



Eppendorf Temperature Verification System

Operating manual

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English (EN)

1 Operating instructions

1.1 Using this manual

- ▶ Read this operating manual completely before using the device for the first time. Also observe the instructions for use of the accessories.
- ▶ This operating manual is part of the product. Thus, it must always be easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ You will find the current version of the operating manual for all available languages on our website under www.eppendorf.com/manuals.
- ▶ The present operating manual applies to the Temperature Verification System. Also observe the operating manuals and safety instructions of the thermal cyclers with which you operate the Temperature Verification System.

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:

	Hazard point		Hot surface
	Electric shock		Biohazard
	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 text or software text
	Additional information

1.4 **Abbreviations used**

CAN

Controller Area Network

The Temperature Verification System uses this bus system to communicate with the Mastercycler nexus, Mastercycler pro, Mastercycler ep und Mastercycler ep *realplex* devices.

PDF

Portable Document Format

USB

Universal Serial Bus

1.5 **Glossary**

A

Adjustment

Tuning or alignment of a device to prevent systematic deviations to the extent required for the observance of specifications. An adjustment requires an intervention that permanently modifies the device.

T

Temperature accuracy

Deviation of the measured temperature from the specified temperature at a given position on the thermoblock.

Temperature homogeneity

Maximum temperature difference between two positions of the thermoblock.

V

Verification

Objective proof of the observance of defined specifications.

2 Safety

2.1 Intended use

The Temperature Verification System is a multi-channel temperature measuring device for verifying and adjusting the thermoblock temperature control and recording the temperature data of thermal cyclers. It supports verification and adjustment exclusively for Eppendorf Mastercycler nexus, Mastercycler pro, Mastercycler ep und Mastercycler ep *realplex* thermal cyclers.

The Temperature Verification System may only be used indoors.

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 people not authorized by Eppendorf.
- The user makes unauthorized changes to the device.

2.4 Warnings for intended use

Read the operating manual and observe the following safety instructions before using the Temperature Verification System.



WARNING! Lethal voltages inside the device.

Touching parts which are under high voltage may cause an electric shock. An electric shock injures the heart and causes respiratory paralysis.

- ▶ Ensure that the housing is closed and undamaged.
 - ▶ Do not remove the housing.
 - ▶ Ensure that no liquid can penetrate into the device.
- Only authorized service staff may open the device.

**DANGER! Electric shock as a result of penetration of liquid.**

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

**WARNING! Electric shock due to damage to device or mains cable.**

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

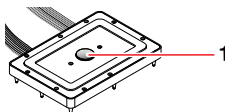
**WARNING! Risk to health from contamination with toxic or radioactive substances or pathogens.**

- ▶ Do not use the device with contaminated thermal cyclers or the sensor plate may also become contaminated.
- ▶ Ensure that the thermal cycler is decontaminated before using it with the device.
- ▶ Perform decontamination before storing or dispatching the device and/or its accessories.

**CAUTION! Risk of burns from hot sensor plate, thermoblock and heated lid.**

The sensor plate, thermoblock and the inside of heated lid reach temperatures above 50 °C very quickly.

- ▶ Take note of the symbols on the thermoblock and heated lid which provide warning that surfaces may be hot.
- ▶ Wear suitable protective gloves when inserting the sensor plate into, or removing it from, the thermoblock.
- ▶ Do not touch the copper sensor (1) on the surface of the sensor plate because it retains heat for a particularly long period of time.





CAUTION! Risk of injury due to the Temperature Verification System falling while being carried or moved.

- ▶ Ensure that the notebook is firmly fastened to the system base before moving the device.
- ▶ Always carry the device in a horizontal position using both of the grips on the system base.



NOTICE! Incorrect measuring results due to strong fluctuations of the ambient temperature

- ▶ Do not expose the device to direct sunlight.
- ▶ Do not place the device close to sources of heat (e.g., radiator, drying cabinet).
- ▶ Allow the device to reach ambient temperature before operating it.



NOTICE! Damage to the system base due to connecting non-approved devices to the CAN out port of the system base.

- ▶ Only use the **CAN out** port to connect Eppendorf thermal cyclers to the system base with the CAN bus cable.



NOTICE! Error due to incompatible software.

Software installed on the computer must be compatible with Eppendorf AG software.

- ▶ Please contact Eppendorf AG before installing the software.



NOTICE! Data loss due to changing the content stored on the USB stick.

Both the system base and sensor plate are equipped with a USB storage device. Changing the stored content affects the proper functioning of the Temperature Verification System.

- ▶ Do not change the data stored on the USB stick.
-

2.5 Warnings for unintended use

**CAUTION! Poor safety due to incorrect accessories and spare parts.**

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

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

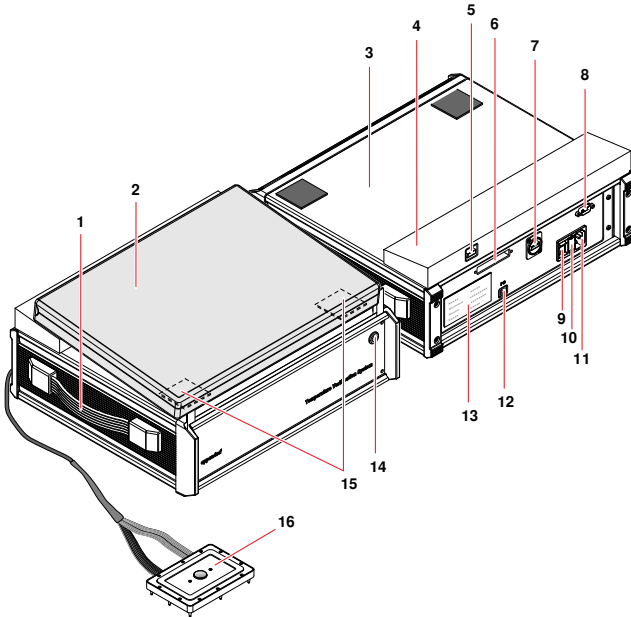
**NOTICE! Damage as a result of incorrect packing.**

Eppendorf AG is not liable for damage caused by incorrect packing.

- ▶ The device may only be stored and transported in its original packing.
-

3 Product description

3.1 Product overview



- | | |
|--|--|
| <p>1 Handle
On both sides of the system base</p> <p>2 Notebook</p> <p>3 System base</p> <p>4 Notebook docking station</p> <p>5 USB port <i>System Base</i> on the docking station
For connecting the system base</p> <p>6 <i>Sensor Plate</i> SUB-D port
For connecting the sensor plate</p> <p>7 <i>Sensor Plate</i> USB connection
For connecting the sensor plate USB stick</p> <p>8 <i>CAN out</i> CAN bus port
For connecting Eppendorf thermal cyclers</p> | <p>9 Mains/power switch
0 = switched off, I = switched on</p> <p>10 Mains fuse</p> <p>11 Mains/power cord socket</p> <p>12 PC USB port
For connecting the notebook</p> <p>13 Name plate</p> <p>14 Operating mode
Lights up green when the system is switched on</p> <p>15 Retaining pads for notebook</p> <p>16 Sensor plate
With port cable and USB stick</p> |
|--|--|

3.2 Delivery package

Quantity	Order no. (International)	Order no. (North America)	Description
1	—	-	System base with docking station for notebook
1	-	-	Notebook with the Temperature Verification System software, CycleManager pro and Microsoft Office installed
1 or	6328 072.007 6328 071.000	6328072007 6328071000	Sensor plate with 14 block temperature sensors, one lid temperature sensor, USB stick and connection cable for 384-well PCR block for 96-well PCR block
1	-	-	Device case for the Temperature Verification System
1	5349 852.006	950017066	Adapter 9-pin SUB-D socket to CAN Bus
1	on request	on request	USB cable with plug type A and plug type B for connecting the system base to the notebook PC
1	5341 890.006	950005387	Front plate tool for removing the front panel of the Mastercycler pro/ep
1	on request	on request	Front clip for Mastercycler pro and Mastercycler ep with relief for cable lead-through
1	-	-	System certificate certifies the adjustment of the Temperature Verification System in conjunction with the sensor plate.
1	6328 900.066	-	Operating manual, in multiple languages

3.3 Features

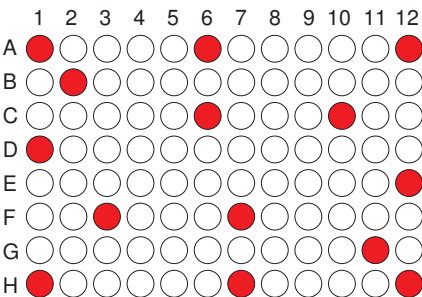
The Temperature Verification System consists of:

- One sensor plate with 15 temperature sensors
- One system base for digitizing the temperature data
- One PC with a database and software for saving the evaluation of temperature data

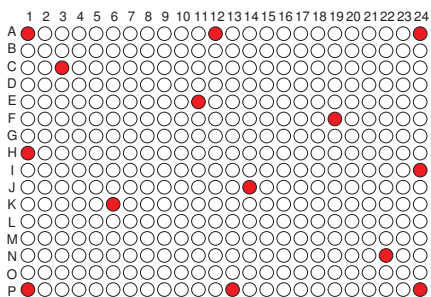
Sensor plates for PCR thermoblocks are available in 96-well and 384-well formats.

Temperatures are measured in the following block positions (marked red):

96-well format



384-well format



The Temperature Verification System supports the following tasks.

- For Eppendorf Mastercycler nexus, Mastercycler pro, Mastercycler ep und Mastercycler ep *realplexthermal cyclers*:
 - Verifying temperature control of the thermoblock and heated lid in accordance with Eppendorf specifications
 - Providing certificates of conformity and measuring reports for thermal cyclers
 - Automatically adjusting the temperature control of the thermoblock
- For all thermal cyclers (Eppendorf and other manufacturers) which are compatible with the sensor plate:
 - Simultaneously recording the temperature profile of a user-defined program in 14 block positions

3.3.1 System certificate

The temperature adjustment of the system can be traced back to international temperature standards and is confirmed with a system certificate. It is valid for 12 months. The software indicates that the recertification is due three months before this time period has expired. Contact Eppendorf for the recertification.



Thermal cyclers cannot be verified or adjusted if the system does not have a valid certification.

4 Installation

4.1 Selecting the location



CAUTION! Risk of injury due to the Temperature Verification System falling while being carried or moved.

- ▶ Ensure that the notebook is firmly fastened to the system base before moving the device.
- ▶ Always carry the device in a horizontal position using both of the grips on the system base.



NOTICE! Incorrect measuring results due to strong fluctuations of the ambient temperature

- ▶ Do not expose the device to direct sunlight.
- ▶ Do not place the device close to sources of heat (e.g., radiator, drying cabinet).
- ▶ Allow the device to reach ambient temperature before operating it.

Place the Temperature Verification System near the thermal cycler to be checked. The area upon which it is placed must be level, free of vibration and guarantee the secure positioning of the device.

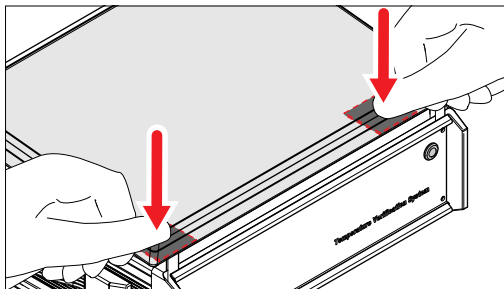
The system requires one mains connection for the system base and one for the notebook.

Information on the dimensions and weight of the device components can be found in a separate section (see *Power supply on p. 55*)

4.2 Installing the device

Prepare the Temperature Verification System for operation as follows:

1. Lock the notebook into place in the docking station on the system base.



2. Lightly press the front corners of the notebooks onto the system base so that the notebook is secure on the system base retaining pads.

3. Establish cable connections

- Use the power cable to connect the system base to the mains supply.
- Connect the notebook to its power pack, and connect it to the mains supply.
- Connect the **System Base** port on the docking station to the **PC** port on the system base using the provided USB cable.
- Connect the sensor plate to **Sensor Plate** port on the system base.
- Connect the sensor plate USB stick to the **Sensor Plate USB** port.
- Connect the CAN bus adapter cable to the **CAN out** port on the system base.

4. Switch on the system base using the mains power switch.

- 5. Switch on the notebook and start the Temperature Verification System software.
The system is now ready for operation.

4.3 CAN configuration for Eppendorf thermal cyclers

A CAN bus connection between the devices and system base is required for verification (see p. 31) and adjustment (see p. 36) of Eppendorf thermal cyclers. A CAN bus connection is only required to record temperatures in the **Record** mode (see p. 38) if the user wants to control the thermal cycler with the CycleManager pro installed on the notebook.

If the thermal cyclers are already operated in a network with CycleManager pro, epCycleManager or with a control panel or Mastercycler nexus as a mini-satellite system, they can remain connected to each other for verification and adjustment.

Before performing a verification with the Temperature Verification System, set the CAN bus address and termination of the thermal cyclers as listed below.



NOTICE! Only for Mastercycler nexus: incorrect measured values due to entries made on the thermal cycler operator panel

- ▶ Do not use the operator panel of the Mastercycler nexus during a verification with the Temperature Verification System.

4.3.1 Setting the CAN bus address and termination for the Mastercycler nexus

- ▶ No special adjustments are required for the Mastercycler nexus.

4.3.2 Setting the CAN bus address and termination for the Mastercycler pro/ep/ep realplex

Prerequisites

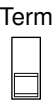
- The thermal cyclers are properly connected to each other using the CAN bus cable (see documentation of the devices and the associated software).
- The switch for setting the CAN bus address and termination is located at the rear of the device. A small flat-blade screwdriver is required to carry out the settings.

1. Switch off all connected thermal cyclers.
2. Set CAN bus address and termination (Term) as follows.

CAN address dial



Termination ON (lower position)



Termination OFF (upper position)



Configuration	CAN address	Termination	Remarks
Stand-alone device	No change	Set to ON	Disconnect the Control Panel plug connection from the Cycler.
Mini-satellite system (with control panel)	No change	Set thermal cycler with control panel to OFF Other thermal cyclers: no change	Disconnect the Control Panel plug connection from the Cycler.
CycleManager pro or epCycleManager network	No change	No change	
Mastercycler ep realplex	No change	No change	Maintain the CAN bus connection to the realplex module.

3. Switch on all thermal cyclers.
- The connection to the system base can now be established. Proceed as follows:

4.3.3 Connecting the thermal cycler to the system base using the CAN bus cable

- ▶ Connect the CAN bus cable of the system base to the **CAN_in** port on the thermal cycler.



If several thermal cyclers are networked with each other, the system base must always be connected to the first device (**CAN_in** port open) in the CAN bus chain.

4.4 Preparing the cable lead-through for the Mastercycler pro/ep/ep realplex

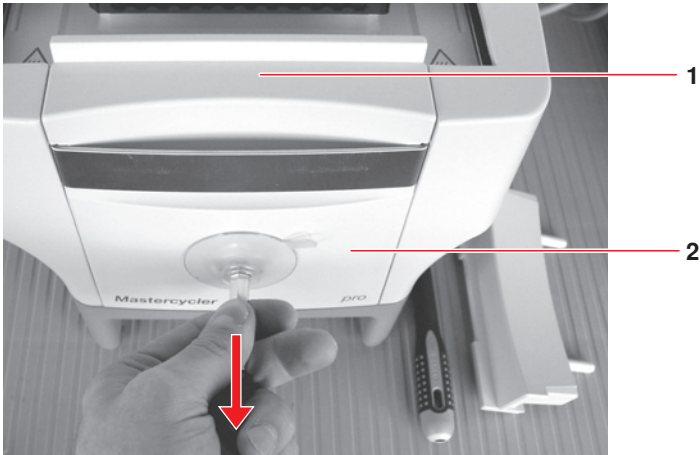


No preparation is necessary for Mastercycler nexus thermal cyclers.

Remove the thermal cycler front clip (1) to avoid damaging the sensor plate cable when the heated lid is closed. Proceed as follows:

Prerequisites

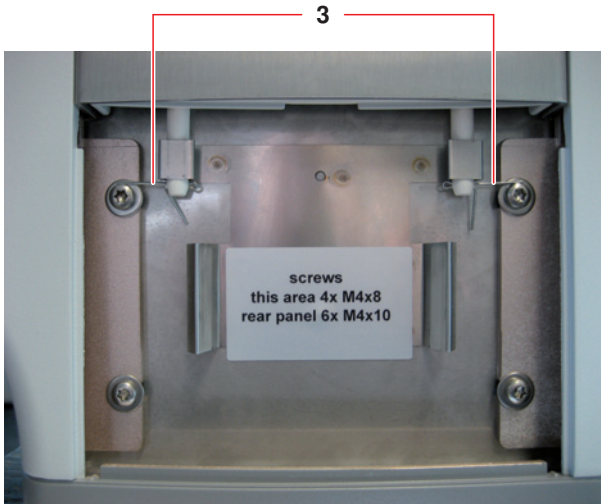
You will need small pliers and the enclosed front plate tool.



1 Front clip

2 Front panel

1. Use the front plate tool to remove the front panel (2) on all thermal cyclers.



3 Splints

2. Straighten the bent legs of the cotter pins and remove the cotter pins toward the middle of the device using pliers (3).
3. Remove the front clip (1) in an upward motion.
4. Reinsert the front panel.

4.5 Handling the sensor plate

Observe the following notices when handling the sensor plate.



WARNING! Risk to health from contamination with toxic or radioactive substances or pathogens.

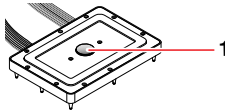
- ▶ Do not use the device with contaminated thermal cyclers or the sensor plate may also become contaminated.
 - ▶ Ensure that the thermal cycler is decontaminated before using it with the device.
 - ▶ Perform decontamination before storing or dispatching the device and/or its accessories.
-



CAUTION! Risk of burns from hot sensor plate, thermoblock and heated lid.

The sensor plate, thermoblock and the inside of heated lid reach temperatures above 50 °C very quickly.

- ▶ Take note of the symbols on the thermoblock and heated lid which provide warning that surfaces may be hot.
- ▶ Wear suitable protective gloves when inserting the sensor plate into, or removing it from, the thermoblock.
- ▶ Do not touch the copper sensor (1) on the surface of the sensor plate because it retains heat for a particularly long period of time.



NOTICE! Damage to the sensor plate due to a cable break

The cable connections of the sensor plate are sensitive to pulls and bends.

- ▶ Ensure that the cable lays loosely when inserting the sensor plate into the thermal cycler.
- ▶ The cable must not be bent or under tensile stress when the heated lid is closed.
- ▶ When handling and packing the sensor plate, avoid bending the cable or placing it under tensile stress
- ▶ Do not turn the sensor heads on the lower side of the sensor plate.



NOTICE! Data loss due to changing the content stored on the USB stick.

The data on the USB sticks is allocated to the corresponding sensor plate.

- ▶ Do not change the data stored on the USB stick.



NOTICE! Incorrect measuring results due to contamination of the sensor plate and thermoblock

- ▶ Ensure that the sensor plate and thermoblock are free of dust, lint and cleaning agent residue before inserting the sensor plate in the thermoblock.



NOTICE! Damage to the sensor plate and thermal cycler due to improper use.

- ▶ Do not insert the sensor plate into thermal cyclers that are not compatible with the Temperature Verification System.
- ▶ When inserting the sensor plate or closing the heated lid, never use an operational force significantly higher than the force recommended by the thermal cycler manufacturer when handling a PCR plate.

Eppendorf accepts no warranty or liability for damage caused by incorrect use of the Temperature Verification System.

4.5.1 Inserting the sensor plate in the Mastercycler nexus

Prerequisites

- The sensor plate and USB stick are connected to the system base.

1. Insert the sensor plate in the thermoblock of the thermal cycler.



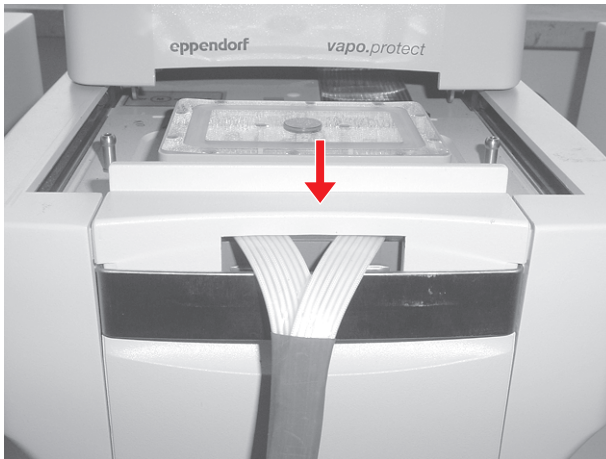
2. Close the heated lid.

The verification (see p. 32) or temperature control (see p. 38) can now be started.

4.5.2 Inserting the sensor plate in the Mastercycler pro/ep/ep realplex

Prerequisites

- The sensor plate and USB stick are connected to the system base.
 - The cable lead-through of the thermal cycler is prepared (see *Preparing the cable lead-through for the Mastercycler pro/ep/ep realplex* on p. 20).
1. Insert the sensor plate in the thermoblock of the thermal cycler.
 2. Press the sensor plate on.
 3. Insert the front clip with cable port (included in the delivery package of the Temperature Verification System).



4. Lay the cable from the front so that it rests on the surface in front of the thermoblock between sensor plate and cable port.
 5. Close the heated lid.
- The verification (see p. 32) or temperature control (see p. 38) can now be started.

4.5.3 Inserting the sensor plate in other thermal cyclers

The sensor plate may only be used with thermal cyclers it is mechanically compatible with.

Prerequisites

The sensor plate and USB stick are connected to the system base.

1. Insert the sensor plate in the thermoblock of the thermal cycler.
 2. Close the heated lid.
- The temperature recording (see p. 38) can now be started.

4.5.4 Removing the sensor plate from the thermal cycler

Prerequisites

The measuring procedure is completed and the thermal cycler is idle.

1. Open the heated lid and allow the sensor plate to cool for several minutes.
2. Remove the sensor plate from the thermoblock.

Store the sensor plate in the device case after use.

4.5.5 Replacing the sensor plate

If you have several sensor plates and you would like to replace them while working with the Temperature Verification System, proceed as follows:



Do not replace the sensor plate when the Temperature Verification System software is activated as this could lead to incorrect measuring results.

1. Exit the Temperature Verification System software and close all other programs.
2. Switch off the system base.
3. Detach the sensor plate and the corresponding USB stick from the system base.
4. Insert a new sensor plate and corresponding USB stick in the system base. The new USB stick will be recognized by Windows as a removable medium.
5. Switch on the system base.
6. Start the Temperature Verification System software.

5

Operation

5.1

Initial steps

5.1.1

Logging in as a user

In order to work with the Temperature Verification System, a user must log on with a user name and password.

Prerequisites

The Temperature Verification System is correctly connected and switched on.

- i

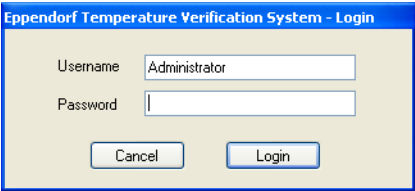
When the software is started for the first time, the user must log on with the pre-defined **Administrator** user name and **Administrator** password.

For security, the password should be changed immediately after the first log-on.
- i

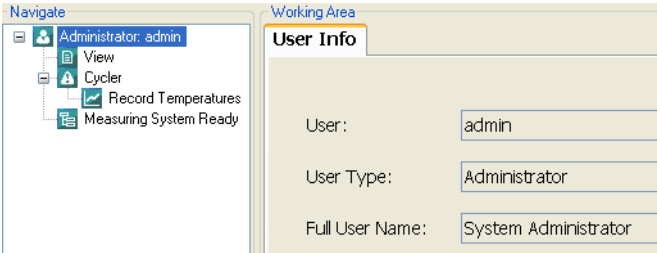
Information on the setup of user accounts and user and password administration can be found in a separate section (see *System management on p. 41*).



- Use the **ep** symbol to start the Temperature Verification System software.
The *Login* dialog appears.



- Enter user name and password and complete the log-on with *Login*.



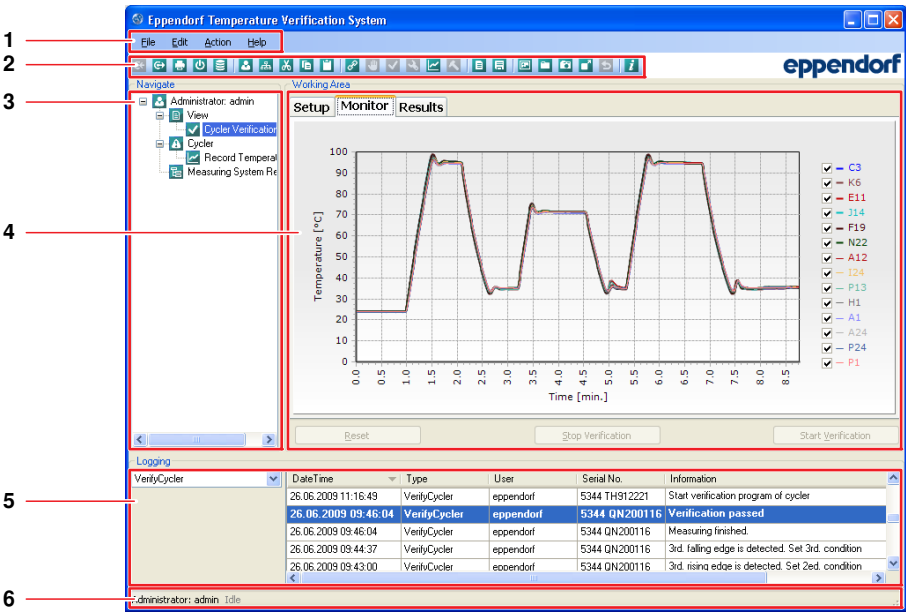
The main node of the navigation tree shows the name of the logged-on user.
The user is logged on and can work with the system.

5.1.2 Changing users

1. Select *Logout* in the *File* menu or click on the toolbar .
The current user is logged off and *<No user>* is displayed in the navigation tree.
2. Select *Login* in the *File* menu or click on the toolbar .
The *Login* dialog appears.
3. Log-on a new user with user name and password.

5.2 Overview of software operation

The main window of the Temperature Verification System software is divided into the following areas:



- 1 Menu bar
- 2 Toolbar
- 3 Navigation tree
- 4 Context-dependent work area
- 5 Log area
- 6 Status line

Most of the functions can be reached via:

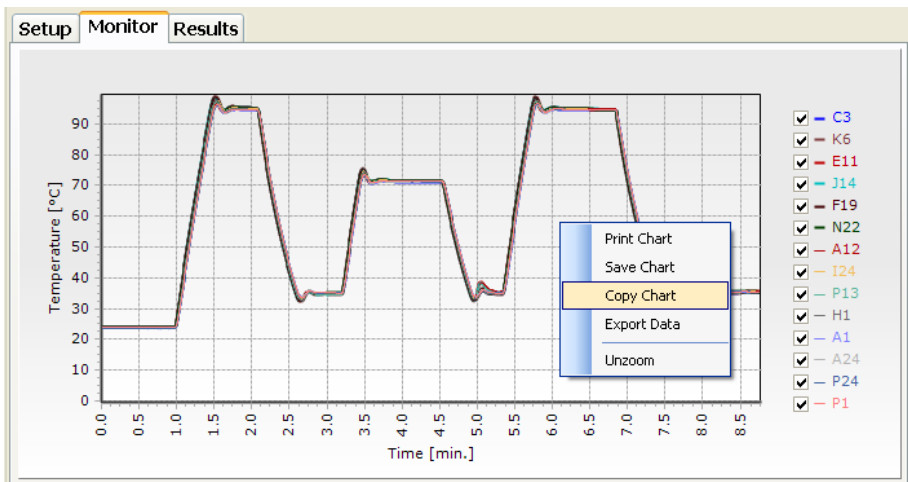
- Menu bar
- Toolbar
- Navigation tree
- Key pad

The content of the work area changes according to the function currently selected.

Several functions are only available to users in the **Administrator** group.

5.3 Diagrams

The Temperature Verification System displays the measured data as a temperature/time chart.



5.3.1 Show and hide the channels.

The measured data of all 14 block sensors is displayed in the diagram.

- ▶ Show or hide the individual channels by clicking on the corresponding checkboxes.

5.3.2 Zooming in/out of a section

Zoom in on a section of the diagram:

- ▶ While holding the left mouse button, draw a rectangle around the desired section. Then release the mouse button.
-  You can move the displayed section by pulling with the right mouse button.

Zoom out to full view:

- ▶ Using the right mouse button, click in the diagram and select in the *Unzoom* context menu.

5.3.3 Printing and exporting a diagram

The diagram can be printed, copied to the Windows clipboard or saved as a graphic file. The measured data can also be exported as a data file. These functions can be accessed via the toolbar or the context menu in the diagram.

Prerequisites

The measuring procedure is completed.

Display context menu:

- ▶ Click in the diagram area with the right mouse button.

Toolbar	Context menu	Description
	<i>Print Chart</i>	Print graphic. The printer settings can be modified via <i>Setup Printer</i> in the <i>File</i> menu.
	<i>Save Chart</i>	Save graphic as file. A dialog field is displayed, allowing you to select a file format.
	<i>Copy Chart</i>	Copy the graphic to the Windows clipboard. You can then insert the graphic, e.g., in a text document.
	<i>Export Data</i>	Save the graphic data in a file. A dialog field is opened, allowing you to select a file format.

5.4 Verifying the thermal cycler

The Temperature Verification System supports verification exclusively for Eppendorf Mastercycler nexus, Mastercycler pro, Mastercycler ep und Mastercycler ep *realplex* thermal cyclers.

During verification, the Temperature Verification System automatically determines the following values using a preset temperature control program:

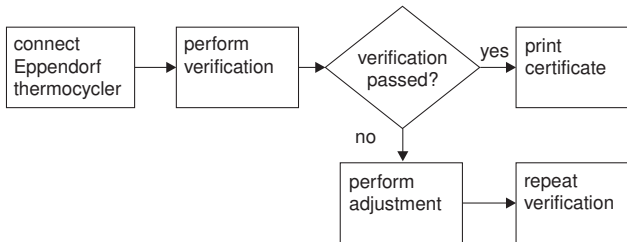
- Temperature accuracy
- Block temperature homogeneity
- Heating and cooling rates of the thermoblock
- Heated lid temperature

After a passed verification, you can issue a certificate of conformity that confirms that the temperature control of the tested device complies with Eppendorf specifications.

If a thermal cycler has not passed the verification, it can be automatically adjusted using the Temperature Verification System (see p. 36).

After the verification has been completed, detailed results can be issued in a report or the measured temperature data can be exported.

The verification is carried out according to the following diagram:



If a thermal cycler does not pass the verification after an adjustment, please carry out the adjustment again before contacting Eppendorf.

5.4.1 Performing verification

Prerequisites

- The Temperature Verification System certificate is valid.
- The CycleManager pro (server and client) installed on the system notebook is **not** started.
- The CAN bus connection (see *CAN configuration for Eppendorf thermal cyclers on p. 18*) and cable lead-through (see p. 20) are prepared.
- The thermal cycler is idle.
- The Mastercycler pro, ep and ep realplex thermal cyclers have firmware with version 2.600 or higher.

1. Insert sensor plate in the thermoblock and close the heated lid (see p. 22).



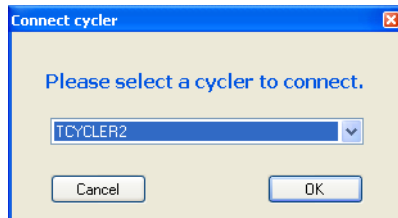
For Mastercycler ep with motorized lid, the lid is automatically closed when the verification is started.

2. Highlight the *Cycler* node in the navigation tree of the software and click on the *Connect Eppendorf Cycler* button.



Alternatively, the Connect function can be reached using the **F11** key or by double-clicking on the *Cycler* node in the navigation tree.

The *Connect cycler* dialog appears.



3. Select the thermal cycler to be verified using its number (= CAN address) and click *OK*.



Do not disconnect the CAN bus cable connection from the thermal cycler while the thermal cycler is connected to the software.

Before disconnecting the CAN bus cable connection, sign off the thermal cycler from the software using *Disconnect Cycler*.



After the Mastercycler nexus, Mastercycler pro, Mastercycler ep und Mastercycler ep *realplex* have been connected to various firmware versions, the software may need to be automatically reconfigured. In this case, the user will be prompted to restart the software and must log on again and repeat steps 2 and 3.

The *Verify* node is shown in the navigation tree.

The status, model and serial number of the connected thermal cycler are shown.

Cycler serial no.

XY0

Production code,
consists of two letters and one digit

12345

Unique number for the device

6324

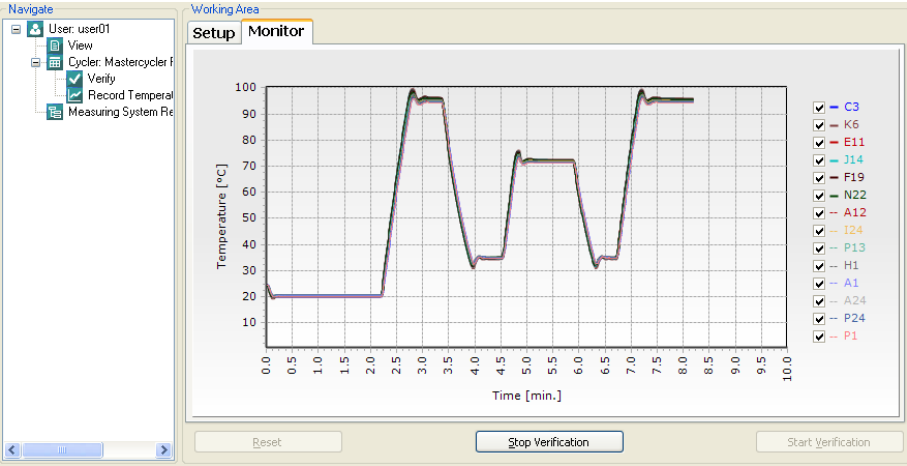
Device code

4. Compare the **Cycler Serial No.** in the menu field to the serial number on the thermal cycler name plate.
 Serial number example: 6324 XY0 12345 refers to a Mastercycler pro (6324) with the unique number 12345.
 The system also issues this number on the thermal cycler verification certificate.
5. Any identifier can be entered in the field *Cycler ID* to identify the device.
6. Highlight the *Verify* node and enter the desired period of validity for the verification certificate (maximum 12 months) in the *Period of Validity* input field.

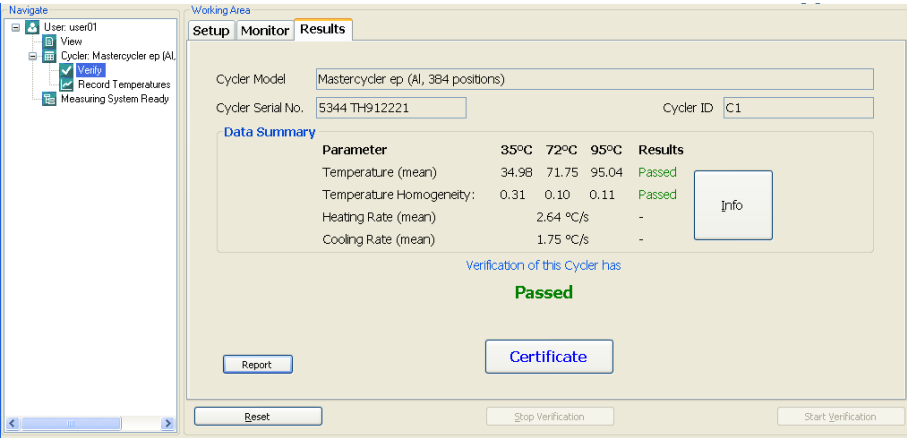


Keep the heated lid closed during the verification process.

7. Start verification with *Start Verification*.
- The lid of the thermal cycler automatically heats up. Then the verification temperature control program starts. The temperature data is recorded and displayed as a diagram in the *Monitor* tab.



You can cancel the verification at any time using *Stop Verification*. The *Results* tab is shown when the verification is completed.



Evaluation of the verification

Temperature (mean)	Mean value of the measured temperatures of the six inner block temperature sensors. This value is calculated separately for the target temperatures 35°C, 72°C and 95°C. Limiting values are: • at 35°C: 34.10°C – 35.90°C • at 72°C: 71.10°C – 72.90°C • at 95°C: 93.70°C – 96.30°C
Temperature accuracy	Deviation of the measured temperature from the specified temperature at a given position on the thermoblock. Limiting values are: • at 35°C and 72°C: $\pm 0.90^{\circ}\text{C}$ • at 95°C: $\pm 1.30^{\circ}\text{C}$ The deviations remain available in the "Certificate" document after a verification has been successfully completed.
Temperature homogeneity	Maximum deviation among the six inner block temperature sensors. This value is calculated separately for the target temperatures 35 °C, 72 °C and 95 °C. Limiting values are: • at 35°C and 72°C: 0.00°C – 1.80°C • at 95°C: 0.00°C – 2.60°C
Heating rate/cooling rate (mean)	Average heating and cooling rates, calculated using a linear regression of the temperature values measured during ramp phases between 40 °C and 90 °C.

The verification has passed when the limiting values for temperature accuracy and temperature homogeneity were observed on each of the six inner block temperature sensors. The measured values of the sensors on the edge of the block and in the corners, as well as the heating and cooling rates, are not incorporated in the verification – but are nevertheless included in the report. *Info* provides you with additional information on the evaluation.

8. Click on the *Report* button to print a report or save it as a text file.
 - If the verification has passed, print the certificate with *Certificate*.
 - If the verification has *not* passed, perform an adjustment of the thermal cycler (see p. 37).
 - To save data recorded during the verification in a file:
 - a Click in the area of the diagram on the *Monitor* tab with the right mouse button.
 - b Select *Export Data* in the context menu.

Measured data and results are automatically stored in the system database and can be reviewed later (see *Displaying stored procedures on p. 40*).

You can proceed as follows:

5.4.1.1 Verifying an additional thermal cycler

1. Highlight the *Cycler* node in the navigation tree and click on *Disconnect Cycler*.
2. Establish CAN bus connection to the thermal cycler, if necessary.
3. Insert the sensor plate in the block of the thermal cycler. According to the thermal cycler version, attach the front clip using the cable lead-through if necessary.
4. Click on the *Connect Cycler* button and select the new thermal cycler.

5.4.1.2 Verifying the same thermal cycler again

1. Click on the *Reset* button in the *Results* tab.
2. Restart the verification with *Start Verification*.

5.4.1.3 Completing work with the Temperature Verification System

1. Highlight the *Cycler* node in the navigation tree and click on *Disconnect Cycler* button.
2. Remove the sensor plate from the block of the thermal cycler (see p. 25).
3. Switch off the thermal cycler and unplug the cable.
4. Reattach the front clip of the thermal cycler.
5. Reset the previous CAN bus address and termination setting.

5.5 Adjusting the thermal cycler

The adjustment process takes approximately one minute. During the process, the adjustment parameters determined during the previous verification are transferred, and permanently saved, to the thermal cycler.

5.5.1 Carrying out an adjustment

Prerequisites

- The Temperature Verification System: a user in the **Administrator** group is logged onto the system.
- The thermal cycler verification is completed and has
 - Failed with the notification **Failed** and the message *Please perform adjustment* will be displayed, or it has
 - **Passed**.
- The Temperature Verification System certificate is valid.

Navigation Tree:

- Administrator: Admin
 - View
 - Cycler: Mastercycler ep (Al.)
 - Verify** (selected)
 - Adjust
 - Record Temperatures
 - Measuring System Ready

Working Area - Results Tab:

Cycler Model: Mastercycler ep (Al, 384 positions)
 Cycler Serial No.: 5344 TH912221 Cycler ID: C1

Data Summary

Parameter	35°C	72°C	95°C	Results
Temperature (mean)	34.09	71.39	95.04	Failed
Temperature Homogeneity:	0.70	0.58	0.58	passed
Heating Rate (mean)	2.65 °C/s			-
Cooling Rate (mean)	1.74 °C/s			-

Verification of this Cycle has **Failed**
 Please perform adjustment.

Buttons: Report, Certificate, Reset, Stop Verification, Start Verification

1. Highlight the *Adjust* node in the navigation tree or press the **F6** key.
2. Click on the *Start Adjustment* button.
 The adjustment data is transferred to the thermal cycler.

i The thermal cycler must be verified again after the adjustment.

5.6 Recording temperature profiles

The *Record Temperatures* function allows user-defined temperature profiles to be recorded in a file. It can be used with all thermal cyclers (Eppendorf and other manufacturers) that are mechanically compatible with the sensor plate.

-  For **Record Temperatures**, the CAN bus connection between the system base and an Eppendorf thermal cycler is only needed if no external option to control the thermal cycler (e.g. control panel) is available. The thermal cycler can then be controlled with the CycleManager pro software available on the notebook. Before starting the CycleManager pro server, sign off any thermal cyclers using *Disconnect Cycler* (see p. 36).
-  If an Eppendorf thermal cycler is not detected by the CycleManager pro software, a firmware update may be required for this device (see CycleManager pro operating manual). After the temperature measurement has been completed, the previous firmware of the device must be reinstalled, as necessary, with the control panel that was originally used, the *realplex* software or the epCycleManager, as described in the corresponding operating manuals.

5.6.1 Carrying out a recording

Prerequisites

- A user is logged onto the Temperature Verification System software.
1. Insert sensor plate in the thermoblock and close the heated lid (see p. 22).
 2. Highlight the *Cycler* node.
Optional: Fill in the *Cycler Model*, *Cycler Serial No.* and *Cycler ID* fields.
This information is recorded in the output file.
 3. Highlight the *Record Temperatures* node or press the **F9** key.

4. Optional: Automatically start and end temperature recording.



The maximum duration for a temperature recording is 24 hours.
 The system records two data points on each sensor per second.

<i>Start Recording</i>	Automatic start of recording, • <i>when average block temp. has reached [30] °C</i> when the block temperature is higher than the specified temperature for the first time. • <i>after a delay of [0] min.</i> after the specified time. • <i>when lid temp. has reached [105] °C</i> when the lid temperature is higher than the specified temperature for the first time.
<i>Stop Recording</i>	Automatic end of recording, • <i>when the average block temp. has reached [30] °C</i> when the block temperature is below the specified temperature for the first time. • <i>after a recording time of [5] min.</i> after the specified recording period beginning with the start of the recording.

5. Insert the sensor plate in the block of the thermal cycler (see p. 22).
6. **Only for Mastercycler pro/ep/ep realplex:** Insert front clip with cable lead-through.
7. Close lid of the thermal cycler.

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8. Click on the *Start Measurement* button.
The dialog *Save as* is shown.
9. Enter name for the output file and select the file format.
The following file types are available:

CSV Measured values separated by commas.

TXT Measured values separated by tabs.

Both file formats can be imported into a table calculation program such as Microsoft Excel for further analysis.

10. Start the user-defined temperature control program on the thermal cycler and confirm the dialog with *OK*.
The temperature recording is started.
11. Click on the *Stop Measurement* button to end the temperature recording.
12. Remove the sensor plate from the thermal cycler (see p. 25).

5.7 Displaying stored procedures

The system records user actions, system actions and errors in the system database. You can display this data again at a later time.

5.7.1 Displaying log entries

The log entries recorded by the system are displayed in the log area as a list. The list can be filtered and sorted according to various criteria.

Logging				
AdjustCycler	DateTime	Type	User	Serial No.
<<All>>	13.07.2009 15:31:19	UserLog	administrator	
UserLog	13.07.2009 14:50:19	UserLog	user01	
ErrorLog	13.07.2009 14:50:18	ConnectToCycler	user01	
RecordData	13.07.2009 14:48:16	ConnectToCycler	user01	5344 TH912221
VerifyCycler	13.07.2009 12:56:05	ConnectToCycler	user01	
AdjustCycler	13.07.2009 12:40:35	ConnectToCycler	user01	5344 TH912221
AdjustSystem				
ImportParameter				

Filters

- Select one of the entries in the list box in the log area. Only log entries that correspond to the selected type are displayed in the log area.
- Display all log entries: select entry *All*.

Sorting

- Click on one of the column headers in the log area. The log entries are sorted ascending using the selected column.
- Reverse sort order: tap on the same column header again.

5.7.2 Displaying verification and adjustment procedures

You can display verifications and adjustments of thermal cyclers that are recorded in the database and subsequently output certificates and reports.

 With *Record Temperatures*, recorded data is not stored in the system database, but as a CSV file or TXT file. Therefore, this data cannot be exported later.

1. In the list box of the log area, select *VerifyCycler*, *AdjustCycler* or *AdjustSystem*.

Logging					
VerifyCycler	DateTime	Type	User	Serial No.	Information
	10.07.2009 15:18:09	VerifyCycler	user01	5344 TH912221	Verification passed
	10.07.2009 14:10:43	VerifyCycler	eppendorf	5344 TH912221	Verification has been cancelled by user.
	10.07.2009 14:42:19	VerifyCycler	Admin	5344 TH912221	Verification failed
	10.07.2009 14:22:18	VerifyCycler	eppendorf	5344 TH912221	Verification failed
	10.07.2009 14:08:59	VerifyCycler	eppendorf	5344 TH912221	Start verification program of cycler
	10.07.2009 14:13:27	VerifyCycler	eppendorf	5344 TH912221	Start verification program of cycler

2. Select an entry highlighted in blue font in the log list.

The stored process data is displayed in the work area.

3. To output a certificate or a report, click on the *Certificate* or *Report* button on the *Results* tab.

5.8 System management

5.8.1 Managing user accounts

You can create, delete and change user accounts in the user administration. The system supports two user groups:

User group	User rights
User (normal user)	- Verify thermal cycler and record temperature profiles. - Print certificates and reports and save them as a file. - View log entries. - Back up the database.
Administrator	Same as User , and - Adjust the thermal cycler. - Manage user accounts. - Restore the database.

Opening user administration	1. Select the <i>Edit</i> menu in the main menu bar. 2. Select the <i>Manage Users</i> button.
-----------------------------	---

Manage Users - Current user: admin

Account Overview		
Username	Group	Full Name
admin	Administrator	admin
user01	User	First User

Edit Account	
Username	admin
Password	Retype Password
Group	Administrator ▼
Full Name	admin

Creating user accounts (only administrator)

1. Click on the *Add* button.
2. Enter a unique user name.
3. Enter password (at least 5 characters long) and re-enter it in the *Retype Password* field.
4. Select a user group.
5. Enter complete name or additional information in the field *Full Name*.
6. Click on the *Save* button.

Deleting user accounts (only administrator)

1. In the list, highlight the user account to be deleted.
2. Click on the *Delete* button.

Changing a password or full name

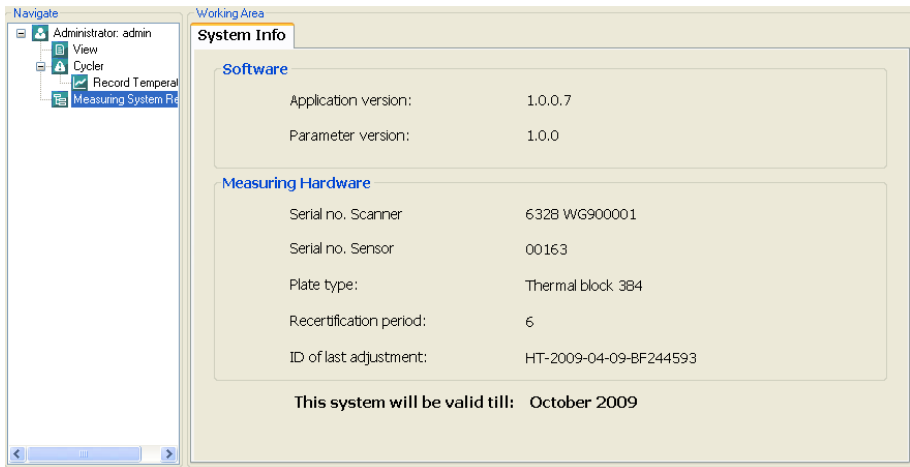
1. In the list, highlight the user account to be changed. (If you are logged on with a user account in the User group, only your entry is visible).
2. Enter new password (at least 5 characters long) and re-enter it in the field *Retype Password* or edit the full user name.
3. Click on the *Save* button.

5.8.2 Displaying system information

The system information can be helpful during troubleshooting.

Prerequisites

- One user is logged on.
 - The system base is switched on and the sensor plate is correctly connected.
- Highlight the *Measuring System* node.



5.8.3 Managing the database

The Temperature Verification System stores log entries, measured data (except with *Record Temperatures*) and user information in a database.

5.8.3.1 Defining the server

If the system will be using a central database on a remote computer, the address of the database server can be defined here.

i The user is automatically logged off of the system before the database is changed.

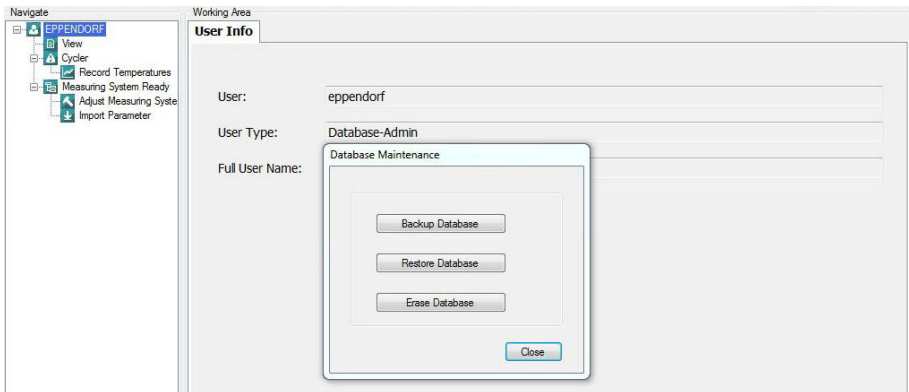
1. Select *Select database server* in the *Edit* menu.
A dialog window is opened.
2. Enter the address of the database server in the field *IP address*.

i In order to use the local database server (standard installation) leave this setting as **localhost**.

5.8.3.2 Backing up the database

The Temperature Verification System database can be saved as a file so that it can be stored on a data storage device.

1. Select the *Edit* menu in the main menu bar.
2. Select *Administrate Database*.



The *Database Maintenance* dialog will open.

3. Click on the *Backup database* button.
The file selection dialog is opened.
4. Select file name and storage location.
The database is saved in a file with the extension ".bak".

5.8.3.3 Restoring the database

In case of failure, you can restore a previously backed up database using the database recovery following software reinstallation.

-  As a part of database recovery, user information and passwords are also reset to the status in the database backup file. Please keep this in mind when logging onto the system after database recovery.
Please contact Eppendorf Service to reset the user passwords.

-  The *Erase database* function can only be accessed by Eppendorf Service.

Prerequisites

- A new database was created with the reinstallation of the software and does not contain any measurement data.
- A user from the group **Administrator** is logged on.

1. Select *Administrate Database* in the *Edit* menu.
The *Database Maintenance* dialog will open.
2. Click on the *Restore database* button.
The file selection dialog is opened.
3. Select the database backup file.
The database is restored from this file.
You will then be automatically logged off the system.

6 Maintenance

6.1 Cleaning



DANGER! Electric shock as a result of penetration of liquid.

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



NOTICE! Damage from the use of aggressive chemicals.

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



Cleaning instructions for the notebook can be found in the notebook operating manual.

6.1.1 Cleaning the system base housing

1. Switch off the system base, detach notebook and remove all cable connections.
2. Wipe the system base housing with a wet, lint-free cloth. Use a mild cleaning agent, if necessary.

6.1.2 Cleaning the sensor plate



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

- ▶ When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security 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, in its respectively current valid version).
-



The sensor plate material and cable may change color over time. This, however, does not impair the function.

1. Detach the sensor plate from the system base.
2. Wipe the housing of the sensor plate with a wet, lint-free cloth. Use a mild cleaning agent, if necessary.
3. Remove cleaning agent residue by rinsing with deionized water. Keep the plug and USB stick for the sensor plate dry.
4. Allow the sensor plate to dry completely.

6.2 Disinfection/Decontamination



DANGER! Electric shock as a result of penetration of liquid.

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



NOTICE! Damage from UV and other high-energy radiation.

- ▶ Do not use UV, beta, gamma, or any other high-energy radiation for disinfecting.
- ▶ Avoid storage in areas with strong UV radiation



NOTICE! Damage to the device due to autoclaving.

- ▶ Do not autoclave any of the Temperature Verification System assemblies.
-

Auxiliary equipment

- Lint-free cloth
 - Disinfectant
1. Switch off the Temperature Verification System and remove it from the power supply.
 2. Allow the device to cool down.
 3. Clean the device (see *Cleaning on p. 47*).
 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.
 6. Spray the sensor plate with a disinfectant. Clean the sensor plate after the exposure time of the disinfectant (see p. 48).

6.3 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. Follow the instructions in the decontamination certificate. You can find it as a PDF file on our website (www.eppendorf.com/decontamination).
 2. Decontaminate all the parts you would like to dispatch.
 3. Include the fully completed decontamination certificate in the packing.
-

7 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.

Problem	Cause	Solution
<i>Select COM port</i>	- The system base is not switched on when the software is started. - USB connection to the system base via the incorrect USB port on the notebook.	- Switch on the system base and restart the software. - Use the USB connection on the docking station labeled → System Base for connecting to the system base. If this does not resolve the problem: - Determine the number of the COM port using the <i>-ICPDAS I-756X Converter</i> entry in the Windows Device Manager and select it in the <i>Select COM port</i> dialog.
<i>Failed to load the file SensorBoxInfo.xml or Failed to load the file SensorPlateInfo.xml.</i>	- The sensor plate USB stick was not inserted into the system base. - Windows allocated a new drive letter to the sensor plate USB stick.	- Insert the sensor plate USB stick in the Sensor Plate USB port. - Indicate the path of the XML file on the USB stick in the file selection dialog.

Problem	Cause	Solution
Connected devices are not listed in <i>Connect Cycler</i> .	• The CAN bus cabling or termination or address settings are faulty. • Thermal cycler is switched off. • Thermal cycler is not idle. • An incompatible firmware is installed on the thermal cycler.	▶ Check the CAN bus cabling and the termination and address settings (see p. 18). If necessary, replace defective cables. A unique address between (and including) 01 and 31 must be set on each thermal cycler. ▶ Ensure that all connected thermal cyclers are switched on and idle (status lamp lights up green). ▶ The firmware version 2.600 or higher must be installed on the thermal cyclers. If this is not the case, perform a software update (see the thermal cycler or device software operating manual).

8 Transport, storage and disposal

8.1 Packing

Proceed as follows to pack the Temperature Verification System for storage or transportation.



A decontamination certificate must be enclosed when the system is sent to Eppendorf.



WARNING! Risk to health from contaminated device

1. Follow the instructions in the decontamination certificate. You can find it as a PDF file on our website (www.eppendorf.com/decontamination).
2. Decontaminate all the parts you would like to dispatch.
3. Include the fully completed decontamination certificate in the packing.

1. If necessary, decontaminate (see p. 49) or disinfect (see p. 48) the sensor plate.
2. Pack the system, and all assemblies, in the supplied transport case.

The storage conditions are listed in a separate section (see *Ambient conditions on p. 55*). Also observe the storage regulations for the notebook in the notebook documentation.

8.2 Disposal

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

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

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

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



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

9 Technical data

The following Technical Data is valid for the system base and sensor plate of the Temperature Verification System. The Technical Data for the notebook can be found in the notebook documentation.

9.1 Power supply

Voltage:	100 V – 130 V, $\pm 10\%$ 200 V – 240 V, $\pm 10\%$
Frequency:	50 Hz – 60 Hz
Power consumption:	5 W
Overvoltage category:	II
Protection class:	IP 20 (EN 60529), class 1 (EN 60950)
Fuses:	1 A (T)

9.2 Weight/dimensions

Dimensions:	Width: 39.5 cm Depth: 32.5 cm Height: 14.0 cm
Weight without transport case and accessories:	6 kg

9.3 Ambient conditions

General operation

Environment:	Only for use in indoors.
Ambient temperature:	15 °C - 35 °C
Relative humidity:	25 % – 75 %, non-condensing humidity
Atmospheric pressure:	79.5 kPa – 106 kPa
Degree of pollution:	2

Storage conditions

Ambient temperature:	–5 °C - 45 °C
Relative humidity:	10 % – 95 %, non-condensing humidity
Atmospheric pressure:	70 kPa – 106 kPa

9.4 Application parameters

	96-well sensor plate	384-well sensor plate
Compatibility for verification, adjustment and temperature measurement:	Eppendorf Mastercycler nexus, Mastercycler pro, Mastercycler ep und Mastercycler ep <i>realplex</i> , with 96-well aluminum or silver block	Eppendorf Mastercycler pro 384 or Mastercycler ep 384
Compatibility for temperature measurement:	Eppendorf Mastercycler/ Mastercycler gradient. Thermal cycler from other manufacturers with a 96-well block that is mechanically compatible with the sensor plate.	Eppendorf Mastercycler 384. Thermal cycler from other manufacturers with a 384-well block that is mechanically compatible with the sensor plate.
Number of sensors:	15 block temperature sensors 1 lid temperature sensor	
Measuring range:	Block temperature +4 °C – +99 °C Lid temperature +4 °C – +110 °C	
System accuracy:	±0.3 °C	

9.5 Temperature profile for the verification

Thermal cycler settings

- Block temperature control: temp. mode **standard**
- Heated lid: 105 °C

Step	Block temp.	Dwell time	Remarks
1	95 °C	30 s	Equilibrate
2	35 °C	30 s	Equilibrate
3	72 °C	60 s	Determine temperature deviation and temperature homogeneity.
4	35 °C	10 s	
5	95 °C	60 s	Determine heating rate between 40 °C and 90 °C. Determine temperature deviation and temperature homogeneity.
6	35 °C	60 s	Determine cooling rate between 90 °C and 40 °C. Determine temperature deviation and temperature homogeneity.

10 Ordering information

10.1 Temperature Verification System



The Temperature Verification System consists of a device case, system base, notebook, software and accessories.

Order no. (International)	Order no. (North America)	Description
6328 000.006	6328000006	Temperature Verification System - Multi-channel for Mastercycler, Mastercycler ep, Mastercycler pro and Mastercycler nexus with sensor plate for 96-well PCR block
6328 000.014	6328000014	Temperature Verification System, Multi-channel for Mastercycler, Mastercycler ep, Mastercycler pro with sensor plate for 384-well PCR block
6328 072.007 6328 071.000	6328072007 6328071000	Sensor plate with 14 block temperature sensors, one lid temperature sensor, USB stick and connection cable for 384-well PCR block for 96-well PCR block
6328 076.002	6328076002	Sensor plate for Mastercycler nexus flat

10.2 Accessories

Order no. (International)	Order no. (North America)	Description
5341 612.006 5341 611.000	950014008 950014016	CAN-Bus cable connecting cable between 2 thermomodules 50 cm 150 cm

10.3 Spare parts

Order no. (International)	Order no. (North America)	Description
5349 852.006	950017066	Adapter 9-pin SUB-D socket to CAN Bus
on request	on request	USB cable with plug type A and plug type B for connecting the system base to the notebook PC
5341 890.006	950005387	Front plate tool for removing the front panel of the Mastercycler pro/ep
on request	on request	Front clip for Mastercycler pro and Mastercycler ep with relief for cable lead-through
6328 900.066	-	Operating manual, in multiple languages

10.4 Certification

Order no. (International)	Order no. (North America)	Description
6328 078.005	6328078005	Certification of Temperature Verification System - Multi-channel for 1 sensor plate for 2 sensor plate for 3 sensor plate
6328 079.001	6328079001	
6328 080.000	6328080000	

10.5 Mastercycler nexus

10.5.1 Master variants

Order no. (International)	Order no. (North America)	Description
6331 000.017	6331000025	Mastercycler nexus gradient 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US-plug
6333 000.014	6333000022	Mastercycler nexus 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug
6345 000.010	6345000028	Mastercycler nexus GSX1 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US-plug
6346 000.013	6346000021	Mastercycler nexus SX1 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US-plug
6335 000.011	6335000020	Mastercycler nexus flat 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug
6336 000.015	6336000023	Mastercycler nexus GX2 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug
6337 000.019	6337000027	Mastercycler nexus X2 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug

Ordering information

Eppendorf Temperature Verification System
English (EN)

10.5.2 Eco variants

Order no. (International)	Order no. (North America)	Description
6334 000.018	6334000026	Mastercycler nexus gradient eco 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US-plug
6332 000.010	6332000029	Mastercycler nexus eco 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug
6347 000.017	6347000025	Mastercycler nexus GSX1e 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US-plug
6348 000.010	6348000029	Mastercycler nexus SX1e 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US-plug
6330 000.013	6330000021	Mastercycler nexus flat eco 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug
6338 000.012	6338000020	Mastercycler nexus GX2e 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug
6339 000.016	6339000024	Mastercycler nexus X2e 230 V/50 – 60 Hz 115 V/50 – 60 Hz, with US - plug

10.6 Mastercycler pro

Order no. (International)	Order no. (North America)	Description
6321 000.019	- 950030010	Mastercycler pro 230 V/50 - 60 Hz 120 V/50 Hz, with US- plug
6325 000.013	- 950030020	Mastercycler pro S 230 V/50 - 60 Hz 120 V/50 Hz, with US-plug
6324 000.010	- 950030030	Mastercycler pro 384 230 V/50 - 60 Hz 120 V/50 Hz, with US-plug
6320 000.007	950030050	Control Panel

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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:

Temperature Verification System, multi-channel

Product type:

Temperature Verification System

Relevant directives / standards:

2014/35/EU: EN 61010-1

2014/30/EU: EN 55011, EN 61326-1

2011/65/EU: EN 50581

Date: March 10, 2016


Management Board
Portfolio Management

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