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Eppendorf Eporator®

Operating Manual

4309 900 010-06/092022

Table of contents

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:

 **Toxic substances**	 **Electric shock**
 **Hazard point**	 **Material damage**

1.2.2 Danger levels

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

1.3 Symbols used

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

1.4 Glossary

A

Arcing
If electrical voltage is applied between two parallel electrodes, a current flows in an evenly distributed layer. If the voltage exceeds a critical value, this layer contracts to a narrow circuit with high current density: an electric arc. The material of the electrodes melts at this point. An explosive evaporation occurs. The cuvette can be destroyed under these conditions.

E

Electrical field strength
Ratio of potential difference between two electrodes (in V) and the distance between these electrodes (electrode gap; in cm). However, this only applies if the electrical field is homogeneous, as with parallel plate electrodes (e.g., in Eppendorf Electroporation Cuvettes).

T

Time constant
Time during which the voltage decreases to the value U/e.

2 Safety

2.1 Intended use

The Eporator is intended for indoor use only and enables the simple and safe electroporation of bacteria and yeast strains using standard protocols.

2.2 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.

2.3 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 which are not recommended by Eppendorf SE.
- The device is maintained or repaired by persons who were not authorized by Eppendorf SE.
- The user makes unauthorized changes to the device.

2.4 Safety instructions on the device

Depiction	Meaning
	**WARNING** Follow the operating manual.

2.5 Warnings for intended use

WARNING! Damage to health due to toxic, radioactive or aggressive chemicals as well as infectious liquids and pathogenic germs.

- Observe the national regulations for handling these substances, the biosafety level of your laboratory, and the manufacturers' Safety Data Sheets and application notes.
- Wear your personal protective equipment.
- Consult the "Laboratory Biosafety Manual" (source: World Health Organization, Laboratory Biosafety Manual, as amended) for comprehensive regulations on the handling of germs or biological material of risk group II or higher.

WARNING! Lethal voltages inside the device.
Touching parts under high voltage can cause an electric shock. Electric shocks cause injuries to the heart and respiratory paralysis.

- Ensure that the housing is closed and undamaged.
- Do not remove the housing.
- Make sure that no liquids can enter the device.

Only authorized service staff may open the device.

WARNING! Electric shock due to damage to the device or 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 case 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 disconnecting device intended for this purpose (e.g., the emergency switch in the laboratory).

WARNING! Danger due to incorrect voltage supply.

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

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 penetration of liquids.
Liquid can enter the device during electroporation with cuvettes without lids.

- Only cuvettes with square lids may be used for electroporation.

3 Product description

3.1 Delivery package

Quantity	Description
1	Eppendorf Eporator
1	Mains/power cord
1	Cuvette holder
1	Eporator operating manual

3.2 Product overview

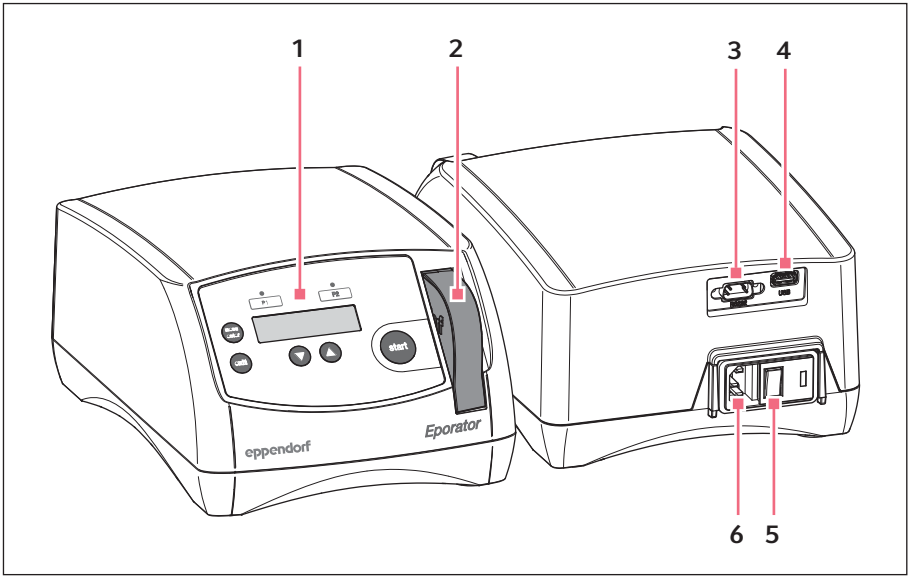


Fig. 3-1: Main illustration

1 Operating controls

2 Cuvette holder
In the cuvette shaft

3 RS-232 interface
Only for technical service

4 USB interface

5 Mains/power switch

6 Mains/power cord socket

3.3 Features

The Eporator is used to perform electroporation. It contains a capacitor that is discharged during the electroporation via a resistor, thus generating an exponential discharge curve. A voltage between 200 V and 2500 V can be set. The exponential pulse generated by the Eporator is transferred to a disposable electroporation cuvette that contains the biological sample.

Unlike devices of other manufacturers, the Eporator is equipped with an integrated cuvette holder.

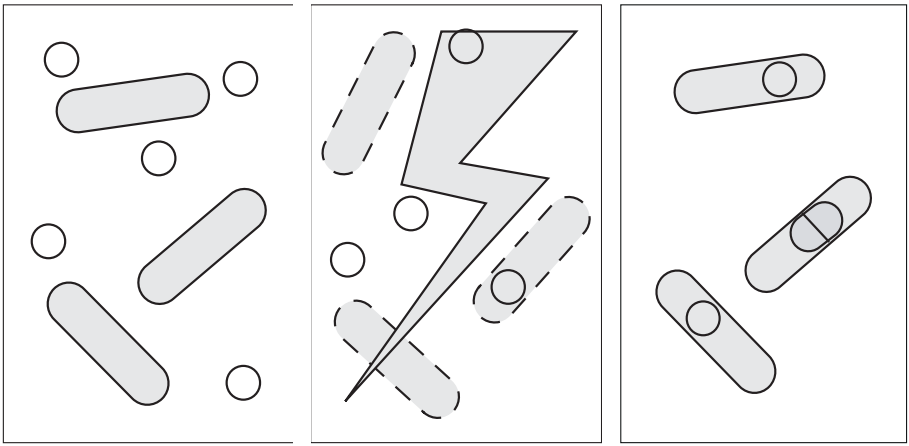
The Eporator is constructed in such a way that the risk of short circuits is minimized. This also applies when using impermissibly high salt concentrations and maximum voltage. Even in the most unlikely event of an electric arc in the cuvette, the bacterial suspension cannot escape from the cuvette and contaminate the device.

The Eporator is easy to operate. There are no assemblies inside the device that require user-maintenance.

The electroporation experiment data can be saved to a USB stick and evaluated on a PC.

Application protocols for the electroporation of various bacterial and yeast strains can be found on the webpage www.eppendorf.com.

3.3.1 The principle of electroporation



DNA and bacteria | Electrical charge | DNA in bacteria

With the electroporation method, macromolecules such as DNA can be placed in electrocompetent bacterial or yeast strains. In the process, small-volume samples with high resistance are exposed to pulses with a very high electrical field strength. The short

high voltage pulses create temporary holes or pores in the cell membrane, through which macromolecules, e.g., plasmid DNA, can diffuse into the cell. The holes close after removal of the electrical field and a period of regeneration. The inserted plasmid DNA can then be transcribed and replicated within the cell.

Compared to chemical transformation, electroporation is characterized by a high transformation efficiency and simple execution.

4 Installation

4.1 Preparing installation

Store the transport packaging and packing material for future safe transport or storage.

- Use the details included in the delivery package to check that the delivery is complete .
- Check all parts for any transport damage.

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
- Minimum distance to other devices and walls:10 cm
- Do not place the device in a wet location.
- Resonance free table with horizontal even work surface
- The location must be well ventilated
- The location is protected against direct sunlight

The mains/power switch and the disconnecting device for the mains/power line must be easily accessible during operation (e.g., a residual current circuit breaker).

4.3 Installing the instrument

WARNING! Danger due to incorrect voltage supply.

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

1. Connect the provided mains cable to the mains connection socket of the Eporator and the power supply.
2. Switch on the Eporator at the mains power switch.

5 Operation

5.1 Overview of the operating controls

Before using the Eporator for the first time, familiarize yourself with the display and the operating controls.

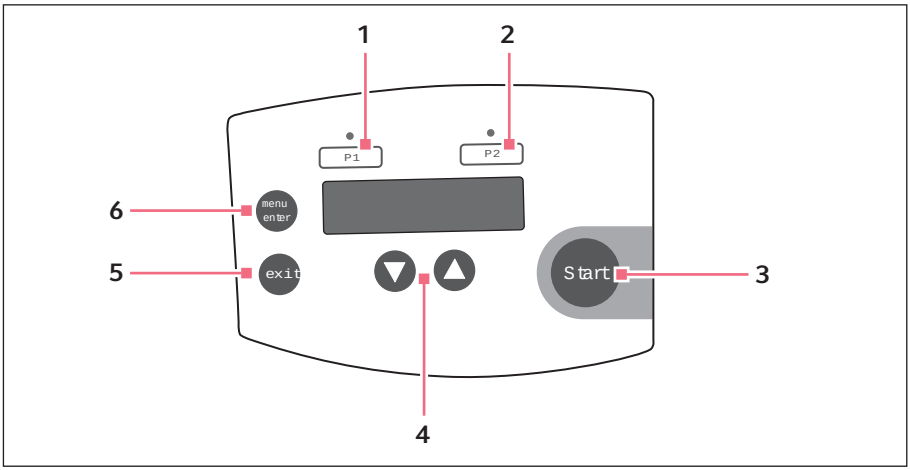


Fig. 5-1: Operating controls

1 **Program key P1 with control LED**
Pressing: Load the voltage value.
Pressing and holding (> 2 s): Save the current voltage value.

2 **Program key P2 with control LED**
Pressing: Load the voltage value.
Pressing and holding (> 2 s): Save the current voltage value.

3 **Start key**
Starting electroporation

4 **Arrow keys**
Setting the voltage

5 **exit key**
Exiting the menu

6 **menu enter key**
Selecting the menu parameters

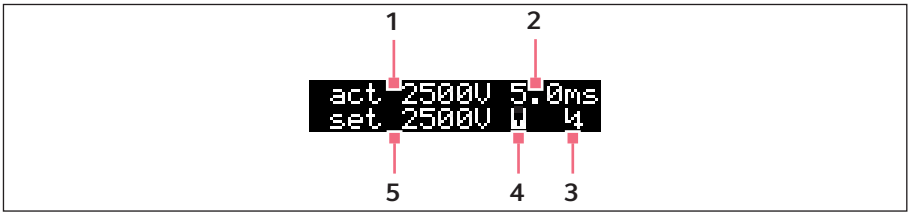


Fig. 5-2: Display

1 **Actual voltage value**

2 **Actual discharge time**

3 **Voltage symbol**
The voltage symbol is displayed after the electroporation and disappears when the cuvette holder is removed.

4 **Cuvette symbol**
The cuvette symbol is shown when a cuvette is inserted.

5 **Set voltage**

5.2 Recommendations for sample preparation

Independent of the device, the success of an electroporation is influenced by a variety of factors:

- Quality and concentration of the inserted DNA
- Quality of the concentration of the cells
- Resuspension medium of the DNA and the cells

5.2.1 DNA preparation

- **DNA quality**: In order to achieve a high transformation efficiency, the DNA solution should be pure and free of salts (e.g., from the purification process).
- **Buffer**: DNA dissolved in TE buffer is acceptable if this DNA is dissolved in approximately ten times the quantity of electrocompetent cells.
- **Salt concentration**: DNA from enzyme reactions (e.g., ligation) can be used directly for electroporation if the salt concentration is below 5 M. If the ionic strength of the reaction mixture is too high, it can be reduced by means of dilution or ethanol precipitation. After ethanol precipitation, the DNA can be resuspended in sterile, demineralized water or TE buffer.
- **Incubation**: Do not incubate the DNA with the cell suspension for too long before electroporation. Generally, the DNA should be added to the cells one minute before electroporation and the solutions should be incubated at 0 °C. Long incubation times can lead to DNA degradation due to the DNases contained in the cell suspension.

- **DNA concentration**: The DNA concentration can significantly influence the transformation efficiency.
- **Frequency and efficiency**: The frequency is defined as the number of transformants per surviving cell. The efficiency is defined as transformants per µg DNA. Using high DNA concentrations helps to achieve a high frequency. A high efficiency can be achieved by using a high cell concentration. Reducing the DNA concentration helps to prevent co-transformations of the same cell.

5.2.2 Electroporation medium

- **Sensitivity of the cells**: The cells are sensitive to external influences because the electroporation creates temporary pores in the cell membrane.
- **Electrolysis of the medium**: During electroporation, the electrolysis of the medium significantly influences the properties of the medium (e.g., the pH value). In order to avoid that many cells die, add fresh medium immediately after electroporation for recovery of the cells.
- **Ionic strength of the medium**: For electroporation of cells, the ionic strength of the medium must be taken into account. Salts must be removed from the cell and DNA preparations in order to keep the resistance of the medium as high as possible. Remaining ions in the cell suspension often come from the culture medium. A higher transformation efficiency can be achieved by removing salts from both the DNA solution and the cell preparation. Preferably, a solution with the lowest possible ionic concentration that cells can withstand should be used.

5.2.3 Growth and preparation of cells

- **Growth phase of cells**: For optimum electroporation efficiency, use strains of bacteria (e.g., *E. coli*) in their exponential growth phase.
- **Preparation of cells**: Wash the cells thoroughly to remove the growth medium that influences the electrocompetence.
- **Concentration of cells**: Use a final cell concentration of approximately 1–3 x 10^{11} cells/mL. Exceeding this value may affect the uniformity of the electrical field.
- **Conditions for electroporation**: Each bacterial or yeast strain has optimal conditions that must be determined empirically. These conditions include:
  - The cell volume
  - The quantity of specific plasmids
  - The used field strength (E). For *E. coli* , a field strength of 12–19 kV/cm is generally required to achieve a maximum transformation efficiency. The field strength results from the voltage applied and the distance between the electrodes (E = V/cm).

5.2.4 Temperature

- **Cooling of the electroporation cuvette**: Electroporation of microorganisms produces the best results at low temperatures (0 °C – 4 °C). Cool the electroporation cuvettes down to 0 °C before electroporation. Remove any residual moisture from the electroporation cuvette before inserting it in the Eporator.

5.3 Performing an electroporation

5.3.1 Switching on the device

▶ Press the mains/power switch at the rear of the device to switch the device on.

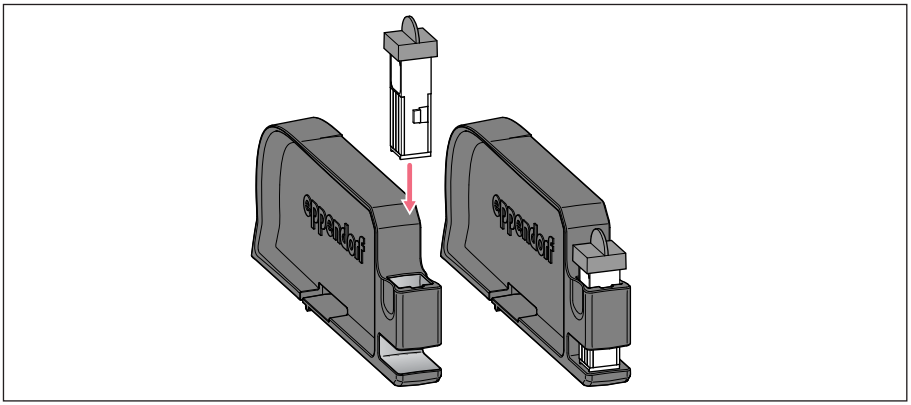
5.3.2 Inserting the electroporation cuvette

To increase the efficiency of the electroporation, the electroporation cuvette can be cooled before filling. Remove any residual liquids from the cuvette before further use.

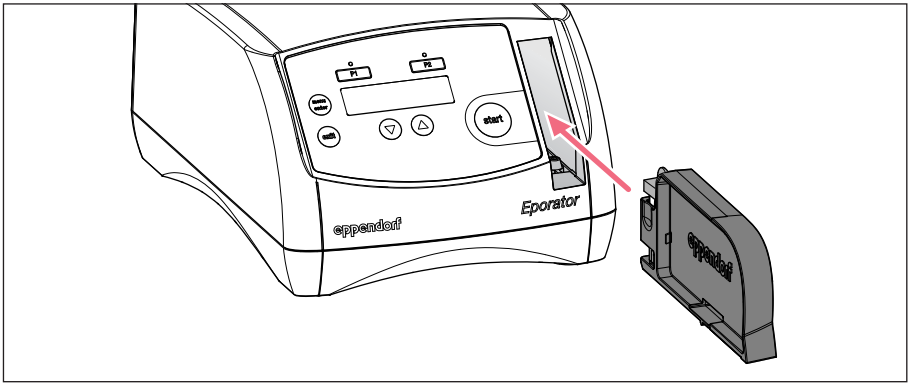
NOTICE! Damage to device due to penetration of liquids.
Liquid can enter the device during electroporation with cuvettes without lids.

▶ Only cuvettes with square lids may be used for electroporation.

1. Remove the electroporation cuvette from the individual packing.
2. Remove the lid from the electroporation cuvette.
3. Fill the sample in the electroporation cuvette. The gap between the plate electrodes must be filled in such a way that there are no bubbles.
4. Seal the electroporation cuvette with the lid.
5. Pull the cuvette holder out of the device.



6. Insert the cuvette into the cuvette holder, making sure the plastic nose points towards the back.



7. Slide the cuvette holder into the cuvette shaft until it engages.
On the display, the actual parameters of the last run disappear and the cuvette symbol is shown in the bottom line.

5.3.3 Electroporation

1. Set a voltage between 200 V and 2500 V using the arrow keys.
   After switching the device on, the last set voltage is always displayed. The most frequently used voltages can be saved and accessed using the program keys.
2. Press the **Start** key to start the electroporation process.
   - During the charging process, the display shows *Charge* and a progress bar.
   - A signal tone sound after the discharge.
   - After the electroporation, the display shows the actual voltage (act), the discharge time of the performed electroporation and a voltage symbol.
3. Pull the cuvette holder out of the device.
   The cuvette symbol and the voltage symbol disappear.
4. Remove the electroporation cuvette from the cuvette holder and carefully transfer the sample into the corresponding medium, avoiding the formation of bubbles.

5.4 Regeneration of the cells

Example for the bacterium *E. coli*:

1. After the electroporation, immediately place about 1 mL fresh medium (without selection chemicals) on the cells. A rich medium is best suited for this, e.g. the SOC medium for *E. coli*.
2. Carefully resuspend cells and transfer them to a new tube.
3. Incubate cells at optimal growth temperature (e.g. 37 °C for *E. coli*) for one hour at light vibration (e.g. with the Eppendorf Thermomixer comfort).

5.5 Determination of the transformation efficiency

After the recovery period, the cells should be plated with a selection medium.

To determine the efficiency, streak different cell concentrations and use this information to calculate the number of transformers/µg DNA.

5.6 Programs

A program contains a saved voltage setting. It allows to quickly access frequently used settings.

5.6.1 Loading a program

Upon delivery, the following parameters are stored for program 1 and 2:

- Program key **P1**: 1700 V
  (e.g., for *E. coli* electroporation in 1 mm electroporation cuvettes)
- Program key **P2**: 2500 V
  (e.g., for *E. coli* electroporation in 2 mm electroporation cuvettes)

▸ Press the required program key
The control LED above the pressed program key lights up blue and the voltage is displayed.

5.6.2 Saving a program

1. Set the voltage with the arrow keys.
2. Press and hold down the desired program key for at least **2 s**.
   A signal tone sounds. *Voltage stored* is shown on the display. The control LED above the program key lights up blue. The voltage is saved under the corresponding program number (1 to 2).

5.7 Advanced settings

Additional settings can be made in the menu. In order to ensure the traceability of exported data, date and time can be set in the device. The following settings can be made:

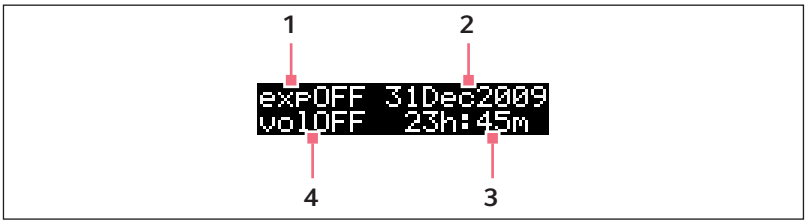


Fig. 5-3: Menu display

1 Data export

2 Date
Set the date.

3 Time
Set the time.

4 Signal tone
Set the signal tone. The display switches between *vol1* (very quiet), *vol2* (quiet), *vol3* (loud), *vol4* (very loud) and *vol OFF* (signal tone off).

Opening the menu

1. Press the **menu/enter** key.

Switching between the parameters

2. Press the **menu/enter** key.
   The selected parameter flashes on the display.

Changing a parameter value

3. Press the arrow key.

Exiting the menu

4. Press the **exit** key.
   The changed parameters are automatically saved.

5.8 Exporting data

You can save the last 50 experiments to a USB stick in separate TXT files via the USB interface at the rear of the device. The file names contain the respective sample numbers. The format is suitable, e.g., for further editing in a text editor or in Microsoft Excel.

The data records of an electroporation contain the following information:

- **Sample number (sample)** of the experiment
  The device automatically assigns a four-digit sample number to each experiment, counting upwards from 0001.
- **Date (date)** of the experiment
- **Time (time)** of the experiment
- **Set voltage (set)** of the experiment
  Voltage that was selected for the respective experiment using the arrow keys.
- **Actual voltage (act)** of the experiment
  Voltage that was actually applied to the electroporation cuvette during the respective experiment.
- **Time constant of the discharge curve (tc)** of the experiment
  Time constant of the discharge curve of the respective experiment.
- **Software version (sw)** of the device
- **Serial number (serial no)** of the device

Date and time can be set in the advanced settings.

Connecting a USB stick

1. Connect a commercially available USB stick to the USB interface at the rear of the device.

Open the menu

2. Press the **menu/enter** key.
   The menu is shown and the cursor flashes at the *exp OFF* export display.

Activate parameters

3. Press one of the arrow keys.
   The *exp ON* menu item is displayed.

Data export

4. Press the **Start** key.
   The data transfer is started. After the export is completed, the main screen is displayed.

6 Troubleshooting

6.1 General errors

Many factors can contribute to a low transformation efficiency:

- **The set voltage**: Specific voltage parameters exist for each microorganism. Some cells die during electroporation. If the field strength is too high or too low, a poor transformation efficiency is achieved. The expected survival rate varies between 20 % and 80 % of the cells used. Electroporation of *E. coli* requires a pulse of approximately 5 ms and field strengths between 12 kV/cm and 19 kV/cm. To optimize the conditions, check the transformation efficiency at different voltages.

  Application protocols for the electroporation of various bacterial and yeast strains can be found on the webpage www.eppendorf.com.
- **The cells**: Generally, cells can be transformed most efficiently when they are in an early to mid-log phase. Different growth conditions can improve the transformation efficiency.

  If too many cells are killed, the electroporation conditions for the strain must be optimized and the DNA preparation and the cell preparation must be examined for toxic or organic substances.

  After electroporation, cells (especially *E. coli*) must be immediately transferred to a rich medium in order to achieve good results. Even a short delay in completing this step can lead to a significantly lower transformation efficiency.
- **The DNA**: The quantity and quality of the DNA should be checked before electroporation. Incorrectly concentrated or degraded DNA can lead to poor transformation efficiency.

  Salts and other elements that can have a toxic effect on cells must be removed from the DNA preparation before the purification process.

  The DNA preparation should be added to the cells no longer than one minute before the electroporation. The DNase present in the cell preparation can degrade the DNA and thereby cause a low transformation efficiency.
- **The temperature**: The electroporation cuvettes should be cooled down to 0 °C – 4 °C before electroporation. This produces better results than would be achieved with electroporation cuvettes at ambient temperature.

  If frozen cells are used, electroporation should be performed immediately after thawing. Frozen cells can be stored a maximum of 6 – 12 months in 10 % – 15 % glycerol at -80 °C.
- **Deviating voltage values during transformation**: The voltage applied to the electroporation cuvette (*act*) differs significantly from the set voltage (*set*).

  A too low resistance can have several causes:
  - The cells were washed and resuspended in a buffer with too high ionic strength.
  - The cells were not sufficiently cleaned during preparation. In the event of insufficient washing, growth medium residues, which have been carried along, can leave undesirable salts.

- The preparation contains lysed cells. They contribute to the reduction of the resistance of the medium.
- The DNA preparation contains too many salts.

6.2 Error messages

▶ Acknowledge all error messages with the **exit** key.

6.2.1 Errors during operation

Problem	Cause	Solution
The display remains dark.	• The device is not connected to the mains/power line. • The device is switched off.	▶ Check the mains/power connection and the mains/ power cord. ▶ Switch on the device.
The display shows: *function not available*	• A key that is not permitted in the current device state was pressed, e.g., the **exit** key in the main screen.	▶ The message disappears after approx. 2 seconds.
The display shows: *no cuvette*	• The **Start** key was pressed although no cuvette is inserted.	1. Insert a cuvette. 2. Start the electroporation .
The display shows: *no USB stick*	• The export command was activated although no USB stick is connected to the USB interface of the device.	1. Connect a USB stick to the USB interface of the device. 2. Activate the export command again .
The display shows: *USB stick full*	• The connected USB stick does not have enough free space.	1. Connect a USB stick with enough free space to the USB interface of the device. 2. Activate the export command again .
The display shows: *no export*	• The data export from the device failed. • All existing electroporation protocols have already been saved to the USB storage medium.	1. Connect a commercially available USB stick to the USB interface of the device. 2. Activate the export command again .
The display shows: *no protocol*	• The data export failed. • There are no exportable protocols in the device.	1. Perform an electroporation. 2. Activate the export command again .

6.2.2 Device error

Problem	Cause	Solution
The display shows: *hardware error*	• Device error	1. Perform the electroporation again. ▶ If the error message appears again: Switch the device off and back on.
The display shows: *internal error*	• Device error	

7 Maintenance

7.1 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.
- ▶ Do not reconnect the device to the mains/power line unless both the inside and outside of the device are completely dry.

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, sodium hypochlorite, halogenated hydrocarbons or phenol.
- ▶ If the device has been contaminated by aggressive chemicals, clean it immediately using a mild cleaning agent.

NOTICE! Corrosion due to aggressive cleaning agents and disinfectants.

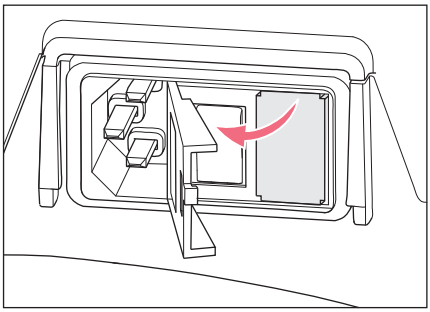
- ▶ Do not use any corrosive cleaning agents, aggressive solvents or abrasive polishes.
- ▶ Do not incubate the accessories in aggressive cleaning agents or disinfectants for longer periods.

- ▶ Wet a cloth with mild cleaning agent and demineralized water and remove contamination from the outside of the device.

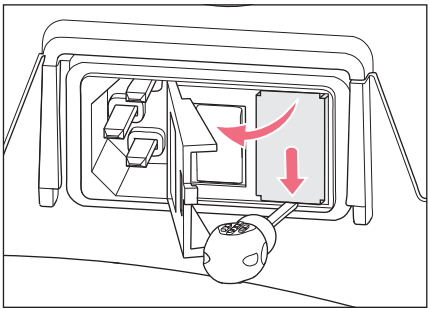
7.2 Replacing the fuse

Prerequisites

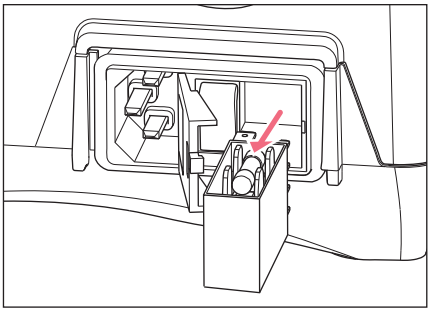
- The device has been disconnected from the mains/power line.



1. Open the lid.



2. Lever the holder out a bit with a flat screwdriver.



3. Remove the holder completely.
4. Replace the defective microfuse.
5. Fully insert the holder in the shaft and close the lid.

8 Technical data

8.1 Power supply

Voltage	100 V – 240 V, ±10 % Adaptation to the voltage takes place automatically
Frequency	50 Hz – 60 Hz
Power consumption	20 W
Charging time	< 10 s
Microfuse	250 V/T 1.25 A

8.2 Ambient conditions

Environment	For indoor use only
Ambient temperature	5 °C – 40 °C
Relative humidity	10 % – 90 %
Atmospheric pressure	79.5 kPa – 106 kPa (2000 m)
Pollution degree	2

8.3 Weight/dimensions

Weight	3,2 kg
Width	19 cm
Height	12.5 cm
Depth	27,5 cm

8.4 Interfaces

USB	USB 2.0
RS-232	For the authorized service

8.5 Pulse intervals

Pause between two pulses	Minimum 30 s
Pulse voltage	200 V – 2500 V

9 Transport, storage and disposal

9.1 Storage

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

9.2 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 contained in the decontamination certificate. It is available as a PDF document on our webpage (www.eppendorf.com/decontamination).
2. Decontaminate all parts to be shipped.
3. Include the fully completed decontamination certificate in the shipment.

9.3 Transport

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

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-25 °C – 60 °C	10 % – 95 %	30 kPa – 106 kPa
Air freight	-40 °C – 45 °C	10 % – 95 %	30 kPa – 106 kPa

9.4 Disposal

Observe the relevant legal regulations when disposing of the product.

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

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

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

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

10 Ordering Information

10.1 Eporator

Order no. (International)	Order no. (North America)	Description
4309 000.019	4309000027	**Eppendorf Eporator**

10.2 Accessories

Order no. (International)	Order no. (North America)	Description
		Cuvette stand
4308 078.006	940001102	for 16 cuvettes
4309 900.010	4309900010	**Operating Manual Eppendorf Eporator**

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Your local distributor: www.eppendorf.com/contact
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