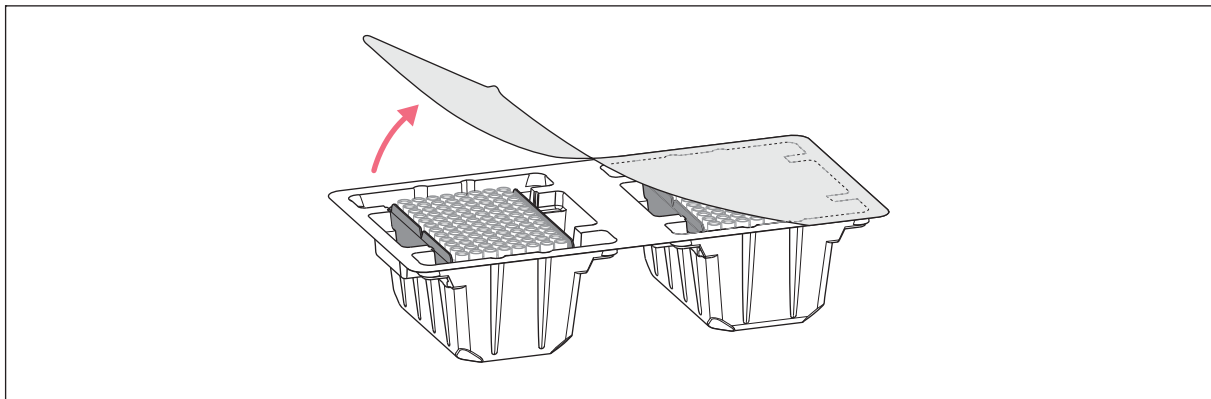


Fig. 3-9: Pipette tips in tray – epT.I.P.S. Motion Reloads

3.4.1 Pipette tips for epMotion 96

**NOTICE! Damage to device due to incorrect size of pipette tips.**

Using a tray with pipette tips smaller than 50 µL will cause damage to the device. Excess liquid ends up in the dispensing head, damages the mechanics and leads to measurement errors.

- ▶ Only use trays with pipette tips in sizes 50 µL or 300 µL.
- ▶ If liquid has penetrated the device, switch off the device.
- ▶ Contact the authorized service.

Pipette tip	Sizes	Use	Depth of plate 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	Depth of plate 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 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

Product description

epMotion® 96 - epMotion® 96xl
English (EN)

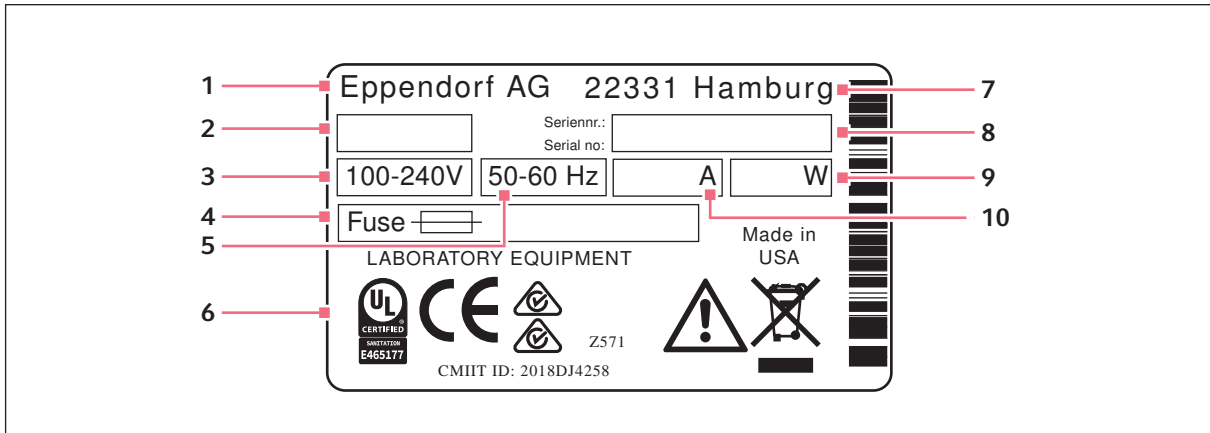
3.6 Name plate

Fig. 3-10: Name plate

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

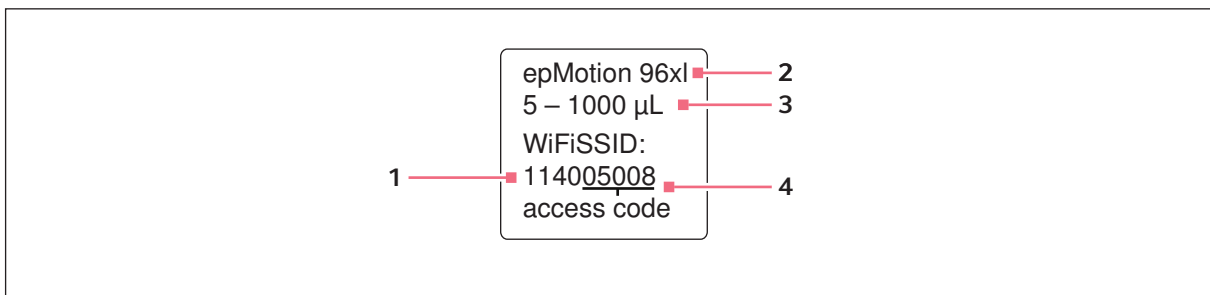
3.6.1 Network name plate

Fig. 3-11: Label with network name

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

4 Installation

4.1 Preparing installation



CAUTION! Risk of injury due to lifting and carrying heavy loads.

The device is heavy. Lifting and carrying the device can lead to back injuries.

- ▶ Transport and lift the device with an adequate number of helpers.
- ▶ Use a transport aid to transport 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 the disconnecting device of the mains/power line must be accessible during operation (e.g., residual current circuit breaker).

4.2.1 epMotion 96 – single lifting table

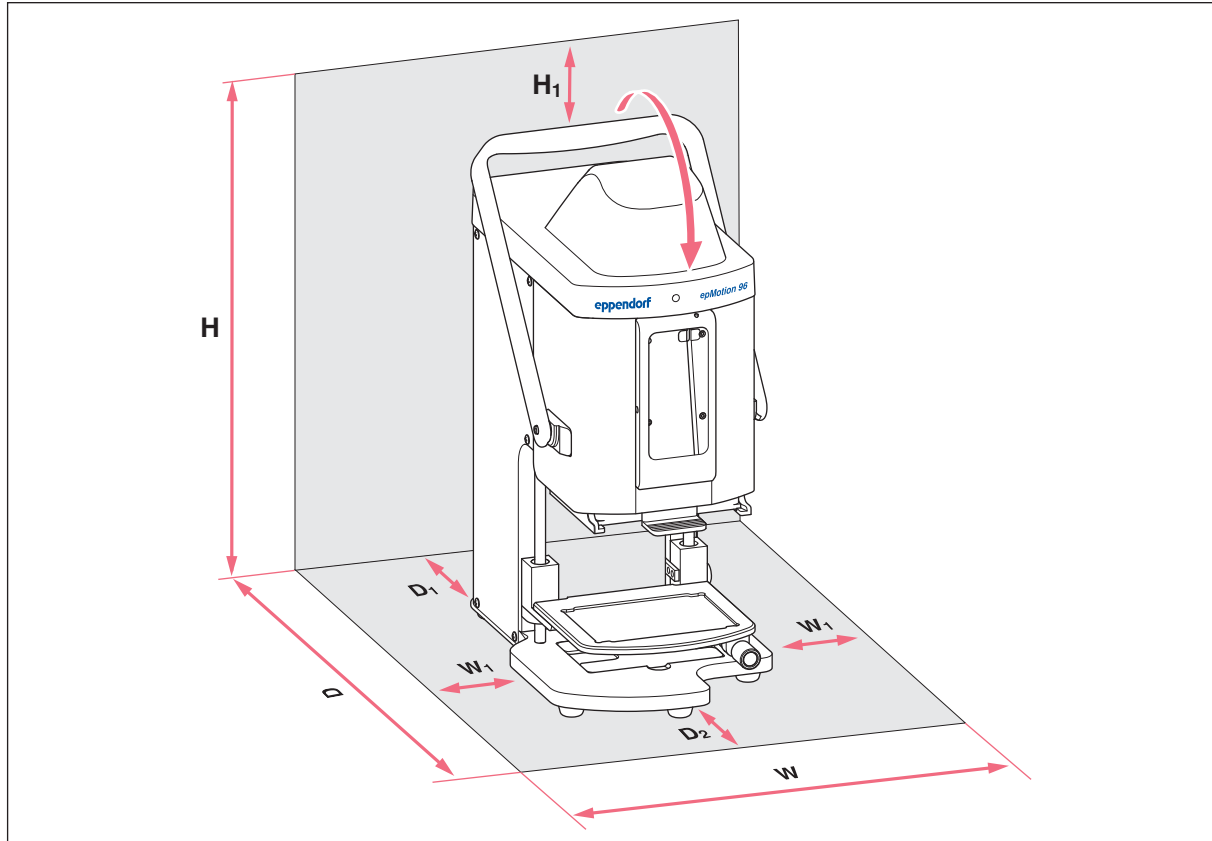


Fig. 4-1: Footprint of an epMotion 96 with a single lifting table

W 335 mm
 $215 + 2 \times W_1$

H 570 mm
 $525 + H_1$

W1
 60 mm

H1
 45 mm

D 594 mm
 $344 + D_1 + D_2$

W Width

D Depth

D1
 100 mm

H Height

D2
 150 mm

4.2.2 epMotion 96 – 2-position slider

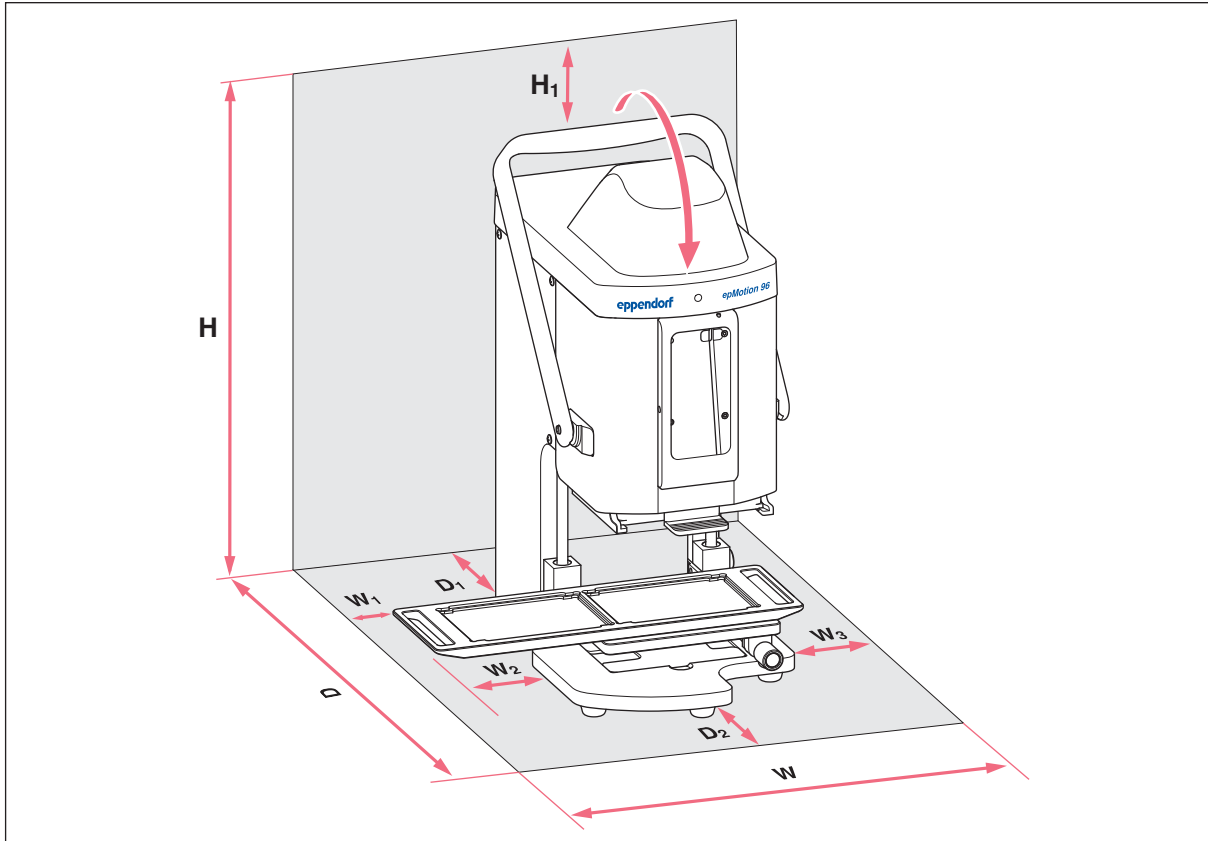


Fig. 4-2: Footprint of an epMotion 96 with 2-position slider

W 601 mm	D2
215 + 2 × W ₂	150 mm
W1	H 570 mm
60 mm	525 + H ₁
W2	H1
133 mm	45 mm
W3	W Width
193 mm	D Depth
W ₁ + W ₂	H Height
D 594 mm	
344 + D ₁ + D ₂	
D1	
100 mm	

Installation

epMotion® 96 - epMotion® 96xl
English (EN)

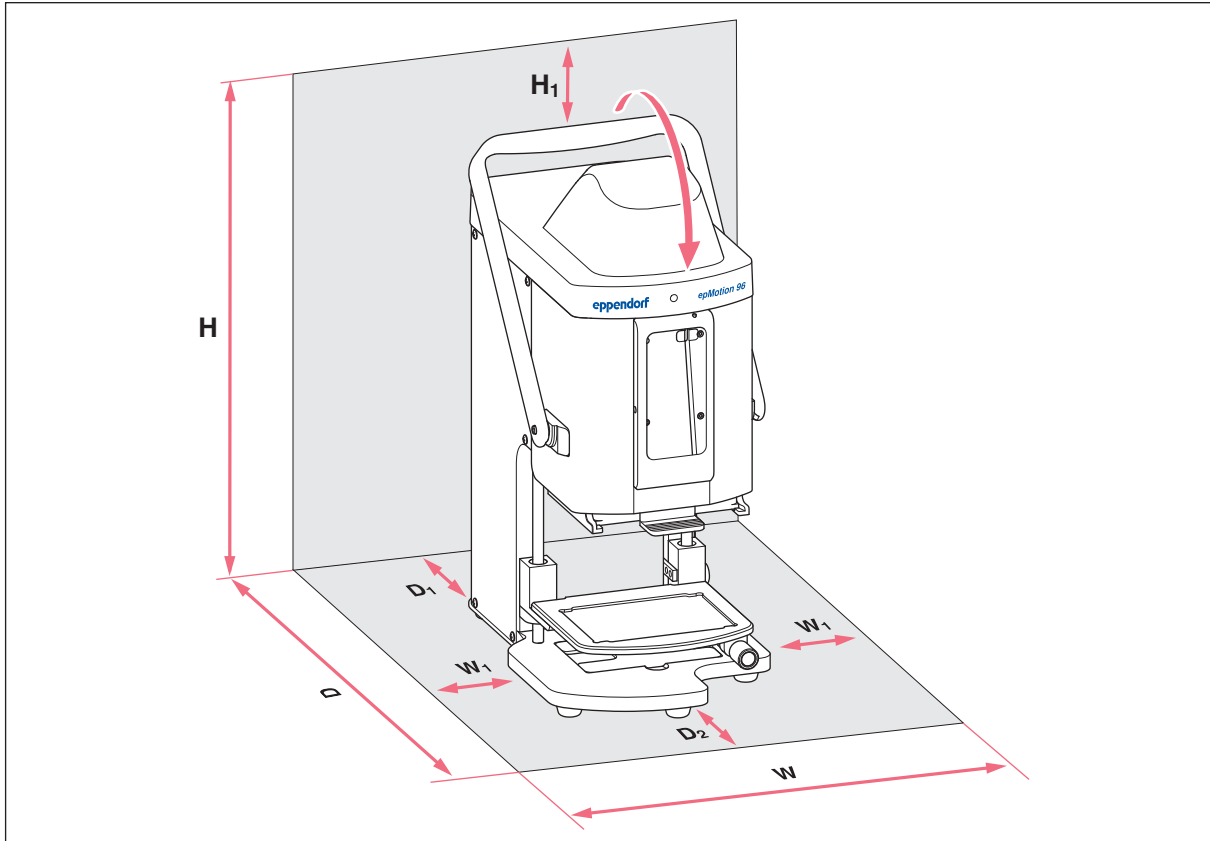
4.2.3 epMotion 96xl – single lifting table

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

W 335 mm
 $215 + 2 \times W_1$

H 621mm
 $576 + H_1$

W1
60 mm

H1
45 mm

D 594 mm
 $344 + D_1 + D_2$

W Width

D1
100 mm

D Depth

H Height

D2
150 mm

4.2.4 epMotion 96xl – 2-position slider

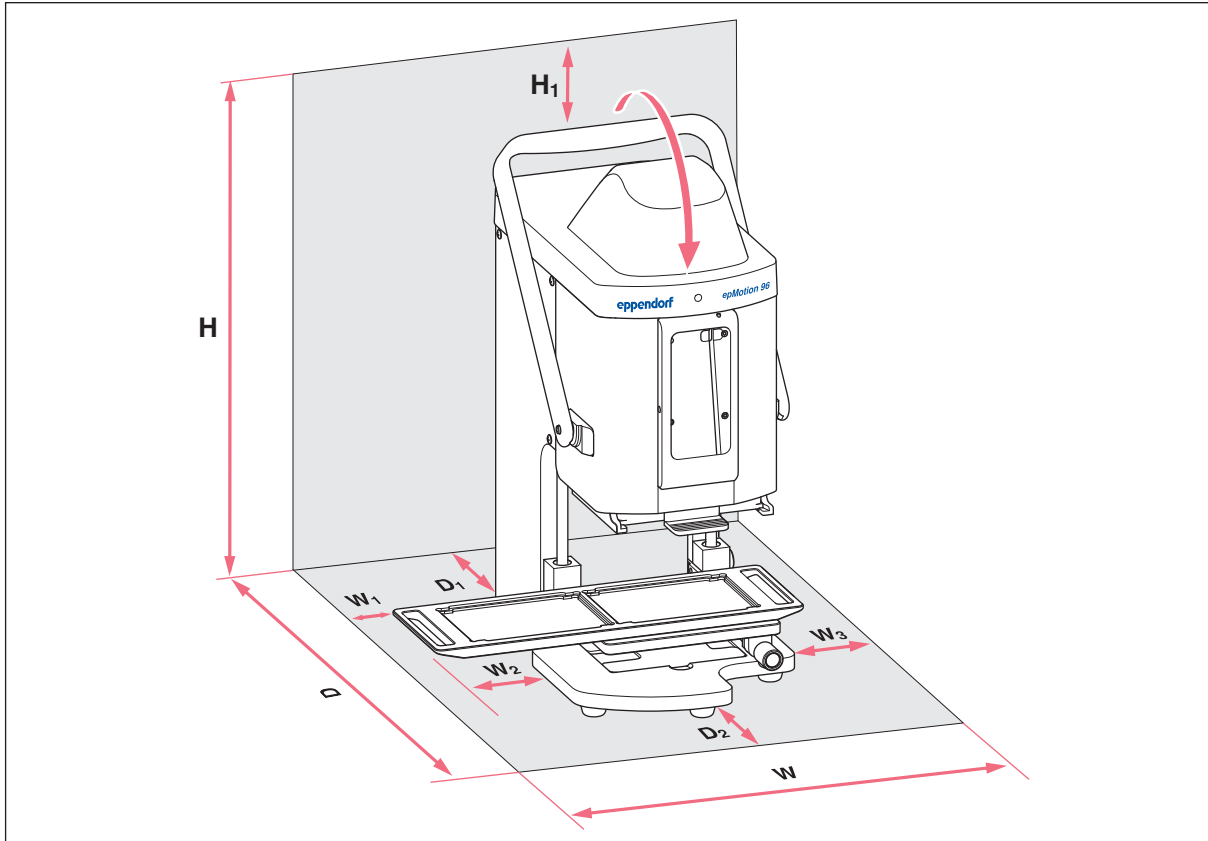


Fig. 4-4: Footprint of an epMotion 96xl with 2-position slider

- W 601 mm**
215 + 2 × W₂
- W1**
60 mm
- W2**
133 mm
- W3**
193 mm
W₁ + W₂
- D 594 mm**
344 + D₁ + D₂
- D1**
100 mm

- D2**
150 mm
- H 621mm**
576 + H₁
- H1**
45 mm
- W Width**
- D Depth**
- H Height**

4.3 Mains/power plug types and earth/grounded sockets

Devices from Eppendorf are supplied with a suitable mains/power cord for the various connection requirements.

4.4 Connecting the device



WARNING! Danger due to incorrect voltage supply.

- ▶ Only connect the device to voltage sources which correspond with the electrical requirements specified on the name plate.
- ▶ Only use earth/grounded sockets with a protective earth conductor.
- ▶ Only use the mains/power cord supplied.



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

- ▶ Only switch on the device if the device and the mains/power cord are undamaged.
- ▶ Only operate devices which have been installed or repaired properly.
- ▶ In the event of danger, disconnect the device from the mains/power supply voltage. 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).



WARNING! Personal injury and damage to device due to the lack of grounding.

Incorrect grounding or the lack of grounding may result in the presence of dangerous electrical voltage on the outside of the housing.

- ▶ Always ensure that the device is properly grounded with the supplied mains/power cord before performing the initial setup of the device.



NOTICE! Damage to electronic components due to condensation.

Condensate may form in the device when it has been transported 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 complies with name plate.
- ▶ Connect the mains/power cord supplied.

4.5 Installing the user software

The user software for epMotion 96 can be directly installed using a control unit. The control unit must have a Wi-Fi connection for this to work. Alternatively, the user software can be saved to a USB stick and installed from a computer with iTunes.

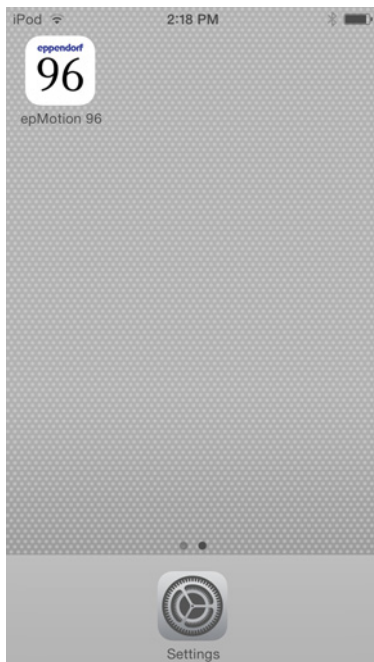


The system software for the device is factory-installed. An update for the system software is described in Chapter (see *Updating the firmware on p. 93*).

Prerequisites

- A control unit is available for use (iPod touch, iPhone or iPad).
- iOS 9.3 operating system or higher is installed.
- Apple ID is available.
- There is an Internet connection.

Operation of the user software will be explained and demonstrated using an iPod touch. All other control unit options are operated in a similar fashion.



1. Start the *App Store*.
2. Enter *epMotion 96* in the search field.
3. Tap *Free*.
4. Tap *Install*.
5. Enter the Apple ID password.
The *epMotion 96* icon appears on the display.

Installation

epMotion® 96 - epMotion® 96xl
English (EN)

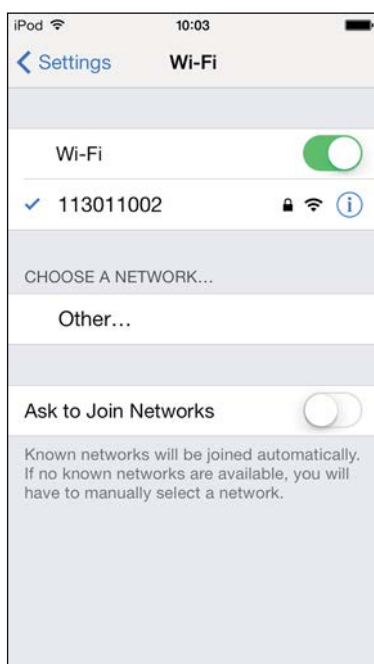
4.6 Setting up the control device

The control device first needs to be set up before the Wi-Fi connection can be established with the pipettor. The network name and a password must be entered here for that purpose.

4.6.1 Activating Wi-Fi

Prerequisites

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

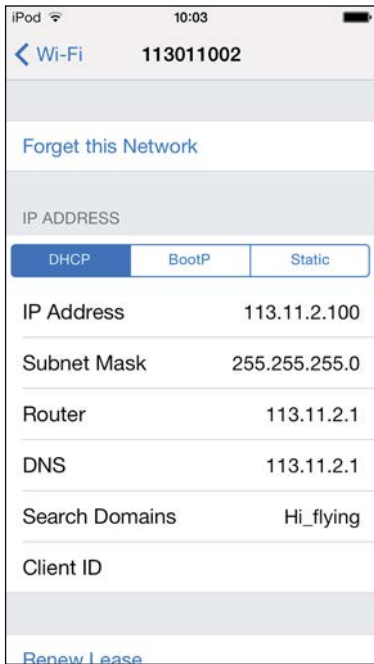


1. Open the *Settings* menu.
2. Select the *Wi-Fi* menu item.
3. Tap the switch for *Wi-Fi* and move to the right.
The switch will be shown in green.
The Wi-Fi connection has been enabled.
Available networks will be shown.
4. Select the network name for the pipettor.
5. To close *Settings*, press *Home*.

4.6.2 Setting up the network

Prerequisites

- Network name (see network name plate).
- Wi-Fi is enabled.



1. Open the *Settings* menu.
2. Select the network for the pipettor.
3. Select the *DHCP* mode.
The network data is set up automatically.
4. Enter the last 5 digits of the network name as the password.
The Wi-Fi connection is shown in the status bar.
The network connection is automatically established.

4.6.3 Deactivating the automatic display switch-off

The control unit automatically switches off the display. This function can be switched off for operation of the device.



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

Installation

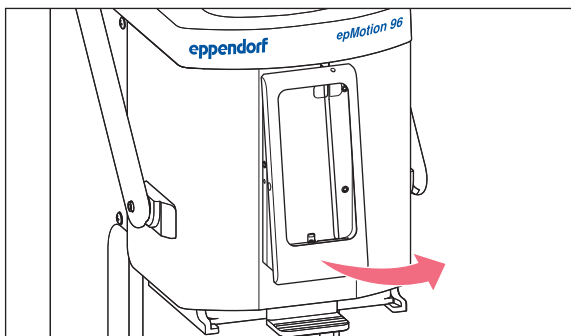
epMotion® 96 - epMotion® 96xl
English (EN)

4.7 Placing the iPod in the docking station

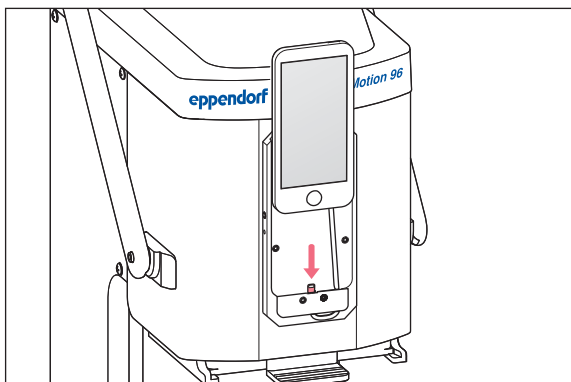
Once placed into the docking station, the iPod's battery is charged automatically. Data connection and data transmission is through a wireless connection.

Prerequisites

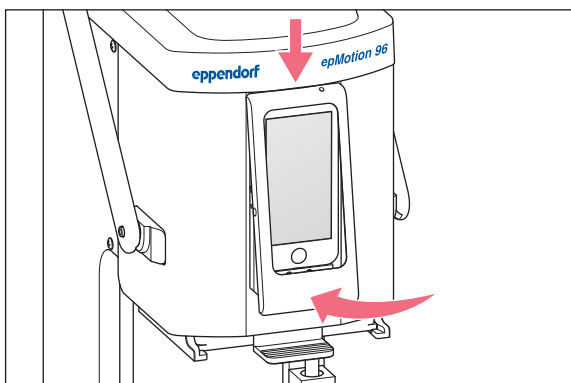
- The tools for the docking station are available.



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.

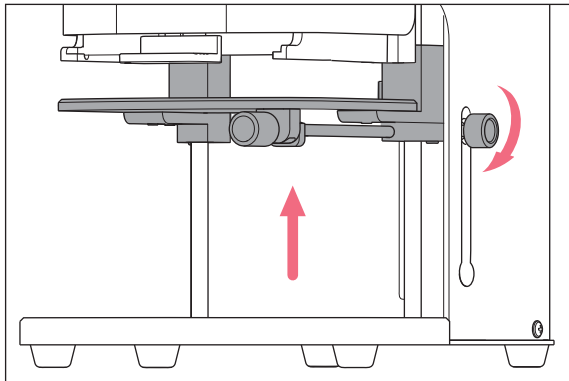


5. Attach the frame.
6. Insert and tighten the screws.
The iPod is charged via the docking station.
The iPod is protected against theft.

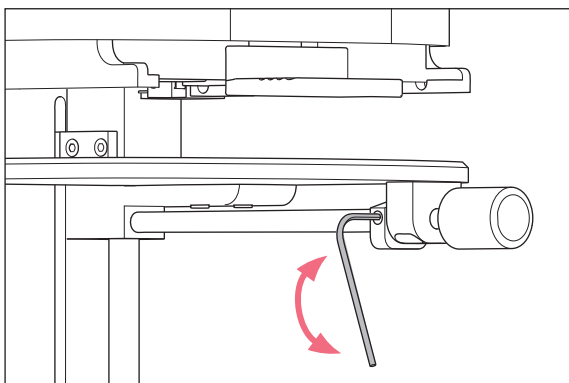
4.8 Changing the locking direction

Prerequisites

- An Allen key 5/64" is available for use.



1. Move the lifting table to the very top and tighten the locking handle.
2. Secure the lifting table in the uppermost position with the lower stop.



3. Loosen the set screw with the Allen key.
4. Turn the locking handle until the end of the stop is reached and tighten the set screw again.
The direction of rotation for tightening/loosening the locking handle has changed.

Installation

epMotion® 96 - epMotion® 96xl
English (EN)

5 User 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

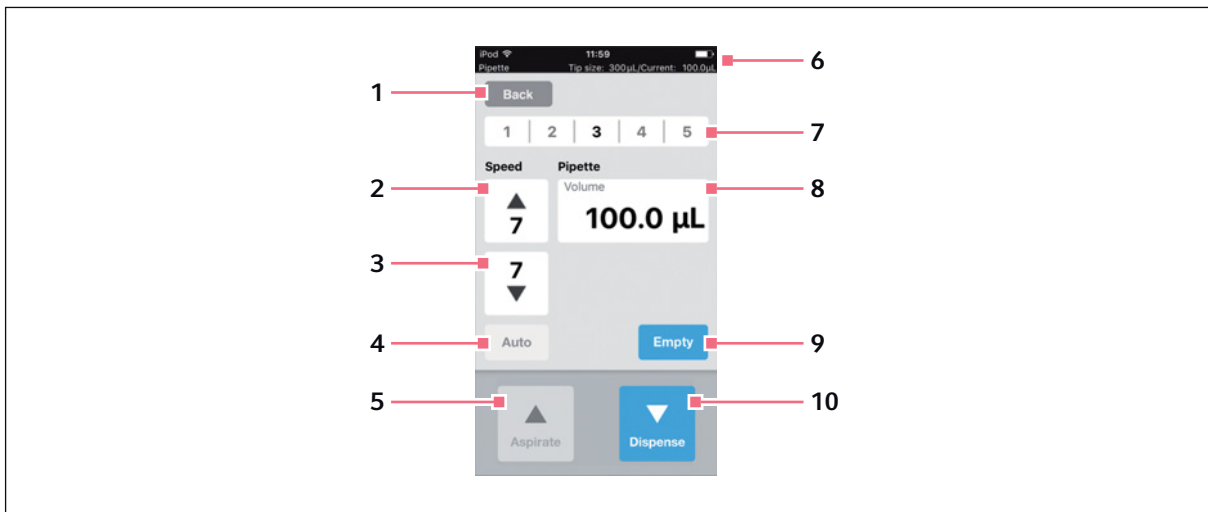


Fig. 5-1: Layout and elements of the touchscreen – example mode *Pipette*

- | | |
|--|--|
| <p>1 Back button
 Selects the previous view</p> <p>2 Speed for liquid aspiration
 Levels 1 – 9</p> <p>3 Speed for liquid dispensing
 Levels 1 – 9</p> <p>4 Function for automatic pipetting</p> <p>5 Aspirate button
 Aspirating liquid</p> | <p>6 Status line
 Wireless connection, time, battery life
 operating mode, size of the pipette tips, current
 volume</p> <p>7 Saved parameter profile
 Profiles 1 – 5</p> <p>8 Parameter</p> <p>9 Empty button
 Empty pipette tips</p> <p>10 Dispense button
 Dispense liquid</p> |
|--|--|

5.2 Overview of operating modes

Predefined operating modes are available for standard applications.

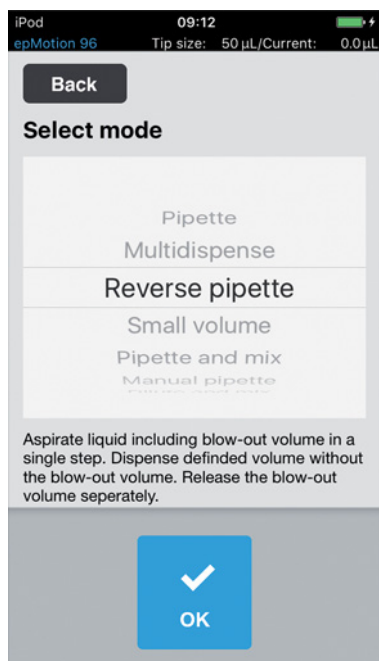


Fig. 5-2: Display with the selection of operating modes

Operating mode	Use
<i>Pipette</i>	Aspirate the liquid in a single step and dispense it in a single step also.
<i>Multidispense</i>	Aspirate liquid in one step and dispense it in several steps.
<i>Reverse pipette</i>	Aspirate a larger volume of liquid using the blow out (blow volume). Dispense the defined amount of fluid without the blow volume. Dispense the blow volume with a separate blow-out.
<i>Small volume</i>	First, aspirate a large volume of a system liquid, followed by the aspiration of an air cushion, and then aspiration of the target liquid. The system liquid remains in the tip when the target liquid is dispensed.
<i>Pipette and mix</i>	Dispense and then mix the liquid.
<i>Manual pipette</i>	Manually set the liquid volumes for aspiration and dispensing.
<i>Dilute and mix</i>	Aspirate plenty of diluting agent and very little concentrated liquid. The diluting agent and concentrated liquid are mixed when dispensed.
<i>Multiaspirate</i>	Aspirate liquid in several steps and dispense it in one step.
<i>Sequential Dispense</i>	Aspirate the liquid in a single step and dispense it in several sub-steps. The dispensed volume of the sub-steps can be determined individually.
<i>PreWet</i>	Aspirate and dispense the liquid volume several times in order to wet the pipette tips with liquid and pre-saturate the air cushion.
<i>Run program</i>	Select and execute the pre-selected program run.
<i>Settings</i>	Set the system properties.

5.2.1 Selecting the operating mode

1. Tap the mode selection and scroll up or down the list.
2. Confirm the mode with *OK*.
The display with the selected mode is shown.

5.3 Operating controls for user software

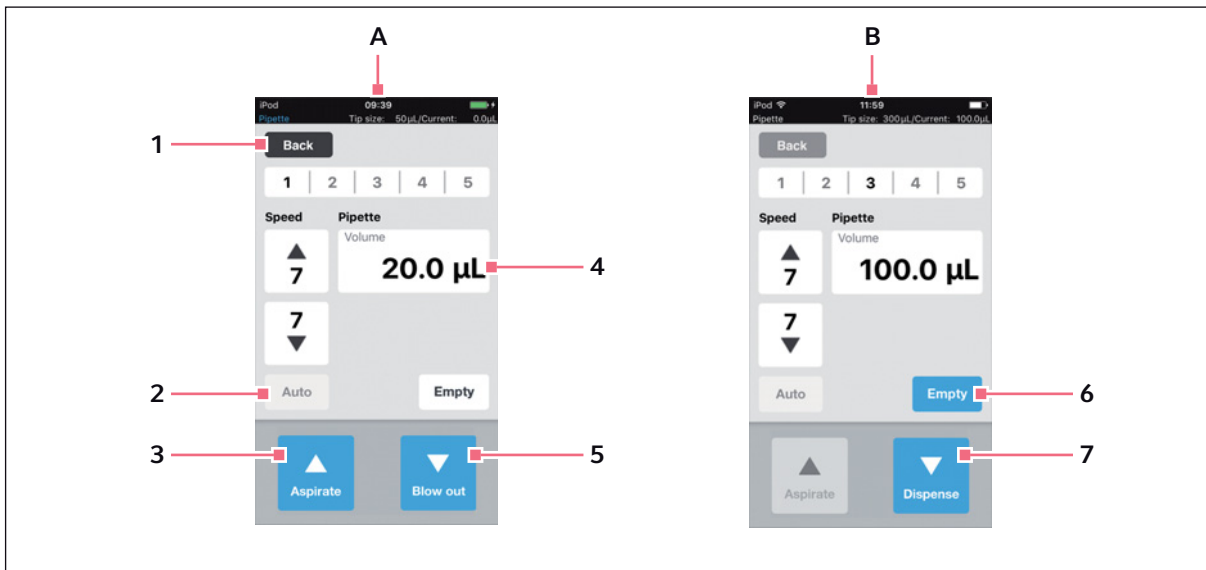


Fig. 5-3: Operating controls for user software

- | | |
|---|--|
| <p>A View after calling up the operating mode</p> <p>B View after liquid aspiration</p> <p>1 Back button
Active button
Call up the previous view</p> <p>2 Auto button
Inactive button</p> <p>3 Aspirate button
Active button</p> | <p>4 Volume parameter
Editable parameter</p> <p>5 Blow out button
Active button</p> <p>6 Empty button
Active button</p> <p>7 Dispense button
Active button</p> |
|---|--|

5.4 Entering or changing the parameters

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

5.4.1 Changing parameters

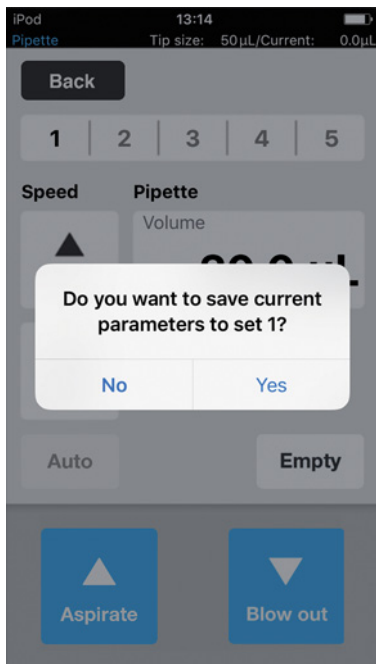
Parameters can be changed with the iPod keypad.



1. Tap and hold the parameter.
The keypad is shown.
2. Change the value for the parameter.
3. Tap a free area of the display.
The keypad is hidden.
The changed value is saved.

5.4.2 Saving the parameter profile

Several parameter profiles can be saved in every operating mode.



1. Select the mode.
2. Set the parameters for the mode.
3. Tap and hold the number required for the parameter profile.
4. Confirm prompt with *Yes*.
The parameter profile is saved.
The number with the saved parameter profile is shown in black.

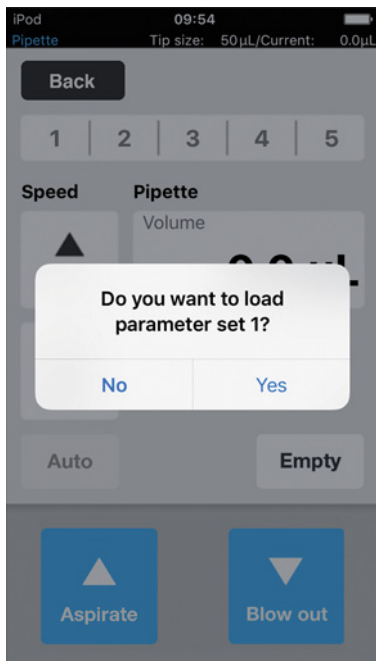
5.4.3 Loading the parameter profile

Prerequisites

- There is a parameter profile saved.



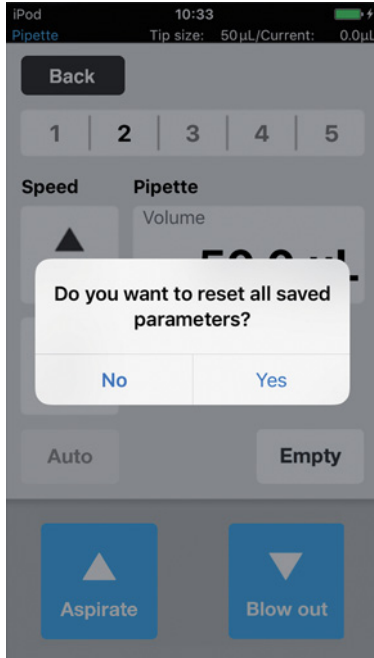
The parameter profile must match both the device used and the pipette tips. If an error message appears, the parameters can be adapted to the device in question.



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

User software

epMotion® 96 - epMotion® 96xl
English (EN)

5.4.4 Resetting all parameter profiles

1. Press and hold *Back*.
2. Confirm prompt with *Yes*.
All user-specific changes in this operating mode will be deleted.
The pre-defined parameter profiles are available.

6 Operation

6.1 Switching the device on or off



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

- ▶ Only switch on the device if the device and the mains/power cord are undamaged.
- ▶ Only operate devices which have been installed or repaired properly.
- ▶ In the event of danger, disconnect the device from the mains/power supply voltage. 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 on the device

Prerequisites

- There are no pipette tips in the device.

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

The device carries out a self-test.

The device is ready for operation once the status lamp lights up green.

The docking station is live.. The iPod touch used is charged.

The user software can be started (see p. 41).

6.1.2 Switching off the device

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

All device components and the docking station are without power.

6.2 Starting the user software

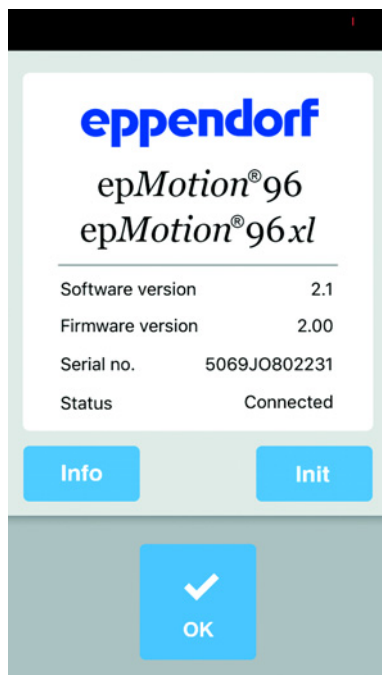
6.2.1 Starting the user software

Prerequisites

- The device is switched on.
- The epMotion 96 user software has been installed.

Operation

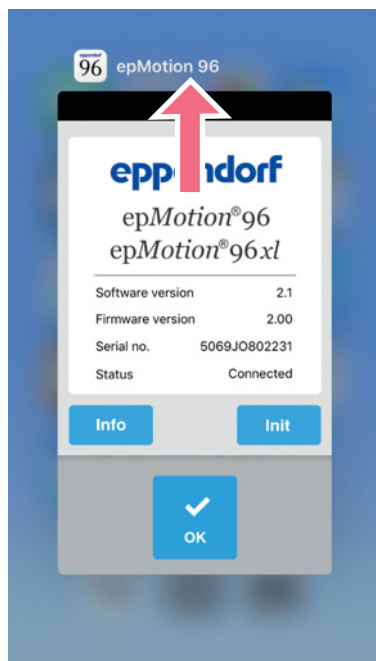
epMotion® 96 - epMotion® 96xl
English (EN)



1. Tap the *epMotion 96* icon.
2. Confirm the start screen with *OK*.
The selection of operating modes is shown.

6.2.2 Exiting the user software

There is no single button to exit the user software.



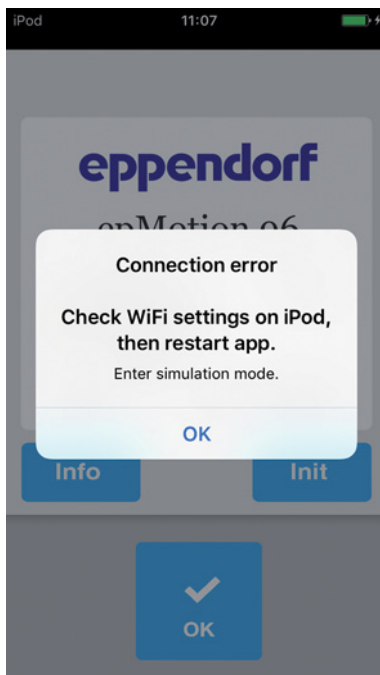
1. The *Home* button on the control unit needs to be pressed twice.
2. Tap the screen of the user software and swipe it upwards and out of the window.
The user software has now been exited.

6.2.3 Using user software in Simulation mode

Prerequisites

- The device is switched off or the Wi-Fi connection is disabled.

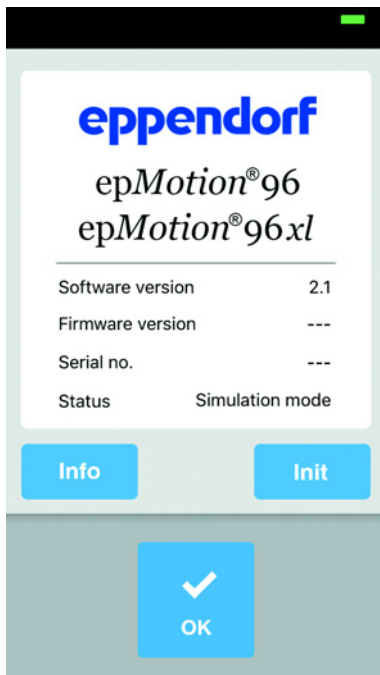
The user software can be used in Simulation mode if there is no Wi-Fi connection to the device. In Simulation mode, all settings and programs can be viewed, changed and tested. No mode can be executed.



1. Tap the *epMotion 96* icon.
2. Confirm the error messages with *OK*.
The user software starts in Simulation mode.
The *Simulation Mode* mode is shown.

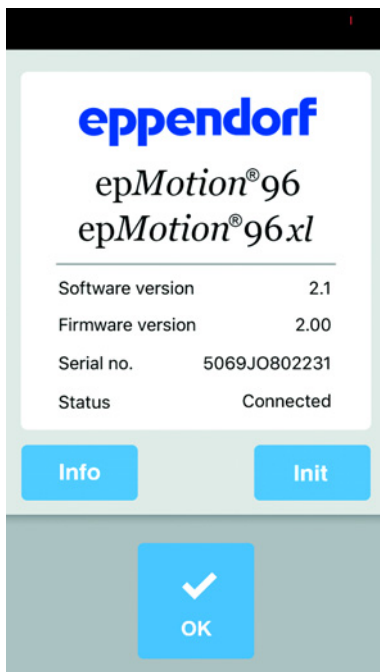
Operation

epMotion® 96 - epMotion® 96xl
English (EN)



3. Start the Simulation mode with *OK*.
All functions and modes are executable and can be used.
There is no Wi-Fi connection.
No data is transferred to the pipettor.

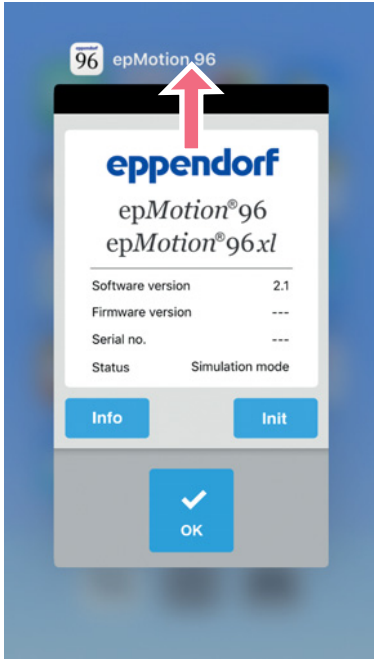
6.2.4 Changing from Simulation mode to Work mode



1. Switch on the device.
2. Wait until a Wi-Fi connection is established.
3. Press the *Init* key.
The Simulation mode is terminated.
The *Connected* mode is shown.

6.2.5 Terminating the Simulation mode

There is no single button to exit the user software.



1. The *Home* button on the control unit needs to be pressed twice.
2. Swipe the screen of the user software upwards and out of the window.
The Simulation mode is terminated.
The user software has now been exited.

6.3 Inserting the pipette tips



CAUTION! Risk of entrapment between the lever and housing.

If the lever is gripped from the side, there is a risk that your fingers could become trapped between the lever and the housing.

- ▶ Always take hold of the middle of the lever from above when locking or unlocking.



NOTICE! Dispensing errors due to incorrect handling of pipette tips.

Pipette tips become deformed and change size during autoclaving.

- ▶ Do not autoclave the pipette tips. If necessary, use pipette tips that are specified as sterile.

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

**NOTICE! Damage to device due to incorrect size of pipette tips.**

Using a tray with pipette tips smaller than 50 µL will cause damage to the device. Excess liquid ends up in the dispensing head, damages the mechanics and leads to measurement errors.

- ▶ epMotion 96 – Only use trays with pipette tips in sizes 50 µL or 300 µL.
- ▶ epMotion 96xl – Only use trays with pipette tips in sizes 300 µL or 1000 µL.
- ▶ If liquid has penetrated the dispensing head, switch off the device.
- ▶ Contact the authorized service.

**NOTICE! Damage to device due to incorrectly equipped trays.**

The device detects the tip size from the code on the tray. Incorrect equipping of the trays can lead to contamination of the pipetting head.

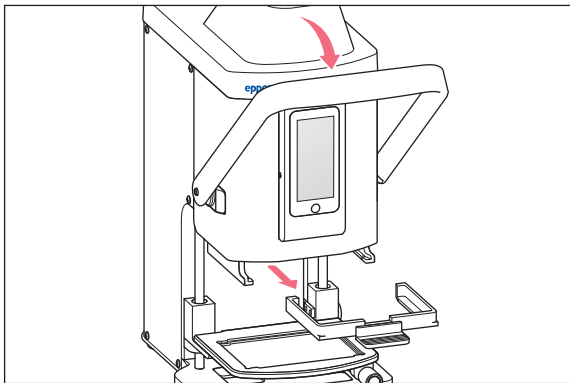
- ▶ Only use trays that were equipped by the manufacturer.
- ▶ Only use the recommended tip sizes.



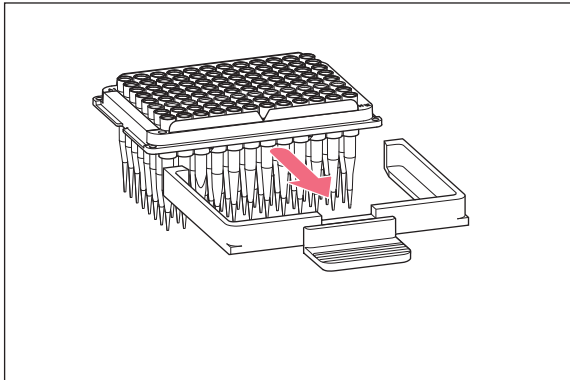
When unlocking the pipette tips, liquid escapes from the pipette tips.
Make sure the pipette tips are completely empty before any replacement.

Prerequisites

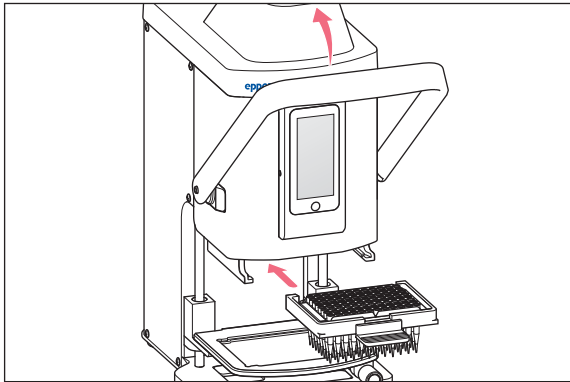
- Device is switched on.
- The lifting table is in the home position.
- Pipette tips (epT.I.P.S. Motion Reloads) are available for use.



1. Pull the lever of the pipettor forwards.
2. Pull out the loading frame.



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



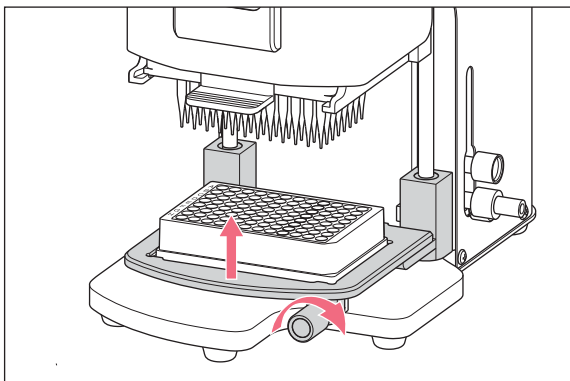
4. Insert the loading frame with the tray into the pipettor.
5. Press the lever of the pipettor backwards.
The pipette tips are inserted and locked in place.
In the status bar of the user software, the volume of the pipette tips is shown.

6.4 Moving the lifting table

6.4.1 Moving the lifting table into the working position

Prerequisites

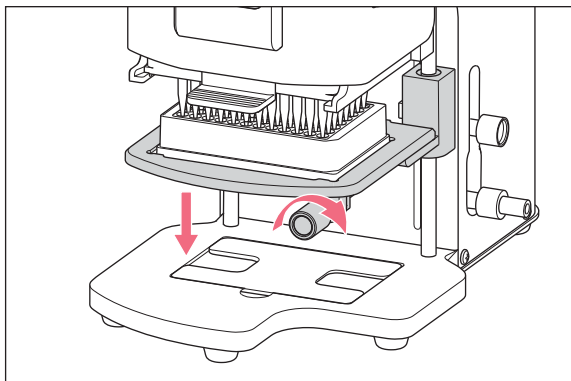
- Pipette tips are in position.



1. Release the locking handle.
2. Move the lifting table upwards into the working position.
3. Tighten the locking handle.
Liquid can be aspirated.
Liquid can be dispensed.
The stop can be adjusted.

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

6.4.2 Moving the lifting table into the home position

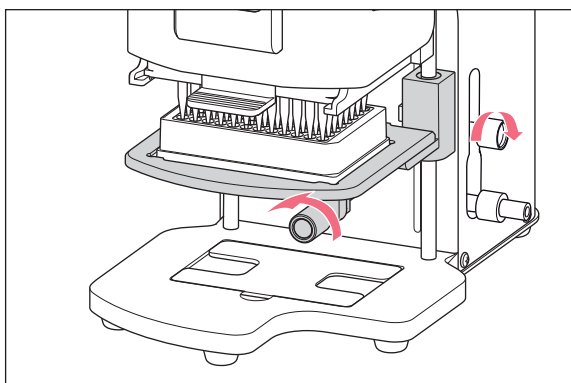
1. Hold the lifting table and loosen the locking handle.
2. Move the lifting table into the basic position.
The source vessel or destination vessel can be changed.
Pipette tips can be inserted.

6.4.3 Adjusting the upper stop for the lifting table

The stop defines the end position of the lifting table in the working position. The stop is useful when several plates need to be filled. In the modes *Multidispense*, *Sequential Dispense* and *Multiaspirate*, the stop can be used for semi-automatic liquid aspiration and liquid dispensing.

Prerequisites

- The stop is in the home position.



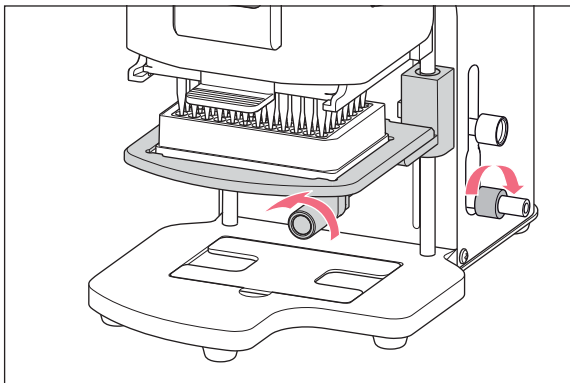
1. Move the lifting table into the working position.
2. Tighten the locking handle on the lifting table.
3. Tighten the locking handle for the stop.
The working position is preset.

6.4.4 Adjusting the lower stop for the lifting table

The stop defines the lower end position of the lifting table in the working position. The traveling distance of the lifting table is thus reduced and processing is completed faster.

Prerequisites

- The stop is in the home position.

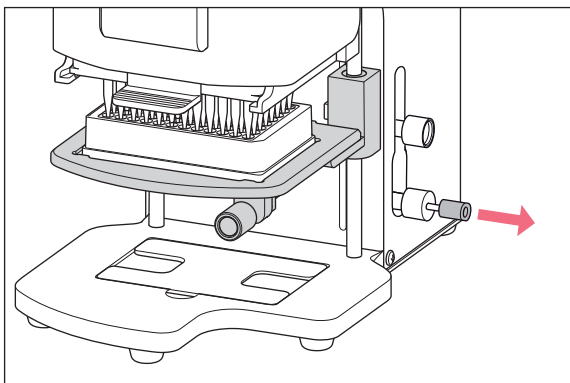


1. Move the lifting table into the working position.
2. Tighten the locking handle on the lifting table.
3. Tighten the locking handle for the lower stop.

6.4.5 Unlocking the lower stop

Prerequisites

- The lower stop is secured in position.



1. Pull out the release mechanism.
The lower stop is unlocked.
The lifting table can be moved as far as the home position.

6.5 Moving the 2-position slider

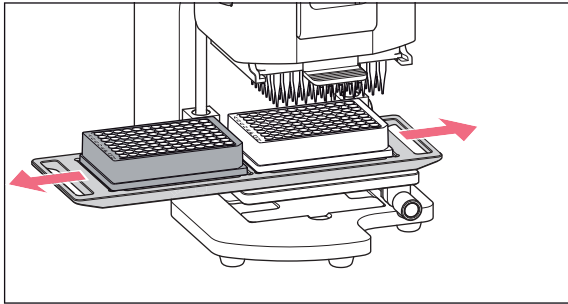
The 2-position slider moves horizontally on the lifting table. A source vessel and a destination vessel can be positioned at the same time. The left side of the 2-position slider is equipped with a grid every 4.5 mm for better positioning. The lifting table is used in the same way as the single lifting table without the 2-position slider.



The grid is particularly suitable for the *Sequential Dispense* mode.

Operation

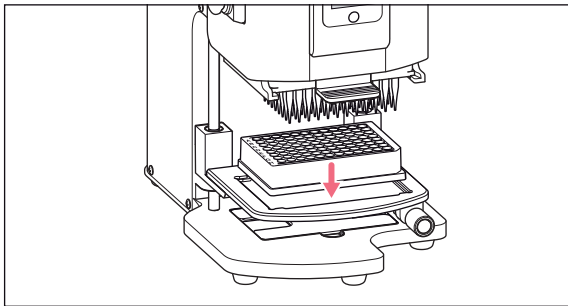
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English (EN)



1. Move the 2-position slider over the locking point.
2. Move the 2-position slider horizontally from the source vessel to the destination vessel.
The 2-position slider locks into the end position.

6.6 Inserting the plate**6.6.1 Inserting a 96-well plate****Prerequisites**

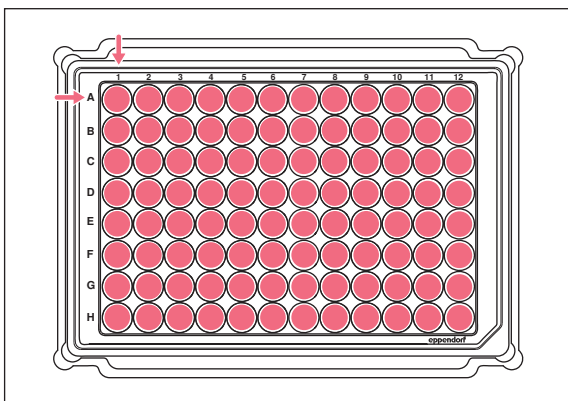
- The lifting table is in the basic position.
- Adapter for 384-well plate is located in the base.



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.

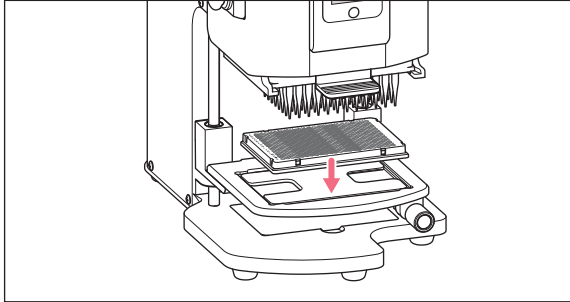


1. Move the lifting table into the working position.
2. Tighten the locking handle.
3. Select the operating mode und fill the plate.

6.6.3 Inserting a 384-well plate

Prerequisites

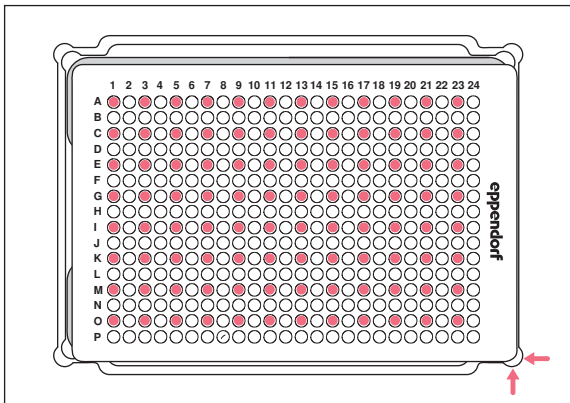
- The lifting table is in the basic position.



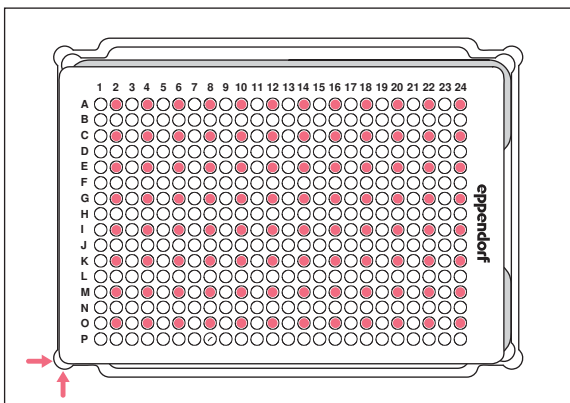
1. Lift the lifting table and take the adapter out of the base.
2. Insert the adapter into the lifting table.
3. Insert the 384-well plate in the lower right-hand corner.

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.



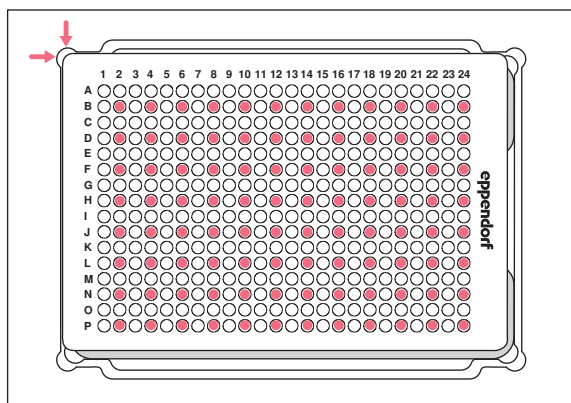
1. Place the 384-well plate in the bottom right position.
2. Move the lifting table into the working position. Every other column (1, 3, 5, ...) and every other row is filled, starting with A1 (A, C, E, ...).



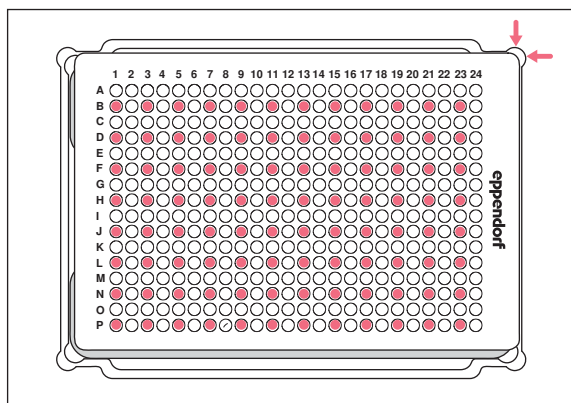
3. Move the lifting table into basic position.
4. Place the 384-well plate in the bottom left position.
5. Move the lifting table into working position. Every other column (2, 4, 6, ...) and every other row is filled, starting with A2 (A, C, E, ...).

Operation

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English (EN)



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 will describe the general approach taken when aspirating liquid. The chapters for the individual operating modes describe the special work steps for the mode in question.

Prerequisites

- Device is switched on.
- User software has started.
- Pipette tips are in position.

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 dipped in 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 be 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 non-aqueous liquids

Non-aqueous liquids have physical properties that impact the dispensing result.

Non-aqueous liquids include:

- Liquids with high vapor pressure
- Liquids with low surface tension (e.g. detergents)
- Viscous liquids
- Suspensions in magnetic particles (beads)

Prerequisites

- The smallest possible pipette tips are selected.

1. Select the operating mode *PreWet* and pre-wet the pipette tips.
2. Select the operating mode *Reverse pipette*.
3. Set the speed setting for liquid aspiration to 4.
4. Set the speed setting for liquid dispensing to 5.
5. Perform the liquid aspiration and liquid dispensing without delay.

6.11 Aspirating and dispensing liquid – 2-position slider

This chapter will describe the general approach taken when aspirating liquid. The chapters for the individual operating modes describe the special work steps for the mode in question.

Prerequisites

- Device is switched on.
- User software has started.
- Pipette tips are in position.

1. Place the source vessel and destination vessel on the lifting table.
2. Pre-wet the pipette tips as required.
3. Select the operating mode.
4. Set the aspiration volume.
5. Set the parameters.
6. Move the 2-position slider horizontally and position the source vessel underneath the pipette tips.
7. Move the lifting table into the working position, until the pipette tips are dipped in the liquid.
8. Tighten the locking handle on the lifting table.
9. Press *Aspirate*.
Liquid is aspirated.
A destination vessel can be filled.
10. Loosen the locking handle on the lifting table.
11. Move the lifting table into the home position.
12. Move the 2-position slider horizontally and position the destination vessel underneath the pipette tips.

13. Move the lifting table to the working position, until the openings of the pipette tips are positioned below the edge of the vessel.
14. Tighten the locking handle on the lifting table.
15. Press the *Dispense* button.
16. Release the locking handle.
17. Move the lifting table up until the pipette tips are dipped in the liquid.
Any drops of liquid remaining on the tips are wiped off.
18. Move the lifting table into the home position.

6.12 *Blow out* function – Dispensing residual liquid

In the following modes, the residual liquid is included in the dispensed volume:

- *Pipette*
- *Pipette and mix*
- *Manual pipette*
- *Dilute and mix*
- *Multiaspirate*
- *Sequential Dispense*
- *PreWet*

In the following modes, the residual liquid is not included in the dispensed volume:

- *Multidispense*
- *Reverse pipette*
- *Small volume*

Prerequisites

- *Blow out* button is active (shown instead of *Dispense*).
 - A destination vessel is available.
1. Move the lifting table into the working position and secure with the locking handle.
 2. Press the *Blow out* button.
The pipette tips are emptied.
 3. Wipe any remaining drops of liquid from the pipette tips.
 4. Move the lifting table into the home position.
 5. Confirm prompt with *OK*.

Operation

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English (EN)

6.12.1 Skipping the *Blow out* function

In the following modes, the function can be canceled or skipped:

- *Pipette*
- *Pipette and mix*
- *Manual pipette*
- *Dilute and mix*
- *Multiaspirate*
- *Sequential Dispense*
- *PreWet*

1. Press *Back*.

The *Quit method w/o blow out?* prompt appears.

2. Confirm with *Yes*.

Blow out is skipped.

The 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.

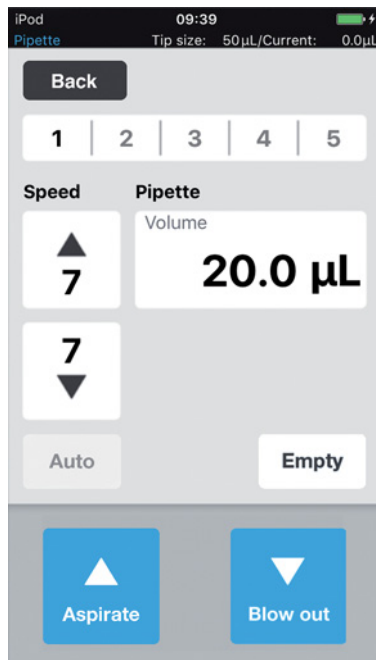


Fig. 6-1: *Pipette* mode

6.14.1 Parameters for epMotion 96

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

6.14.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed of liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed of liquid dispensing.	1 – 9
<i>Volume</i>	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*.

Operation

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English (EN)

6.15 Multidispense mode – Dispensing liquid in steps of equal measure

Aspirate liquid in one step and dispense it in several steps of equal measure. The *Auto* function can be used to activate the automatic liquid dispensing.

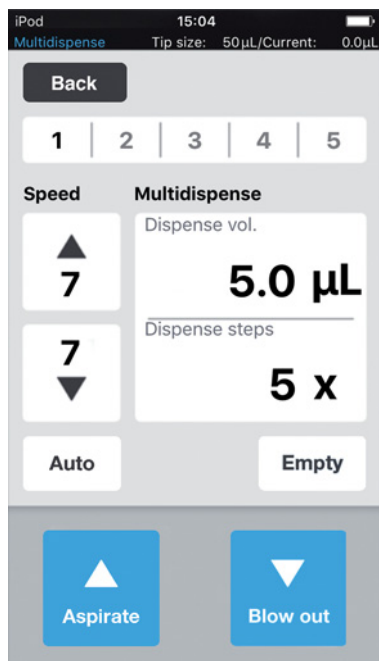


Fig. 6-2: Mode *Multidispense*

6.15.1 Parameters for epMotion 96

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

6.15.2 Parameters for epMotion 96xl

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

6.15.3 Aspirating liquid

Prerequisites

- Source vessel is available for use.
1. Place the source vessel on the lifting table and move the lifting table into the working position.
 2. Set the dispensed volume and dispensing steps.
 3. Set the speed levels.
 4. Press *Aspirate*.

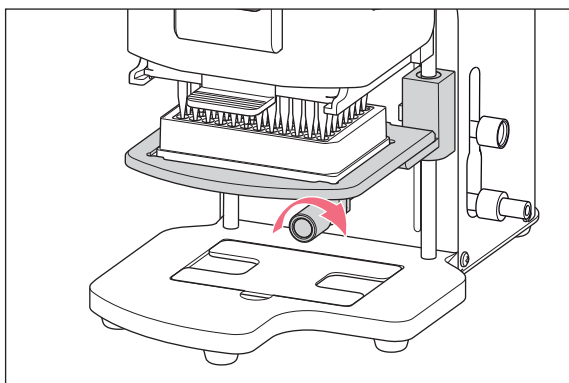
6.15.4 Dispensing liquid

Prerequisites

- Liquid has been aspirated.
 - Destination vessels are available for use.
1. Place the destination vessel on the lifting table and move the lifting table into the working position.
 2. Press *Dispense*.
 3. Move the lifting table into the home position.
 4. Change or move the destination vessel.

6.15.5 Semi-automatic dispensing of liquid

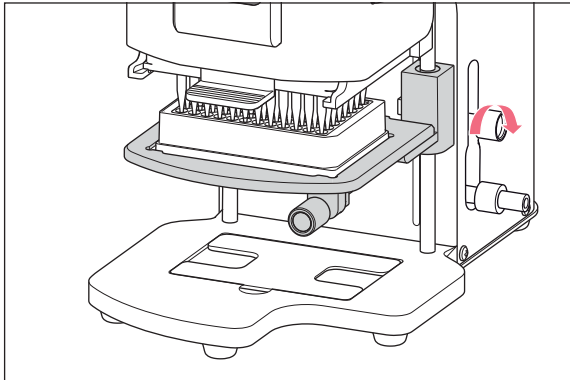
The *Auto* function is useful when filling several 96-well plates one after the other, or when filling one 384-well plate.



1. Press the *Auto* button.
2. Set the dispensed volumes.
3. Set the dispensing steps.
4. Aspirate liquid from a source vessel.
5. Place the destination vessel on the lifting table.
6. Move the lifting table to the working position and hold it here.

Operation

epMotion® 96 - epMotion® 96xl
English (EN)



7. Tighten the locking handle for the stop of the working position.
8. Lower the lifting table.
9. Move the lifting table as far as the stop and keep it here.
The liquid dispensing is triggered.
The number of remaining dispensing steps is shown.
10. Move the lifting table into the home position.
11. Change or move the destination vessel.

6.16 Reverse pipette mode – Aspirating larger volumes of liquid

More liquid is aspirated through the use of the blow out (blow volume). Dispense the defined amount of fluid without the blow volume. Dispense the blow volume with a separate blow-out.

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

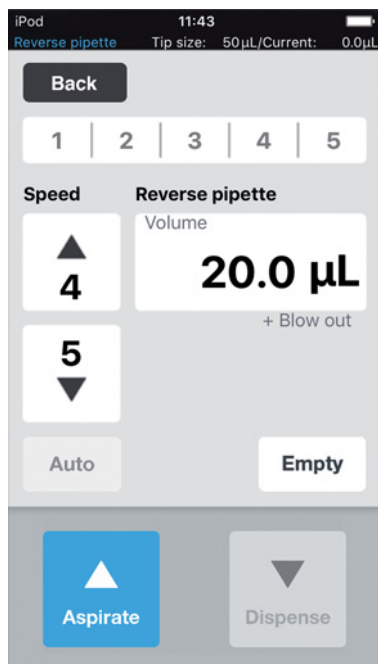


Fig. 6-3: Mode *Reverse pipette*

6.16.1 Parameters for epMotion 96

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Volume</i>	Set the dispensed volume in μL .	0.5 – 300
<i>Blow out</i>	Volume determined according to size of pipette and the sample volume. Aspirated together with the sample volume.	

Parameter	Pipette tip	Sample volume	Value
<i>Blow out</i>	50 μL	0.5 μL – 50 μL	22 μL
	300 μL	0.5 μL – 300 μL	22 μL

6.16.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Volume</i>	Set the dispensed volume in μL .	5 – 1000
<i>Blow out</i>	Volume determined according to size of pipette and the sample volume. Aspirated together with the sample volume.	

Parameter	Pipette tip	Sample volume	Value
<i>Blow out</i>	300 μL	5 μL – 300 μL	74 μL
	1000 μL	5 μL – 1000 μL	74 μL

6.16.3 Aspirating liquid

Prerequisites

- Source vessel is available for use.

1. Place the source vessel on the lifting table and move the lifting table into the working position.
2. Set the dispensed volumes and 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 the working position.
2. Press *Dispense*.
3. Press *Empty*
The liquid dispensing is complete.

Operation

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English (EN)

6.16.5 Dispensing liquid multiple times

1. Place the source vessel with 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 the working position.
4. Press *Dispense*.
The liquid is dispensed.
5. Press *Empty*
The 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.

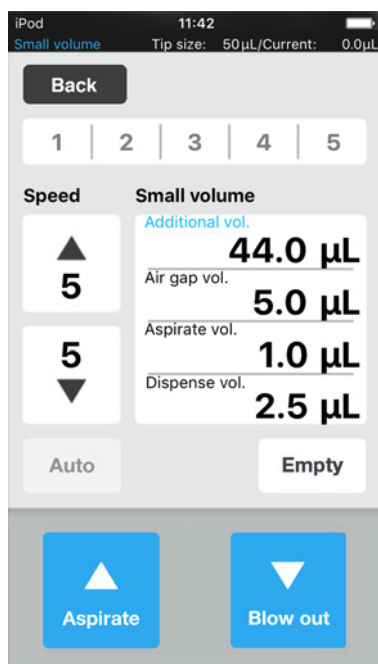


Fig. 6-4: *Small volume* mode

6.17.1 Parameters for epMotion 96

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

6.17.2 Parameters for epMotion 96xl

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

Operation

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English (EN)

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 Pipette and mix mode – Dispensing and mixing the liquid

Aspirate the liquid in one step, dispense the liquid in one step and automatically mix the liquid.

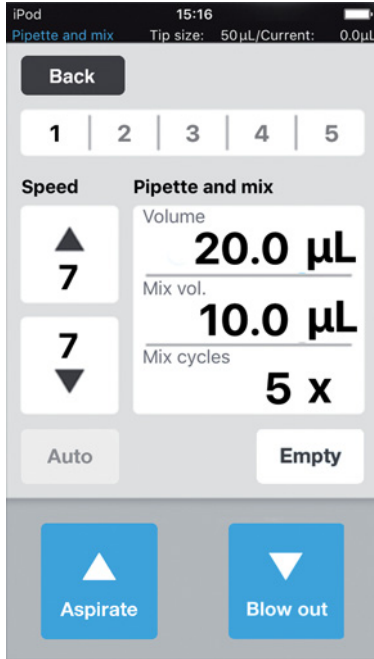


Fig. 6-5: Pipette and mix mode

6.18.1 Parameters for epMotion 96

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Volume</i>	Set the aspiration volume in µL.	0.5 – 300
<i>Mix vol.</i>	Set the mixing volume in µL.	0.5 – 300
<i>Mix cycles</i>	Set the number of mixing cycles.	1 – 19

6.18.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Volume</i>	Set the aspiration volume in µL.	5 – 1000
<i>Mix vol.</i>	Set the mixing volume in µL.	5 – 1000
<i>Mix cycles</i>	Set the number of mixing cycles.	1 – 19

Operation

epMotion® 96 - epMotion® 96xl
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6.18.3 Aspirating liquid

Prerequisites

- Source vessel is available for use.
1. Place the source vessel on the lifting table and move the lifting table into the working position.
 2. Set the aspiration volumes and 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 the working position.
 2. Set the mixing volumes and mixing cycles.
 3. Press *Dispense*.
 - The liquid volume set is dispensed.
 - The mixing volume is automatically aspirated and dispensed.

6.19 Manual pipette mode – Manually aspirating and dispensing liquid

Manually set the liquid volumes for aspiration and dispensing.

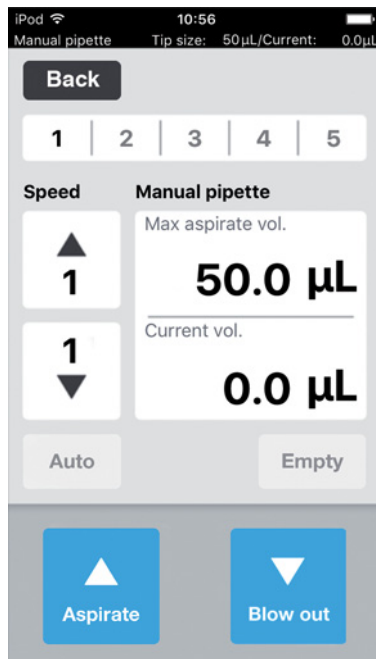


Fig. 6-6: Mode *Manual pipette*

6.19.1 Parameters for epMotion 96

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Max. aspirate vol.</i>	Set the dispensed volume in μL .	0.5 – 300
<i>Current vol.</i>	Display of current volume in μL .	0 – 300

6.19.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Max. aspirate vol.</i>	Set the dispensed volume in μL .	5 – 1000
<i>Current vol.</i>	Display of current volume in μL .	0 – 1000

6.19.3 Aspirating liquid

Prerequisites

- Source vessel is available for use.

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

The liquid will continue to be aspirated until *Aspirate* is released or the aspiration volume set has been 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 the working position.
2. Press and hold *Dispense*.

The liquid will continue to be dispensed until *Dispense* is released or the volume of liquid has been used up.

6.20 Dilute and mix mode – Diluting and mixing liquid

The application is used for the dilution of samples and reagents with a suitable diluting solution. Aspirate the dilution, air, liquid concentrate and mix when dispensing.

Operation

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English (EN)

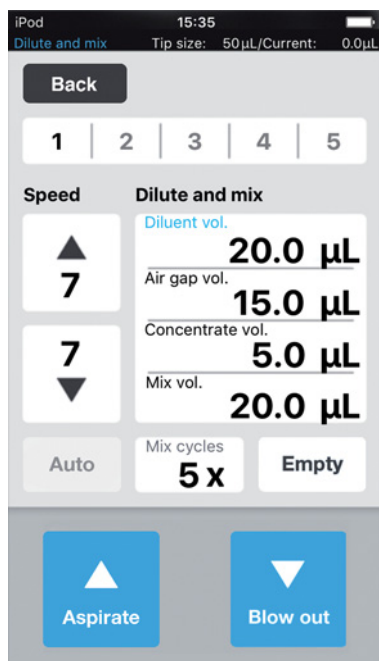


Fig. 6-7: Dilute and mix mode

6.20.1 Parameters for epMotion 96

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Diluent vol.</i>	Set the aspiration volume for the diluting solution in µL.	0.5 – 300
<i>Air gap vol.</i>	Set the volume for the air cushion in µL.	0.5 – 300
<i>Concentrate vol.</i>	Set the aspiration volume for the concentrate in µL.	0.5 – 300
<i>Mix vol.</i>	Set the mixing volume in µL.	0.5 – 300
<i>Mix cycles</i>	Set the number of mixing cycles.	1 – 19

6.20.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Diluent vol.</i>	Set the capacity for the diluting solution in µL.	5 – 1000
<i>Air gap vol.</i>	Set the aspiration volume for the air cushion in µL.	5 – 1000
<i>Concentrate vol.</i>	Set the aspiration volume for the concentrate in µL.	5 – 1000
<i>Mix vol.</i>	Set the mixing volume in µL.	5 – 1000
<i>Mix cycles</i>	Set the number of mixing cycles.	1 – 19

6.20.3 Aspirating liquid

Prerequisites

- Source vessel is available for use.

1. Set the speed levels.
2. Set the liquid volume for the diluting solution.
3. Set the volume for the air cushion.
4. Set the liquid volume for the concentrate.
5. Place the source vessel with diluting solution on the lifting table and move the lifting table into the working position.
6. Press *Aspirate*.
The diluting solution is aspirated.
7. Move the lifting table into the home position.
8. Press *Aspirate*.
The air cushion is aspirated.
9. Place the source vessel with concentrate on the lifting table and move the lifting table into the working position.
10. Press *Aspirate*.
The concentrate is aspirated.
The destination vessel can be filled.

6.20.4 Diluting and mixing liquid

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 the working position.
2. Setting the mixing cycles.
3. Press *Dispense*.
The liquids are dispensed and automatically mixed.

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

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.

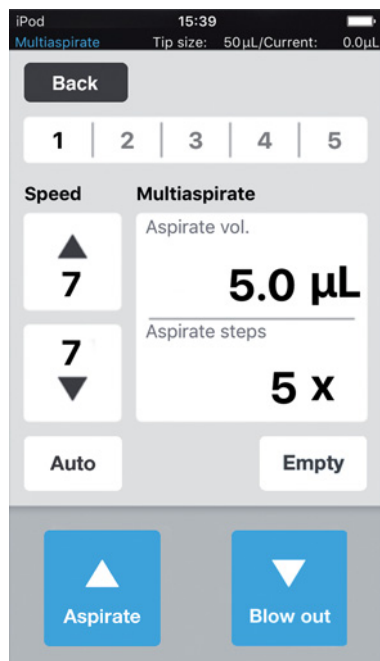


Fig. 6-8: *Multiaspirate* mode

6.21.1 Parameters for epMotion 96

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

6.21.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed of liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed of liquid dispensing.	1 – 9
<i>Aspirate vol.</i>	Set the aspiration volume in µL.	5 – 1000
<i>Aspirate steps</i>	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 *Sequential Dispense* mode – Dispensing liquid to varying degrees

Aspirate the liquid in a single step and dispense it in partial steps of different sizes.

Particularly suitable for:

- Lifting table with 2-position slider



A 2-position slider can be ordered as a modification kit.

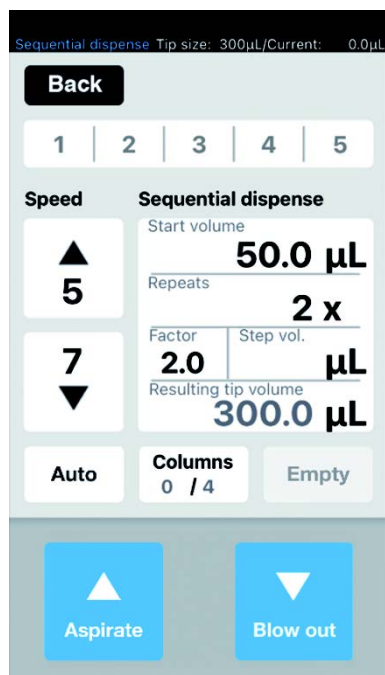


Fig. 6-9: Sequential Dispense mode

6.22.1 Parameters for epMotion 96

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Dispense vol.</i>	Set the dispensed volume in µL.	0.5 – 300
<i>Repeats</i>	Set the number of dispensing steps per sequence.	1 – 12
<i>Factor</i>	Set the factor for changing the volume between the sequences.	0.2 – 5
<i>Step vol.</i>	Set the change of volume in µL between the sequences.	5 – 150

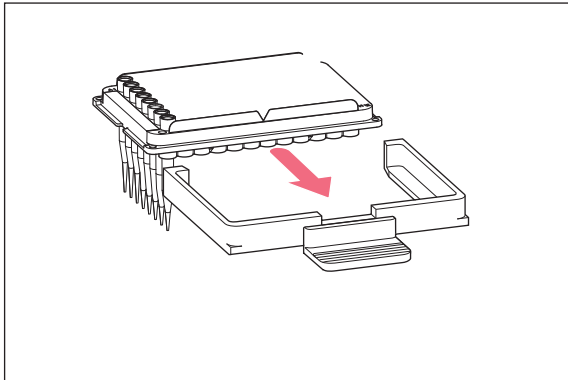
6.22.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Dispense vol.</i>	Set the dispensed volume in µL.	0.5 – 1000
<i>Repeats</i>	Set the number of dispensing steps per sequence.	1 – 12
<i>Factor</i>	Set the factor for changing the volume between the sequences.	0.2 – 5
<i>Step vol.</i>	Set the change of volume in µL between the sequences.	5 – 150

6.22.3 Place the pipette tips in an empty tray

Prerequisites

- There is a tray with pipette tips available.
- There is an empty tray available in the same volume size of the pipette tips used.
- The “Eppendorf TipTool” (8-channel lower part) auxiliary tool is available.



1. Use the auxiliary tool to pick up a column with pipette tips.
2. Place the pipette tips in column 1 of the empty tray.
3. Place the tray in the loading frame.
4. Insert the loading frame with the tray into the pipettor and lock it.

6.22.4 Aspirating liquid

Prerequisites

- A source vessel (e.g. a collection vessel) is available.
- A destination vessel (e.g. a 96-well plate) is available.

1. Place the source vessel on the right-hand side.
2. Place the destination vessel on the left-hand side.
3. Set the dispensed volume and dispensing steps.
4. Set the speed levels.
5. Set the start volume.
6. Set the repetitions.
7. Set the factor or volume per step.
8. Press *Aspirate*.

The aspiration volume that results from the start volume, factor, volume per step and repetitions for execution of the largest possible number of complete volume increments is automatically calculated and saved.

6.22.5 Dispensing liquid

Prerequisites

- Liquid has been aspirated.

1. Position the destination vessel under the row of pipette tips.



Start to fill the destination vessel plate from the right-hand side (column 12). The plate can also be turned 180° if column 1 is to be filled first.

2. Press *Dispense*.

The first liquid volume is dispensed.

The step counter “Columns” increases by 1.

3. Move the destination vessel.

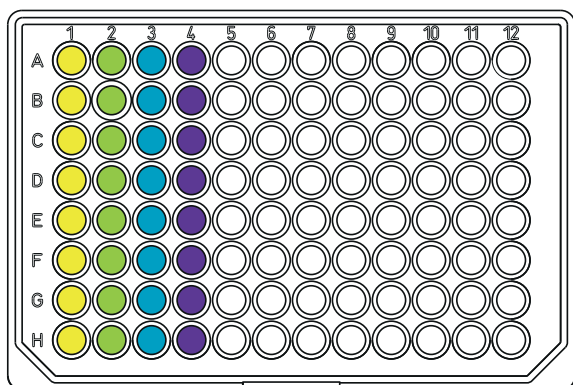
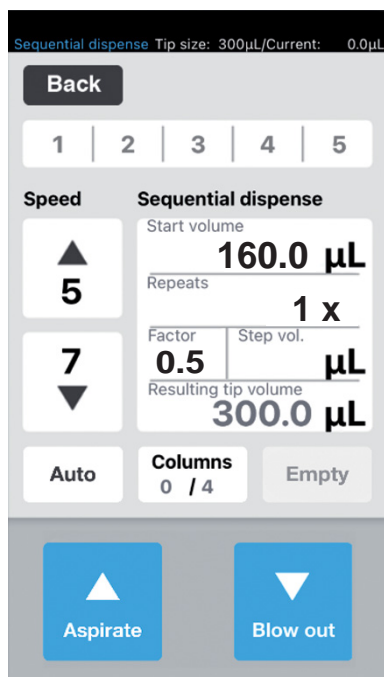
Operation

epMotion® 96 - epMotion® 96xl
English (EN)

6.22.6 Example 1 – Sequential liquid dispensing with pipette tips in column 1

Prerequisites

- A tray with pipette tips in column 1 is prepared and inserted.
- A collection tray with liquid is available as the source vessel.
- A 96-well plate is available as the destination vessel.

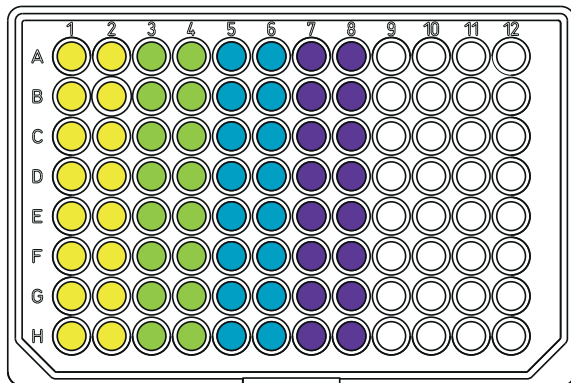


1. Set start volume to 160, repetitions x1 and factor to 0.5.
The total volume and the number of columns is calculated and shown.
2. Place the source vessel on the right-hand side and the destination vessel on the left-hand side.
3. Position the source vessel under the pipette tips and aspirate the liquid.
300 µL liquid is aspirated.
4. Position the pipette tips over column 1 of the destination vessel and dispense the liquid.
In column 1 ●, 160 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 140 µL.
5. Position the pipette tips over column 2 and dispense the liquid.
In column 2 ●, 80 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 60 µL.
6. Position the pipette tips over column 3 and dispense the liquid.
In column 3 ●, 40 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 20 µL.
7. Position the pipette tips over column 4 and dispense the liquid.
In column 4 ●, 20 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 0 µL.





6.22.7 Example 2 – Sequential liquid dispensing with pipette tips in column 1 and 2

Prerequisites

- A tray with pipette tips in column 1 and 2 is prepared and inserted.
- A collection tray with liquid is available as the source vessel.
- A 96-well plate is available as the destination vessel.



1. Set start volume to 5 µL, repetitions x1 and factor to 2.
The total volume and the number of columns is calculated and shown.
2. Place the source vessel on the right-hand side and the destination vessel on the left-hand side.
3. Position the source vessel under the pipette tips and aspirate the liquid.
75 µL liquid is aspirated.

4. Position the pipette tips over column 1 and 2 of the destination vessel and dispense the liquid.
In column 1 and 2 , 5 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 70 µL.
5. Position the pipette tips over column 3 and 4 and dispense the liquid.
In column 3 and 4 , 10 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 60 µL.
6. Position the pipette tips over column 5 and 6 and dispense the liquid.
In column 5 and 6 , 20 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 40 µL.
7. Position the pipette tips over column 4 and dispense the liquid.
In column 4 , 40 µL is dispensed.
The step counter in *Columns* increases by 1.
The resulting volume is 0 µL.



The same result is achieved if you work with pipette tips in column 1 and repetitions x2. The liquid volume to be aspirated then doubles to 150 µL.

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

6.23 *PreWet* mode – Pre-wetting the inner wall and pre-saturating the air cushion

Aspirate and dispense the liquid several times. This pre-wets the inner wall of the pipette tip with liquid and pre-saturates the air volume in the pipette tip with liquid, which improves accuracy when pipetting small volumes, particularly when using completely new pipette tips.

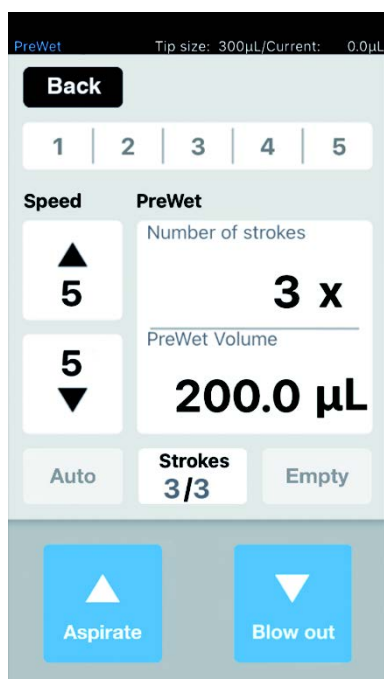


Fig. 6-10: *PreWet* mode

6.23.1 Parameters for epMotion 96

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Number of strokes</i>	Set the number of liquid volume strokes.	1 – 10
<i>PreWet Volume</i>	Set the liquid volume (nominal volume of pipette tip) in µL.	5 – 300

6.23.2 Parameters for epMotion 96xl

Parameter	Value	Range of values
<i>Speed aspirate</i>	Set the speed level for the liquid aspiration.	1 – 9
<i>Speed dispense</i>	Set the speed level for the liquid dispensing.	1 – 9
<i>Number of strokes</i>	Set the number of liquid volume strokes.	1 – 10
<i>PreWet Volume</i>	Set the liquid volume (nominal volume of pipette tip) in µL.	5 – 1000

6.23.3 Aspirating and dispensing the liquid

Prerequisites

- A source vessel is available for use.
1. Place the source vessel on the lifting table and move the lifting table into the working position.
 2. Set the speed levels.
 3. Set the number of *Strokes* for pre-wetting.
 4. Set the liquid volume *PreWet Volume*.
 5. Press *Aspirate*.
The liquid volume is aspirated.
 6. Press *Dispense*.
The liquid volume is automatically dispensed and aspirated.
The step counter for *Strokes* is increased by 1 with every stroke.

6.24 Run program mode for the connected device

Various operating modes can be selected, adjusted, saved as a program run and executed. Use this mode to perform pre-defined work processes. The pipette tips can be changed between the operating modes during the program run.

When “Connected”, the user can write programs with all the tip types permitted for the device variant, regardless of the tip type actually loaded. However, if a program sequence is executed which has been programmed for tip types other than the one loaded, an error message will appear after pressing the first command in the loaded program (usually: Aspirate).

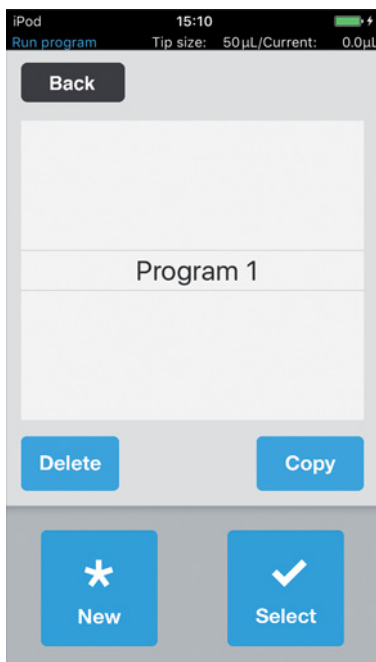
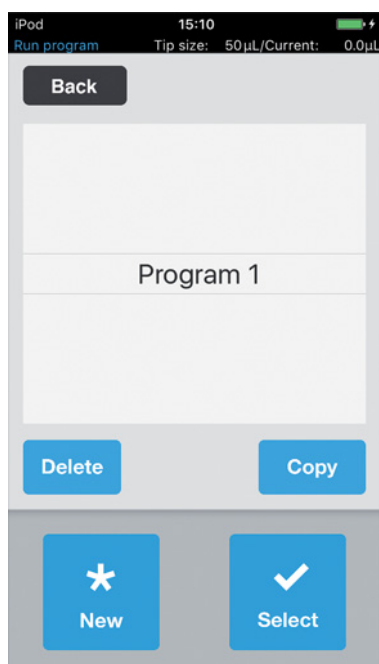


Fig. 6-11: ModeRun program

Operation

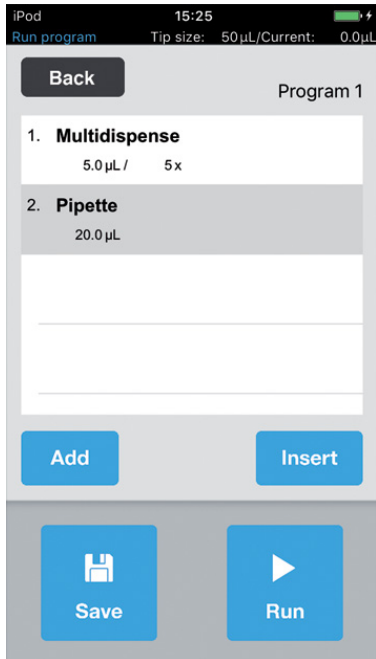
epMotion® 96 - epMotion® 96xl
English (EN)

Parameter	Value
<i>Delete</i>	Deleting the selected program.
<i>Copy</i>	Making a copy of the selected program.
<i>New</i>	Creating a new program.
<i>Select</i>	Opening the selected program.

6.24.1 Creating and storing a program run

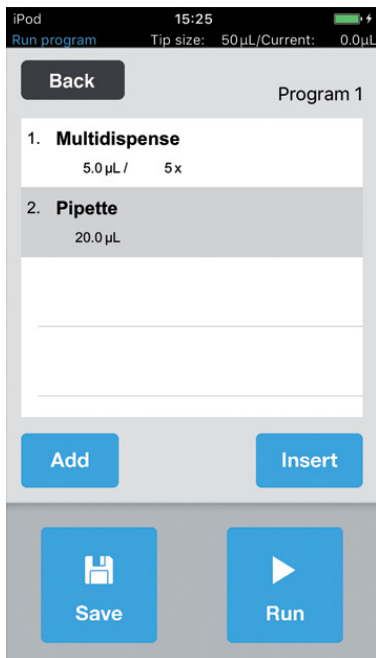
1. Press *New*.
2. Enter the program name.
The program editor opens.
3. Enter the modes.
4. Press *Save*.
The program run is saved.

6.24.2 Editing the program run - Adding the mode at the end



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

6.24.3 Editing the program run - Adding a mode



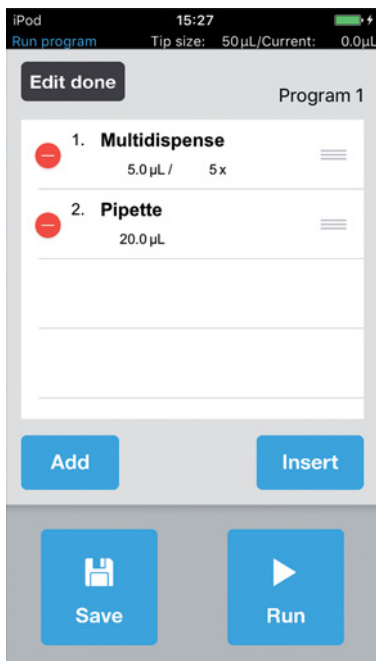
1. Select the mode that will come after the mode being added.
2. Press *Insert*.
3. Select the mode and confirm with *Select*.
4. Select the parameters for the mode selected and confirm with *Back*.
5. Press *Save*.
The program run is saved.

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

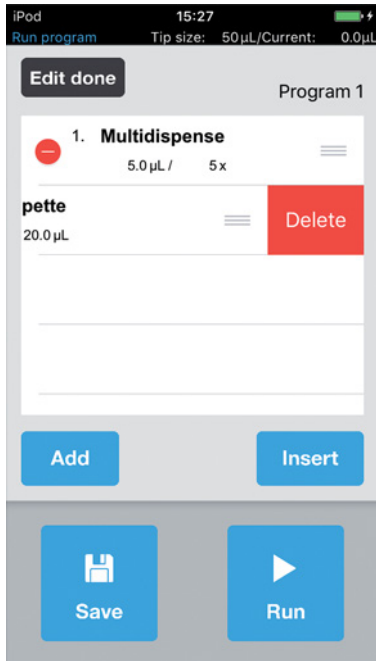
6.24.4 Editing the program run - Changing the parameters of a mode

1. Select the mode, then press and hold the selected entry.
The parameter view of the mode is shown.
2. Change the parameters.
3. Select *Previous* or *Next* to change the parameters for the previous or next mode.
4. Press *Back* to return to the program list overview.
5. Press *Save*.
The program run is saved.

6.24.5 Changing the order of the program run

1. Select the mode in the program run and tap twice.
2. Select the mode and move to the marking on the right in the program run.
3. Press *Edit done*.
4. Press *Save*.
The program run is saved.

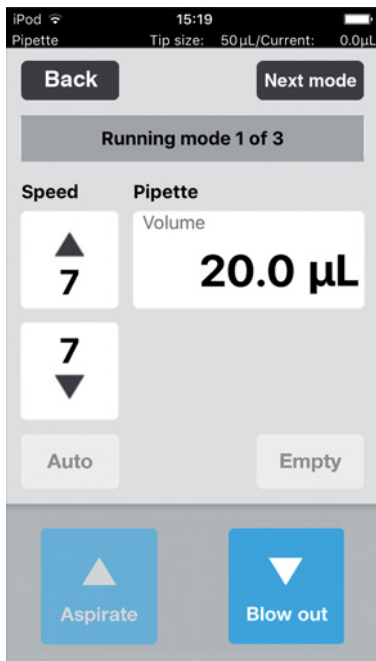
6.24.6 Deleting the mode in the program run



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

The program run is saved.

6.24.7 Selecting and executing the program run



1. Select the saved program and confirm with *Select*.
2. Start the program run with *Run*.
The program run starts with the operating mode first saved.
The number of program steps is shown.
3. Press the *Blow out* button when the next program step is *Reverse pipette*.
4. Press *Next mode* and start the next program step.

6.25 Run program mode for unconnected devices in simulation mode

While “Connected” mode only permits the programs for the currently loaded pipette tips to be shown and started, “Simulation” mode allows for the programming and simulation of programs for both device variants and all pipette tips that can be used for the two epMotion 96 options. If the Wi-Fi connection between the control unit and pipettor is established after a program is created, the current device version and pipette tips are automatically recognized by the software and only compatible programs will be included in the corresponding list.

Programs are always saved in conjunction with the pipette tips used. This means, as is the case in other file management systems, there are files that have the same name, however these files will never be shown in the same list. This prevents any incorrect operation caused by unsuitable combinations of pipette tips and devices.

In order to simulate a specific device and pipette tip configuration, this must be specified in *Device settings* with *Max volume (μL)* and *Tip size (μL)* (see *Device settings – Setting the device properties on p. 83*). Programs can then be created, as described for the “Connected” mode (see *Run program mode for the connected device on p. 77*).

6.26 Settings – Setting the system properties

Set the device and software properties.

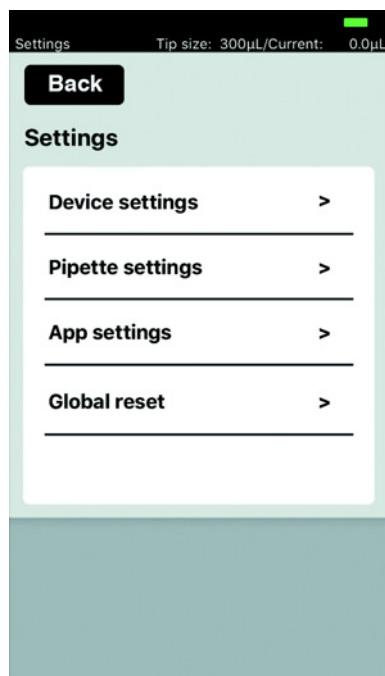


Fig. 6-12: Mode *Settings*

Parameter	Value
<i>Device settings</i>	Display or set the device variant, Wi-Fi ID and tip type.
<i>Pipette settings</i>	Set the pipette properties.
<i>App settings</i>	Save the app settings.
<i>Global reset</i>	Reset the app to the factory settings.

6.26.1 Device settings – Setting the device properties

Set the device and software properties.

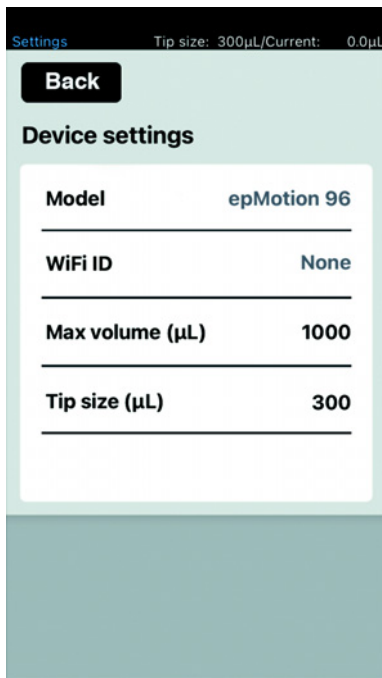


Fig. 6-13: Device settings – Example for epMotion 96

Parameter	Value
<i>Model</i>	Display of model name.
<i>WiFi ID</i>	Display of network name.

Parameter	Value	Standard	Range of values
<i>Max volume (µL)</i>	Display the maximum pipette tip volume possible. In Simulation mode: select and change.	300/1000	300/1000
<i>Tip size (µL)</i>	Show the current tip size. In Simulation mode: select and change.	300/1000	50/300 300/1000

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

6.26.2 Pipette settings – Setting the pipette properties

Changes to the pipette properties are only implemented after a re-initialization.

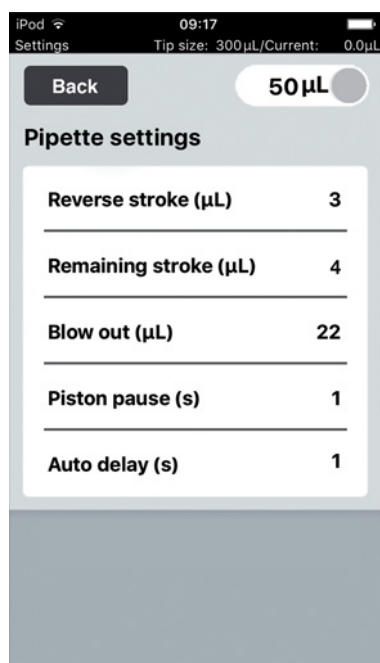


Fig. 6-14: *Pipette settings* – Example for epMotion 96

6.26.3 Parameters for epMotion 96

Parameter	Value	Pipette tips	Standard	Range of values
<i>Reverse stroke</i>	Set additional volume for liquid aspiration in µL.	50 µL	6 µL	0 – 6
		300 µL	6 µL	0 – 6
<i>Remaining stroke</i>	Remaining volume in µL for liquid aspiration in <i>Multidispense</i> mode.	50 µL	4 µL	–
		300 µL	12 µL	–
<i>Blow out</i>	Set the air volume for dispensing of the remaining liquid in µL.	50 µL	22 µL	–
		300 µL	22 µL	–
<i>Piston pause</i>	Set the delay between the pipette actions in seconds.	–	1 s	0 – 4
<i>Auto delay</i>	Set the delay for the automatic liquid dispensing in seconds (<i>Multidispense</i> and <i>Multiaspirate</i> mode).	–	1 s	0 – 5

6.26.4 Parameters for epMotion 96xl

Parameter	Value	Pipette tips	Standard	Range of values
<i>Reverse stroke</i>	Set additional volume for liquid aspiration in μL .	300 μL	12 μL	0 – 12
		1000 μL	12 μL	0 – 12
<i>Remaining stroke</i>	Remaining volume in μL for liquid aspiration in <i>Multidispense</i> mode.	300 μL	12 μL	–
		1000 μL	20 μL	–
<i>Blow out</i>	Set the air volume for dispensing of the remaining liquid in μL .	300 μL	74 μL	–
		1000 μL	74 μL	–
<i>Piston pause</i>	Set the delay between the pipette actions in seconds.	–	1 s	0 – 4
<i>Auto delay</i>	Set the delay for the automatic liquid dispensing in seconds (<i>Multidispense</i> and <i>Multiaspirate</i> mode).	–	1 s	0 – 5

6.26.5 App settings – Setting up the app

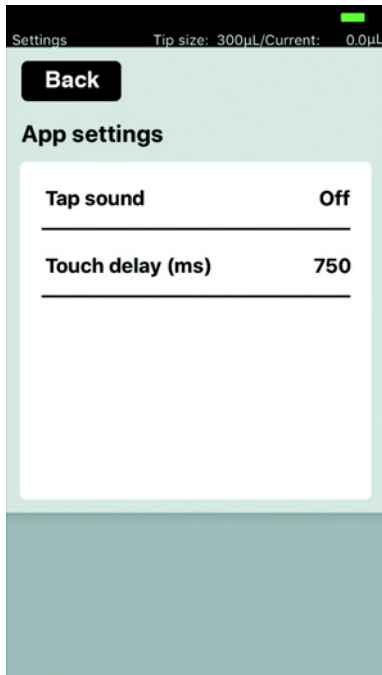


Fig. 6-15: App settings

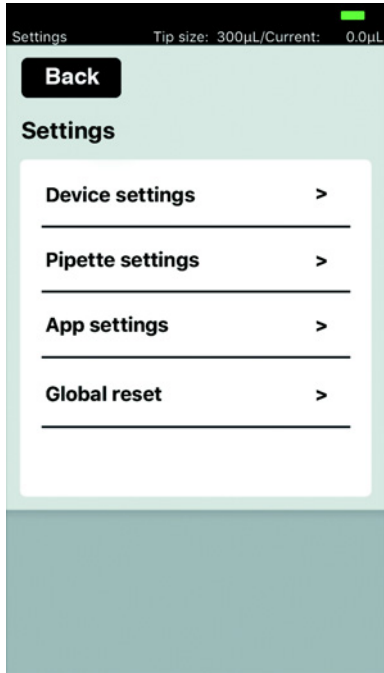
Parameter	Value	Standard	Range of values
<i>Tap sound</i>	Switch the keypad sound on or off.	<i>On</i>	<i>On/Off</i>
<i>Touch delay</i>	Time span between activation and execution of the function.	750 ms	200 – 3000

Operation

epMotion® 96 - epMotion® 96xl
English (EN)

6.26.6 Global reset – Resetting all settings

With this function, all user-specific changes that have been made to the standard settings are reset to the factory settings.



1. Press *Global reset*.
2. Confirm prompt with *Yes*.
All user-specific settings are reset.

6.27 Pipette settings – Setting the pipette properties

Changes to the pipette properties are only implemented after a re-initialization.

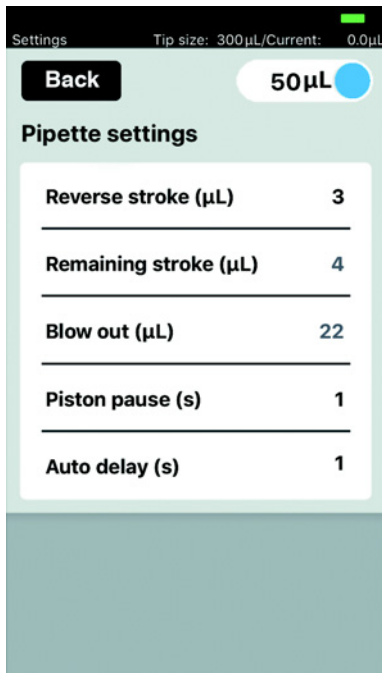


Fig. 6-16: *Pipette settings* – Example for epMotion 96

6.27.1 Parameters for epMotion 96

Parameter	Value	Values
Slide switch	Loads the parameters suitable for the pipette tip size selected	50 µL 300 µL

Parameter	Value	Pipette tips	Standard	Range of values
<i>Reverse stroke</i>	Set additional volume for liquid aspiration in µL.	50 µL	6 µL	0 – 6
		300 µL	6 µL	0 – 6
<i>Remaining stroke</i>	Remaining volume in µL for liquid aspiration in <i>Multidispense</i> mode.	50 µL	4 µL	–
		300 µL	12 µL	–
<i>Blow out</i>	Set the air volume for dispensing of the remaining liquid in µL.	50 µL	22 µL	–
		300 µL	22 µL	–
<i>Piston pause</i>	Set the delay between the pipette actions in seconds.	–	1 s	0 – 4
<i>Auto delay</i>	Set the delay for the automatic liquid dispensing in seconds (<i>Multidispense</i> and <i>Multiaspirate</i> mode).	–	1 s	0 – 5

6.27.2 Parameters for epMotion 96xl

Parameter	Value	Values
Slide switch	Loads the parameters suitable for the pipette tip size selected	300 µL 1000 µL

Parameter	Value	Pipette tips	Standard	Range of values
<i>Reverse stroke</i>	Set additional volume for liquid aspiration in µL.	300 µL	12 µL	0 – 12
		1000 µL	12 µL	0 – 12
<i>Remaining stroke</i>	Remaining volume in µL for liquid aspiration in <i>Multidispense</i> mode.	300 µL	12 µL	–
		1000 µL	20 µL	–
<i>Blow out</i>	Set the air volume for dispensing of the remaining liquid in µL.	300 µL	74 µL	–
		1000 µL	74 µL	–
<i>Piston pause</i>	Set the delay between the pipette actions in seconds.	–	1 s	0 – 4
<i>Auto delay</i>	Set the delay for the automatic liquid dispensing in seconds (<i>Multidispense</i> and <i>Multiaspirate</i> mode).	–	1 s	0 – 5

7 Troubleshooting

7.1 General errors

7.1.1 Pipette tips

Problem	Cause	Solution
Pipette tips are not correctly identified.	<ul style="list-style-type: none"> • Tray with pipette tips has rotated 180°. 	<ul style="list-style-type: none"> ▶ Insert the tray with the notch to the handle of the loading frame.
Liquid drips from the pipette tips.	<ul style="list-style-type: none"> • Incorrect pipette tips. 	<ul style="list-style-type: none"> ▶ Check the pipette tips. ▶ Insert epT.I.P.S. Motion Reloads 50 µL, 300 µL or 1000 µL.
	<ul style="list-style-type: none"> • The pipette tips are not sitting correctly on the tip cones. 	<ul style="list-style-type: none"> ▶ Unlock the pipette tips. ▶ Check the space between the tips. ▶ Remove any foreign matter. ▶ Lock the pipette tips.
	<ul style="list-style-type: none"> • O-rings are damaged. 	<ul style="list-style-type: none"> ▶ Contact the authorized service.
	<ul style="list-style-type: none"> • Non-aqueous liquid with different physical properties to water (e.g. high vapor pressure). 	<ul style="list-style-type: none"> ▶ Aspirate and dispense the liquid (see <i>Aspirating and dispensing non-aqueous liquids</i> on p. 54).

7.1.2 Wi-Fi connection

Problem	Cause	Solution
<i>Connection error</i>	<ul style="list-style-type: none"> • The device is switched off. 	<ul style="list-style-type: none"> ▶ Switch on the device. ▶ Close and restart the user software.
	<ul style="list-style-type: none"> • There is no Wi-Fi connection. 	<ul style="list-style-type: none"> ▶ Open <i>Settings</i> in iPod touch. ▶ Activate <i>Wi-Fi</i>. ▶ Close and restart the user software.
	<ul style="list-style-type: none"> • The Wi-Fi connection has not been correctly set up. 	<ul style="list-style-type: none"> ▶ Open <i>Settings</i> in the control unit. ▶ Open <i>Wi-Fi</i> and check the network settings. ▶ Close and restart the user software.
	<ul style="list-style-type: none"> • There is no Wi-Fi connection. • iPod touch is too far away from the device. 	<ul style="list-style-type: none"> ▶ Position iPod touch closer to the device or place in the docking station.
	<ul style="list-style-type: none"> • There is no Wi-Fi connection. • Control unit is too far away from the device. 	<ul style="list-style-type: none"> ▶ Position the control unit closer to the device.
The display freezes.	<ul style="list-style-type: none"> • The Wi-Fi connection is overloaded. • There is no free Wi-Fi channel available. • Outdated operating system 	<ul style="list-style-type: none"> ▶ Perform a firmware update (see p. 93). ▶ Assign the Wi-Fi channel (see p. 97).

Troubleshooting

epMotion® 96 - epMotion® 96xl
English (EN)

7.1.3 Liquid volume

Problem	Cause	Solution
<i>Pipetting volume is larger than ...</i>	• Liquid volume has been set too high.	▶ Reduce the liquid volume.
	• Pipette tips are too small.	▶ Use pipette tips with 300 µL or 1000 µL.
<i>No tips installed</i>	• No pipette tips used.	▶ Use epT.I.P.S. Motion Reloads 50 µL, 300 µL or 1000 µL.
	• Pipette tips not recognized. • Pipette tips not correctly locked.	▶ Push the lever fully backwards.
	• Pipette tips not recognized. • Tray not correctly inserted.	▶ Rotate the tray by 180°.
<i>Input Volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	• The volume entered does not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Dispense volume exceeded the allowed range. Range for this tip size is Input volume set to limit</i>	• The volume entered does not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Additional volume/Air gap volume/Aspirate volume/Dispense volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	• The volumes entered do not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Pipette volume/Mix volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	• The volumes entered do not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Max aspirate volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	• The volumes entered do not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Diluent/Air gap/Concentrate/Mix volume exceeded the allowed range.</i>	• The volumes entered do not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Aspirate volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	• The volume entered does not match the pipette tips used.	▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.

Problem	Cause	Solution
<i>Input Start volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	<ul style="list-style-type: none"> • The volume entered does not match the pipette tips used. 	<ul style="list-style-type: none"> ▶ Enter a value that lies within the volume range. ▶ Use suitable pipette tips.
<i>Input Repeats value exceeded the allowed range. Range is 1 ~ 12.</i>	<ul style="list-style-type: none"> • The quantity entered for repetitions is too high. 	<ul style="list-style-type: none"> ▶ Enter a number between 1 and 12.
<i>Input Step volume exceeded the allowed range. Range is</i>	<ul style="list-style-type: none"> • The volume entered does not match the pipette tips used. 	<ul style="list-style-type: none"> ▶ Enter a value that lies within the volume range.
<i>Input Factor value exceeded the allowed range. Range is 0.2 ~ 5.0.</i>	<ul style="list-style-type: none"> • The factor entered lies outside the permitted range. 	<ul style="list-style-type: none"> ▶ Enter a factor between 0.2 and 5.0.
<i>Input Prewet volume exceeded the allowed range. Range for this tip size is Input volume set to limit.</i>	<ul style="list-style-type: none"> • The volume entered does not match the pipette tips used. 	<ul style="list-style-type: none"> ▶ Enter a value that lies within the volume range.
<i>Input Number of strokes exceeded the allowed range. Range is 1 ~ 10.</i>	<ul style="list-style-type: none"> • The number of strokes entered is higher than the amount permitted. 	<ul style="list-style-type: none"> ▶ Enter a number between 1 and 10.

7.1.4 File name

Problem	Cause	Solution
<i>File name too long</i>	<ul style="list-style-type: none"> • File name is too long. • Program cannot be saved. 	<ul style="list-style-type: none"> ▶ File names must not have more than 21 letters.
<i>File name already exists</i>	<ul style="list-style-type: none"> • File name has already been assigned. • Program cannot be saved. 	<ul style="list-style-type: none"> ▶ Select a different file name.

7.1.5 Sensors

Problem	Cause	Solution
<i>Lower sensor triggered</i>	<ul style="list-style-type: none"> • Sensor for the piston movement has been triggered. 	<ul style="list-style-type: none"> ▶ Switch the device off and then on again. ▶ If the error persists, contact the authorized service.
<i>Upper sensor triggered</i>	<ul style="list-style-type: none"> • Device error. • Sensor for the piston movement has been triggered. 	<ul style="list-style-type: none"> ▶ Switch the device off and then on again. ▶ If the error persists, contact the authorized service.

8 Maintenance

8.1 Service options

We recommend having the device checked and maintained at regular intervals by trained and skilled personnel.

Eppendorf offers customized service options for preventive maintenance, qualification, and calibration of your device. For further information, service requests, and local offers, refer to www.eppendorf.com/epservices and the local websites.

8.2 Replacing fuses



DANGER! Electric shock.

- ▶ Switch off the device and disconnect the mains/power plug before commencing any service or cleaning procedures.
-

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.

8.3 Updating the user software

The user software is updated directly from the App Store. Once the user software has been updated, the firmware will need to be updated. The firmware version required can be found in the information text for the app in the App Store. If the user software version does not match the version of the firmware on the connected device, a message will appear on the control unit.

1. Compare the installed firmware version with the current firmware version.
2. If the current firmware version is higher, the firmware will need to be updated.

8.4 Performing a backup of the settings, programs and logs

The system properties, program sequences and logs can be exported from the control unit to an external computer. An Apple ID and the free iTunes software are required for this. iTunes must be installed on the computer.

Prerequisites

- iTunes has been installed.
- USB cable is available.

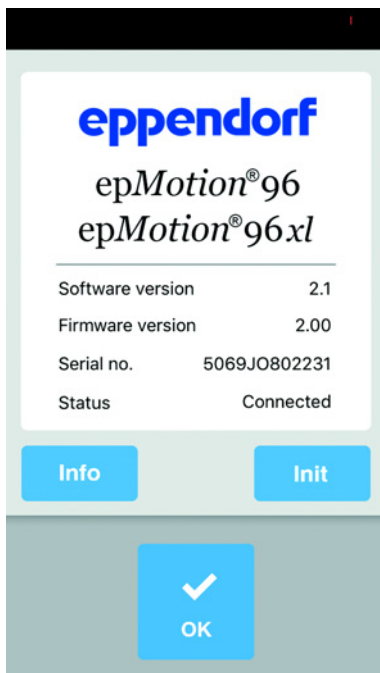
1. Connect the control unit to the computer.
2. Start iTunes.
3. Select the connected device.
4. Select *File sharing*.
5. Select the connected device.
The files are shown.
6. Mark the required files and copy these to the target directory.
7. Complete this action by clicking on *Finished*.
8. Disconnect.

8.5 Updating the firmware

8.5.1 Activating *Admin* mode

Prerequisites

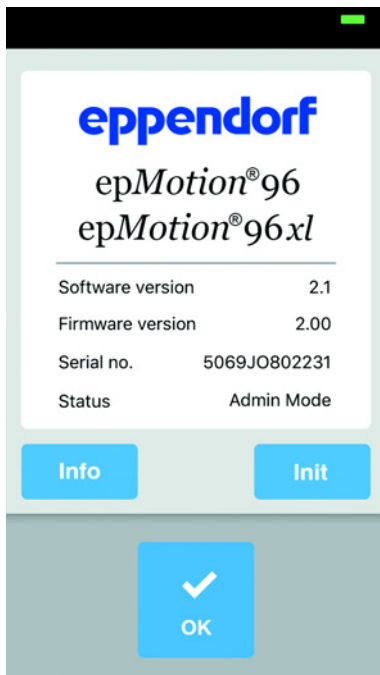
- Device is switched on.
- The control unit is switched on.
- There is a Wi-Fi connection.



1. Tap the *epMotion 96* icon.
The start screen is shown.

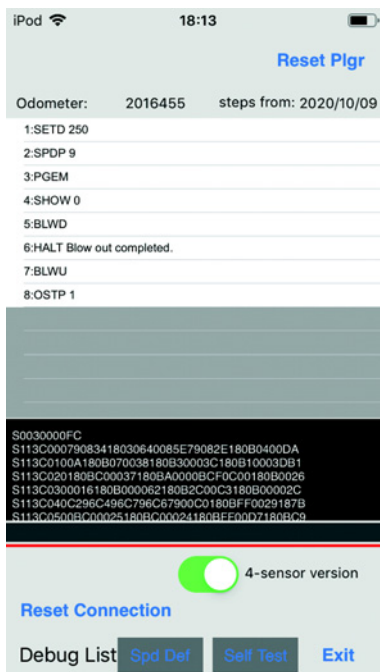
Maintenance

epMotion® 96 - epMotion® 96xl
English (EN)

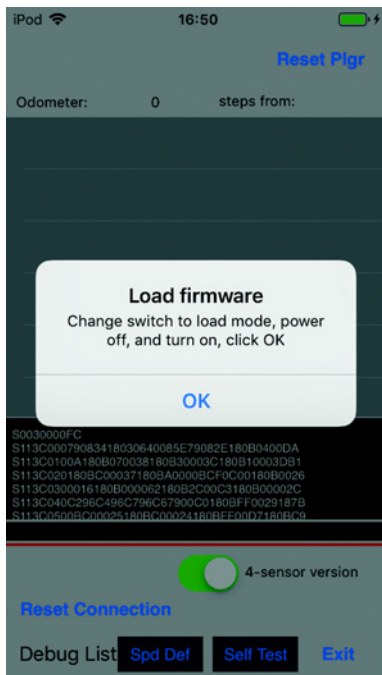


2. Press and hold the *Info* button until the status changes from *Connected* to *Admin Mode*.
3. Press the *Info* button.
The Service menu appears.

8.5.2 Updating the firmware



1. Activate the *4-sensor version* switch.
2. Press the *Reset connection* button.



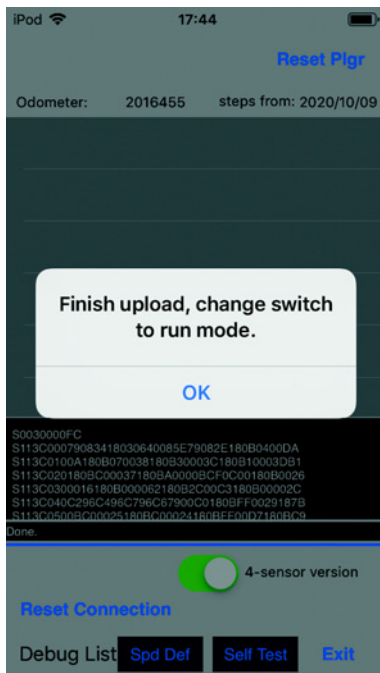
3. Tilt the switch for the firmware update to the left. The switch is in the *LOAD* position. The switch is active.
4. Switch off the device.
5. Wait until the Wi-Fi connection to the control unit is disabled.
6. Switch on the device.
7. Wait until the Wi-Fi connection to the control unit is established.
8. Press the *OK* button.



9. Press the *Update Firmware* button. The firmware update is carried out. A self-test is carried out. If the firmware update and the self test were successful, a message appears.

Maintenance

epMotion® 96 - epMotion® 96xl
English (EN)



10. Tilt the switch for the firmware update to the right.

The switch is in the *RUN* position.

The switch is inactive.

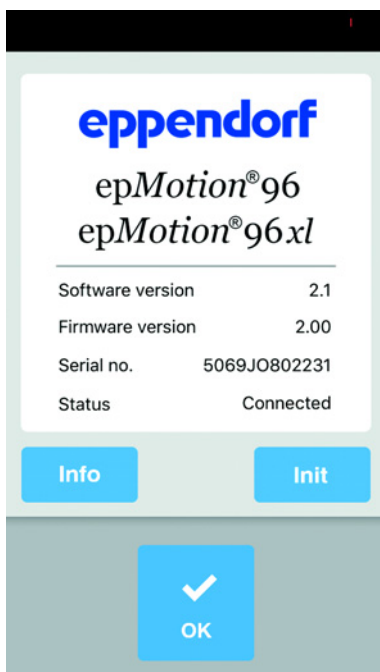
11. Wait until the status lamp turns green.

12. Press the *OK* button.

13. Press the *Exit* button.

The Service menu is closed.

8.5.3 Exiting the Admin mode



▶ Press the *Init* button.

The Admin mode is closed.

The status changes from *Admin Mode* to *Connected*.

8.6 Assigning a Wi-Fi channel

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

Prerequisites

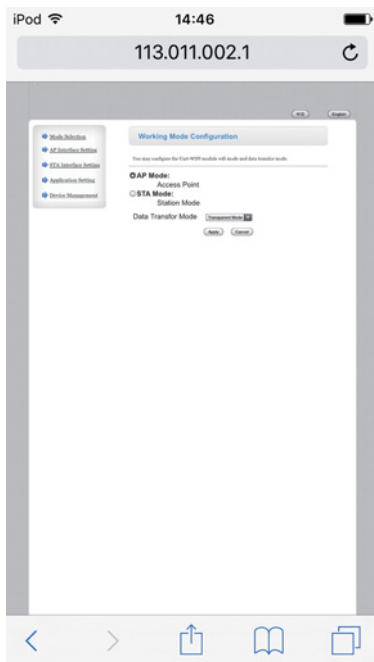
- The device is switched on.
- Apple iPod touch is switched on.
- A Wi-Fi connection to the device exists.

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.

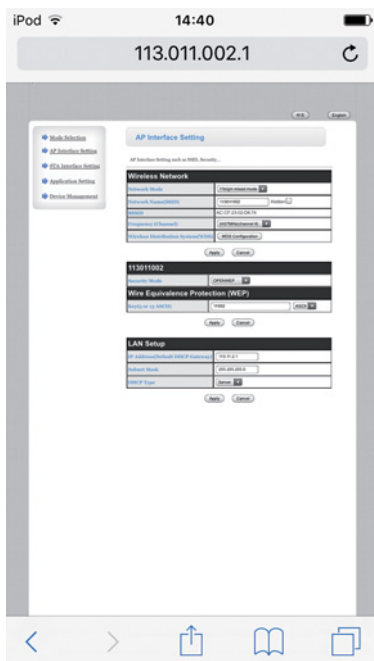


Maintenance

epMotion® 96 - epMotion® 96xl
English (EN)

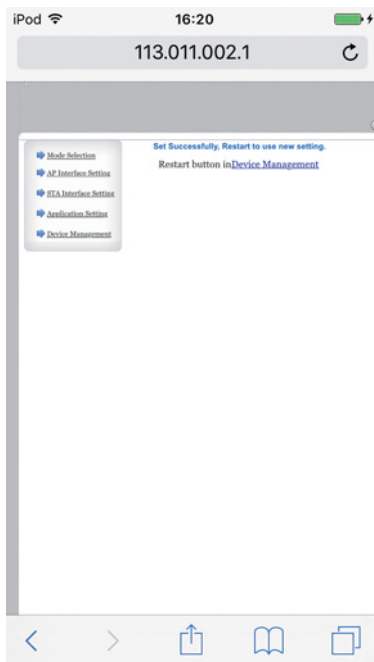


4. Select the *AP Interface Setting* submenu.
The *AP Interface Setting* window opens.

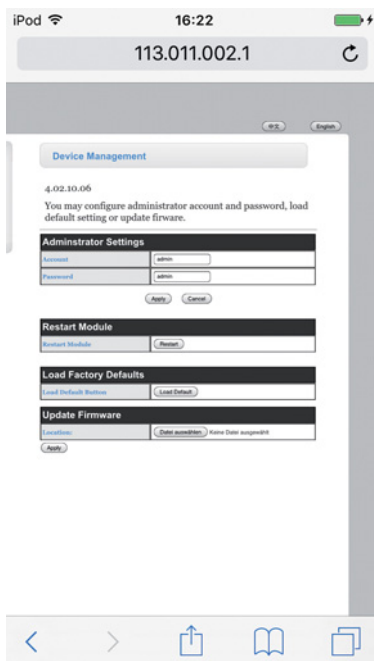


5. In *Frequency (Channel)*, open the drop-down list and select *2462MHz(channel 11)*.
6. Confirm with *Apply*.
The setting will be saved.
Wi-Fi channel 11 has now been set.
The Wi-Fi module needs to be restarted.

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.



Maintenance

epMotion® 96 - epMotion® 96xl
English (EN)

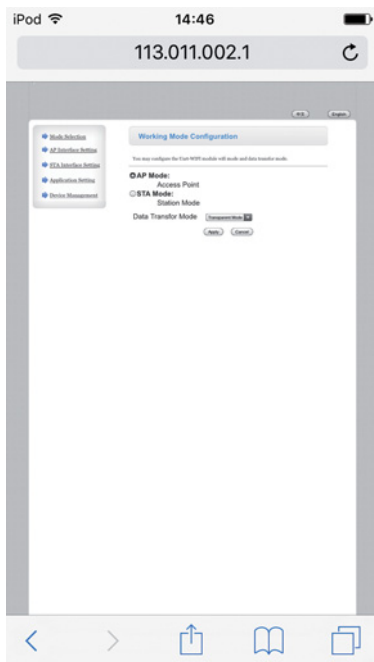
8.6.1 Checking the assigned Wi-Fi channel

Prerequisites

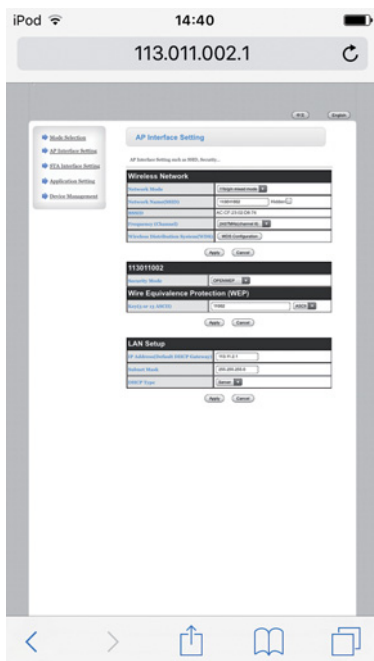
- The device is switched on.
- Apple iPod touch is switched on.
- A Wi-Fi connection to the device exists.

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.

8.7 Cleaning



DANGER! Electric shock due to the ingress of liquid.

- ▶ Switch off the device and disconnect it from the mains/power line before commencing any cleaning or disinfection procedures.
- ▶ Do not allow any liquids to enter the inside of the housing.
- ▶ Do not spray clean or spray disinfect the housing.
- ▶ Only reconnect the device to the mains/power line when it is completely dry, both inside and outside.



NOTICE! Damage due to 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.

8.8 Disinfection/Decontamination



DANGER! Electric shock due to the ingress of liquid.

- ▶ Switch off the device and disconnect it from the mains/power line before commencing any cleaning or disinfection procedures.
- ▶ Do not allow any liquids to enter the inside of the housing.
- ▶ Do not spray clean or spray disinfect the housing.
- ▶ Only reconnect the device to the mains/power line when 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.

8.9 Maintaining and replacing the o-rings

8.9.1 Maintaining the o-rings

Prerequisites

- There is grease available for the o-rings.

If solvents are used, the o-rings will need to be regularly maintained.

1. Re-grease the o-rings.

8.9.2 Replacing the o-rings

Damaged o-rings can be replaced.

In the following examples, the o-rings need to be replaced:

- O-ring is damaged.
- Liquid is unevenly aspirated.
- The pipette tips are dripping.

Prerequisites

- The device is switched off.
- The mains/power cord has been removed.
- The loading frame has been removed.
- The o-ring tool set is available.

1. Lock the lever.
2. Carefully place the device on its left side.
3. Cut the damaged o-ring.
4. Remove the rest of the o-ring.
5. Clean the tip cone using a lint-free cloth.
6. Position the new o-ring and carefully press into the groove.

8.10 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.

Technical data

epMotion® 96 - epMotion® 96xl
English (EN)

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.

Technical data

epMotion® 96 - epMotion® 96xl
English (EN)

9.7 Ambient conditions

Environment	For indoor use only
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 packing	-20 °C – +70 °C	10 % – 80 %	300 hPa – 1060 hPa
Without transport packing	-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 in the decontamination certificate. It is available as a PDF document on our webpage (<https://www.eppendorf.com/decontamination>).
2. Decontaminate all the parts to be shipped.
3. Include the fully completed decontamination certificate in the shipment.

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 due to lifting and carrying heavy loads.

The device is heavy. Lifting and carrying the device can lead to back injuries.

- ▶ Transport and lift the device with an adequate number of helpers.
- ▶ Use a transport aid to transport 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.

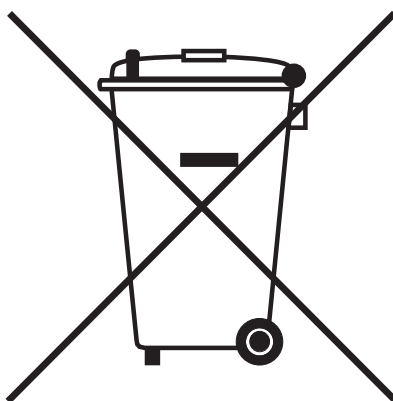
10.4 Disposal

Observe the relevant legal regulations when disposing of the product.

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

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

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



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

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
5075 787.008	960002199	Thermoadapter for PCR plates, 96 wells, skirted
5075 788.004	960002202	for PCR plates, 384 wells, skirted
5075 766.000	960002083	Thermoblock 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
5069 858.505		O-ring tool set with separator, blade, hook, mounting cone, mounting cylinder
5069 884.000		O-ring grease

11.4 Pipette tips and boxes

11.4.1 50 µL

- epMotion 96

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

Ordering information

epMotion® 96 - epMotion® 96xl
English (EN)

Order no. (International)	Order no. (North America)	Description
0030 014.677	0030014677	Box for epT.I.P.S. Motion 1 000 µL 10 pieces

11.4.2 300 µL

- epMotion 96
- epMotion 96xl

Order no. (International)	Order no. (North America)	Description
0030 014.537	0030014537	epT.I.P.S. Motion Filter Reloads 300 µL 12 × 2 trays with 96 tips each PCR clean and Sterile
0030 014.472	0030014472	PCR clean
0030 014.464	0030014464	epT.I.P.S. Motion Reloads 300 µL 12 × 2 trays with 96 tips each Eppendorf Quality
0030 014.677	0030014677	Box for epT.I.P.S. Motion 1 000 µL 10 pieces

11.4.3 1000 µL

- epMotion 96xl

Order no. (International)	Order no. (North America)	Description
0030 014.510	0030014510	epT.I.P.S. Motion Filter Reloads 1 000 µL 12 × 2 trays with 96 tips each PCR clean
0030 014.502	0030014502	epT.I.P.S. Motion Reloads 1 000 µL 12 × 2 trays with 96 tips each Eppendorf Quality
0030 014.669	0030014669	Box for epT.I.P.S. Motion 10 µL, 50 µL, 300 µL 10 pieces
0030 014.677	0030014677	Box for epT.I.P.S. Motion 1 000 µL 10 pieces

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 61010- 1, CAN/CSA C22.2 No. 61010- 1

2014/30/EU: EN 61326- 1, ETSI EN 301 489- 1 V1.9.2, ETSI EN 301 489- 17 V2.2.1

2011/65/EU: EN 50581

2014/53/EU: ETSI EN 300 328 V1.7.1

EN ISO 14971, EN 60068- 2- 30

Date: December 13, 2016



Management Board



Portfolio Management

Your local distributor: www.eppendorf.com/contact
Eppendorf AG · 22331 Hamburg · Germany
eppendorf@eppendorf.com

ISO 9001
Certified

ISO
13485
Certified

ISO
14001
Certified

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Evaluate Your Manual

Give us your feedback.

www.eppendorf.com/manualfeedback

Your local distributor: www.eppendorf.com/contact

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