![avantor — delivered by VWR logo]

Instruction manual

VWR® PCR Thermal Cycler XT⁹⁶ / XTender⁹⁶

	EU cat. no	US cat. no
XT96	732-1359	76452-151
XT96 Gradient	732-3428	76452-153
XTender96	732-3657	76452-155
XTender96 Gradient	732-3658	76452-157

CE   UK CA

Legal address of Manufacturer

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Country of Origin : GERMANY

CONTENTS

INTRODUCTION

The VWR thermal cyclers are the ideal PCR devices for all molecular biological and biochemical laboratories working in the field of basic research or routine diagnostics. The 250°C HTR (High Temperature Range) Peltier technology allows quick changes in temperature up to 4 °C/sec (max). The individual monitoring and controlling of each of the eight Peltier elements per block equipped with 'Long Life Technology' ensure the tightest correlation of target and actual temperature across the entire thermal plate leading to highest reproducibility of the results. To avoid condensation each block is equipped with a heated lid.

The VWR thermal cyclers are equipped with a touch-sensitive, graphic coloured TFT display of the newest generation, allowing operation of the device by simply touching symbols and graphic elements on the screen. This leads to easy and intuitive handling and programming of the device. Additionally, a mouse can be connected via USB.

Furthermore, an Ethernet port is available to connect the devices with Microsoft Windows® or Linux networks. It is therefore possible to use an external server for archiving programs and GLP reports which will be available globally in the network (e.g. for other thermal cyclers).

Transfer of data can be done by using commercially available USB memory sticks enabling a nearly unlimited saving space for programs and GLP reports, which can be printed using a printer connected to the thermal cycler via the network.

Notice: The USB ports support only standard cable mice and standard USB sticks. The maximum acceptable length of the connecting cable of the port is 3 m!

GENERAL WARNING

The PCR Cycler XT⁹⁶ has been designed for laboratory use and it should not be used at temperature below 15 °C. If the instrument is at a temperature below 10 °C place it in a warmer room and wait at least two hours before using it. Before plugging the instrument into a power supply, check that the voltage and frequency on the label matches the power supply specifications. Before any operation ensure that the ventilation grids are not obstructed.

SAFETY INSTRUCTIONS

The PCR Cycler XT⁹⁶ is designed with function, reliability, and safety in mind.
Before using the PCR Cycler XT⁹⁶ please read this entire manual and strictly follow the safety instructions!

Intended use of the PCR Cycler XT⁹⁶: Working environment for DNA amplification during a Polymerase Chain reaction (PCR).

Safety and protection of the user cannot be ensured if the PCR Cycler XT⁹⁶ is used in any manner that is not specified in these instructions. Special notice must be taken of the following:

Returns only in original packaging
Please use the manufacturer's original package to ensure a safe return.

Caution: Dangerous voltage

Ensure that the voltage requirements of the PCR Cycler XT[96] exactly match your local AC power supply.

Only use the original AC cable supplied with the PCR Cycler XT[96].

Caution: Liquids

Ensure that no liquids can enter the device. Reaction tubes must be filled outside of the thermal cycler.

Caution: Dangerous explosive material

Do not use reactive or explosive substances in the PCR Cycler.

Caution: Damage

Check for transport damage and completeness of the accessories upon arrival. If any damage is noticed, contact your distributor or manufacturer immediately. If you detect any damage of the PCR Cycler XT[96] or one of its accessories, do not connect the PCR Cycler to the AC wall outlet and do not use the device in any manner!

Caution: Hot surfaces

The thermal plate, the heated lid and the reaction tubes quickly reach temperatures above 50 °C / 122 °F. There is danger of burning! Keep the lid closed until the temperature reaches 30 °C / 86 °F or less. Only use materials (tubes, tube caps, plates and sealing films) which are heat resistant to 120 °C / 248 °F.

Caution: Environment

The ventilation of the device must not be covered.

Danger: Line voltage

Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 3-conductor power cable (3x 0.75 mm^2) with protective ground. The power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

LICENCE NOTICE

This instrument is licensed for research and development and for uses other than human in vitro diagnostics under one or more of the following patens of Applera Corporation: U.S. Patent Nos. 5,656,493, 5,038,852, 5,333,675, 5,475,610 (claims 1-159 and 164-166), 6,703,236 (claims 7-10) and 7,238,517 or corresponding claims in their non-U.S. counterparts. No right is conveyed expressly, by implication or by estoppels under any other patent of Applera, including but not limited to U.S. Patent No. 6,814,934 and its non-U.S. counterparts, which describe and claim thermal cyclers capable or real-time detection.

DELIVERY CONTENTS

After receipt of the system, please check if the following items are included in the shipment. If any transport damage is noticed, contact your distributor or manufacturer immediately.
IMPORTANT NOTICE: IF YOU FIND ANY DAMAGE OF THE DEVICE, DO NOT USE THE DEVICE!

1 Thermal cycler
1 Power cord
1 Instruction manual
1 Link PC-software VWR 'PCR Cycler XT Software'

UNPACKING

- ➢ Remove the instrument from its packaging and inspect it for signs of damage. If any are discovered, inform your supplier immediately

- ➢ The instrument must be placed on a stable, level surface and positioned such that air can circulate freely around the casing

- ➢ Ensure your proposed installation site conforms to the environmental conditions for safe operation

- ➢ There should be enough space to make sure that the ventilation grills on the front and back are not covered and sufficient ventilation is provided. The accessibility of the power switch must not be hindered. There should be a distance of at least 25 cm (10 inch) to the wall or the next device. Two thermal cyclers should not be placed back-to-back or back to front.

- ➢ The instrument is designed for indoor use only, temperature range of 10 to 35 °C and humidity of 35 to 70% are recommended

- ➢ If the instrument has just been unpacked or has been stored in a cold environment, it should be allowed to come to room temperature for 2 – 3 hours in the laboratory before switching on. This will prevent calibration failure because of internal condensation

- ➢ The instrument must be connected to the power supply with the power cord supplied.

- ➢ It is recommended that users should thoroughly read this manual prior to use

- ➢ Contact your supplier if you experience any difficulties with this instrument

SPECIFICATIONS

VWR PCR Cycler XT⁹⁶

- 8 Peltier elements with Long-Life-technology and 8 control circuits with Pt 1000 temperature sensors
- Maximal heating and cooling rate: 4 °C/s
- Block uniformity (at 72 °C): ± 0.35 °C
- Temperature range thermoblock: 4 to 105 °C
- Control accuracy thermoblock: ± 0.2 °C
- Variable ramping: 0.1 to 3.0 °C/s
- Increment/Decrement time: 0:00:01 to 0:59:59
- Increment/Decrement temperature: 0.1 to 3 °C
- Lid heating temperature range: 40 to 110 °C
- 2 x USB, 1 x Ethernet interfaces (MS Windows® or Linux)
  Note: USB interfaces only support standard USB sticks, cord mouse and keyboards!
- Dimensions (B x H x D) : 22 x 30 x 33 cm (**XTender**: 22 x 20 x 33 cm)
- Weight incl. block: 8.9 kg (**XTender**:8.3 kg)
- Pollution rate: 2
- Environmental temperature range: +10 °C to +35 °C
- Max. relative humidity: 70 %
- Maximum height above sea level: 2000 m
- Noise level: < 37 dB (A)

Gradient feature (optional)
- Maximal gradient range over 8 columns, respectively: 30 °C (± 15 °C)
- Temperature range Gradient: 30 to 100 °C
- Gradient accuracy: ± 0.2 °C

User interface/functions
- Touch sensitive (capacitive) TFT-Display (800 x 480) (not included in the XTender)
- Direct help function
- Internal flash memory for 500.000 typical PCR programs in free configurable folders/subfolders. Unlimited number of programs via network PC or USB stick
- Free PC software for the generation of PCR programs on the computer
- Unlimited number of steps per program
- Password protected user accounts with variable access rights
- GLP reports for complete recording of all runs
- QuickStart function of the last used program
- Automatic restart after power failure, Power-Fail-Denaturation, Instant Incubation
- Remote control and monitoring of instruments via PC-software
- MP3 sounds free of choice
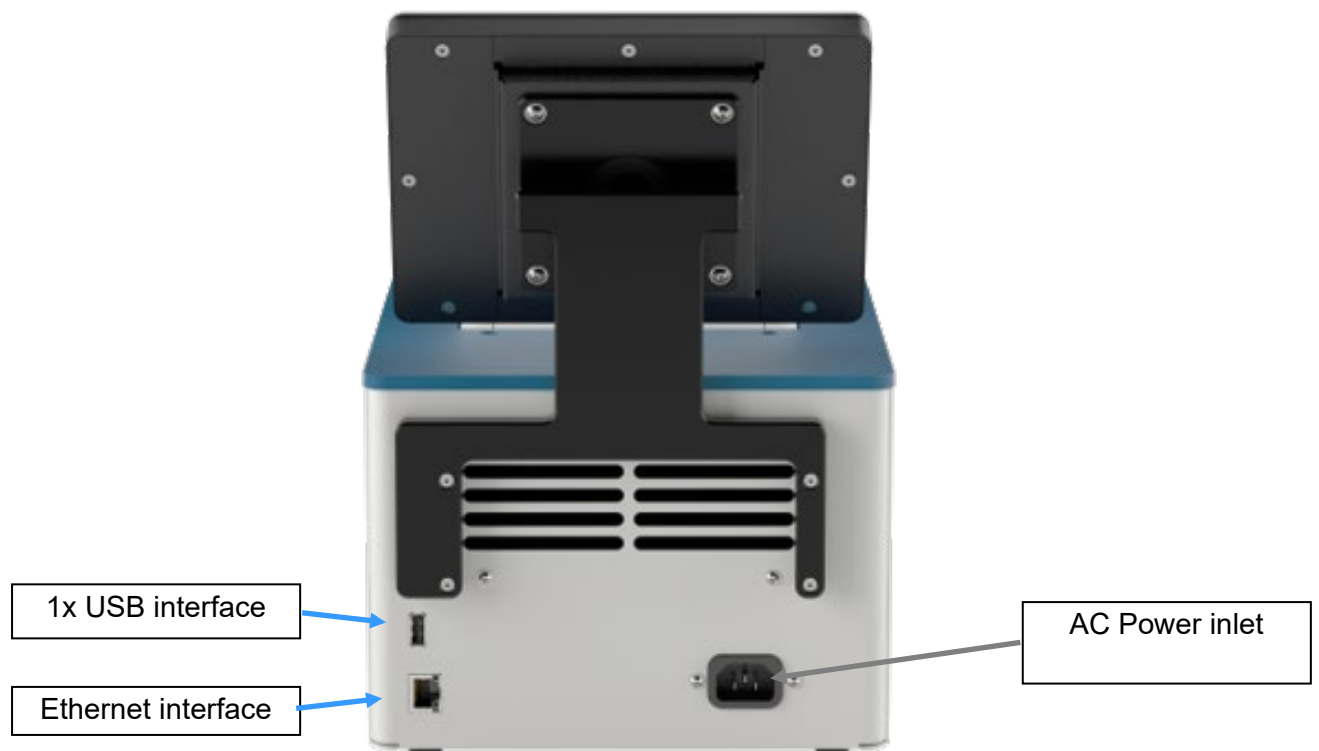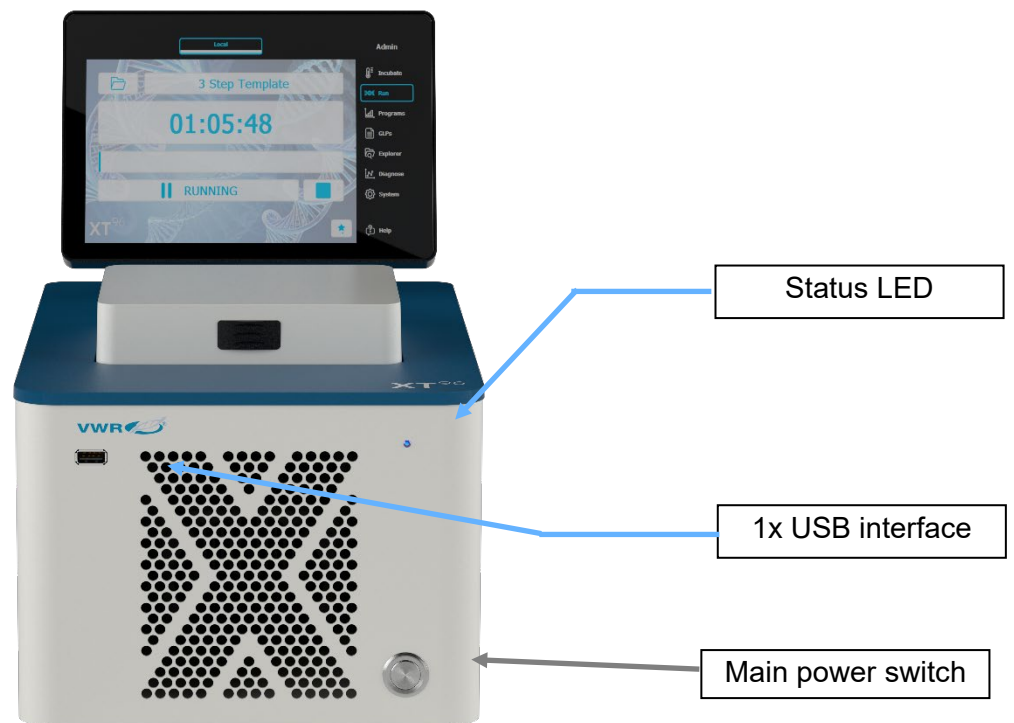- Master-/Slave-control

Block capacity
- 96 well Universal block with lid heating and automatic height adaption for 96 x 0.2 ml tubes and 96 well PCR plates (non-skirted and half-skirted)

Power supply
100 - 240 V AC, 50/60 Hz, max. 860 VA

For indoor use, only!

CONNECTIONS

Status LED

1x USB interface

Main power switch

1x USB interface

Ethernet interface

AC Power inlet

Before first use, ensure that the voltage requirements of the PCR Cycler exactly match your local AC power supply. Connect the PCR Cycler to the AC power supply only by the AC power cord delivered with your PCR Cycler XT. Only connect the PCR Cycler XT to electric power systems with an earth conductor. The AC power inlet is located at the rear of the Cycler. To disconnect the cycler from the AC power supply, remove the AC power cord from the AC power inlet. The accessibility of the AC power inlet must be not hindered or obscured in any way.

If a service is required, contact your local distributor or the manufacturer (see "TECHNICAL SERVICE AND ORDER INFORMATION", page 36).

The serial number of the PCR Cycler is located underneath the instrument. Unauthorised work on the device voids the warranty.

The surface of the device should be decontaminated with a lint-free cloth soaked with 70% ethanol before sending. Please fill in and sign the decontamination certificate and send it to the manufacturer together with the device.

For safety reasons the device must be switched off and the mains plug pulled before cleaning is performed!

INSTALLATION OF THE PCR CYCLER XTENDER⁹⁶

The VWR thermal cycler XTender⁹⁶ is a fully equipped PCR Thermal cycler without a Touch screen, the ideal device controlled by a PC or from another XT⁹⁶ Thermal cycler.

To connect multiple XTender⁹⁶ Thermal Cyclers, you need:
- An Ethernet cable for each XTender⁹⁶ Thermal Cycler
- A network or an external network router (DHCP server is required)

Please ask your network administrator for the required settings.

Set up the Connections

1. Connect the Ethernet cable to the back of the thermal cycler and connect the other end of the cable to the network.
2. Repeat step 1 for each thermal cycler.
3. Power on the XTender⁹⁶ thermal cycler.
4. Plug the "Network Configuration USB-Stick" into an USB port of the XTender⁹⁶ thermal cycler. **Note:** For each XTender⁹⁶ thermal cycler, a new "XT96ConfigFile" file must be created.
5. The XTender⁹⁶ Thermal Cycler will recognize the USB stick and set up the network configuration automatically. After finalization, the instrument will switch of.
6. Remove the "Network Configuration USB-Stick" from the USB port of the XTender⁹⁶.
7. Power on the XTender⁹⁶ thermal cycler
8. Follow the instructions in "Remote Control" on page 33 and 34 of the manual to enable a remote control from a XT⁹⁶ Thermal cycler or from a PC.

Generate a "Network Configuration USB-Stick"

1. Power on a XT⁹⁶ Thermal Cycler (Master unit) or start the XT⁹⁶ PC Software on your PC.
2. Use the "System" dialogue in the Software and click on "Thermal Block" and "Configure USB Stick"
3. Insert an USB Stick into the Cycler or PC.
4. Configure the network settings for the XTender⁹⁶ thermal cycler, as shown in the picture.
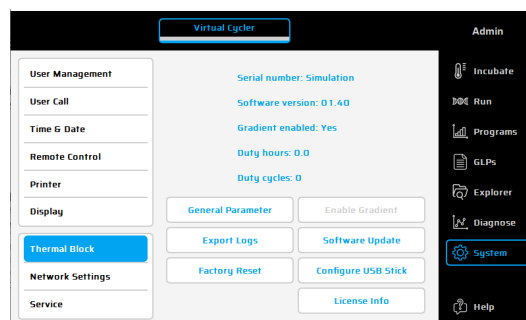
5. Make sure each instrument name is unique and press OK.
6. A "XT96ConfigFile" file will be generated and stored on the USB stick.
7. Use this "Network Configuration USB Stick" to set up the Network configurations on your XTender⁹⁶ Thermal Cycler.
   Note: Every XTender⁹⁶ Thermal Cycler needs a separate "XT96ConfigFile" file where the instrument name is unique.

OPERATING THE PCR CYCLER XT⁹⁶

General operation

The operation of the thermal cycler can be run by the internal touch screen, by using the touch sensitive surface of the display or by using a mouse connected to an available USB port. Furthermore, the thermal cycler can also be controlled by computer integrated to a network. The supplied application software offers the same functions as the internal thermal cycler software, except for some system settings.

If the user has to enter numbers or text the corresponding field has to be touched on the touch screen or clicked with the mouse. An appropriate keyboard will appear on the screen according to the expected entry.

All functions of the thermal cycler will be served by operating elements explained in the following chapters. An operating element is activated by touching the screen or clicking the mouse.

Operating elements which are not available in an actual operating mode are displayed in a grey colour. Not all operating buttons are available in each operating mode.

Turn on the cycler using the power switch on the back panel of the Cycler. When the PCR Cycler XT[96] starts, it runs a self-test to verify proper functions and then displayed the RUN screen.

To open the lid, press the butten on the lid gently.

Place the reaction vessels into the 96 well block. To ensure uniform heating and cooling of samples, reaction tubes must be in complete contact with the block. Block must be clean.

Press the lid downwards till the lid locks, the height of the heating lid will be adjusted automatically.

If the touch screen of the Thermal cycler will not be used for at least 2 minutes, a group view will be shown. Displayed information is: Thermal cycler connected to this device, status of each cycler and time remaining. Press ✖ to close this screen.
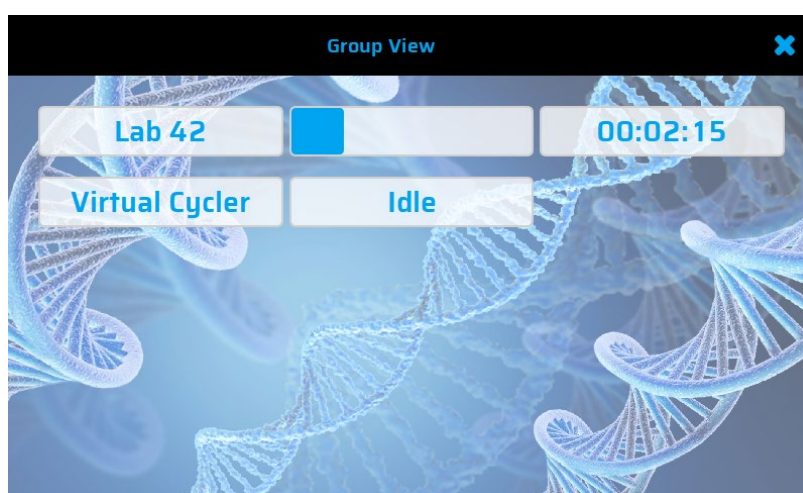
Did you know?
Shorter PCR protocols and moderate temperatures (8°C – 10°C) in the "Store-Step" will reduce the power consumption of your PCR Thermal cycler dramatically. For saving energy and prevent excessive condensation.

Tube and Strip:

To enable a homogenous pressure of the heating lid, distribute single tubes and strips over the whole block. When using only one or a few tubes – load at least one empty tube in each corner of the block.
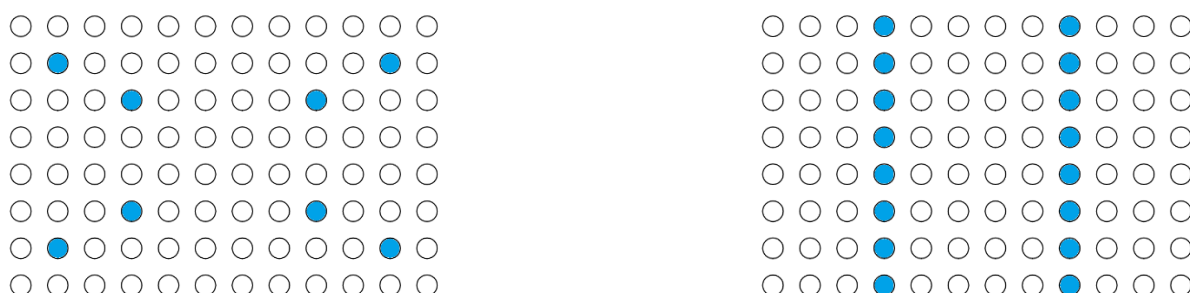
Fig : Ideal positioning Tubes and Strips

Status LED:

Status	LED Light
Self-Test	White light – flashes
Standby	White light – turns on
PCR Run	Colour change
Store-Step	Blue light – glowing
Incubation Mode	Red light – glowing
Remote Control connected	Green light – flashes
Warning	Orange light – flashes
Error	Red light – flashes

Main Menu

The main menu consists of seven dialogues, which can be selected via tabs at the right side of the screen. Each dialogue contains a help button for direct help function. The functions of the individual dialogues are explained below.
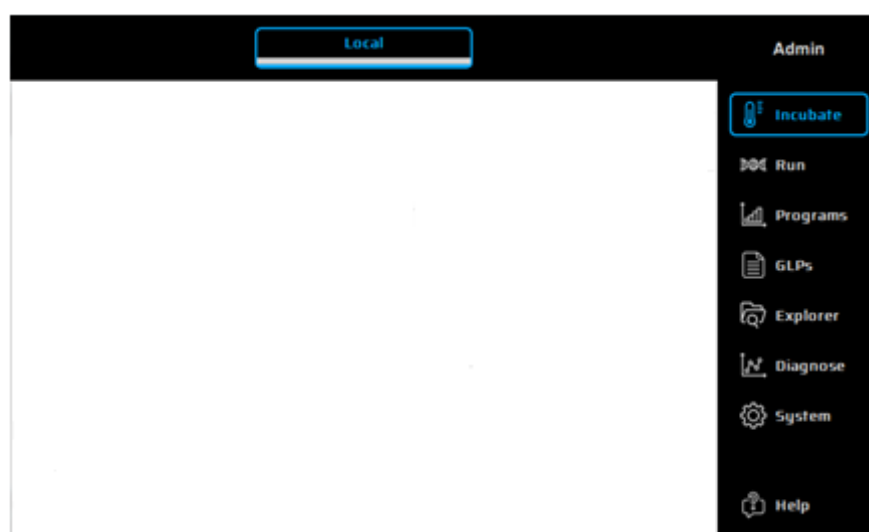
Change User

This dialogue is used for selecting a User.
The user account management, user groups or single users can be configured in the System dialogue (see page 11).

Incubate

This dialogue is used for selecting and executing the incubation mode. It can be activated to manually program temperatures of the thermal plate and heated lid. This is useful for fast and easy incubations similar to a digital dry bath. Further instructions for the Incubation Mode are given on page 13.

Run

This dialogue is used for selecting, executing and monitoring existing PCR protocols. A detailed description of the 'Run' dialogue is given on page 14.

Programs

This dialogue is used for creating, editing and organizing PCR protocols (see page 20).

GLPs

This dialogue is used for displaying and organizing GLP reports created by the thermal cycler (see page 26).

Explorer

This dialogue is used for creating, editing and organizing files and folders created by the thermal cycler (see page 28).
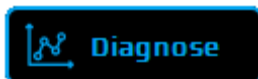
Diagnostics

This dialogue is used for monitoring the actual temperature profile of the thermoplate. Also, the temperature of the heated lid and the temperature of the cycler interior are displayed (see page 30).
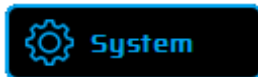
System

This dialogue is used for changing the general settings of the device and for the user management functions (see page 31). The 'System' dialogue is also used for checking serial and version numbers of hardware and software, respectively.
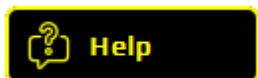
Help Button

Use this button to activate (deactivate) the direct help mode. The help function is active, when the button appears pressed. If the mouse pointer is visible a question mark appears alongside. By touching a function button or other dialogue element the corresponding help window will appear. Closing the opened window or pressing the help button again, will deactivate the direct help mode and the system returns to normal operation.

Change User
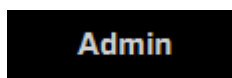
Change User

Use this button to select a user from a list. Group rights of this user are shown on the right side of the screen.

To change the settings or implement new users, please go to the User Management dialogue in the System dialogue (page 29)

The factory-set password for the Administrator is admin.
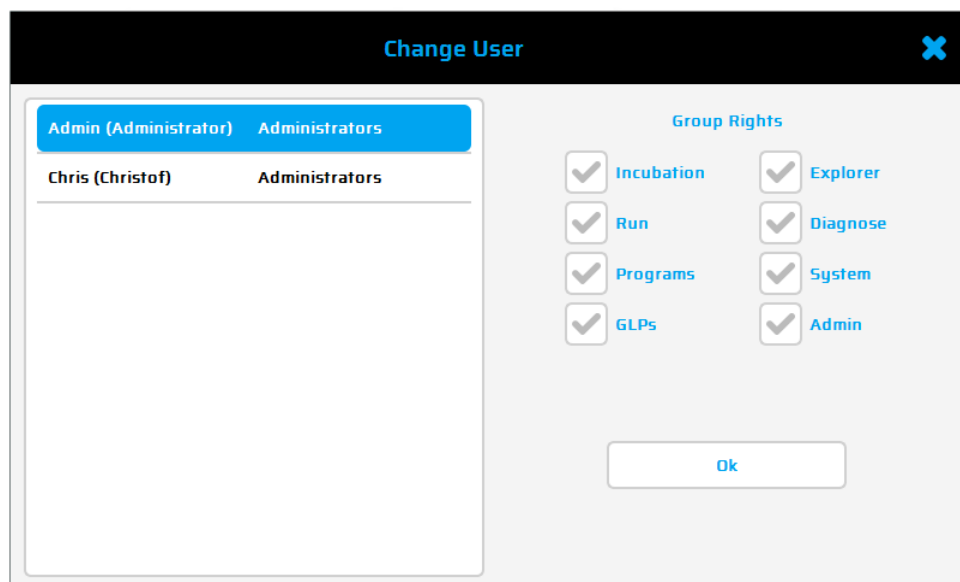
Incubation Mode
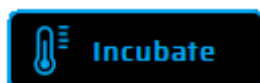
Run incubation

Use this button to set the device into the incubation mode. The temperature for the thermal plate and lid can be set manually.

Setting the block and lid temperature and timer

Set temperatures of block and lid and time by entering the values of choice in the corresponding editor fields. By entering values < 35 °C / 104 °F the lid heating will be turned off.
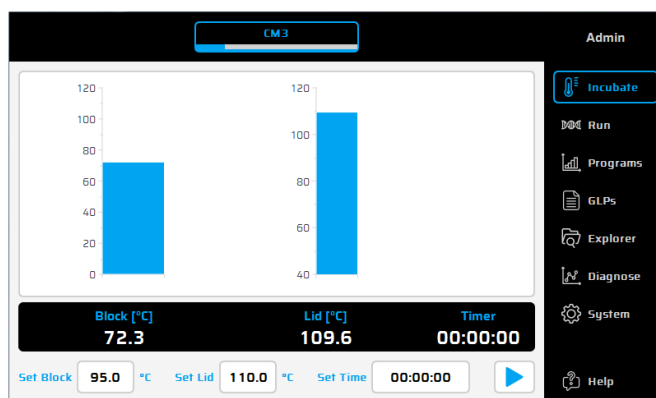
Start / Stop

Use this button to start and quit the incubation mode. Heating of the thermal plate and lid are then activated / deactivated.
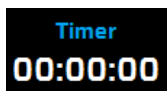
Timer

The clock shows the time passed by in the incubation mode.

Block

Current temperature of the thermal plate.
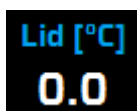
Lid

Current temperature of the lid heat.

Run dialogue

The Run dialogue is used for running and monitoring existing PCR protocols. Two versions are available, the "Simple Mode" with reduced information or the "Expert-Mode" with access to all main functions.

Run dialogue: Overview – "Simple Mode"

The following functions are found in the 'Run' dialogue:
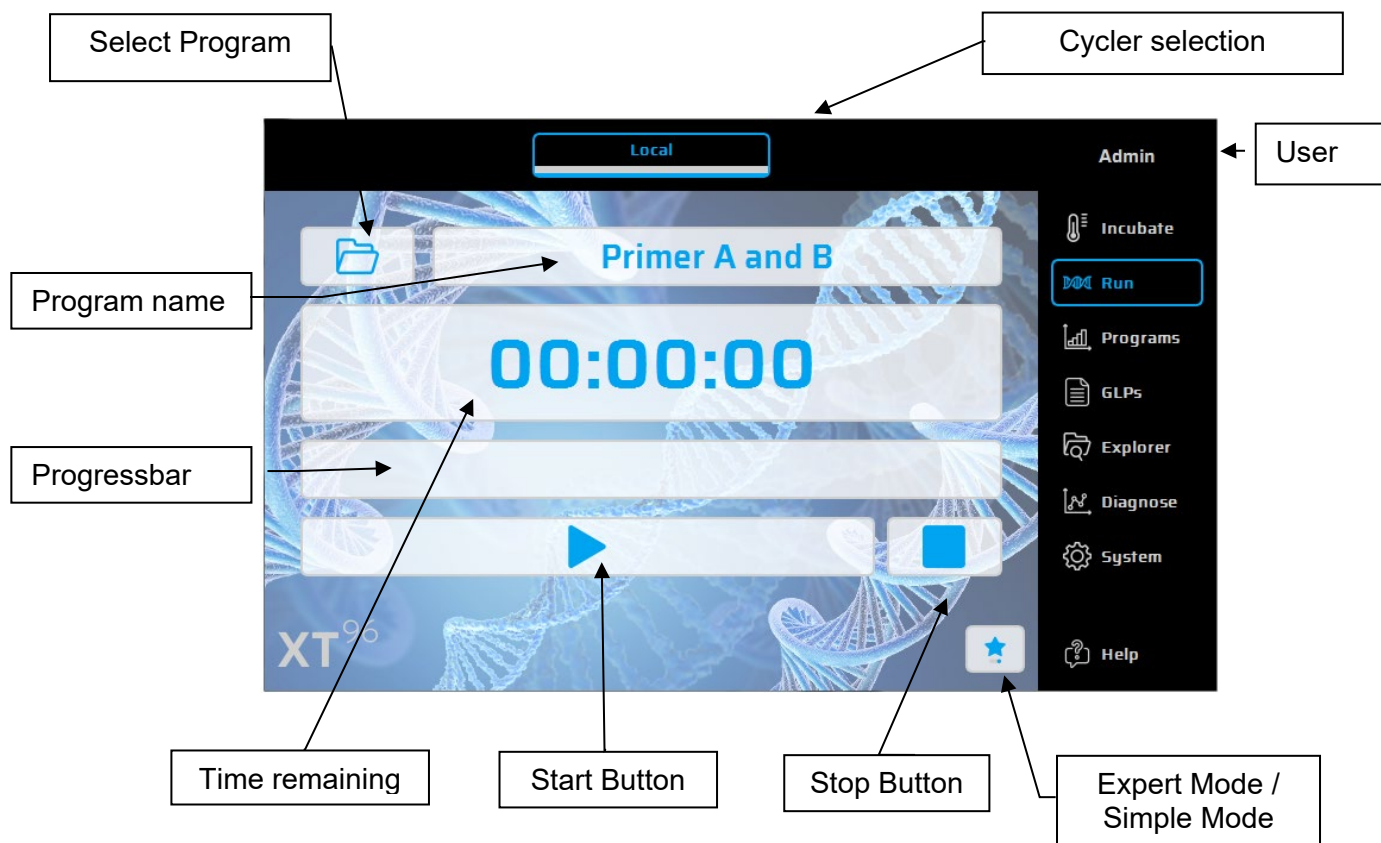
Protocol Wizard

Select Program

Using this button, a stored or recently used PCR protocol can be selected and loaded. Also, the Protocol Wizard can be used to create new Protocols.

Recently used Protocols
use pin to lock a protocol in the list

Select Program

3 Step Template	New.js
2 Step Template	3 Step.js
Gradient Template	Primer A and B .js
Empty Program	New.js
	Primer A and B.js
Explorer	New 3-Step.js
	Open Recent Program
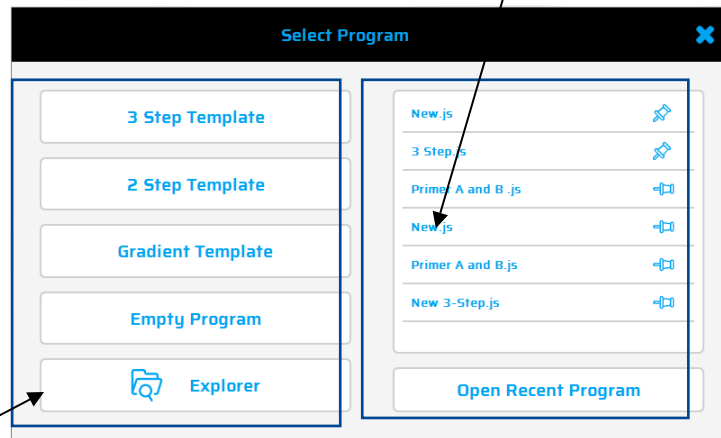
Open Explorer

Run dialogue: Overview – "Expert Mode"

The following functions are found in the 'Run' dialogue:

Protocol window

Cycler selection

Local

Admin

User

1	Heat Lid	110.0 ºC	
2	Temperature	95.0 ºC	02:00
3	Start Cycle	30x	
4	Temperature	95.0 ºC	00:30
5	Gradient	60.0 ±5.5 ºC	00:30
6	Temperature	72.0 ºC	01:00

Incubate

Run

Programs

GLPs

Explorer

Diagnose

System

Help

Program name

| Cycle | Block [ºC] | Lid [ºC] | Time remaining | Progress |
| 0/0 | 0.0 | 0.0 | 00:00:00 | 0% |

Primer A and B
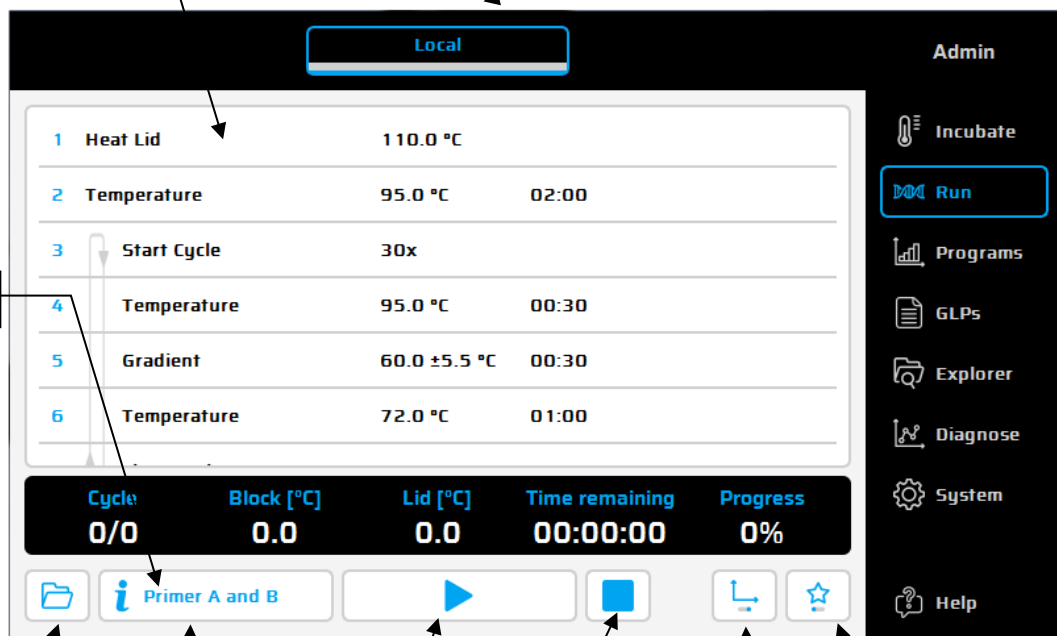
Select protocol

Info Button

Start

Stop

List view / diagram view

Expert Mode / Simple Mode

Run dialogue: Operating elements – "Simple Mode"

Select program

Using this button, a stored or recently used PCR protocol can be selected and loaded. Also, the Protocol Wizard can be used to create new Protocols.

Info button

Use this button to display details of a PCR protocol (name, program options, author, settings and comments).

Start / Pause

Use this button to start a PCR protocol or pause a PCR protocol that is in progress.

Stop

Use this button to stop a PCR protocol that is in progress.

Select Program dialogue – Recent Protocols / Protocol Wizard

Stored programs or recently used PCR protocol can be selected and loaded. Also, the Protocol Wizard can be used to create new Protocols.

If a recently used program is selected, the chosen program will be loaded in the run dialogue by clicking Open Recent Program.
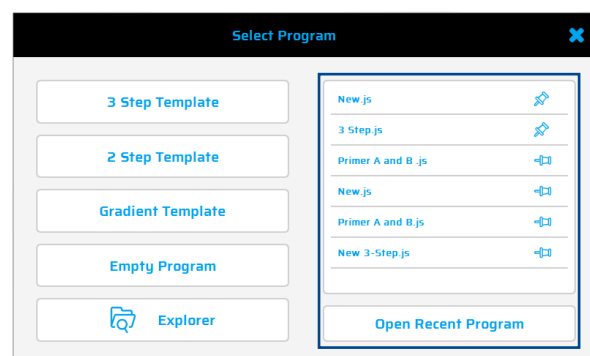
Protocol Wizard

The Wizard is a useful tool for a fast and automatic creation of PCR programs like 3-Step, 2-Step and Gradient Programs.

A three-step program consists of a separated step for denaturation, annealing (priming) and elongation. In a two-step program, the annealing and elongation steps are combined in a single step.
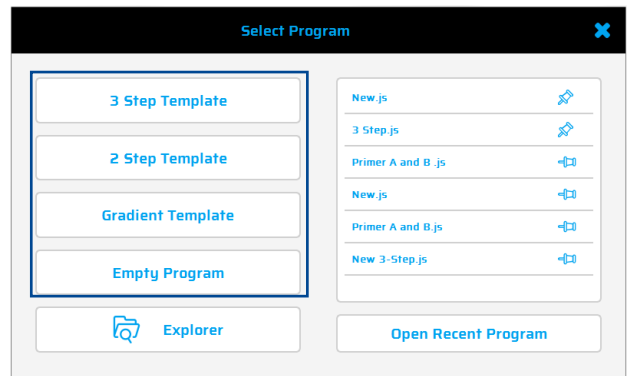
How to use the 3-Step Wizard:
1. Enter the number of cycles
2. Enter the denaturation temp (recommendation 95°C) and time (s)
3. Enter the primer annealing temperature.

Note: In general, the annealing temperature is about 5°C below the calculated average primer pair melting temperature (Tm)
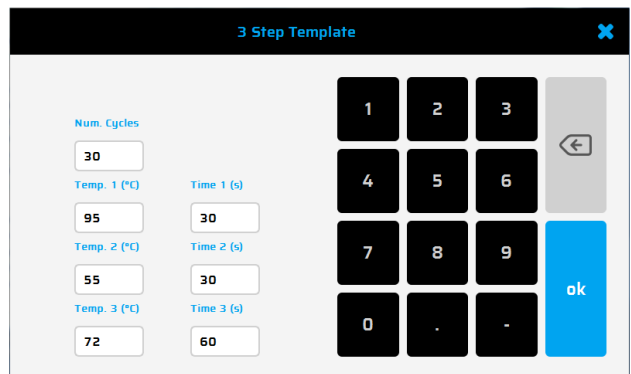
4. Enter the elongation Temp (72°C recommended) and time.
Note: Elongation time (s) = product length [bases] / 1000 [bases] * 60 s
Press OK to create a 3-step-PCR Protocol with the selected settings.

Press [save icon] to save or [save and start icon] to save and start the new protocol.
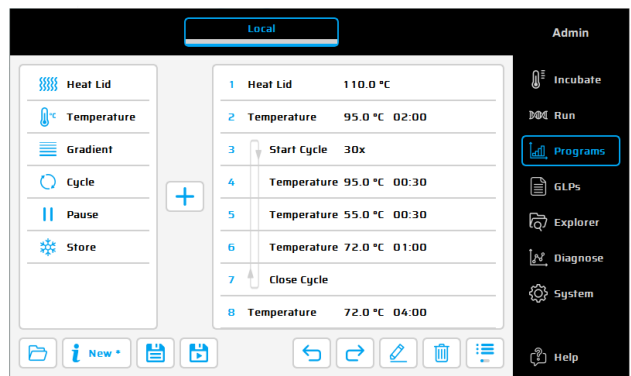
Run dialogue: Operating elements – "Expert Mode"

Select program

Using this button, a stored or recently used PCR protocol can be selected and loaded. Also, the Protocol Wizard can be used to create new Protocols.

Info button

Use this button to display details of a PCR protocol (name, program options, author, settings and comments).

Start / Pause

Use this button to start a PCR protocol or pause a PCR protocol that is in progress.

Stop

Use this button to stop a PCR protocol that is in progress.

List view

Push this button to view the selected program in list view.

Diagram view

Push this button to view the selected program in diagram view.

If the path for the printer is already entered, simply click for printing.

Using the button Test Printer , a test printing will be performed to check the correct settings.

Starting a program

If a program is opened, the contents of the program can be seen in the program window. The loaded program is started by using the 'Start' button.
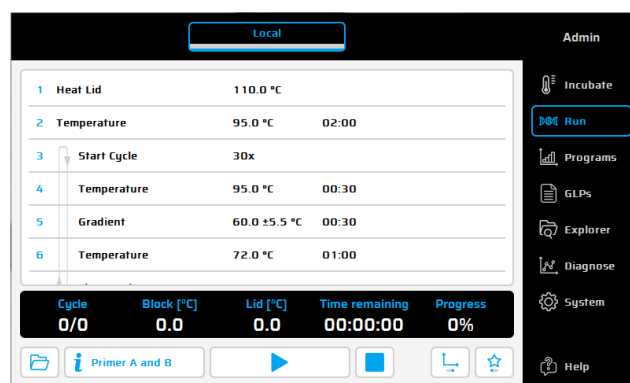
A program is running
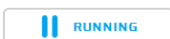
General: 'Pause' and 'Stop' button

After starting the chosen program, you can use these buttons to either pause or to stop the program.
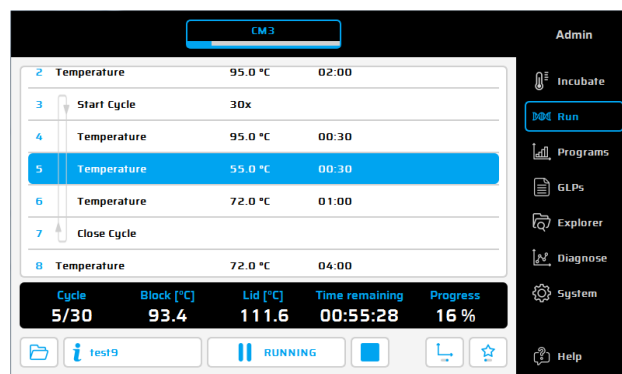
▶ PAUSED   **'Pause' button**

If the 'Pause' button is pressed during the operating sequence, the program is paused and the 'Start' button appears which can be used to continue the program.
During the break the status 'Paused' is shown.

'Stop' button

If this button is pressed after starting a program, the adjoining security query appears.
By confirming the security query with 'Yes', the program will be stopped.

Warning ✖

Do you really want to stop PCR?

| Yes | No |
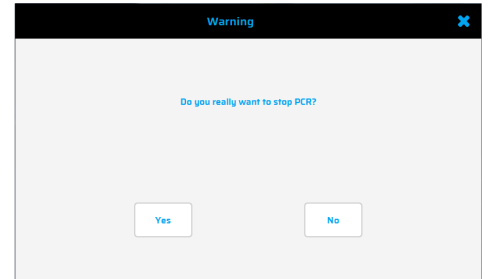
Status Display

In this window the following information on the status is shown during a run:

Cycle:
The number of finished cycles is shown

Block:
Average temperature of the thermal block

Time remain.:
Remaining time of PCR program

Cycle	Block [°C]	Lid [°C]	Time remaining	Progress
5/30	93.4	111.6	00:55:28	16 %

Lid:
Temperature of the heated lid

Total Progress:
Total Progress of PCR program in %

Program window

In the program window the blue flashing bar is showing the actual program step.

2	Temperature	95.0 °C	02:00
3	Start Cycle	30x	
4	Temperature	95.0 °C	00:30
5	Temperature	55.0 °C	00:30
6	Temperature	72.0 °C	01:00
7	Close Cycle		
8	Temperature	72.0 °C	04:00

Save GLP Report

If stopping the program after the security query, the GLP report appears.

Note: The GLP report also appears when a program is finished.

The GLP report will be created and shown on the display. It will be saved under the file name <program name>_<date>_<time>.glp if not deleted by the user. For this the adjoining window is shown.

GLP file will be saved as a default setting, to change this parameter go to 'System/Thermal Block' and deselect – 'Always save GLP´s' function. If the GLP Report is not needed press

to deleted.

Save GLP Report

GLP Report

Date/Time: 2019/01/16 14:29:47
Program: C:/Users/Public/Documents/Primer A and B.js
User: Admin
Software Version: 01.00

Author:
Comment:
Power Fail Denaturation Active: true
Power Fail Denaturation Temperature: 94.0 °C
Power Fail Denaturation Time: 01:00
Global Ramp Active: false
Global Ramp Rate: 0.0 °C/s
Tube Control Active: false

User remarks:

Program Dialogue

The 'Programs' dialogue serves for generating and editing PCR protocols (programs). This is a list of commands, which the thermal cycler performs in sequence after starting the program. The 'Programs' dialogue provides an editor for this purpose.

Operating elements of the 'Programs' dialogue

| Name of the PCR program and Settings | List of available commands | Program window | Direct help |
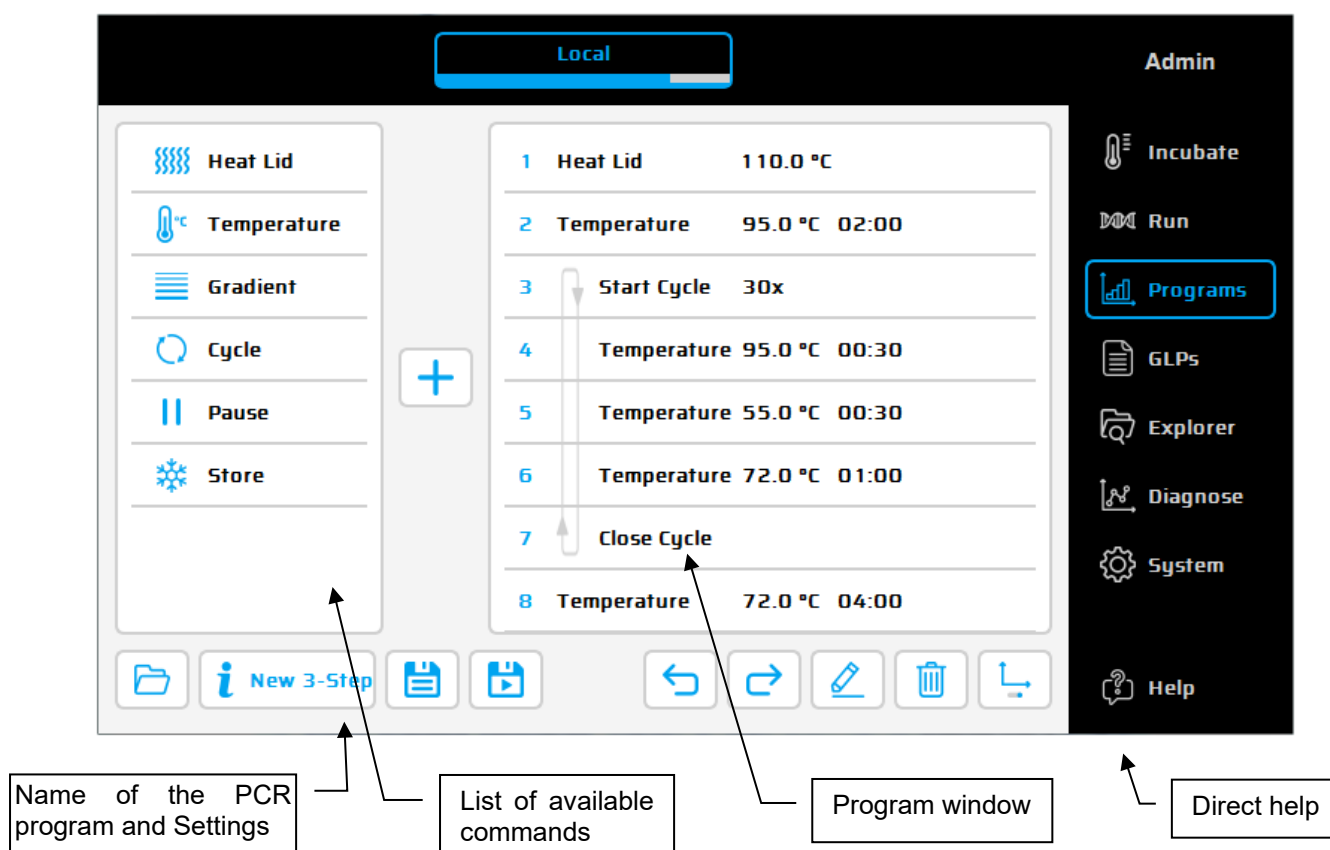
The **'Program window'** displays the list of commands (steps) the program is composed of. The **'List of available commands'** displays all steps which can be entered into a program. The meanings of the individual commands are explained in this chapter. The **function buttons** serve for editing of programs (see following section).

Function buttons of the 'Programs' dialogue:

Entering a command

To enter a new command into a program the desired line has to be selected. After selecting the program command from the list in the left window it can be inserted above the desired place via the '+' button. Alternatively, the command can be inserted by the drag and drop function of the screen or by double clicking on the program command. Once a command is added the corresponding parameters will need to be adapted. To enter a parameter the desired input field has to be selected and click on [edit icon] or by double click.

Select program

Using this button, a stored or recently used PCR protocol can be selected and loaded. Also, the Protocol Wizard can be used to create new Protocols.

New program

By selecting this button, program options can be adapted. A program name must be defined. Author name or comments may be entered on an optional basis.

New Cycler program

The adjoining window appears and the necessary information (Author and Comment) can be entered or changed in the dialogue window.

Power Fail Denaturation

If 'Power Fail Denaturation' will be activated the adjoining dialogue appears:
If a power failure happens while a program is running the thermal cycler will restart the program at the point it was stopped as soon as power is restored (Auto restart after power failure).
Additionally, if the option 'Power Fail Denaturation' is activated the thermal block will heat to the stated temperature for the set time before continuing with the program.

Global Program Ramp

Using this Checkbox, a global ramp rate in °C/s can be programmed. This global ramp rate will be used in all temperature and gradient steps of the PCR program but could be changed in a single temperature or gradient step manually by entering the desired value at the step.

Tube Control

With this Checkbox, you can adjust temperature regulation for a temperature step according to sample volume (0 – 100 µl). If necessary, the temperature regulation will perform short-term deliberate overshoots and undershoots depending on the entered sample volume during PCR run.
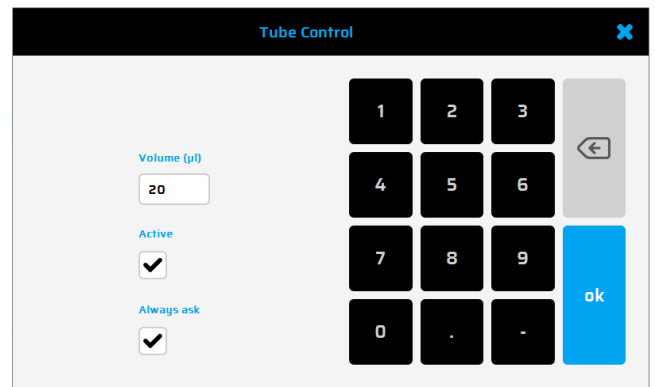
Saving a program

Use this button to save a program. The adjoining window appears to add the program name and select the folder to save.
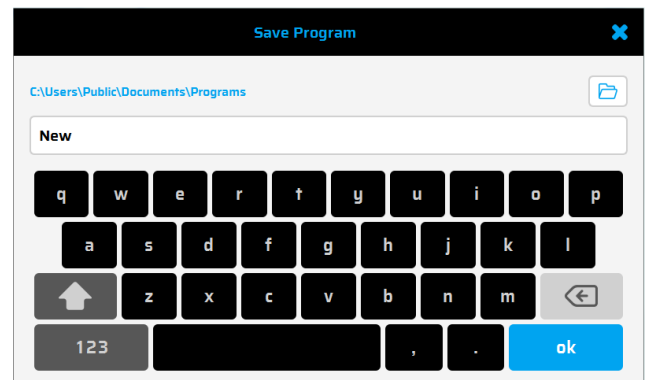
Save & Run

A program can be saved and run immediately using this button. The adjoining window appears (see saving a program) to add the program name and select the folder to save.

Do/ Undo a Step

Use this button to do- or undo a step after adding or deleting a step into a program.

Editing a command

The parameters of a command can be modified by selecting the corresponding command line of the program and changing it with the 'Edit' button. (The same function has a double click on the command line).

Deleting a command from the program

Select command to be deleted and then push the 'Delete' button. A command can also be deleted directly in the selected command.

| 1 | Temperature | 95.0 °C 00:30 | 🗑 |

List view

Push this button to view the selected program in list view.

Diagram view

Push this button to view the selected program in diagram view.

Available commands (program steps)

Heat Lid

Using this command, you can activate or deactivate lid heat and the adjoining window appears.

By activating 'Lid heat on' it is possible to enter the desired lid temperature. The chosen temperature must be in the range 40 - 110 °C. When Lid heat is not activated, the lid heat is switched off.

Please note:
- When reaching a 'Store' the 'Heat Lid' is deactivated automatically
- Furthermore the 'Heat Lid' is deactivated automatically during temperature steps < 30 °C.
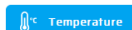
Temperature

Use this button to insert a temperature step in the PCR program.

Temp (°C)
Set the required temperature for the step.

Time
Set the required hold time for the step. In hours, minutes and seconds.

Ramp-Rate
Activate the checkbox if a custom ramp rate is desired for the step. The setting here will overwrite the 'Global Program Ramp' in the program options.
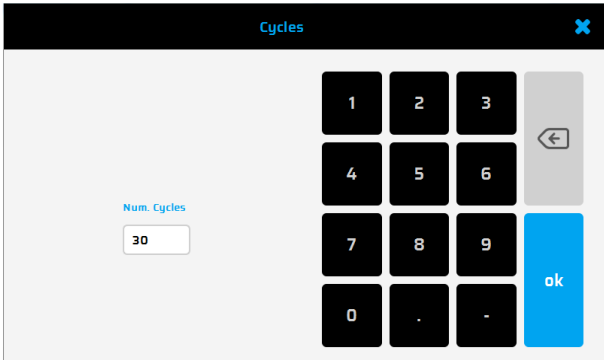
Temp-Incr./Decr
Incremental change of temperature with each successive cycle. The sign indicates whether the temperature will increase or decrease.
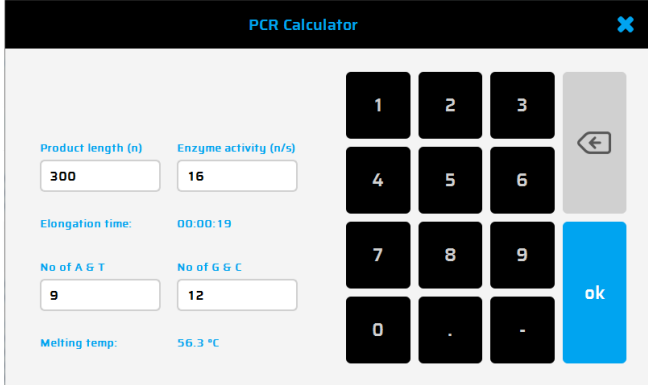
Time Incr./Decr
Incremental change of hold time with each successive cycle. The sign indicates whether the hold time will increase or decrease.

'Elongation Time' and 'Melting Temp.'
The elongation time and the melting temperature of the primers can be calculated by using this button. Calculated values are for guidance only, and further optimization may be necessary. Typically, the optimal annealing temperature is about 5 °C lower than the calculated melting temperature.
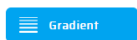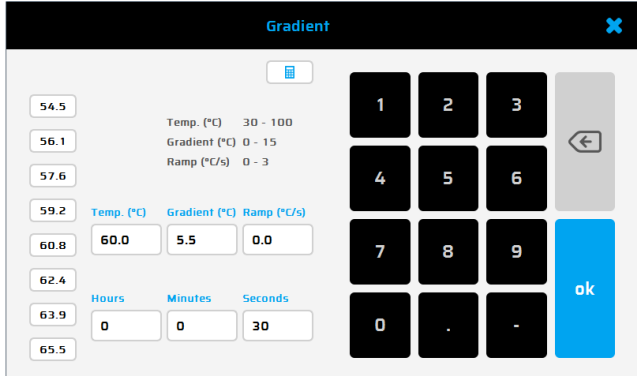
Gradient step

Use this button to enter a temperature gradient.
The following dialogue appears:

Temp
Set the desired temperature for the centre of the gradient.

Gradient ±
Set the desired temperature span of the gradient. The resulting temperatures in the 8 rows are shown on the buttons at the left side of the window.

Time
Set the desired duration of the gradient step in hours, minutes and seconds.

Ramp Rate
Activate the checkbox if a custom ramp rate is desired for the step. The setting here will overwrite the 'Global Program Ramp' in the program options.

'Elongation Time' and 'Melting Temp.'
See above - Temperature.

Cycle

Use this button to define a program cycle (loop), consisting of several individual program steps.

In the field 'Number of Cycles' enter the desired number of cycle repeats, (max. 99 cycles).
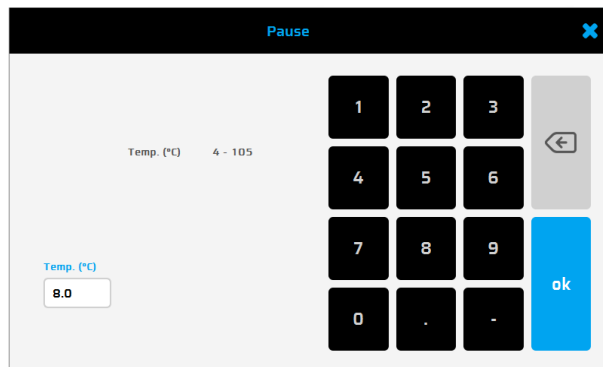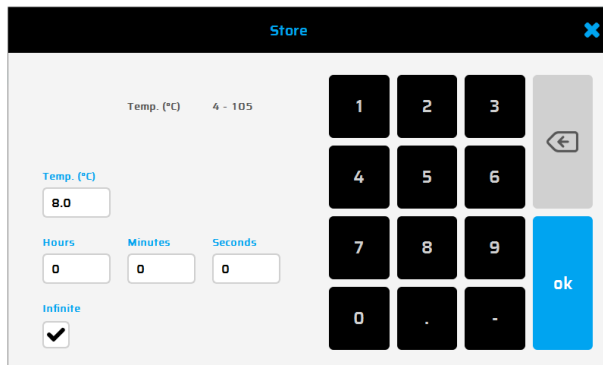
Pause

Use this button to interrupt the running program temporarily.
The adjoining window appears where you can enter a temperature value for the pause

Store

This command keeps the thermal plate temperature on the set value. Automatically the lid heat is turned off. This command usually is the last program step and is used to store the samples at a constant temperature until removal.
If the exact time of sample removal is uncertain activate the 'Infinite' field to store for an infinite time.

Did you know?

Shorter PCR protocols and moderate temperatures (8°C – 10°C) in the "Store-Step" will reduce the power consumption of your PCR Thermal cycler dramatically. For saving energy and prevent excessive condensation.

GLPs dialogue

The 'GLPs' dialogue is used for the administration, viewing and printing of the GLP reports generated by the thermal cycler.

Displaying a GLP report

After pushing the GLP button a dialogue appears to select a GLP report, which will then be shown. The dialogue can also be opened by pushing the button .

GLP Report

Date/Time: 2019/01/17 14:50:37
Program: C:/Users/Public/Documents/Programs/New.js
User: Admin
Software Version: 01.00

Author:
Comment:
Power Fail Denaturation Active: true
Power Fail Denaturation Temperature: 94.0 °C
Power Fail Denaturation Time: 01:00
Global Ramp Active: false
Global Ramp Rate: 0.0 °C/s
Tube Control Active: false

New-20190117145041

This window shows the content of the GLP report.

Shows the name of the selected GLP report. The name of the GLP is composed of the name of the PCR program, date and time.

Saving (generates a pdf file) and Printing of the GLP report.

Operating elements of the 'GLPs' dialogue

Select GLP

Select a GLP report (shown in the adjoining text window). GLP reports can also be copied or deleted and a new folder can be created for GLP reports.
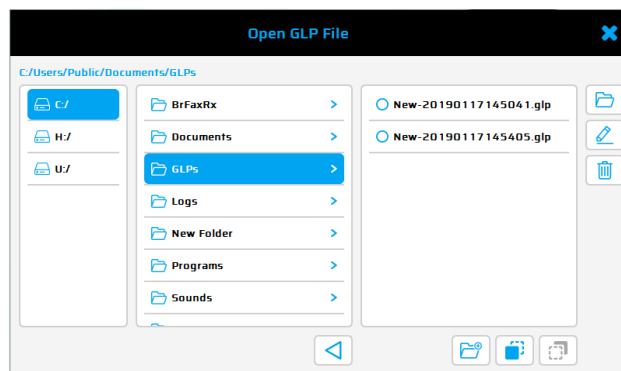
Open GLP report

Use this button to open a stored GLP report. Select the desired GLP report from the file list and open it by pushing the button 'Open' ⬜. The GLP report is shown as displayed.

Save

Use this button to save a pdf file of the selected GLP report.

Printer

Use this button to print out the selected GLP report.

Explorer dialogue

The 'Explorer' dialogue is used for the data management with the thermal cycler.
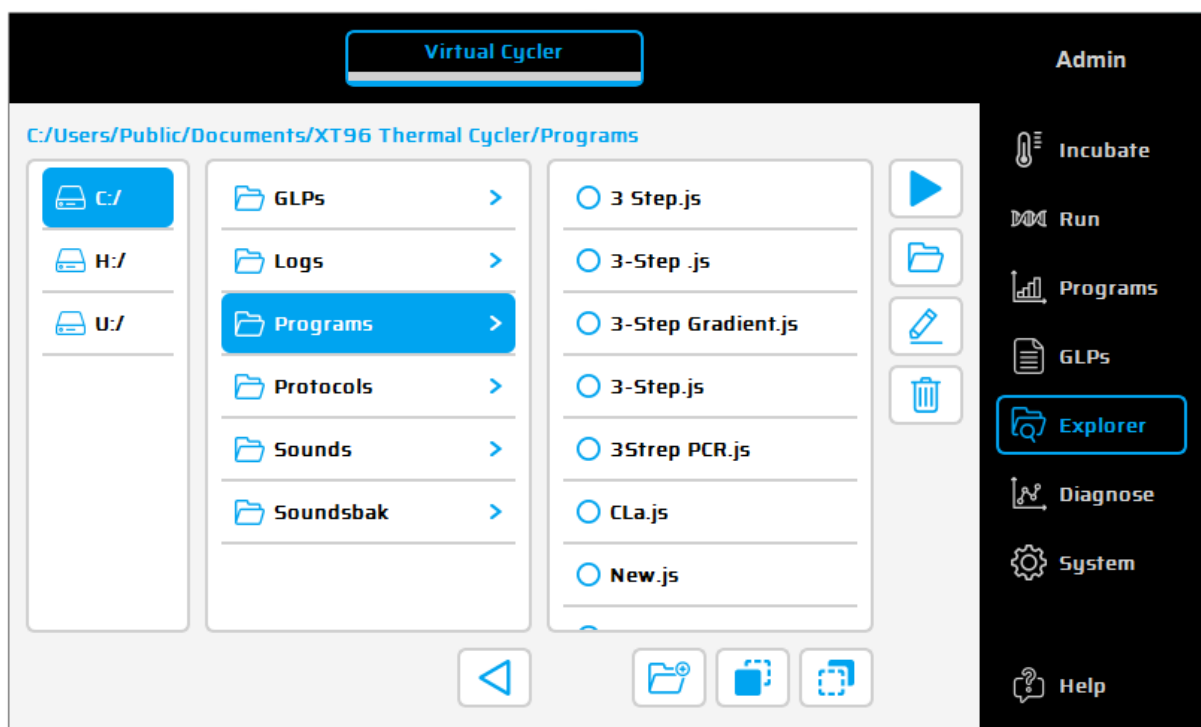
Edit

Use this button to rename marked Files and Folders
Marked files and folders are shown with a blue background.
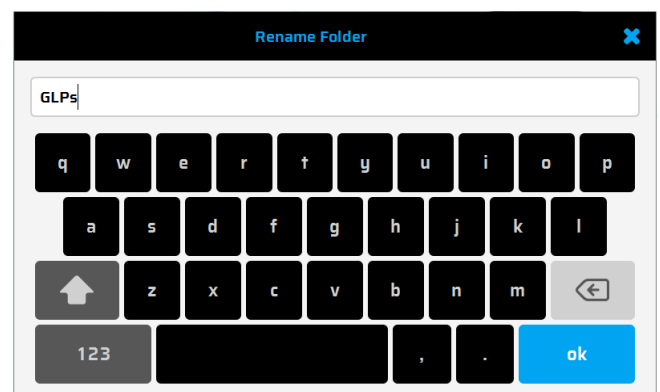
Delete

Use this button to delete marked Files and Folders
Marked files and folders are shown with a blue background.

New Folder

A new folder can be created using this button

Copy

Pushing the button allows saved programs or folders to be copied. Marked programs/folders are shown with a blue background

Past

Pushing the button allows copied programs or folders to be past. The button appears in blue when a folder/program is already copied.

Start

Pushing the button will start a selected PCR program directly from the Explorer mode. Only possible if no other PCR Program is running.

Diagnose dialogue

The 'Diagnostics' dialogue visualizes the temperature profile of the thermal plate. Current values for lid temperature and cycler temperature are shown. While a PCR protocol or incubation is running, the thermal cycler automatically records all temperatures.

Operation of the 'Diagnostics' dialogue

Different operating elements for indication and navigation within a diagram are available:

Display of the selected zones, 8 zones per block and a lid (un-selected zones are marked in gray)

Navigation button: left / right

Zoom-in and -out - horizontal

Navigation button: up and down

Zoom-in and - out vertical

Automatic scrolling active or inactive
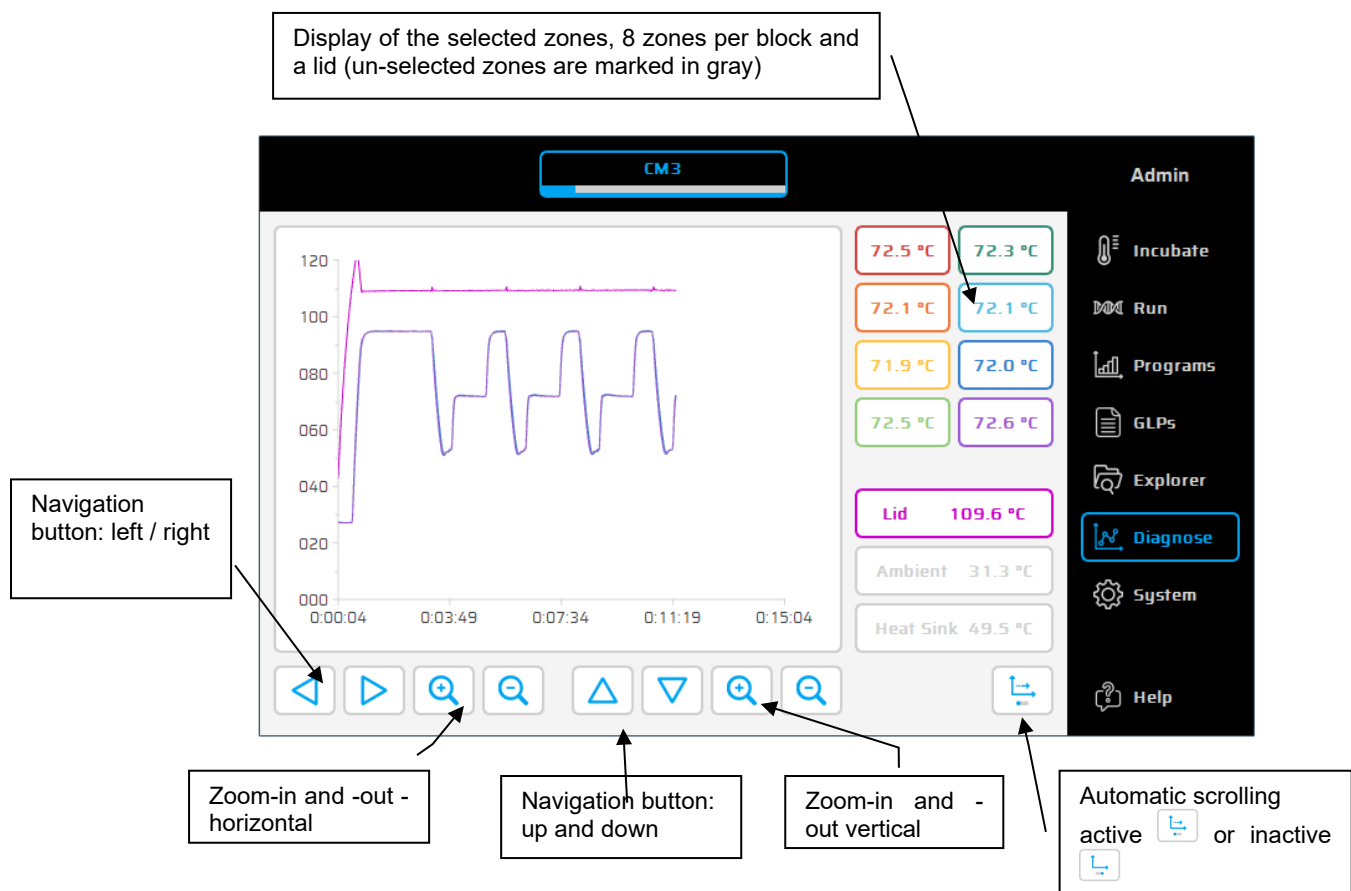
System dialogue

In this dialogue the configuration and settings of the general parameters of the device can be carried out.

The main menu of this dialogues consists of 3 areas
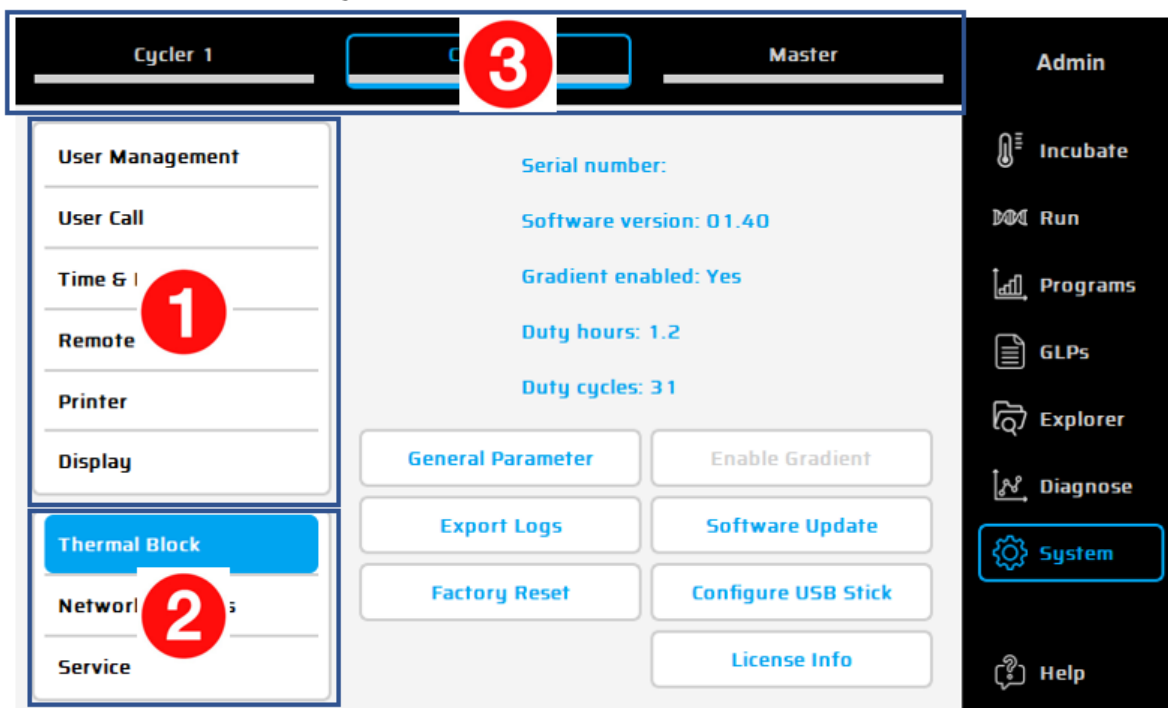
1) Parameters of the XT^{96} Cycler

2) Parameters of the active Cycler or connected cycler – selected in section ❸

3) Select a Cycler – before modifying the parameters in section ❷

Having selected one of the symbols the function is called up and the corresponding settings can be executed or changed as explained in the following dialogue.

User Management
In the user accounts management, user groups or single users can be configured and their settings e.g. right of access (reading programs, edit programs etc.) administered. The users are assigned to given or predefined user groups to which are assigned rights of access.

Important: the thermal cycler supports the assignment of rights of access to certain user groups. This means that rights for the operation of functions are given or refused to certain user groups. In the user administration, user groups are configured and equipped with rights. Single users of those groups are limited to the appropriate rights.
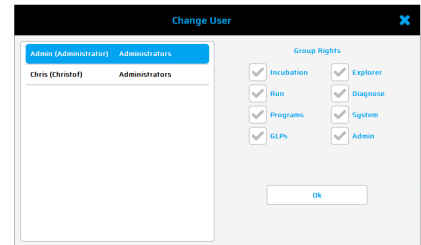
Rights are not assigned to single users but user groups. Users of a certain user group inherit the rights of that group.

The name of a user appears in the program header of a program generated by the user as well as in the GLP report of a program run by the user.

After pressing the **Admin** button the adjoining dialogue appears:

To change a user, please select a user click on OK and enter the appropriate password. The thermal cycler is delivered with Administrator access preconfigured.
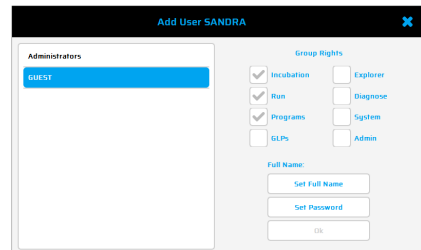
The factory-set password for the Administrator is admin.

Add User

In this dialogue, single users can be added. Add a Username, select a Group (Admin or Guest are default groups). With the button 'Group Management' new Groups can be added.
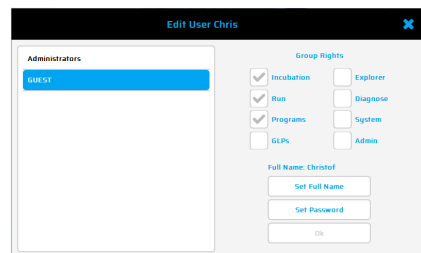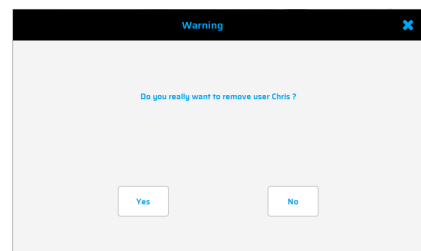
Set a password for the new user.

Edit User

In this dialogue, single users can be a, changed/edit. Select the user from the list and click on 'Edit User' The adjoining dialogue window appears where appropriated group, the username and password can be changed.
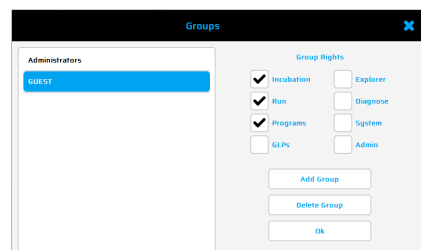
Delete User

In this dialogue, single users can be deleted. Select the user from the list and click on 'Delete User' The adjoining dialogue window appears to confirm the step.

Group Management

In this dialogue, Groups can be added, changed or deleted. The adjoining dialogue window appears where user details can be added.

Save the data with the OK button. To add a user to the relevant user group, select a user from the list and click on 'Edit User'.
Important: If a new user should only have limited rights, it might be useful to set up a new user group with the appropriate rights to access.

Auto Login

By unchecking the checkbox 'Auto Login' an obligatory Login request appears, when turning on the instrument.
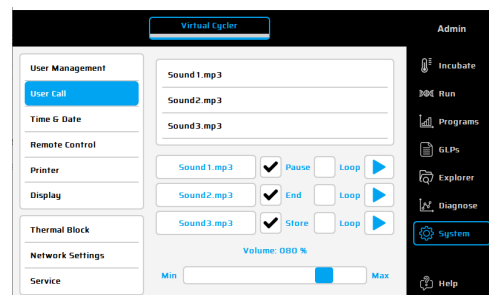

User Call

Using this button different user calls can be set. Sound files are stored at: /C/Sounds

Sound

To activate sound for the desired event, mark the relevant sound file in the list and click into the event box ('Pause', 'End' and 'Store'. The file name will appear in the box and can be activated by a click in the checkbox. Each sound may be selected to play once (standard setting) or in a loop.

Loop

When this checkbox is activated, the user call will be repeated periodically as long as the event is open.

Play sound

The selected sound can be listened to when pushing this button

Sound intensity

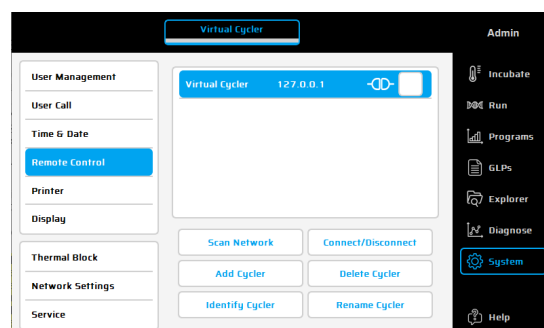Set the desired sound intensity.

Time / Date

Using this button, the time and date can be set.

Remote Control

This dialogue is used to connect a thermal cycler via network, to enable a remote control off the instrument.
The following command buttons are available:

Scan Network

This dialogue is used to search network for existing XT⁹⁶ Thermal cyclers.

**Note:** All existing connections must be disconnected before searching.

Connect/Disconnect

Once a remote-control connection has been made via LAN the target cycler will be displayed in the LAN control window (in our example: XT96).

To reconnect with this cycler, mark it in the overview and use the button 'Connect/Disconnect' to start a new connection.

To disconnect a LAN connection with a cycler, mark the chosen unit in the overview and use the button 'Connect/Disconnect'. The cycler can then be controlled again via touch screen.

Alternatively, the LAN connection will be stopped when the cycler is switched off or the software at the PC is closed.
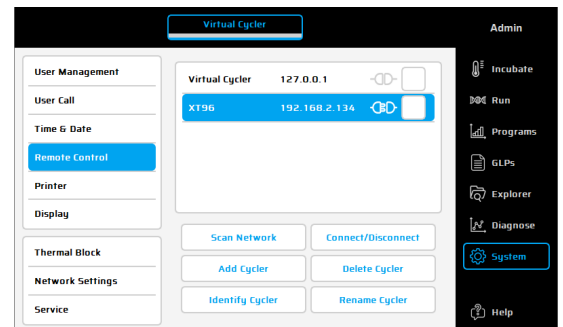
Add Cycler

Using this function, a connection to a new cycler for remote control can be set up manually. Enter the IP address of the target cycler and a name, in the input box. Click on 'Test connection' to verify if a communication between both cyclers is possible.

Note: As a preferred alternative please use the function "Scan Network" to find and connect XT⁹⁶ Thermal Cyclers from your network.
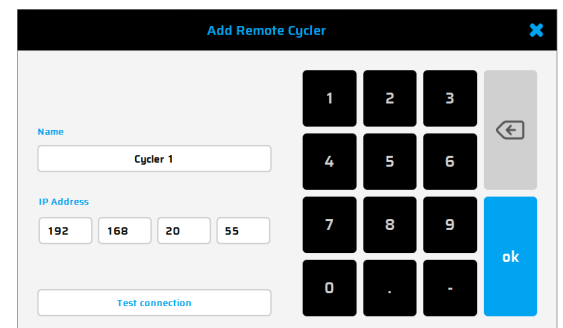
Delete Cycler

Using this button, a marked connection to a cycler for remote control can be deleted. To mark a connection, click on the connection in the list and click on Delete. The adjoining dialogue window appears, press Yes if you really want to delete the Cycler settings.
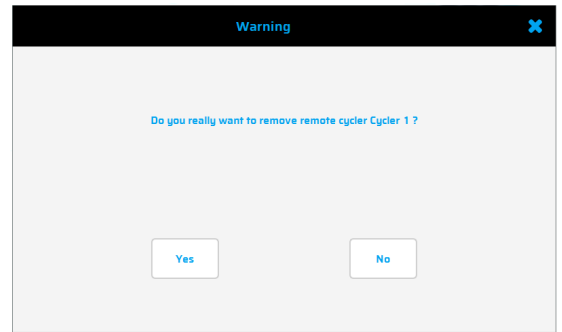
Identify Cycler

This function is used to identify a cycler displayed in the LAN control window (in our example: XT^{96}).
To identify this cycler, mark it in the overview and use the button 'Identify Cycler'. The status LED of the marked cycler will start blinking for 5 seconds.
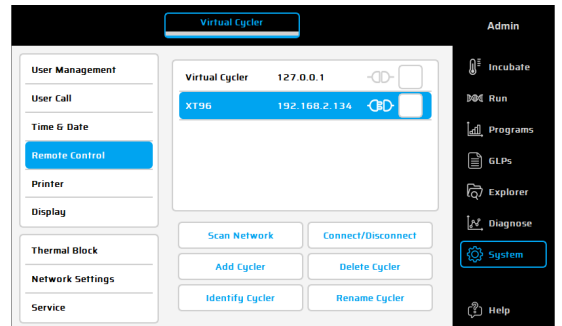
Rename Cycler

Use this function to change the cycler name displayed in the LAN control window (in our example: XT^{96}).

Print

The XT^{96} thermal cyclers can print GLPs on a network printer. Using this dialogue, the IP address for the network printer, can be entered.
Please refer to your network administrator for the correct printer path.

Use the button [Test Printer] to produce a test print.

Display

Pushing this button, the adjoining window opens:
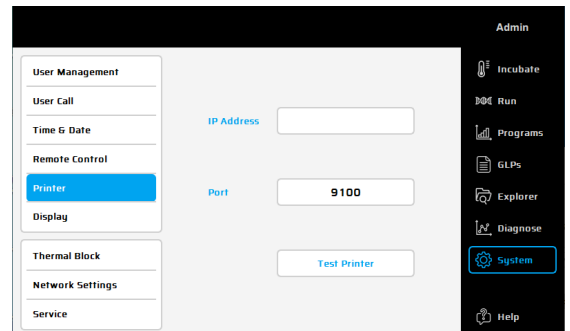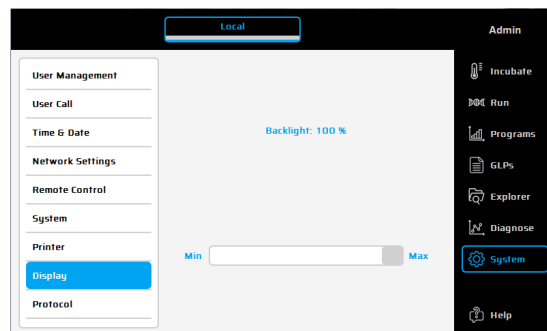By moving the roll bar, the backlight of the display can be adjusted

Thermal Block

Shows the serial number of thermal cyclers, the Software version, if the gradient function is already loaded and the duty hours / cycles of your device.
The following command buttons are available:
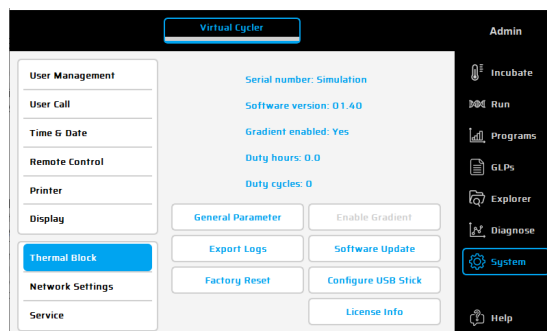
General Parameter

This function is used to change general parameters as Lid deactivation Temperature, save GLP Files in general or Calibration tools settings – only for service purposes.
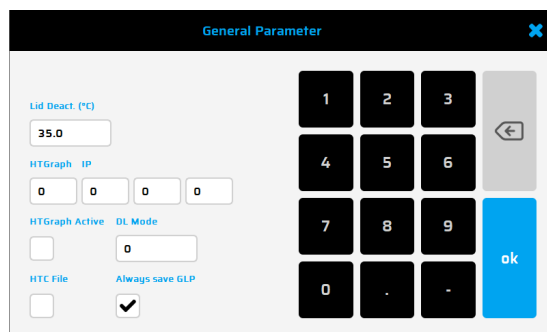
Enable Gradient

Enables the gradient function on a non-Gradient Thermal Cycler. Software key can be ordered separately (732-3482). Please ask your local VWR partner.

Export Logs

For troubleshooting, the thermal cycler can record its own internal communication. The protocol files can be stored on a USB stick. By using the button 'System Logs' the protocol files will be zipped and saved on an USB stick.

Software Update

Software Update

Updates the software of the Thermal Cycler. The software must be available on a USB memory stick connected to the device. The file "XT96Update.XT96" must be present on the USB Stick. Click on Software update.

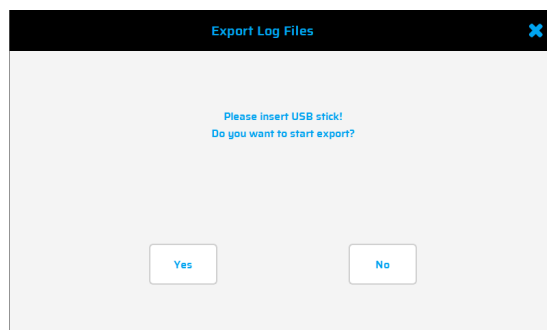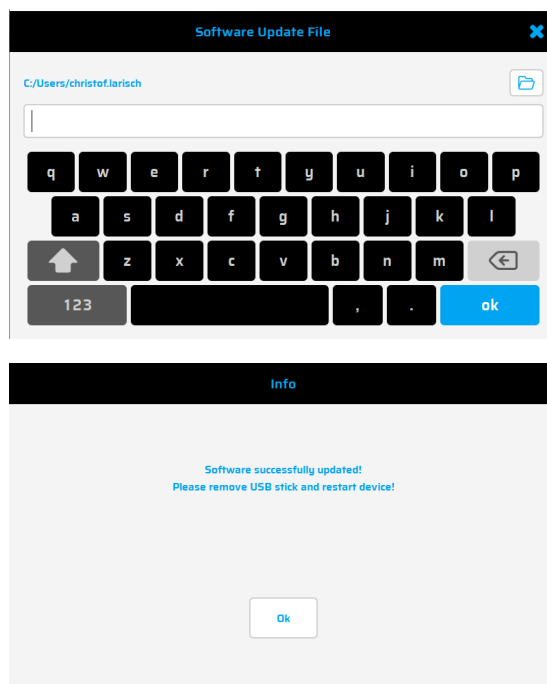<u>**The USB memory stick must not be removed during update process!**</u>

After a successful update the display shows the corresponding message and the software starts again. The USB memory stick can be removed then.

Factory Reset

Factory Reset

All Settings done in the System dialogue will be resetted to their default settings, program and GLP files will be deleted.

Configure USB Stick
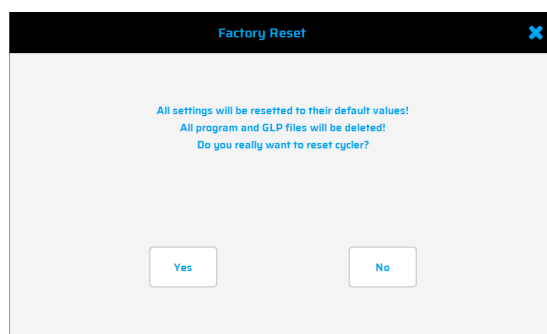
Configure USB Stick

Insert an USB Stick into the Cycler or PC. Configure the network settings for the thermal cycler (XT^{96} or XTender^{96}), as shown in the picture.

Make sure each instrument name is unique and press OK.

A "XT96ConfigFile" file will be generated and stored on the USB stick.

Use this "Network Configuration USB Stick" to set up the Network configurations on your XTender^{96} Thermal Cycler.

Note: Every Thermal Cycler needs a separate "XT96 Config File" where the instrument name is unique.

Plug the "Network Configuration USB-Stick" into an USB port of the Thermal cycler (XT^{96} or XTender^{96}).
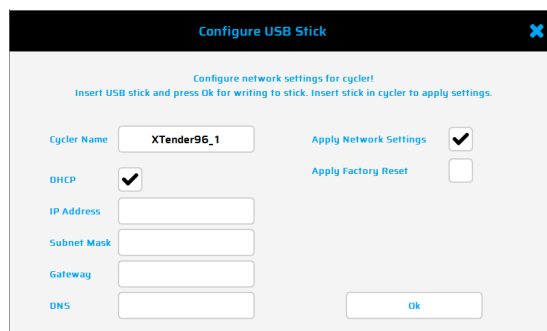
The Thermal Cycler will recognize the USB stick and set up the network configuration automatically. After finalization, the instrument will switch off.
Remove the "Network Configuration USB-Stick" from the USB port of the XTender[96] and power on the XTender[96] thermal cycler
Note: For each thermal cycler, a new "XT96 Config File" must be created.

License Info

Licence Info

Software licence of the XT[96] GUI will be shown

Network Settings

Network Settings

Using this button, network settings can be changed

To change settings, click into the box and enter the required settings for network integration.

Please ask your network administrator for the required settings.

Service

Service

Use of the service function is restricted to authorised, technical service. Access to this function is therefore password protected.

MAINTENANCE

Cleaning, maintenance and repair of the thermal cycler

For safety reasons the device must be switched off and the mains plug pulled before cleaning is carried out!
The surface of the thermal cycler can be wiped off with a damp cloth or ethanol. **Do not use aggressive or scouring cleaners or organic solvents for cleaning. The device must be protected from aggressive chemicals. Make sure that no liquid penetrates into the interior of the device.** If sample liquids penetrate into the drill holes of the thermal cycler clean them immediately with mild soap followed by distilled water. **You can use mild disinfectants for decontamination.**
Maintenance should be carried out regularly to detect possible technical failures.
The device may only be opened by a qualified specialist. Unauthorized work on the device voids the warranty. All kinds of repairs may only be carried out by authorized persons using original replacement parts.
The replacement of single components of the device must not be done by the user but exclusively by authorized specialists. Therefore, the device must be sent to the manufacturer. **The surface of the device should be decontaminated with a lint free cloth soaked with 70 % ethanol before sending.** The drill holes of the thermoblock shall be cleaned with a 1.5 % hypochlorite solution with the help of a cotton bud. **Please fill in and sign the decontamination certificate and send it to the manufacturer together with the device.**

Returns only in original packaging

Please use the manufacturer's original package to ensure a safe return.

Temperature check-up

Maintenance of temperature accuracy at regular intervals is recommended. The thermometer for use should be equipped with wired sensing devices (e.g. Pt1000) and should have an accuracy of measurements of 1/10 class B ($\Delta T = \pm 0.03$ °C) in the range of 0 to 100 °C. While processing the temperature control, the room temperature should be 25 °C at maximum.

Calibration

If there is a reasonable suspicion that the device has deviated from the calibration range, because the variations of the temperature check-up are out of the acceptable tolerance, a new calibration must be carried out by the manufacturer. Please contact your VWR representatives.

ORDERING INFORMATION

Article	Description	Cat. No.
PCR Cycler XT⁹⁶	VWR Collection PCR Thermal Cycler XT96 with EU/UK/US plugs	732-1359 (EU) 76452-151 (US)
PCR Cycler XT⁹⁶ Gradient	VWR Collection PCR Thermal Cycler XT96 with Gradient and EU/UK/US plugs	732-3428 (EU) 76452-153 (US)
PCR Cycler XTender⁹⁶	VWR Collection PCR Thermal Cycler XT96 without a touch screen, with EU/UK/US plugs	732-3657 (EU) 76452-155 (US)
PCR Cycler XTender⁹⁶ Gradient	VWR Collection PCR Thermal Cycler XT96 without a touch screen, with Gradient and EU/UK/US plugs	732-3658 (EU) 76452-157 (US)
Gradient Upgrade	Enables the gradient function on a non-gradient Thermal Cycler	732-3482 (EU) *not available in US*

TECHNICAL SERVICE

Web resources

Visit the VWR's website at **vwr.com** for:
Complete technical service contact information

Access to VWR's online catalogue and information about accessories and related products

Additional product information and special offers

For information or technical assistance contact your local VWR representative or visit **vwr.com**.

WARRANTY

VWR International warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

COMPLIANCE WITH LOCAL LAWS AND REGULATIONS

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, unless any refusal is due to a defect of the product.

DISPOSAL INSTRUCTION

This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it's your responsibility to correctly dispose of your equipment at lifecycle end by handing it over to an authorised facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

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