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Eppendorf ThermoMixer® C

Operating manual

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Table of contents

1 Operating instructions . . . 7
1.1 Using this manual . . . 7
1.2 Danger symbols and danger levels . . . 7
1.2.1 Danger symbols . . . 7
1.2.2 Danger levels . . . 7
1.3 Symbols used . . . 8
1.4 Abbreviations used . . . 8
1.5 Glossary . . . 8

2 Safety . . . 9
2.1 Intended use . . . 9
2.2 User profile . . . 9
2.3 Information on product liability . . . 9
2.4 Warnings for intended use . . . 10
2.5 Danger symbols on the device . . . 13

3 Product description . . . 14
3.1 Delivery package . . . 14
3.2 Product overview . . . 14
3.3 Features . . . 15

4 Installation . . . 17
4.1 Selecting the location . . . 17
4.2 Installing the instrument . . . 17

5 Operation . . . 18
5.1 Operating controls . . . 18
5.2 Setting the language . . . 20
5.3 Installing the thermoblock . . . 21
5.3.1 Attaching the thermoblock . . . 22
5.3.2 Removing the thermoblock . . . 23
5.4 Inserting tubes and plates . . . 23
5.4.1 Inserting tubes . . . 24
5.4.2 Inserting the plate . . . 24
5.5 Installing the ThermoTop . . . 24
5.6 Installing the SmartExtender . . . 25
5.6.1 Attaching the SmartExtender . . . 26
5.6.2 Removing the SmartExtender . . . 27
5.7 Activating the SmartExtender . . . 27
5.7.1 Activating the SmartExtender with an arrow key . . . 28
5.7.2 Activating SmartExtender via the menu . . . 28
5.8 Inserting tubes in the SmartExtender . . . 29
5.9 Setting the temperature on the SmartExtender . . . 29

5.10 Controlling the thermoblock temperature . . . 30
5.10.1 Temperature control with time setting . . . 30
5.11 Mixing . . . 31
5.11.1 Mixing without temperature control . . . 31
5.11.2 Mixing and tempering . . . 31
5.11.3 Mixing/temperature control with continuous run . . . 32
5.11.4 Interrupting the mixing process . . . 33
5.11.5 Short Mix . . . 33
5.11.6 Mixing/tempering with Time Control or Temp Control . . . 33
5.12 Navigating the menu . . . 34
5.13 Menu structure . . . 35
5.13.1 SmartExtender . . . 35
5.13.2 Programs . . . 35
5.13.3 Key lock . . . 36
5.13.4 Time mode . . . 36
5.13.5 Settings . . . 36
5.14 Programs . . . 37
5.14.1 Creating a program . . . 37
5.14.2 Interval Mix: Creating a program level with pause interval . . . 39
5.14.3 Restricting ramp rates . . . 40
5.14.4 Quick save with program keys . . . 40
5.14.5 Loading a saved program . . . 41
5.14.6 Editing programs . . . 42
5.14.7 Deleting programs . . . 42

6 Troubleshooting . . . 43
6.1 General errors . . . 43
6.2 Error messages . . . 44

7 Maintenance . . . 45
7.1 Setting service intervals . . . 45
7.2 Cleaning . . . 45
7.2.1 Cleaning the Eppendorf ThermoMixer C . . . 46
7.2.2 Cleaning the thermoblock . . . 46
7.2.3 Cleaning the SmartExtender . . . 47
7.3 Disinfection/decontamination . . . 47
7.4 Decontamination before shipment . . . 48
7.5 Verification of temperature control . . . 48

8 Transport, storage and disposal . . . 49
8.1 Transport . . . 49
8.2 Storage . . . 49
8.3 Disposal . . . 50

9 Technical data . . . 51
9.1 Power supply . . . 51

9.2 Weight/dimensions 51
9.3 Ambient conditions 51
9.4 Application parameters 51
9.4.1 Temperature control 51
9.4.2 Mixing 52
9.4.3 Time setting 53
9.5 Interface 53

Index 54

Certificates 57

1 Operating instructions

1.1 Using this manual

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

1.2 Danger symbols and danger levels

1.2.1 Danger symbols

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

	**Biohazard**		**Explosive substances**
	**Electric shock**		**Hot surface**
	**Hazard point**		**Highly flammable substances**
	**Risk of crushing**		**Material damage**

1.2.2 Danger levels

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

1.3 Symbols used

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

1.4 Abbreviations used

PCR
Polymerase Chain Reaction

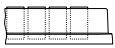
rpm
Revolutions per minute

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 C 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 C 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 compromised. Liability for any resulting property damage or personal injury is then transferred to the operator:

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables which are not recommended by Eppendorf.
- The device is maintained or repaired by individuals not authorized by Eppendorf.
- 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 C.

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 and the heating/cooling plate can be very hot after heating and cause burns.

- Allow the thermoblock and the heating/cooling plate to cool down completely before removing the thermoblock.

WARNING! Personal injury or material damage due to chemically or mechanically damaged thermoblocks.

- Do not use thermoblocks that show signs of corrosion or mechanical damage.
- Check the condition of the thermoblocks regularly.

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.
▶ Do not remove the thermoblock 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

Depiction	Meaning	Location
	Risk of burns from hot surfaces.	• Upper side of the device • On the thermoblock
	Hazard point ▸ Observe the operating manual.	Rear of the device

3 Product description
3.1 Delivery package

Quantity	Description
1	Eppendorf ThermoMixer C (without thermoblock)
1	Mains/power cord
1	Operating manual
1	Short instructions

- 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

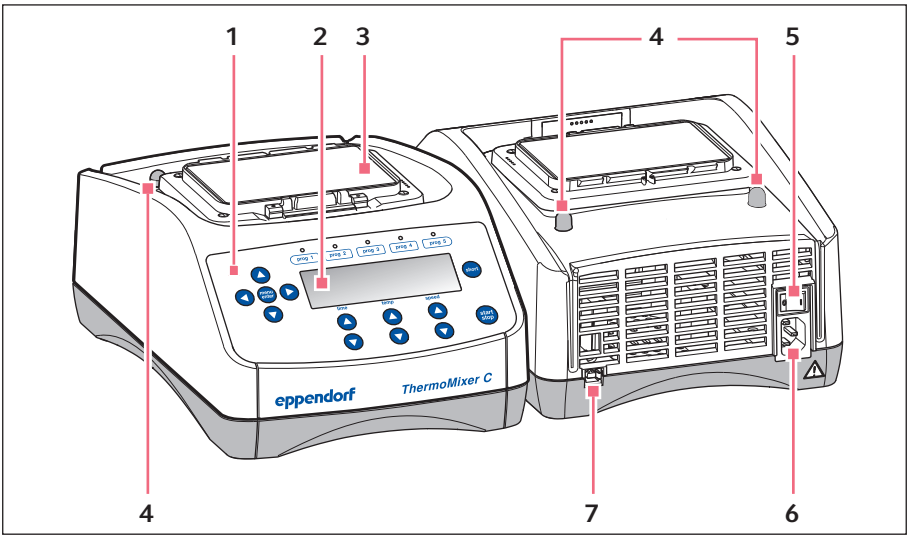


Fig. 3-1: Eppendorf ThermoMixer C

1 **Operating controls**
2 **Display**
3 **Heating/cooling plate**
4 **Centering pins**
5 **Mains/power switch**
6 **Mains/power cord socket**
7 **USB interface (for connecting to VisioNize)**

3.3 Features

You can use the Eppendorf ThermoMixer C to perform two basic applications of sample preparation in one convenient step: The simultaneous mixing and temperature control of the sample material.

The thermoblocks can be exchanged quickly and easily, without the use of tools. The thermoblocks allow the use of lab tubes in the microliter and milliliter ranges:

- Micro test tubes (e.g. 0.2 mL PCR tubes to 5.0 mL micro test tubes)
- Conical tubes with volumes of 5 mL to 50 mL
- Microplates and deepwell plates with any kind of bottom shape
- PCR plates (e.g., Eppendorf twin.tec PCR Plate 96, Eppendorf twin.tec PCR Plate 384)
- Tubes with a diameter of 11 mm to 11.9 mm
- Cryogenic tubes

Temperature control

- Peltier cooling allows samples to be cooled to 15 °C below ambient temperature.
- The temperature range can be set from 1 °C to 100 °C.

Mixing

- Depending on the utilized thermoblock, you can select mixing frequencies between 300 rpm and 3 000 rpm.
- Anti-spill technology prevents lid wetting and cross contamination.
- 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.
- **Interval Mix:** Continuous switching between mixing phases and pauses. The mixing frequency and the duration are freely selectable.
- **Interrupting the time counter:** If you want to add reagents or exchange tubes while mixing, you can interrupt the mixing process and the time counter.

Multi-level mixing/temperature control

- In addition to a normal mixing/temperature control run, you can freely define programs with up to four successive levels ("steps"). The program levels automatically run one after the other.
- A total of 20 program slots is available.
- Program keys: The 5 most common mixing and temperature control parameters are already stored as programs and can be selected directly with the program keys. The programs can be overwritten.

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.

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 to support the weight of 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 C 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

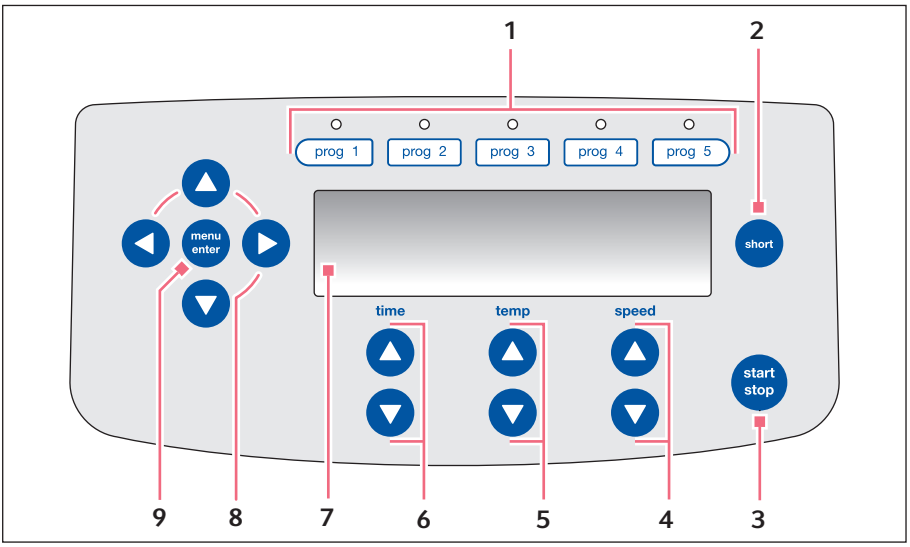


Fig. 5-1: Operating controls Eppendorf ThermoMixer C

1 **Program keys with control LEDs**
Press the program key: Load program
Press and hold the program key for 2 seconds: Save current parameters

2 **short key**
Short Mix will run as long as the **short** key is being pressed (see p. 33).

3 **start/stop key**
Press the **start/stop** key: Start or stop mixing/temperature control
Press and hold the **start/stop** key for 2 seconds: Pause (interrupt mixing process and time counting)

4 **speed arrow keys**
Setting the mixing frequency
Pressing and holding the arrow key: Quick setting

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.

6 **time arrow keys**
Setting the mixing time
Pressing and holding the arrow key: Quick setting

7 **Display**

8 **Menu arrow keys**
Navigating in the menu: Load or edit programs, set key lock, set the time mode, edit the settings.

9 **menu/enter key**
Open the menu
Confirm your selection

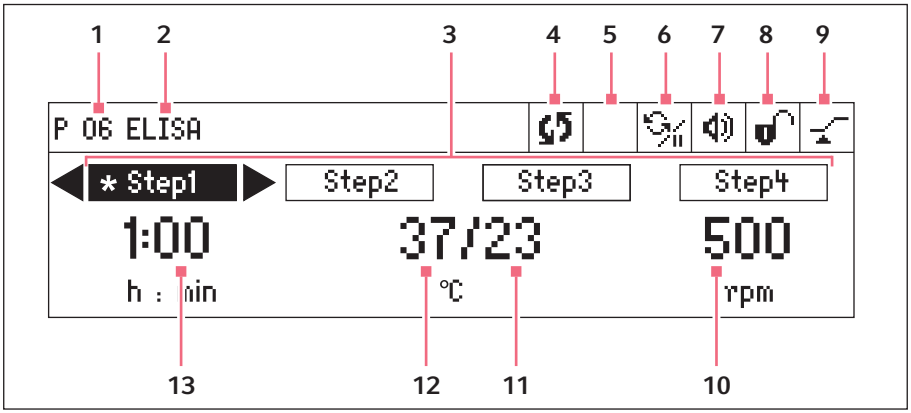


Fig. 5-2: Display Eppendorf ThermoMixer C

1 Program number

2 Program name

3 Program levels (step 1 to step 4)
*: current step

4 Device status
Device is performing mixing/ temperature control.
Mixing process interrupted, temperature control to be continued.

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

5 SmartExtender
SmartExtender is attached.

6 Interval Mix
Interval Mix has been activated for the current step.

7 Speaker
Speaker switched on.
Speaker switched off.

8 Key lock
Key lock is activated: Parameters cannot be changed.
No key lock.

9 Time mode
Time Control Time counting begins immediately.
Temp Control Time counting begins when the set temperature has been reached.

10 Mixing frequency

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

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

13 Mixing time

5.2 Setting the language

The device is delivered with *English* as the default language. To set another language, proceed as follows:

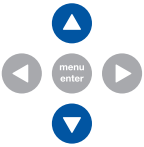
1. Switch on the device with the power switch at the rear of the device.

2. To open the menu, press the **menu/enter** key.

3. Select the *Settings* menu item with the menu arrow keys.

4. To confirm your selection, press the **menu/enter** key.

5. Select the *Language* menu item with the menu arrow keys. Confirm with the **menu/enter** key.



6. Select the language with the menu arrow keys and press the **menu/enter** key.
   A checkmark will appear in front of the selected language.

7. To exit the menu, press the left menu arrow key several times.

5.3 Installing the thermoblock

WARNING! Personal injury or material damage due to chemically or mechanically damaged thermoblocks.

- Do not use thermoblocks that show signs of corrosion or mechanical damage.
- Check the condition of the thermoblocks regularly.

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.

When you attach the thermoblock, the device automatically recognizes the mounted thermoblock. The mixing frequency is automatically limited to the maximum value for the thermoblock being used.

Only the following thermoblocks can be used with the Eppendorf ThermoMixer C. Exchangeable thermoblocks for the Eppendorf Thermomixer comfort/Eppendorf Thermomixer R are not compatible.

Thermoblock	Tubes/plates	Maximum mixing frequency	Accessories
SmartBlock *0.5 mL*	Tube volume 0.5 mL	2 000 rpm	ThermoTop or Lid**
SmartBlock *1.5 mL*	Tube volume 1.5 mL	2 000 rpm	ThermoTop or Lid**
SmartBlock *2.0 mL*	Tube volume 2.0 mL	2 000 rpm	ThermoTop or Lid**
SmartBlock *5.0 mL*	Tube volume 5.0 mL	1 000 rpm	–
SmartBlock *12 mm*	Tubes with a diameter of 11 mm to 11.9 mm	2 000 rpm	–
SmartBlock *cryo*	Cryotubes	2 000 rpm	–
SmartBlock *15 mL*	Conical tubes volume 15 mL	1 000 rpm	–
SmartBlock *50 mL*	Conical tubes volume 50 mL	1 000 rpm	–

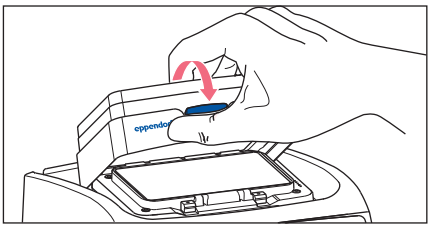
Thermoblock	Tubes/plates	Maximum mixing frequency	Accessories
SmartBlock *plates*	Microplates with various bottom contours	3 000 rpm*	ThermoTop or Lid**
	Deepwell plates with various bottom contours up to 80 °C	2 000 rpm	
	Deepwell plates with various bottom contours from 80 °C	1 000 rpm	
SmartBlock *PCR 96*	96-well PCR plates 0.2 mL PCR tubes	2 000 rpm	ThermoTop or Lid**
SmartBlock *PCR 384*	384-well PCR plates	3 000 rpm	ThermoTop or Lid**
SmartBlock *DWP 500***	Eppendorf Deepwell Plates 96/500 µL	1 600 rpm	ThermoTop or Lid**
SmartBlock *DWP 1000***	Eppendorf Deepwell Plates 96/1000 µL	1 600 rpm	ThermoTop or Lid**

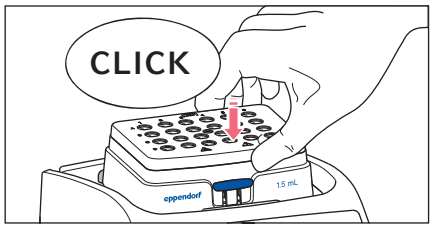
* The height sensor of the SmartBlock *plates* automatically differentiates between deepwell plates and microplates.

** If you are using the Lid, select a mixing frequency of max. 2 000 rpm.

*** SmartBlock *DWP 500* and SmartBlock *DWP 1000* can only be used with Eppendorf Deepwell Plates (optimal fit and temperature transfer).

5.3.1 Attaching the thermoblock



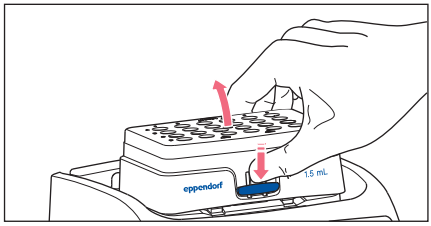


1. First only attach the rear edge of the thermoblock. The writing must face to the front.
2. Push the front edge of the thermoblock down.
   - The thermoblock audibly engages.
   - The display shows the name of the thermoblock.

5.3.2 Removing the thermoblock

WARNING! Risk of burns from hot surfaces.
The thermoblock and the heating/cooling plate can be very hot after heating and cause burns.

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



1. To unlock the thermoblock, press the lever at the front of the thermoblock down.
2. Lift the front edge so that the thermoblock is tilted backwards.
3. Remove the thermoblock upwards.

5.4 Inserting tubes and plates

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.

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.

5.4.1 Inserting tubes

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

5.4.2 Inserting the plate

The height sensor of the SmartBlock *plates* 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.

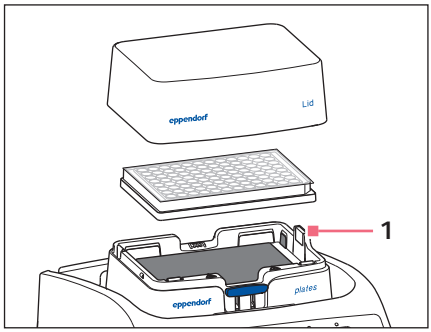


Fig. 5-3: 1 – SmartBlock *plates* height sensor

- 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.

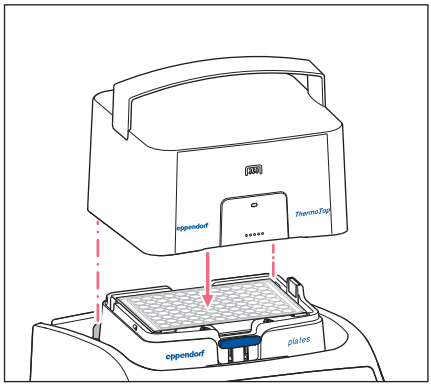
5.5 Installing the ThermoTop

The ThermoTop is compatible with thermoblocks which feature the ***condens.****protect* symbol:

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

Prerequisites

- A compatible thermoblock has been attached.
- Tubes or plates have been inserted.
- The SmartExtender is **not** attached.
- The TransferRack is **not** attached.



- ▸ Set the ThermoTop on the device vertically from above. The centering pins behind the heating/cooling 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.

5.6 Installing the SmartExtender

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

- ▸ Do not use SmartExtenders that show signs of corrosion or mechanical damage.
- ▸ Check the conditions of the SmartExtender regularly.

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

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

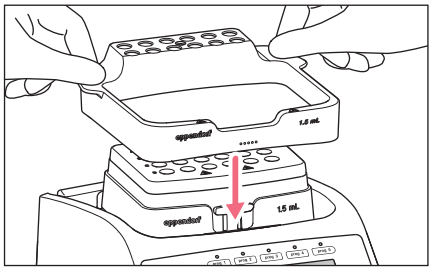
- High vapor pressure of the content
- Improperly closed lids
- Damaged sealing lips

- ▸ Always check that consumables have been tightly closed before use.

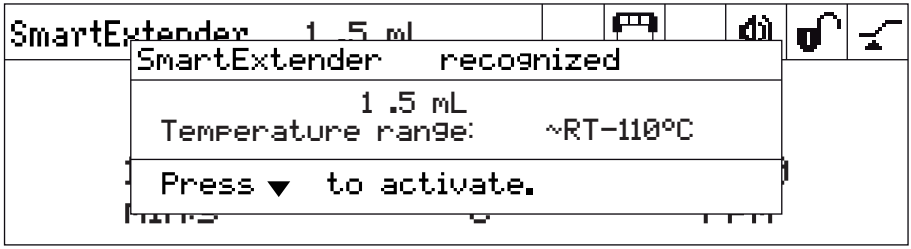
5.6.1 Attaching the SmartExtender

Prerequisites

- ThermoMixer C, ThermoStat C and ThermoMixer F: Software Version 3.0.0. or higher
- The ThermoTop is **not** attached.
- The TransferRack is **not** attached.



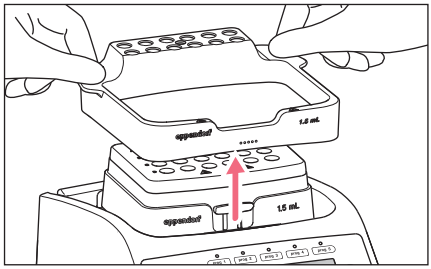
▸ Place the SmartExtender on the device vertically from above until it clicks into place.
The centering pins behind the heating/ cooling plate fit into the recesses of the SmartExtender.
The device will detect the SmartExtender automatically when it is attached.
A message that the SmartExtender has been attached and the SmartExtender symbol will appear in the display.



5.6.2 Removing the SmartExtender

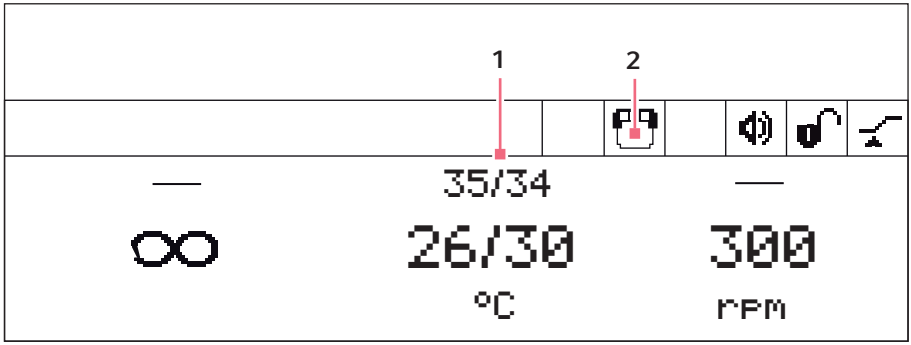
WARNING! Risk of burns from hot surfaces.
The thermoblock, the SmartExtender and the heating/cooling plate reach high temperatures that can lead to burns.

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



1. Pull the SmartExtender upwards with both plate carriers.
2. Remove the SmartExtender.

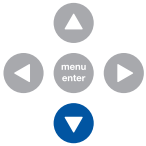
5.7 Activating the SmartExtender



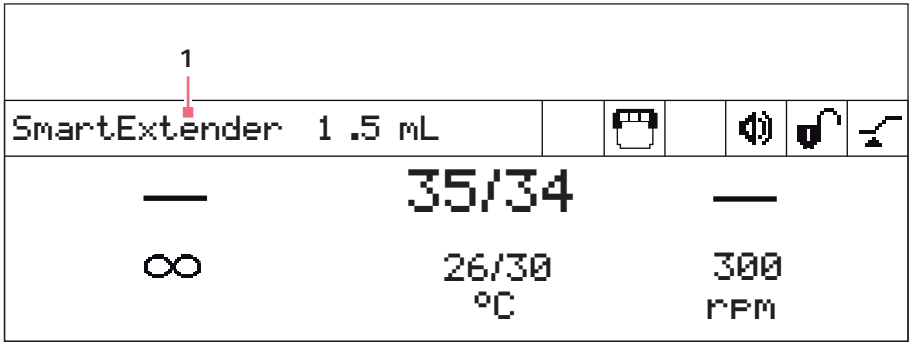
1 **SmartExtender temperature indication.**

2 **The SmartExtender is operational.**

5.7.1 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 is switched from the thermoblock to the SmartExtender.
  - On the display, the SmartExtender temperature indication is shown larger.
    The SmartExtender temperature can now be set.



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

5.7.2 Activating SmartExtender via the menu

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

5.8 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.

5.9 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.

5.10 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 C can control temperature in a range from 15 °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.

5.10.1 Temperature control with time setting

Prerequisites

The time mode is set to *Time Control* (see p. 33)

1. To switch off the mixing function, select the 0 rpm setting with the **speed** arrow keys (▼ before 300 rpm or ▲ after 3 000 rpm).

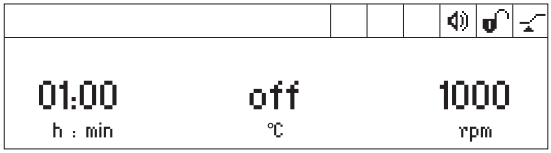
2. Set the temperature control duration with the **time** arrow keys.
3. Set the temperature with the **temp** arrow keys.
4. To start the time counter, press the **start/stop** key.
   - The ⟳ symbol flashes on the display.
   - The temperature control duration is counted down.
   - The display shows the remaining temperature control duration and the actual temperature/set temperature.
   - A signal sounds after the temperature control duration has elapsed.

5.11 Mixing

You can select the mixing frequency between 300 rpm and 3 000 rpm. The mixing frequency can be adjusted in steps of 50 rpm.

5.11.1 Mixing without temperature control

1. In order to switch off the temperature control, use the **temp** arrow keys for selecting the *off* setting (▼ below 1 °C or ▲ above 100 °C).



2. Set the mixing time with the **time** arrow keys.
3. Set the mixing frequency with the **speed** arrow keys.
4. In order to start the mixing process, press the **start/stop** key.
   - The ↻ symbol flashes on the display.
   - The mixing time is counted down.
   - The display shows the remaining mixing time, the actual temperature/set temperature and the mixing frequency.
5. After the set mixing time has elapsed, the device stops automatically.
   - A signal tone sounds.
   - The display shows the last used parameters.

5.11.2 Mixing and tempering

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

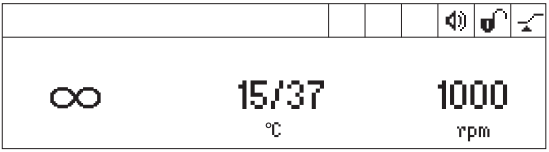
4. In order to start the mixing process, press the **start/stop** key.
   - The ↻ symbol flashes on the display.
   - The mixing time is counted down.
   - The display shows the remaining mixing time, the actual temperature/set temperature and the mixing frequency.

5. After the set mixing time has elapsed, the device stops automatically.
   - A signal tone sounds.
   - The display shows the last used parameters.
   - Temperature control is continued.

5.11.3 Mixing/temperature control with continuous run

Icing up of the thermoblock
Ice may form on the thermoblock if samples are tempered at low temperatures for a long time.

1. In order to mix without any time limits, use the **time** arrow keys to select the ∞ setting (▼ below 5 s or ▲ above 99:30 h).
2. Set the temperature with the **temp** arrow keys.
   The device immediately starts to perform the temperature control.
3. Set the mixing frequency with the **speed** arrow keys.



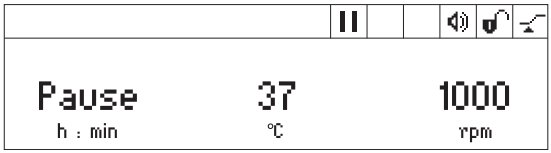
4. In order to start the mixing process, press the **start/stop** key.
   - The ⟳ symbol flashes on the display.
   - The display alternately shows the mixing time and the ∞ symbol, the actual temperature/set temperature and the mixing frequency.
   - The mixing time is counted up.
5. In order to end the mixing process, press the **start/stop** key.
   - A signal sounds.
   - The display shows the last used parameters.
   - Temperature control is continued.

A mixing time of more than 99:30 h is possible. After 99:30 h has passed, the display only will show the ∞ symbol.

5.11.4 Interrupting the mixing process

If you want to add reagents or exchange tubes while mixing, you can interrupt the mixing process. The temperature control continues to run during the pause.

1. In order to interrupt the mixing process, keep the **start/stop** key pressed for 2 s.



- The display shows *Pause*.
- The mixing process is interrupted.
- Time counting is stopped.
- Temperature control is continued.

2. In order to continue the mixing process, press the **start/stop** key.

5.11.5 Short Mix

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

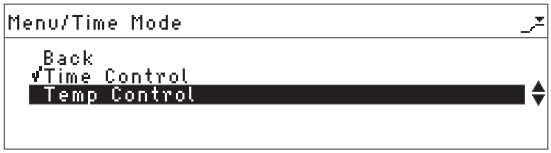
1. Set the mixing frequency with the **speed** arrow keys.
2. Keep the **short** key pressed.
   The mixing process continues as long as the **short** key will be pressed.
3. In order to end Short Mix, release the **short** key.

5.11.6 Mixing/tempering with *Time Control* or *Temp Control*

You can specify when time counting should begin:

- Time counting and mixing process begin immediately: *Time Control*
- Time counting and mixing process begin when the set temperature has been reached: *Temp Control*

1. Under *Menu*, select the *Time Mode* menu item.

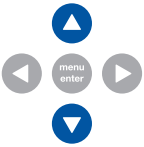


2. Use the menu arrow keys to select *Time Control* or *Temp Control*.
   A tick indicates the selected setting.
3. To exit the menu, press the left ◂ menu arrow key twice.

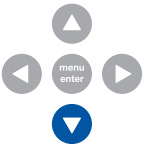
5.12 Navigating the menu

The menu has 3 levels. To change settings, proceed as follows:

1. To open the menu, press the **menu/enter** key.

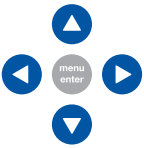


2. Select the menu item with the menu arrow keys.



3. Activate the SmartExtender with the **down** menu arrow key (with the SmartExtender attached).

4. To confirm your selection, press the **menu/enter** key.



5. Change the settings with the menu arrow keys.

6. To confirm the changed setting, press the **menu/enter** key. A tick appears in front of the setting.

7. To exit the menu level, select *Back* in the menu and press the **menu/enter** key.

5.13 Menu structure
5.13.1 SmartExtender

Menu items and options	Description	Symbol on the display
Activating	• Press the **down** menu arrow key or • Menu/Enter > *SmartExtender* menu item	

5.13.2 Programs

List with **20** program slots

Menu items and options	Description	Symbol on the display
• Loading a saved program	• Select a program key (**prog 1** to **prog 5**) or • Select the program from the program list: *Menu* > *Programs* > *Load* • Start the program with the **start/stop** key	
• Creating a program	• Save the set parameters (mixing time, temperature and mixing frequency) on a free program space. • You can save up to 4 sets of parameters as automatically consecutive program levels ("steps").	
• Editing a program	• Overwrite saved program or save it to a new program space.	
• Deleting a program	• Delete the saved program. • Programs 1 to 5 cannot be deleted. You can edit and overwrite the programs.	

5.13.3 Key lock

Menu items and options	Description	Symbol on the display
• *Key lock on*	• Parameters cannot be changed.	
• *Key lock off*	• Parameters can be changed.	

5.13.4 Time mode

Menu items and options	Description	Symbol on the display
• *Time Control*	• Time counting and mixing process begin immediately.	
• *Temp Control*	• Time counting and mixing process only begin when the set temperature has been reached.	

5.13.5 Settings

Menu items and options	Description	Symbol on the display
Signal tones	• The signal tone for error messages is always output at medium volume level regardless of the speaker settings.	
• Volume	• Set the volume of the speaker: *20 %, 40 %, 60 %, 80 %, 100 %*	
	• Switching the speaker off: *0 %*	
• Repetitions	• Set repetitions of the signal tone. *1 ×, 5 ×, 10 ×, 30 ×, Unlimited*	
Language	• Set the language: *English*, *German*, *French*, *Italian*, *Spanish*	

Menu items and options	Description	Symbol on the display
Contrast	• Set the contrast: *0 %, 25 %, 50 %, 75 %, 100 %*	
Service	• Set the service interval: *After 500 operating hours* *After 1000 operating hours* *After 2000 operating hours* *No notification*	

5.14 Programs

A program consists of up to four program levels ("steps"). The program levels automatically run one after the other. You can save separate settings for each program level:

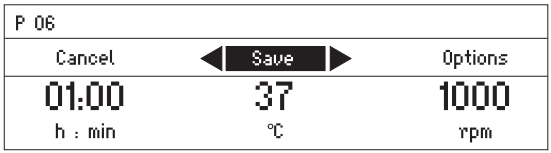
- Mixing time/temperature control duration
- Mixing frequency
- Temperature
- Program levels with pause interval (Interval Mix).
- Program levels with restricted ramp rates.

The program ends automatically.

The Eppendorf ThermoMixer C has 20 program slots.
At the end of this operating manual there is a printed form of a program table.
The program data can be noted there.

5.14.1 Creating a program

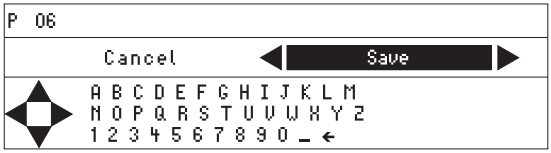
1. In order to open the menu, keep the **menu/enter** key pressed.
2. Use the menu arrow keys to select the *Programs* menu item. Confirm with the **menu/enter** key.
3. Use the menu arrow keys to select an empty program space. Confirm with the **menu/enter** key.



5.14.1.1 Creating a single-level program

1. Set the mixing time, temperature, and mixing frequency with the **time**, **temp** and **speed** arrow keys.
2. Use the menu arrow keys to select *Save*. Confirm with the **menu/enter** key.

Entering the program name



3. Select letters or numbers with the menu arrow keys and confirm with the **menu/enter** key.
   The program name can have a maximum of 15 characters.
   In order to delete individual characters, select ← and press the **menu/enter** key.
4. In order to save the program with the program name, use the menu arrow keys to select *Save*.
5. Select the program space with the menu arrow keys. Confirm with the **menu/enter** key.

5.14.1.2 Creating a multi-level program

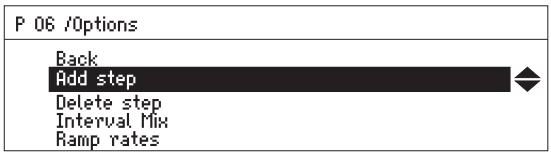
1. Select an empty program space in the *Menu* > *Programs* menu item.

Defining step 1

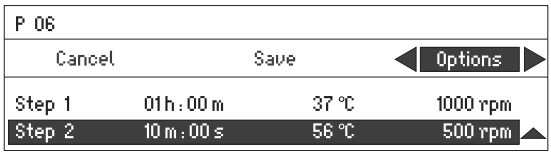
2. Set the mixing time, temperature, and mixing frequency for the first program step with the **time**, **temp** and **speed** arrow keys.

Adding step 2

3. Select *Options*. Confirm with the **menu/enter** key.



4. Select *Add step*. Confirm with the **menu/enter** key.



The set parameters have been adopted in step 1.

5. Set the parameters for the second program level.

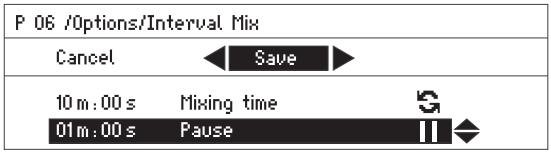
- In order to save the program with 2 program levels, select *Save*.
- In order to program a third and a fourth program level, respectively select *Options* > *Add step*.

In order to delete a step from a program, select *Options* > *Delete step*.

5.14.2 Interval Mix: Creating a program level with pause interval

By using the Interval Mix function, you can determine the mixing process to be interrupted by one or several pauses **within one program level**. Interval Mix can only be specified in programs. For program levels with Interval Mix, the symbol will appear in the display

1. Select an empty program space under *Menu* > *Programs*.
2. Set the mixing time, temperature, and mixing frequency with the **time**, **temp** and **speed** arrow keys.
   Select the mixing time so that it covers the entire duration, including mixing processes and pauses.
3. Select *Options*. Confirm with the **menu/enter** key.
4. Select *Interval Mix*. Confirm with the **menu/enter** key.



5. Set the mixing time (before the pause) in the *Mixing time* row using the **time** arrow keys.
6. Set the pause duration in the *Pause* row using the **time** arrow keys.
7. In order to save the program, select *Save*. Confirm with the **menu/enter** key.
   The Interval Mix settings are now saved for the program level.

To program a change between several mixing processes and pauses within a program level, select a correspondingly longer mixing time for the program level:

Change between mixing process and pause:

- Mixing time set for program level: 6:00 min
- Interval Mix: *Mixing time*: 1:00 min, *Pause*: 0:30 min

In the program level the device performs the setting 1 min mixing and 0:30 min pause 4 times.

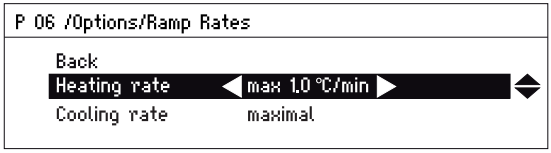
5.14.3 Restricting ramp rates

You can use the Eppendorf ThermoMixer C to choke the heating rate as well as the cooling rate. Restricted ramp rates can only be specified for programs.

Tab. 5-1: Heating rates and cooling rates

Heating rate	max. 3.0 °C/min	max. 2.0 °C/min	max. 1.0 °C/min	max. 0.1 °C/min
Cooling rate	max. 1.0 °C/min	max. 0.5 °C/min	max. 0.1 °C/min	

1. Select an empty program space under *Menu* > *Programs*.
2. Set the mixing time, temperature, and mixing frequency with the **time**, **temp** and **speed** arrow keys.
3. Select *Options*. Confirm with the **menu/enter** key.
4. Select *Ramp rates*. Confirm with the **menu/enter** key.



5. Use the menu arrow keys to select and change *Heating rate* or *Cooling rate*.
6. In order to leave the *Ramp rates* menu, select the *Back* menu item. Confirm with the **menu/enter** key.

When you start a program that runs with restricted heating or cooling rates, a message is displayed: *The program's ramp rates are restricted.*

5.14.4 Quick save with program keys

To quickly save a single-level program, you can use the program keys.

1. Set the mixing time, temperature, and mixing frequency with the **time**, **temp** and **speed** arrow keys.
2. Keep one of the program keys **prog 1** to **prog 5** pressed for 2 seconds.
   - A signal tone sounds.
   - The LED above the program key lights blue.
   - The parameters of the program are saved.

- If you want to assign a program name, save the program in the menu: *Menu* > *Programs*.
- If you want to save a program with multiple levels under the program numbers 1 to 5 , select the program space under *Menu* > *Programs*.

5.14.5 Loading a saved program

5.14.5.1 Loading program prog 1 to prog 5

On supply, the **prog 1** to **prog 5** program keys are assigned as follows:

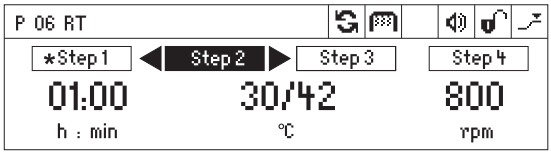
	Program name	Temperature	Mixing time/ temperature control duration	Mixing frequency
prog 1 key	Cooling	8 °C	∞	0 rpm
prog 2 key	Ligation	16 °C	16:00 h	0 rpm
prog 3 key	Restr. Digest	37 °C	1:00 h	1 000 rpm
prog 4 key	Prot. K Digest	56 °C	10:00 min	1 000 rpm
prog 5 key	Denaturation	95 °C	30:00 min	0 rpm

1. In order to call up a program on the program spaces 1 to 5, press one of the program keys **prog 1** to **prog 5**.
   - The LED above the program key lights blue.
   - The display shows the parameters of the program.
2. In order to start the program, press the **start/stop** key.

5.14.5.2 Loading a program from the program list

1. In order to load a program from the program list, select the program under *Menu* > *Programs*. Confirm with the **menu/enter** key.
2. Use the menu arrow keys to select the *Load* menu item. Confirm with the **menu/enter** key.
   - The display shows the parameters of the program.
   - Programs with several program levels:

     The display shows the parameters of the first program level. To display the parameters of the other program levels, use the ◂ or ▸ menu arrow keys to select the corresponding step.
3. In order to start the program, press the **start/stop** key.



The asterisk marks the active program level Step 1. The display shows the parameters of Step 2.

5.14.6 Editing programs

There are two ways to change a saved program:

- Changing the program via the *Edit* menu item in the program list
- Changing the program during operation

5.14.6.1 Changing the program via the *Edit* menu item in the program list

1. In order to change the parameters of a program, select the program under *Menu* > *Programs*. Confirm with the **menu/enter** key.
2. Use the menu arrow keys to select the *Edit* menu item. Confirm with the **menu/enter** key.
   The display shows the saved parameters.

You can change all parameters and save them (see *Creating a program on p. 37)*.

5.14.6.2 Changing the program during operation

1. Load the program with the program keys or from the program list.
2. Change the parameters.
   For programs with program levels: Use the ◂ or ▸ menu arrow keys to select a step, change the parameters of the step.
3. Start the program.

After completion of the program, a message appears stating that the program has been changed. You can confirm or discard the changes.

5.14.7 Deleting programs

Programs 1 to 5 cannot be deleted. You can change and overwrite the program name and all parameters of these programs.

1. In order to delete a program from the program spaces 6 to 20, select the program under *Menu* > *Programs*. Confirm with the **menu/enter** key.
2. Use the menu arrow keys to select the *Delete* menu item. Confirm with the **menu/enter** key.
   The display shows the message *Confirm delete*. In order to confirm, press the **menu/enter** key.

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.	▶ Check the mains connection and the power supply. ▶ Switch on the device.
Set temperature is not reached.	Set temperature is more than 15 °C below ambient temperature.	▶ Set up the device in a cooler environment.
ThermoTop LED does not light.	• No thermoblock has been attached • The thermoblock is not compatible with the ThermoTop.	▶ Use a compatible thermoblock with a ***condens.****protect* symbol:
	The interface between the device and the ThermoTop is dirty.	▶ Remove any dirt from the front of the ThermoTop. ▶ Remove any dirt from the top of the device, especially from the viewing window beside the heating/cooling plate.
ThermoTop does not fit on the device.	• The thermoblock is not compatible with ThermoTop. • The lid is attached to the thermoblock. • TransferRack is attached. • SmartExtender is attached.	▶ Use a compatible thermoblock with a ***condens.****protect* symbol: ▶ If using the ThermoTop, do not use the lid. ▶ Remove the TransferRack when using the ThermoTop. ▶ Remove the SmartExtender when using the ThermoTop.
The device does not mix or control the temperature.	Various causes are possible.	▶ Contact your local Eppendorf partner.

6.2 Error messages

Problem	Cause	Solution
Thermoblock not detected.	• Thermoblock is not compatible with the device. • The thermoblock is not attached properly.	▶ Use a compatible thermoblock. ▶ Remove the thermoblock and then reattach it.
	The interface between the device and the thermoblock is dirty.	▶ Remove any dirt from the bottom of the thermoblock. ▶ Remove any dirt from the top of the device, especially from the viewing window beside the heating/cooling plate.
Error message preceded by a number code.	Various causes are possible.	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 being detected by the device.	• The Eppendorf ThermoMixer® C requires software version 3.0.0 or higher to detect SmartExtenders.	▶ Perform a software update. The software can be downloaded from the Eppendorf website.

7 Maintenance

7.1 Setting service intervals

The Eppendorf ThermoMixer C 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.

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.

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 C and the thermoblocks regularly.

7.2.1 Cleaning the Eppendorf ThermoMixer C

Auxiliary equipment

- Lint-free cloth
- Mild, soap-based lab cleaner
- Dist. water

1. Switch off the Eppendorf ThermoMixer C and disconnect it from the power supply.
2. Allow the device to cool down.
3. Clean all external parts of the Eppendorf ThermoMixer C 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 thermoblock

Auxiliary equipment

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

Clean the thermoblock immediately if sample fluid enters the bore holes or comes into contact with the surfaces.

1. Clean the thermoblock with a mild soap solution. Clean the bores with a soft bottle brush or cotton swabs.
2. Rinse off the soap solution with dist. water.
3. Dry the cleaned thermoblock at ambient temperature.
   Let the cleaned thermoblock dry with the bores pointing downwards. Do not dry thermoblocks in a drying cabinet.

7.2.3 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.

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.
- Disinfectant.

1. Switch off the Eppendorf ThermoMixer C and disconnect it from the mains/power supply.
2. Allow the device, SmartBlock or SmartExtender to cool.
3. Clean the device, SmartBlock or SmartExtender.
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 C 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.

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.

9 Technical data

9.1 Power supply

Power connection	100 V – 130 V ±10 %, 50 Hz – 60 Hz 220 V – 240 V ±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	13.6 cm (5.4 in)
Weight	6.3 kg (13.9 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: 15 °C (±2 °C) below the ambient temperature Maximum: 100 °C	
Temperature accuracy	Set temperature 20 °C – 45 °C	Set temperature < 20 °C or > 45 °C
SmartBlock *1.5 mL*	±0.5 °C	±1.0 °C
Temperature homogeneity	In the range of 20 °C – 45 °C max. ±0.5 °C for all positions of the thermoblock	
Heating rate*	6.0 °C/min The change of temperature in filled tubes is slower.	

Cooling rate*	if the set temperature is above the ambient temperature 2.5 °C/min	if the set temperature is between ambient temperature and 15 °C below ambient temperature 0.5 °C/min – 0.8 °C/min

*Heating rate and cooling rate can be throttled.

The heating and cooling rates listed only apply if the SmartBlock is being operated with no ThermoTop or SmartExtender.

9.4.2 Mixing

Thermoblock	**Mixing frequency**
	can be set in increments of 50 rpm
SmartBlock *0.5 mL*	300 rpm – 2 000 rpm
SmartBlock *1.5 mL*	300 rpm – 2 000 rpm
SmartBlock *2.0 mL*	300 rpm – 2 000 rpm
SmartBlock *5.0 mL*	300 rpm – 1 000 rpm
SmartBlock *12 mm*	300 rpm – 2 000 rpm
SmartBlock *cryo*	300 rpm – 2 000 rpm
SmartBlock *15 mL*	300 rpm – 1 000 rpm
SmartBlock *50 mL*	300 rpm – 1 000 rpm
SmartBlock *plates* with deepwell plates and temperature control up to 80 °C with deepwell plates and temperature control from 80 °C	300 rpm – 3 000 rpm 300 rpm – 2 000 rpm 300 rpm – 1 000 rpm
SmartBlock *PCR 96*	300 rpm – 2 000 rpm
SmartBlock *PCR 384*	300 rpm – 3 000 rpm
SmartBlock *DWP 500*	300 rpm – 1 600 rpm
SmartBlock *DWP 1000*	300 rpm – 1 600 rpm

9.4.3 Time setting

Cycle times of 5 s to 99:30 h or unlimited.

Cycle time range	Step size [or increment]
5 s – 1 min	5 s
1 min – 20 min	15 s
20 min – 1:00 h	1 min
1:00 h – 10:00 h	5 min
1:00 h – 99:30 h	30 min

9.5 Interface

USB interface	For connecting to VisioNize

Index

A

Actual temperature 19
Application parameters 51

C

Cleaning 46
condens.protect 24
Continuous run 32

D

Danger symbol
  Device 13
Decontamination 48
Deepwell plate 8, 21, 23
Display 14, 19
Disposal 50

G

Glossary 8

H

Hazards 10
Heating/cooling plate 14

I

Installation
  Device 17
  Selecting the location 17
Intended use
  Hazards 10
Interval Mix
  Set 39
  Symbol 19

K

Key lock 36
  Symbol 19

L

Language 36
  setting 20
Lid 8, 21, 23

M

Main illustration 14
Mains/power cord socket 14
Mains/power switch 14
Menu
  Menu arrow keys 18
  Navigation 34
  Overview 35
  Setting the language 20
Microplate 8, 21, 23
Mixing 31
  Application parameters 52
  Mixing frequency 19
  Mixing time 19
  Setting the mixing frequency 18, 31
  Setting the mixing time 18
  Starting 18
  Stopping 18
  Symbol 19
  with continuous run 32
  without temperature control 31

O

Operating controls 14, 18

P

Pause 33, 39
PCR plate 8, 21, 23
Plates 23
Program
  Create 37
  Multi-level 38
  Program name 19, 38
  Program number 19
  save 40
  Single-level 38
Program keys 18

R
Ramp rates 51
Restrict 40

S
Safety precautions 10
Selecting the location 17
Set temperature 19
Short Mix 18, 33
SmartExtender
Symbol 19
Speaker
off 36
Setting the volume 36
Symbol 19
Step 38
Storage 49

T
Technical data
Ambient conditions 51
Application parameters 51
Power supply 51
Weights and dimensions 51
Temperature control
Application parameters 51
Setting the temperature 18
Setting the temperature control duration 30
Switching off the temperature control 31
Symbol 19
Thermoblock 21
Attach 22
Remove 23
ThermoTop 8, 24
Symbol 19
Time mode
Temp Control 19, 33
Time Control 19, 33
Time setting 18, 30
Application parameters 53
Tubes 21, 23

U
USB interface 14

V
Verification of temperature control 48

W
Well 8

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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® C

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

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