

Register your instrument!
www.eppendorf.com/myeppendorf



Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP

Operating manual

Copyright ©2018 Eppendorf AG, Germany. All rights reserved, including graphics and images. No part of this publication may be reproduced without the prior permission of the copyright owner.

Eppendorf® and the Eppendorf Brand Design are registered trademarks of Eppendorf AG, Germany.

Eppendorf ThermoMixer®, Eppendorf ThermoTop®, and *condens.protect*® are registered trademarks of Eppendorf AG, Germany.

Registered trademarks and protected trademarks are not marked in all cases with ® or ™ in this manual.

U.S. Patents are listed on www.eppendorf.com/ip

Table of contents

1	Operating instructions	5
1.1	Using this manual	5
1.2	Danger symbols and danger levels	5
1.2.1	Danger symbols	5
1.2.2	Danger levels	5
1.3	Symbols used	6
1.4	Abbreviations used	6
1.5	Glossary	6
2	Safety	7
2.1	Intended use	7
2.2	User profile	7
2.3	Information on product liability	7
2.4	Warnings for intended use	8
2.5	Danger symbols on the device	11
3	Product description	12
3.1	Delivery package	12
3.1.1	ThermoMixer F0.5, ThermoMixer F1.5, ThermoMixer F2.0	12
3.1.2	ThermoMixer FP	12
3.2	Product overview	13
3.3	Features	14
4	Installation	16
4.1	Selecting the location	16
4.2	Installing the instrument	16
5	Operation	17
5.1	Operating controls	17
5.2	Inserting tubes and plates	19
5.2.1	Inserting tubes	19
5.2.2	Inserting the plate	19
5.3	Installing the ThermoTop	20
5.4	Installing the SmartExtender	20
5.4.1	Attaching the SmartExtender	21
5.4.2	Removing the SmartExtender	22
5.5	Activating the SmartExtender	22
5.5.1	Activating the SmartExtender with an arrow key	23
5.5.2	Activating the SmartExtender via the menu	23
5.6	Inserting tubes in the SmartExtender	24
5.7	Setting the temperature on the SmartExtender	24
5.8	Controlling the thermoblock temperature	25
5.8.1	Temperature control without mixing process	25

4 Table of contents
Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP
English (EN)

5.9	Mixing	26
5.9.1	Mixing without temperature control	26
5.9.2	Mixing and tempering	26
5.9.3	Short Mix	27
5.10	Menu	27
5.10.1	Navigate the menu	27
5.10.2	Menu structure	28
5.11	Loading saved parameters	28
6	Troubleshooting	30
6.1	General errors	30
6.2	Error messages	30
7	Maintenance	31
7.1	Setting service intervals	31
7.2	Cleaning	31
7.2.1	Cleaning the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP	32
7.2.2	Cleaning the SmartExtender	32
7.3	Disinfection/Decontamination	33
7.4	Decontamination before shipment	33
7.5	Verification of temperature control	33
8	Transport, storage and disposal	34
8.1	Transport	34
8.2	Storage	34
8.3	Disposal	35
9	Technical data	36
9.1	Power supply	36
9.2	Weight/dimensions	36
9.3	Ambient conditions	36
9.4	Application parameters	37
9.4.1	Temperature control	37
9.4.2	Mixing	37
9.5	Interface	37
	Index	38
	Certificates	41

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		Explosive substances
	Electric shock		Hot surfaces
	Hazard point		Highly flammable substances
	Risk of crushing		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
i	Additional information

1.4 Abbreviations used

PCR

Polymerase Chain Reaction

rpm

Revolutions per minute

1.5 Glossary

Deepwell plate Plate with 48, 96 or 384 wells with a larger volume than microplates. Suitable for the preparation, mixing, centrifuging, transporting and storing of solid and liquid samples.



Lid Lid for the thermoblock. Ensures uniform temperature control and protects samples from unwanted exposure to light.

Microplate Plate with 24, 48, 96 or 384 wells for the preparation, mixing, centrifuging, transporting and storing of solid and liquid samples.



PCR plate Plate with 96 or 384 wells for PCR applications.

ThermoTop Heated cover for the thermoblock. Prevents the formation of condensation on the inner wall or the lid of the tube thanks to the *condens.protect* technology.

Well Concave vessel of a microplate, PCR plate or deepwell plate.

2 Safety

2.1 Intended use

The Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP is designed for the temperature control and mixing of liquids in closed tubes and closed plates for the preparation and processing of samples.

The Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP is exclusively intended for indoor use. All country-specific safety requirements for operating electrical equipment in laboratories must be observed.

Only use Eppendorf accessories or accessories recommended by Eppendorf.

The product can be used for training, routine and research laboratories in the areas of life sciences, industry or chemistry. This product is intended to be used for research purposes only. Eppendorf does not provide a warranty for other applications. The product is not suitable for use in diagnostic or therapeutic applications. The product may only be used by skilled personnel who have been trained in the areas mentioned above.

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 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. 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.

2.4 Warnings for intended use

Read the operating instructions and observe the following general safety information before using the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP.



DANGER! Risk of explosion.

- ▶ Do not operate the device in areas where explosive substances are handled.
- ▶ Do not use this device to process any explosive or highly reactive substances.
- ▶ Do not use this device to process any substances which may generate an explosive atmosphere.



DANGER! Electric shock due to the ingress of liquid.

- ▶ Switch off the device and disconnect it from the mains/power line before starting cleaning or disinfection.
 - ▶ Do not allow any liquids to penetrate the inside of the housing.
 - ▶ Use sealed tubes and sealed plates.
 - ▶ Do not perform a spray clean/spray disinfection on the housing.
 - ▶ Only reconnect the device to the mains/power line when it is completely dry, both inside and outside.
-



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

- ▶ Only switch on the device if the device and 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 isolating device intended for this purpose (e.g. the emergency switch in the laboratory).



WARNING! Lethal voltages inside the device.

If you touch any parts which are under high voltage you may experience 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.
- ▶ Ensure that no liquids can penetrate the device.

Only authorized service staff may open the device.



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.



WARNING! Risk of burns from hot surfaces.

The thermoblock can be very hot after heating and cause burns.

- ▶ Avoid direct contact with a heated thermoblock.



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

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biosafety level of your laboratory, the material safety data sheets, and the manufacturer's application notes.
- ▶ Wear your personal protective equipment.
- ▶ 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, the current edition).



WARNING! Risk of fire.

- ▶ Do not use this device to process any highly flammable liquids.



WARNING! Risk to health due to contaminated device and accessories.

- ▶ Decontaminate the device and the accessories prior to storage and shipping.



WARNING! Risk of injury due to incorrect consumables.

- Poorly fitting tubes or plates can become detached from the thermoblock.
- Glass tubes can smash.
- ▶ Only use the thermoblocks with the consumables intended for this purpose.
- ▶ Never use tubes made of glass or other fragile material.

**WARNING! Contamination due to opening seals of consumables.**

In the following cases, the seals of micro test tubes or plates can spring open. Sample material can escape.

- High vapor pressure of the content
 - Improperly sealed lid
 - Damaged sealing lip
 - Improperly fastened foil
- ▶ Always check that consumables have been sealed tightly before use.

**WARNING! Injury from sample material being thrown out.**

Sample material can be thrown out of open, improperly sealed or unstable tubes and plates.

- ▶ Only mix in closed tubes and closed plates.
- ▶ Observe the nationally prescribed safety environment when working with hazardous, toxic and pathogenic samples. Pay particular attention to personal protective equipment (gloves, clothing, goggles, etc.), extraction, and the biosafety level of the lab.

**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 the improper use of such equipment.

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

**CAUTION! Risk of crushing form movable parts.**

- ▶ Do not replace any consumables during the mixing process.
- ▶ Do not remove the Transfer Rack during the mixing process.
- ▶ Put on the ThermoTop or Lid prior to the mixing process.
- ▶ Do not remove the ThermoTop or Lid during the mixing process.

**NOTICE! Damage due to strong vibrations.**

When mixing at high speeds, items located near the device may be moved by the vibrations of the work surface and, e.g., fall off the work table.

- ▶ Do not place easily movable items near the device or secure them adequately.



NOTICE! Damage to the display due to mechanical pressure.

- ▶ Do not apply any mechanical pressure to the display.



NOTICE! Damage due to overheating.

- ▶ Do not install the device near heat sources (e.g. heating, drying cabinet).
- ▶ Do not expose the device to direct sunlight.
- ▶ Ensure unobstructed air circulation. Maintain a clearance of at least 10 cm (3.9 in) around all ventilation gaps.



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 3 h. Only then connect the device to the mains/power line.



NOTICE! Damage from the use of aggressive chemicals.

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

2.5 Danger symbols on the device

Representation	Meaning	Location
	Risk of burns from hot surfaces.	On the thermoblock
	Hazard point ▶ Observe the operating manual.	Rear of the device
	Hazard point Risk of injury from moving parts. ▶ Observe the operating manual.	On the thermoblock

Product description

Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP
English (EN)

3 Product description**3.1 Delivery package****3.1.1 ThermoMixer F0.5, ThermoMixer F1.5, ThermoMixer F2.0**

Quantity	Description
1	ThermoMixer
1	Mains/power cord
1	Operating manual
1	Short instructions
1	Certificate of conformity

3.1.2 ThermoMixer FP

Quantity	Description
1	ThermoMixer
1	Lid
1	Mains/power cord
1	Operating manual
1	Short instructions
1	Certificate of conformity



- ▶ Check whether the delivery is complete.
- ▶ Check all parts for any transport damage.
- ▶ To safely transport and store the device, retain the transport box and packing material.

3.2 Product overview

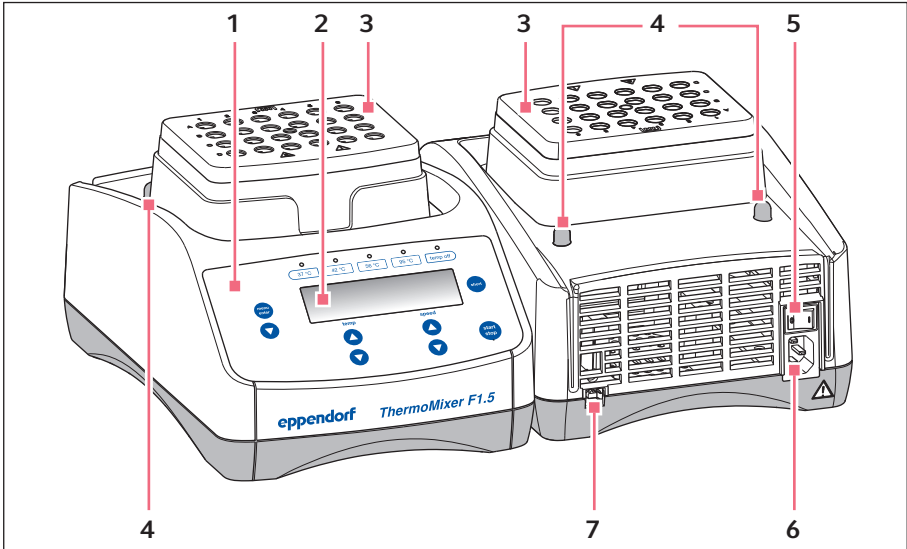


Fig. 3-1: ThermoMixer F1.5 (ThermoMixer F0.5 and ThermoMixer F2.0 are similar)

Product description

Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP
English (EN)

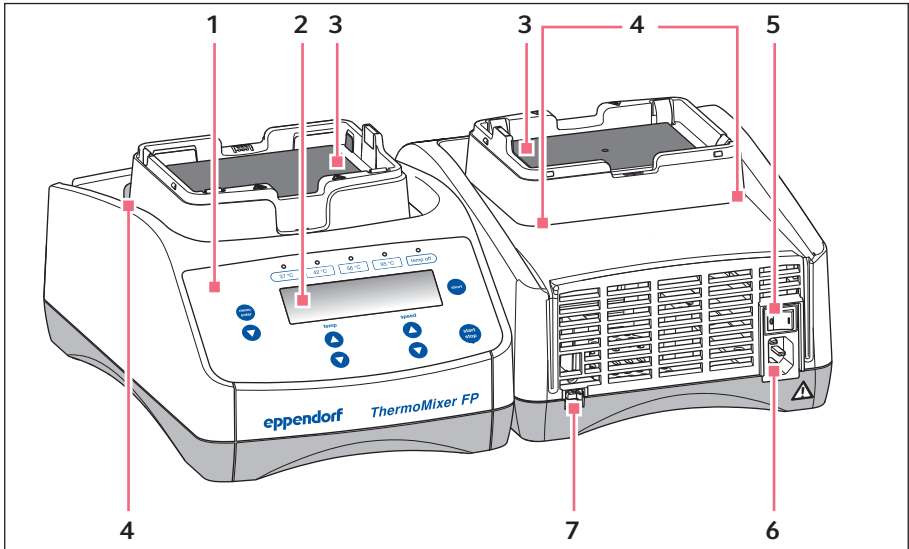


Fig. 3-2: ThermoMixer FP

- 1 **Operating controls**
- 2 **Display**
- 3 **Thermoblock**
- 4 **Centering pins**

- 5 **Mains/power switch**
- 6 **Mains/power cord socket**
- 7 **USB interface (for Eppendorf Service only)**

3.3 Features

You can use the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP to perform two basic applications of sample preparation in one convenient step: The simultaneous mixing and temperature control of the sample material.

- Eppendorf ThermoMixer F0.5: for 24 0.5 mL micro test tubes (e.g., Eppendorf Safe-Lock Tubes)
- Eppendorf ThermoMixer F1.5: for 24 1.5 mL micro test tubes (e.g., Eppendorf Safe-Lock Tubes)
- Eppendorf ThermoMixer F2.0: for 24 2.0 mL micro test tubes (e.g., Eppendorf Safe-Lock Tubes)
- Eppendorf ThermoMixer FP: all common plate formats (e.g., Eppendorf Microplates or Eppendorf Deepwell Plates).

Temperature control

- Temperatures from 4 °C above ambient temperature to 100 °C are maintained exactly and constantly.
- The temperatures 37 °C, 42 °C, 56 °C, 95 °C can be selected directly.

Mixing

- Anti-spill technology prevents lid wetting and cross contamination.
- Eppendorf ThermoMixer F1.5, Eppendorf ThermoMixer F2.0: You can select a mixing frequency between 300 rpm and 1 500 rpm.
- Eppendorf ThermoMixer F0.5, Eppendorf ThermoMixer FP: You can select a mixing frequency between 300 rpm and 2 000 rpm.
- The controlled and efficient mixing movement of the ^{2D}Mix-Control technology provides for a fast and complete mixing even of minimum volumes.
- **Short Mix:** Short, uncomplicated mixing of sample material. The mixing process is performed at the selected speed as long as you press the **short** key.

Lid and ThermoTop

- The Lid ensures uniform temperature control and protects samples from unwanted exposure to light.
- The ThermoTop prevents the formation of condensation on the inner wall or the lid of the tube thanks to the *condens.protect* technology.

Installation

Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP
English (EN)

4 Installation**4.1 Selecting the location**

Select the device location according to the following criteria:

- Mains/power connection in accordance with the name plate
- Minimum distance to other devices and walls: 10 cm (3.9 in)
- Resonance free table with horizontal even work surface
- The design of table is suitable for operating the device.
- The design of table is suitable for operating the device.
- Surrounding area must be well ventilated.
- The location must be protected against direct sunlight.



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

4.2 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. Place the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP on a suitable work surface. Position the device in such a way that the ventilation slots of the device are not obstructed.
2. Connect the power cable to the power connection socket of the device and the power supply.

5 Operation
5.1 Operating controls

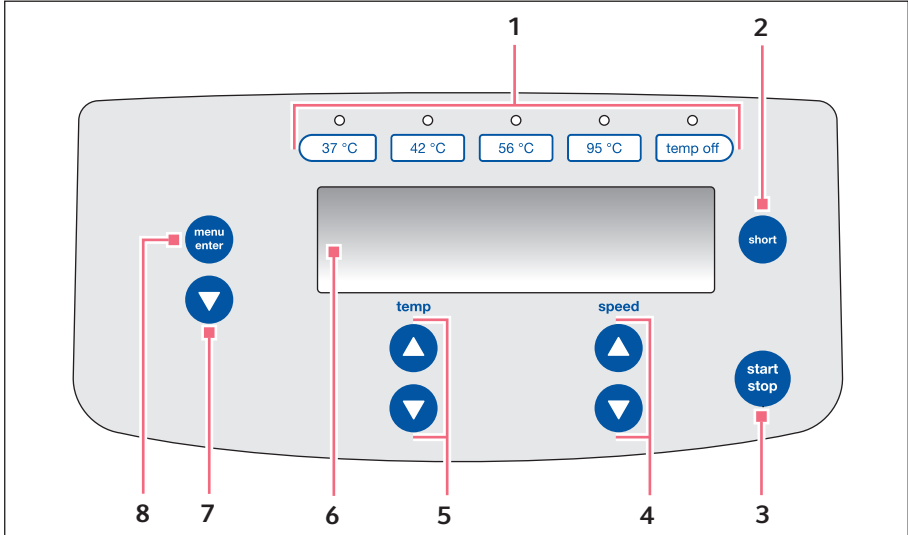


Fig. 5-1: Operating controls Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP

- | | |
|--|--|
| <p>1 Temperature keys with control LEDs
Select a temperature or switch off temperature control</p> <p>2 short key
Short Mix will run as long as the short key is pressed (see p. 27).</p> <p>3 start/stop key
Start or stop mixing/temperature control</p> <p>4 speed arrow keys
Setting the mixing frequency
Pressing and holding the arrow key: quick setting</p> | <p>5 temp arrow keys
Setting the temperature
Pressing and holding the arrow key: quick setting
As soon as the target temperature is modified, the device begins to perform temperature control.</p> <p>6 Display</p> <p>7 Menu arrow key
Navigating in the menu: activating the key lock or editing settings.</p> <p>8 menu/enter key
Opening the menu
Confirming your selection</p> |
|--|--|

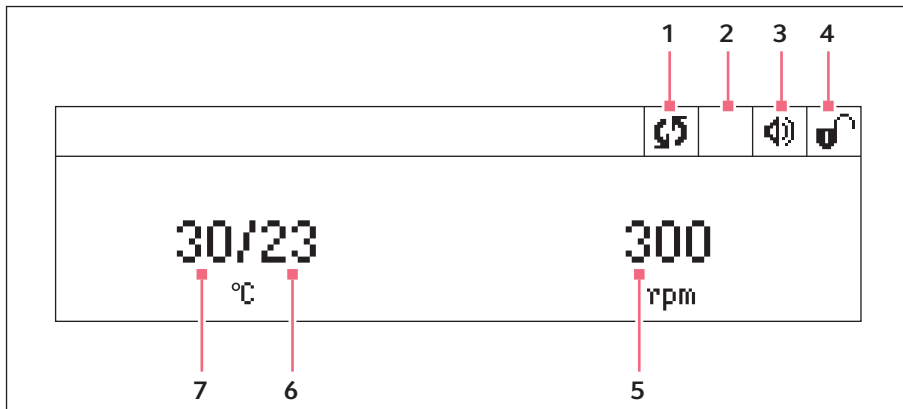


Fig. 5-2: Display Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP

1 Device status

☒ Device is performing mixing/
temperature control.

2 ThermoTop

☒ ThermoTop has been attached.
To prevent condensation, the device
heats up the ThermoTop before
controlling the temperature of the
thermoblock.

3 Speaker

☒ Speaker switched on.
☒ Speaker switched off.

4 Key lock

☒ Key lock is activated: parameters
cannot be changed.
☒ No key lock.

5 Mixing frequency

6 Actual temperature

When the actual temperature flashes on
the display, the device is not in
temperature control mode operation.

7 Set temperature

When the set temperature has been
reached, only one value is displayed.

5.2 Inserting tubes and plates



NOTICE! Damaged plates due to temperatures that are too high.

Polystyrene microplates melt at temperatures above 70 °C.

Polypropylene deepwell plates deform at temperatures above 80 °C. Deformed plates may become detached from the thermoblock or are more difficult to remove.

- ▶ Temper polystyrene microplates up to 70 °C max.
- ▶ If you are heating deepwell plates above 80 °C, do not exceed the mixing frequency of 1000 rpm.



NOTICE! Material change of consumables at extreme temperatures.

Extreme temperatures (e.g. during refrigeration or autoclaving) affect the material. The mechanical strength, dimensions and shape of the consumable will change.

- ▶ Use consumables that are suitable for the selected temperature range or the selected procedure.

5.2.1 Inserting tubes

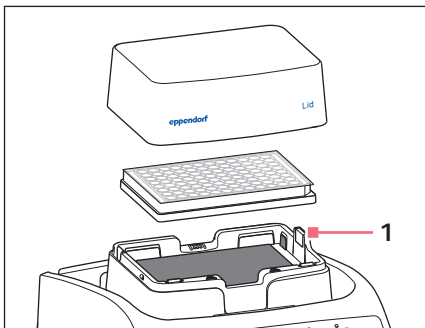
- ▶ Use closed vessels only.
- ▶ Insert the tubes completely into the bores of the thermoblock.

5.2.2 Inserting the plate



The height sensor of the Eppendorf ThermoMixer FP automatically differentiates between deepwell plates and microplates.

- ▶ When inserting microplates, make sure that the height sensor is not covered.
- ▶ Take care that the height sensor does not get contaminated.



- ▶ Only use closed plates.
- ▶ Insert the plate with the back edge first. Then press it down at the front.
- ▶ To ensure uniform temperature control in all wells, place the lid on the thermoblock.

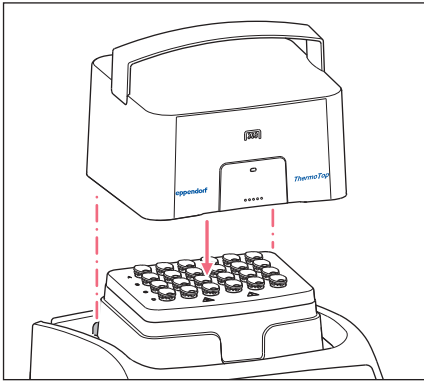
Fig. 5-3: 1 – Eppendorf ThermoMixer FP height sensor

5.3 Installing the ThermoTop


The *condens.protect* technology available with ThermoTop prevents the formation of condensation on the inner wall or the lid of the tube.

Prerequisites

- Tubes or plates have been inserted.
- The SmartExtender is **not** attached.
- The Transfer Rack is **not** attached.



► Set the ThermoTop on the device vertically from above. The centering pins behind the heating plate fit into the recesses of the ThermoTop.

- The ThermoTop is correctly positioned if the seal is fully flush with the upper part of the device.
- The blue LED of the ThermoTop lights.
- The  symbol appears in the display.



Functioning principle of the ThermoTop

- In order to prevent the formation of any condensate in a reliable manner, the device first heats the ThermoTop until it reaches the set temperature. The tempering of the thermoblock occurs with a delay.
- The temperature sensor of the thermoblock reacts to the temperature of samples: After inserting samples into a pre-heated thermoblock, the displayed actual temperature may temporarily decrease.
- While temperature control is active, the blue LED of the ThermoTop will flash.

5.4 Installing the SmartExtender



WARNING! Risk of personal injury or material damage due to chemically or mechanically damaged SmartExtenders.

- Do not use the SmartExtender if it shows traces of corrosion or is mechanically damaged.
- Check the condition of the SmartExtender regularly.



WARNING! Risk of contamination due to lids of consumables opening accidentally.

The following cases can lead to the lids of micro test tubes opening accidentally.

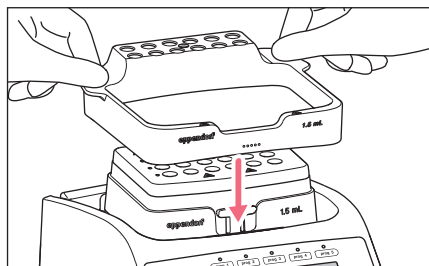
- High vapor pressure of the content
- Improperly closed lids
- Damaged sealing lips

▶ Always check that consumables are sealed tightly before use.

5.4.1 Attaching the SmartExtender

Prerequisites

- The device software is version 3.0.0. or higher
- The ThermoTop is **not** attached.
- The Transfer Rack is **not** attached.

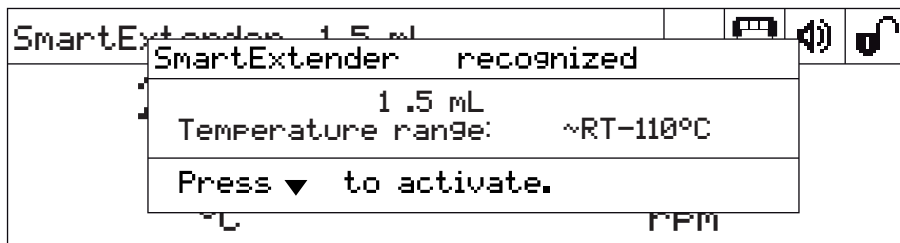


- ▶ Place the SmartExtender on the device vertically from above until it clicks into place.

The centering pins behind the heating/cooling plate fit into the recesses of the SmartExtender.

The device will detect the SmartExtender automatically when it is attached.

A message that the SmartExtender has been detected and the SmartExtender symbol will appear on the display.



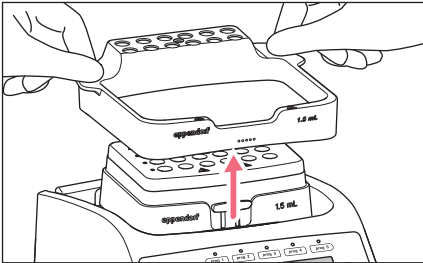
5.4.2 Removing the SmartExtender



WARNING! Risk of burns from hot surfaces.

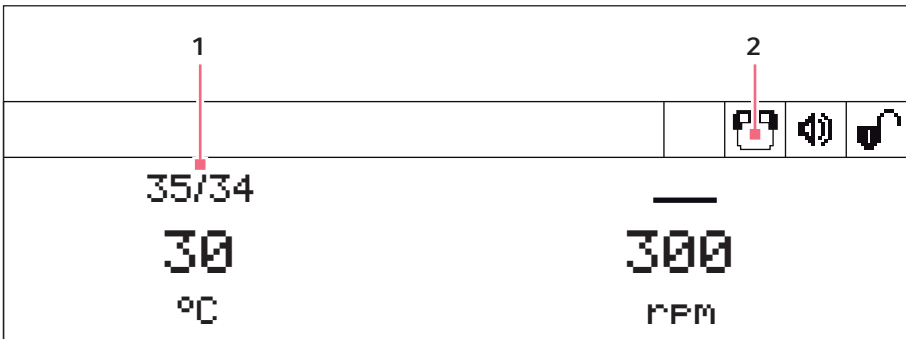
The thermoblock, the SmartExtender and the heating/cooling plate reach high temperatures that can lead to burns.

- ▶ Allow the thermoblock, the SmartExtender and the heating/cooling plate to cool down before removing the SmartExtender or the thermoblock.



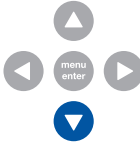

1. Pull the SmartExtender vertically up at both plate carriers.
2. Remove the SmartExtender.

5.5 Activating the SmartExtender

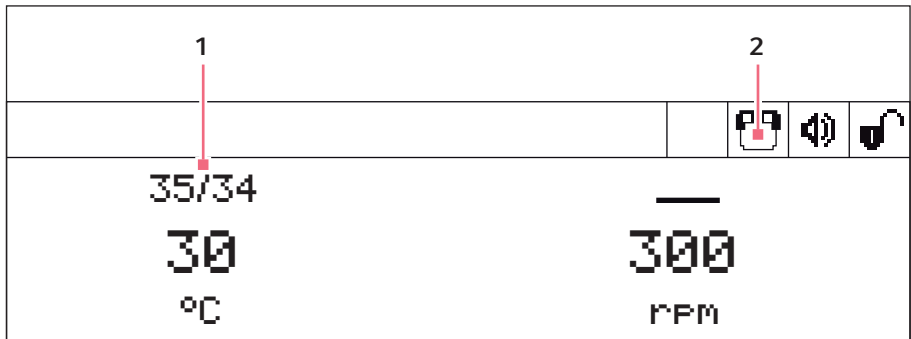


- 1 SmartExtender temperature display.
- 2 SmartExtender is ready for operation.

5.5.1 Activating the SmartExtender with an arrow key

ThermoMixer C ThermoStat C	ThermoMixer F
	

- ▶ Press the bottom arrow key on the control panel.
 - The temperature setting switches from the thermoblock to the SmartExtender.
 - The temperature of the SmartExtender is shown larger on the display.
The SmartExtender temperature can now be set.



- 1 The SmartExtender is active.
The temperature can be set.

5.5.2 Activating the SmartExtender via the menu

1. To open the menu, press the **menu/enter** key.
2. Select the SmartExtender menu item with the arrow key.
3. Press the **menu/enter** key to confirm your selection.

5.6 Inserting tubes in the SmartExtender



WARNING! Risk of injury due to using the wrong consumables.

- Improperly inserted tubes may come out of the SmartExtender bores.
 - Glass tubes can smash.
 - ▶ Only use the SmartExtender with the consumables designed for it.
 - ▶ Never use tubes made of glass or other fragile materials.
-



NOTICE! Material change of consumables at extreme temperatures.

Extreme temperatures (e.g. during refrigeration or autoclaving) affect the material. The mechanical strength, dimensions and shape of the consumable will change.

- ▶ Use consumables that are suitable for the selected temperature range or the selected procedure.
-

- ▶ Use closed tubes only.
- ▶ Insert the tubes completely into the bores of the SmartExtender.

5.7 Setting the temperature on the SmartExtender

Prerequisites

The SmartExtender has been activated.

The SmartExtender can control temperatures in a range of 3 °C above ambient temperature to 110 °C.

- ▶ Use the **temp** arrow keys to set the target temperature.
The SmartExtender starts heating immediately.

If no key is pressed within several seconds, the device switches back to the temperature setting of the thermoblock.



Entering a temperature control duration is not possible for the SmartExtender.

5.8 Controlling the thermoblock temperature



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 3 h. Only then connect the device to the mains/power line.

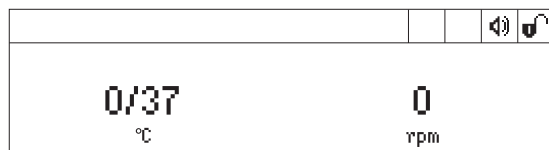
The Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP can control temperature in a range from 4 °C below ambient temperature to 100 °C.



- When the actual temperature flashes on the display, the device is not in temperature control mode operation.
- As soon as the set temperature is modified with the **temp** arrow keys, the device will start temperature control.
- When the set temperature has been reached, the display only shows a value.

5.8.1 Temperature control without mixing process

1. To switch off the mixing function, select the 0 rpm setting with the **speed** arrow keys (▼ before 300 rpm or ▲ after 1 500 rpm or 2 000 rpm).



2. Set the temperature with the **temp** arrow keys.
 - The device immediately starts temperature control.
 - When the set temperature is not changed, the actual temperature flashes on the display and the device does not perform temperature control.
3. To start the temperature control process manually, press the **start/stop** key.
 - The symbol flashes on the display.
 - The display shows the actual temperature/set temperature.

5.9 Mixing




The mixing frequency can be adjusted in steps of 50 rpm.

- Eppendorf ThermoMixer F0.5: 300 rpm – 2 000 rpm
- Eppendorf ThermoMixer F1.5: 300 rpm – 1 500 rpm
- Eppendorf ThermoMixer F2.0: 300 rpm – 1 500 rpm
- Eppendorf ThermoMixer FP: 300 rpm – 2 000 rpm

5.9.1 Mixing without temperature control

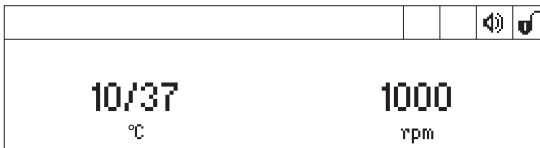
1. In order to switch off the temperature control, press the **temp off** key.




2. Set the mixing frequency with the **speed** arrow keys.
3. In order to start the mixing process, press the **start/stop** key.
 - The  symbol flashes on the display.
4. In order to end the mixing process, press the **start/stop** key.
 - The display shows the last used parameters.

5.9.2 Mixing and tempering

1. Set the temperature with the **temp** arrow keys.
The device immediately starts to perform the temperature control.
2. Set the mixing frequency with the **speed** arrow keys.



3. In order to start the mixing process, press the **start/stop** key.
 - The  symbol flashes on the display.
 - The display shows the actual temperature/set temperature and the mixing frequency.
4. In order to end the mixing process, press the **start/stop** key.
 - The display shows the last used parameters.
 - Temperature control is continued.

5.9.3 Short Mix






Use the Short Mix function for mixing for a short while without temperature control.

1. Set the mixing frequency with the **speed** arrow keys.
2. Keep the **short** key pressed.
The mixing process continues as long as the **short** key will be pressed.
3. In order to end Short Mix, release the **short** key.






5.10 Menu

5.10.1 Navigate the menu

To change settings, proceed as follows:

1.		In order to open the menu, keep the menu/enter key pressed.
2.		Select the menu item with the menu arrow key.
3.		To confirm your selection, press the menu/enter key.
4.		Change the settings with the menu arrow key.
5.		To confirm the changed setting, press the menu/enter key. A tick appears in front of the setting.
6.		To exit the menu level, select <i>Back</i> in the menu and press the menu/enter key.

5.10.2 Menu structure

Menu items and options	Description	Symbol on the display
Key lock (<i>Key lock</i>) <ul style="list-style-type: none"> • <i>Key lock on</i> • <i>Key lock off</i> 	<ul style="list-style-type: none"> • Parameters cannot be changed. • Parameters can be changed. 	 
Volume (<i>Volume</i>)	<p>The signal tone for error messages is always output at medium volume level regardless of the speaker settings.</p> <ul style="list-style-type: none"> • Set the volume of the speaker: <i>Volume 1, Volume 2, Volume 3</i> • Switching the speaker off: <i>Volume off</i> 	 
Contrast (<i>Contrast</i>)	<ul style="list-style-type: none"> • Set the contrast: <i>0 %, 25 %, 50 %, 75 %, 100 %</i> 	
Service (<i>Service</i>)	<ul style="list-style-type: none"> • Set the service interval: <i>After 500 operating hours</i> <i>After 1000 operating hours</i> <i>After 2000 operating hours</i> <i>No notification</i> 	

Back: Go to next higher menu level.

5.11 Loading saved parameters

The **37 °C** to **95 °C** keys can be used to quickly select a temperature for a temperature control procedure for an unlimited period of time. Use the **temp off** key to switch off temperature control.

	Temperature	Mixing frequency
Key 37 °C	37 °C	<i>off</i>
Key 42 °C	42 °C	<i>off</i>
Key 56 °C	56 °C	<i>off</i>
Key 95 °C	95 °C	<i>off</i>
Key temp off	<i>off</i>	<i>off</i>

- ▶ To call a saved temperature, press a direct selection key (**37 °C** to **95 °C**).
 - The LED above the key lights blue.
 - The display shows saved parameters.

- ▶ To start temperature control, press the **start/stop** key.
- ▶ To perform temperature control and mixing at the same time, also set the mixing frequency using the **speed** arrow keys.
- ❶ To exit the displayed parameters, set different values for the temperature or mixing frequency.

6 Troubleshooting

If you cannot remedy an error with the recommended measures, please contact your local Eppendorf partner. The contact addresses can be found on the Internet at www.eppendorf.com.

6.1 General errors

Problem	Cause	Solution
Display remains dark.	No power supply.	<ul style="list-style-type: none"> ▶ Check the mains connection and the power supply. ▶ Switch on the device.
Set temperature is not reached.	Set temperature is less than 4 °C above ambient temperature.	<ul style="list-style-type: none"> ▶ Set up the device in a cooler environment.
ThermoTop LED does not light.	The interface between the device and the ThermoTop is dirty.	<ul style="list-style-type: none"> ▶ Remove any dirt from the front of the ThermoTop. ▶ Remove any dirt from the top of the device, especially from the viewing window in front of the thermoblock.
ThermoTop does not fit on the device.	The lid is attached to the thermoblock.	<ul style="list-style-type: none"> ▶ If using the ThermoTop, do not use the lid.
The device does not mix or control the temperature.	Various causes are possible.	<ul style="list-style-type: none"> ▶ Contact your local Eppendorf partner.

6.2 Error messages

Problem	Cause	Solution
Error message preceded by a number code.	Various causes are possible.	<ol style="list-style-type: none"> 1. Switch off the device and wait 10 seconds. 2. Switch on the device. If the error message appears again, contact your local Eppendorf partner.
SmartExtender is not detected by the device.	<ul style="list-style-type: none"> • The Eppendorf ThermoMixer® requires software version 3.0.0 or higher to detect the SmartExtender. 	<ul style="list-style-type: none"> ▶ Perform a software update. The software can be downloaded from the Eppendorf website.

7 Maintenance

7.1 Setting service intervals

The Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP offers the option of activating a reminder that the device needs to be serviced. To set a service interval, proceed as follows:

1. Under *Menu > Settings >* select the *Service* menu item. Confirm with the **menu/enter** key.
2. Select a service interval with the menu arrow keys (after 500, 1 000 or 2 000 operating hours).
To switch off the notification, select *No notification*.

When the specified operating hours have been reached, a message appears. Contact your local Eppendorf partner. The contact addresses can be found online at www.eppendorf.com/worldwide.

7.2 Cleaning



DANGER! Electric shock due to the ingress of liquid.

- ▶ Switch off the device and disconnect it from the mains/power line before starting cleaning or disinfection.
- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Use sealed tubes and sealed plates.
- ▶ Do not perform a spray clean/spray disinfection on the housing.
- ▶ Only reconnect the device to the mains/power line when it is completely dry, both inside and outside.



NOTICE! Damage from the use of aggressive chemicals.

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



NOTICE! Corrosion due to aggressive cleaning agents and disinfectants.

- ▶ Do not use any corrosive cleaning agents, aggressive solvents or abrasive polishes.
- ▶ Do not use any laboratory cleaners with sodium hypochlorite.

-
- ▶ Clean the housing of the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP regularly.

7.2.1 Cleaning the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP

Auxiliary equipment

- Lint-free cloth.
 - Mild, soap-based lab cleaner.
 - Dist. water
1. Switch off the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP and disconnect it from the power supply.
 2. Allow the device to cool down.
 3. Clean all external parts of the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP with a mild soap solution and a lint-free cloth.
 4. Wipe off the soap solution with dist. water.
 5. Dry all cleaned parts.

7.2.2 Cleaning the SmartExtender



NOTICE! Damage to the SmartExtender due to penetration of liquids

- ▶ Do not allow any liquids to run over the SmartExtender.
 - ▶ Do not rinse the SmartExtender with aqueous, alcoholic or other liquids.
 - ▶ Only wipe the SmartExtender with slightly moistened cloths.
-

Auxiliary equipment

- Lint-free cloth
- Soft bottle brush or cotton swabs
- Mild soap-based laboratory cleaner
- Dist. water

Clean the SmartExtender immediately if sample fluid enters the bores or comes into contact with the surfaces.

1. Wipe the SmartExtender with a mild soap solution and a cloth. Clean the bores with a soft bottle brush or cotton swabs.
2. Wipe off the soap solution with a damp cloth.
3. Let the cleaned SmartExtender dry with the bores pointing downwards. Do not dry the SmartExtender in a drying cabinet.

7.3 Disinfection/Decontamination



DANGER! Electric shock due to the ingress of liquid.

- ▶ Switch off the device and disconnect it from the mains/power line before starting cleaning or disinfection.
 - ▶ Do not allow any liquids to penetrate the inside of the housing.
 - ▶ Use sealed tubes and sealed plates.
 - ▶ Do not perform a spray clean/spray disinfection on the housing.
 - ▶ Only reconnect the device to the mains/power line when it is completely dry, both inside and outside.
-

Auxiliary equipment

- Lint-free cloth.
 - Disinfectant.
1. Switch off the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP and disconnect it from the mains/power supply.
 2. Allow the device to cool down.
 3. Clean the device.
 4. Select a disinfection method that complies with the legal requirements and regulations in place for your range of application.
 5. Wipe the surfaces with the lint-free cloth and disinfectant.

7.4 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 (www.eppendorf.com/decontamination).
 2. Decontaminate all the parts you are going to dispatch.
 3. Include the fully completed decontamination certificate in the shipment.
-

7.5 Verification of temperature control

To verify the temperature accuracy of the thermoblock, use the Eppendorf Temperature Verification System – Single Channel. In combination with the temperature sensor for the Eppendorf ThermoMixer F0.5/F1.5/F2.0/FP the exact temperature in the thermoblock can be measured.

Details on the verification process with the Eppendorf Temperature Verification System – Single Channel can be found in the corresponding operating manual.

Transport, storage and disposal

Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP

English (EN)

8 Transport, storage and disposal

8.1 Transport



CAUTION! Risk of injury due to lifting and carrying of 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 only.
- ▶ Use a transport aid for transporting the device.

- ▶ Use the original packing for transport.

	Air temperature	Relative humidity	Atmospheric pressure
General transport	-25 °C – 60 °C	10 % – 75 %	30 kPa – 106 kPa
Air freight	-40 °C – 55 °C	10 % – 75 %	30 kPa – 106 kPa

8.2 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

8.3 Disposal

If the product needs to be disposed of, the relevant legal regulations must be observed.

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

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

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



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

Technical data

Eppendorf ThermoMixer® F0.5/F1.5/F2.0/FP

English (EN)

9 Technical data**9.1 Power supply**

Power connection	100 V – 130 V \pm 10 %, 50 Hz – 60 Hz 220 V – 240 V \pm 10 %, 50 Hz – 60 Hz
Power consumption	Maximum 200 W
Overvoltage category	II
Degree of pollution	2
Protection class	I

9.2 Weight/dimensions

Width	20.6 cm (8.1 in)	
Depth	30.4 cm (12.0 in)	
Height	Eppendorf ThermoMixer F0.5	16.3 cm (6.4 in)
	Eppendorf ThermoMixer F1.5	17.0 cm (6.7 in)
	Eppendorf ThermoMixer F2.0	17.0 cm (6.7 in)
	Eppendorf ThermoMixer FP	16,4 cm (6.5 in)
Weight	Eppendorf ThermoMixer F0.5	6.2 kg (13.7 lb)
	Eppendorf ThermoMixer F1.5	6.3 kg (13.9 lb)
	Eppendorf ThermoMixer F2.0	6.3 kg (13.9 lb)
	Eppendorf ThermoMixer FP	6.1 kg (13.4 lb)

9.3 Ambient conditions

Environment	For indoor use only
Ambient temperature	5 °C – 40 °C
Relative humidity	10 % – 90 %, non-condensing
Atmospheric pressure	79.5 kPa – 106 kPa

9.4 Application parameters

9.4.1 Temperature control

Temperature control range	1 °C – 100 °C, can be set in increments of 1 °C Minimum: 4 °C above the ambient temperature Maximum: 100 °C	
Temperature accuracy	Set temperature 20 °C – 45 °C	Set temperature < 20 °C or > 45 °C
Eppendorf ThermoMixer F0.5	±0.5 °C	±0.5 °C
Eppendorf ThermoMixer F1.5	±0.5 °C	±0.5 °C
Eppendorf ThermoMixer F2.0	±0.5 °C	±0.5 °C
Eppendorf ThermoMixer FP	±1.0 °C	±4.0 °C
Temperature homogeneity in relation to all positions of the thermoblock	Set temperature 20 °C – 45 °C	Set temperature < 20 °C or > 45 °C
Eppendorf ThermoMixer F0.5/F1.5/ F2.0/FP	±0.5 °C	±1.5 °C
Heating rate	The change of temperature in filled tubes is slower.	
Eppendorf ThermoMixer F0.5	15 °C/min	
Eppendorf ThermoMixer F1.5	11 °C/min	
Eppendorf ThermoMixer F2.0	13 °C/min	
Eppendorf ThermoMixer FP	18 °C/min	

9.4.2 Mixing

Mixing frequency can be set in increments of 50 rpm

Eppendorf ThermoMixer F0.5	300 rpm – 2 000 rpm
Eppendorf ThermoMixer F1.5	300 rpm – 1 500 rpm
Eppendorf ThermoMixer F2.0	300 rpm – 1 500 rpm
Eppendorf ThermoMixer FP	300 rpm – 2 000 rpm

9.5 Interface

USB interface	For connecting to VisioNize
---------------	-----------------------------

Index**A**

Actual temperature	18
Application parameters	37

C

Cleaning	32
condens.protect	20

D

Danger symbol	
Device	11
Decontamination	33
Deepwell plate	6, 19
Display	14, 18
Disposal	35

G

Glossary	6
----------------	---

H

Hazards	8
Heating rate	37

I

Installation	
Device	16
Selecting the location	16
Intended use	
Hazards	8

K

Key lock	
set	28
Symbol	18

L

Lid	6, 19
-----------	-------

M

Main illustration	13
Mains/power cord socket	14
Mains/power switch	14
Menu	27
Menu arrow key	17
Navigation	27
Overview	28
Microplate	6, 19
Mixing	26
Application parameters	37
Setting the mixing frequency	26
Starting	17
Stopping	17
Symbol	18
without temperature control	26
Mixing frequency	18
Setting	17

O

Operating controls	14, 17
--------------------------	--------

P

PCR plate	6, 19
Plates	19

S

Safety precautions	8
Selecting the location	16
Set temperature	18
Short Mix	17, 27
Speaker	
Symbol	18
Storage	34

T

Technical data	
Ambient conditions	36
Application parameters	37
Power supply	36
Weights and dimensions	36
Temperature	
Setting	17
Temperature control	25
Application parameters	37
Switching off the temperature control	26
Symbol	18
Temperature key	17
Thermoblock	14
ThermoTop	6, 20
Symbol	18
Tubes	19

U

USB interface	14
---------------------	----

V

Verification of temperature control	33
Volume	
set	28

W

Well	6
------------	---

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:

Eppendorf ThermoMixer® F1.5, Eppendorf ThermoMixer® FP
Eppendorf ThermoMixer® F0.5, Eppendorf ThermoMixer® F2.0
including accessories

Product type:

Thermomixer for test tubes and plates

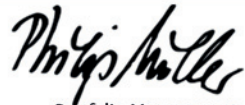
Relevant directives / standards:

2014/35/EU: EN 61010-1, EN 61010-2-010, EN 61010-2-051
UL 61010-1, CAN/CSA C22.2 No. 61010-1
2014/30/EU: EN 55011, EN 61326-1
2011/65/EU: EN 50581

Date: June 06, 2016



Management Board



Portfolio Management

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

Eppendorf® and the Eppendorf logo are registered trademarks of Eppendorf AG, Germany.
U.S. Design Patents are listed on www.eppendorf.com/ip.
All rights reserved, incl. graphics and pictures. Copyright 2016 © by Eppendorf AG.

www.eppendorf.com

ISO 9001
Certified

ISO
13485
Certified

ISO
14001
Certified

Evaluate Your Manual

Give us your feedback.
www.eppendorf.com/manualfeedback

Your local distributor: www.eppendorf.com/contact
Eppendorf AG · Barkhausenweg 1 · 22339 Hamburg · Germany
eppendorf@eppendorf.com · www.eppendorf.com