VWR® UNO, Doppio and Ristretto Thermal cyclers

Instruction Manual

North American Catalog Numbers

UNO^{96} Thermal cycler	10783-118
UNO^{96} Gradient Thermal cycler	10783-120
UNO^{384} Thermal cycler	10783-122
Doppio 2 x 48 well Thermal cycler	10783-124
Doppio Gradient 2 x 48 well Thermal cycler	10783-142
Ristretto 32 well personal Thermal cycler	10783-126

European Catalogue Numbers

UNO^{96} Thermal cycler	732-2548
UNO^{96} Thermal cycler with HPL	732-2914
UNO^{96} Gradient Thermal cycler	732-2549
UNO^{96} Gradient Thermal cycler with HPL	732-2915
UNO^{384} Thermal cycler	732-2550
Doppio 2 x 48 well Thermal cycler	732-2551
Doppio Gradient 2 x 48 well Thermal cycler	732-2552
Ristretto 32 well personal Thermal cycler	732-2553

Version 3
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Country of origin Germany

CONTENT

1 SYSTEM OVERVIEW

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 5 °C/sec (max). The individual monitoring and controlling of each of the eight or 16 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 colored 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 (reboot required).
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!

2 SAFETY INSTRUCTIONS

Before the first use of the thermal cycler please read the entire instruction manual.

Special notice should be taken of the following

Caution of dangerous voltage
Please ensure the voltage indicated on the device exactly matches your local electrical supply.

Caution of dangerous explosive material
Explosive or reactive material mustn't be heated in the thermal cycler.

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

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

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.

Note: If the thermal cycler is used in any manner not specified by these instructions, the safety of the user can not be guaranteed.

3 LICENSE 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.

4 INSTALLATION

4.1 Contents

1 Thermal cycler
1 Power cord
1 Instruction manual
1 CD PC-software VWR 'PCR Cycler Master Software'

Please check delivery for completeness and transport damage upon arrival. 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!

4.2 Installing the thermal cycler

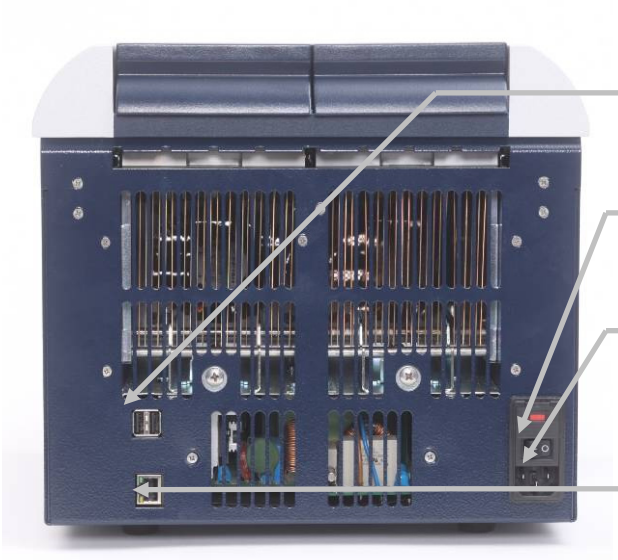
Check the packaging for any transport damage. Remove the packaging and place the thermal cycler onto a solid surface. The device should not be exposed to direct sunlight. There should be enough space to make sure that the ventilation grills on the front and back are not covered and sufficient ventilation 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. Room temperature between 4 °C / 39 ºF and 25 °C / 77ºF is advised.

All original packaging should be stored in case a need arises to return the instrument to the supplier.

4.3 Operation of the thermal cycler

Before starting up the thermal cycler for the first time make sure that your local power supply matches the voltage and frequency range of the device. Plug in the mains plug of the thermal cycler to an electricity supply. The outlet and the power switch are located at the back of the device. The mains switch serves as disconnection from the power supply. The serial number is written onto a typed label at the bottom of the device. The device should only be used by authorized staff. To ensure this, a user management with appointing rights for specific users is available in the device.
More details about this and a detailed instruction manual can be found in the following chapters.

4.4 Connections on the thermal cyclers



5 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.

6 MAIN MENU

The main menu consists of five dialogues, which can be selected via tabs at the right side of the screen. Doppio thermal cyclers offer two tabs 'L' (left) and 'R' (right) for choosing the desired block. This option is not available for Ristretto, UNO 96, 384 systems. Each dialogue contains a help button for direct help function. The functions of the individual dialogues are explained below.

6.1 Run

This dialogue is used for selecting, executing and monitoring existing PCR protocols. A detailed description of the 'Run' dialogue is given in chapter 7. Additionally, the incubation mode can be activated here in order 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 in chapter 8.

6.2 Programs

This dialogue is used for creating, editing and organizing PCR protocols (see chapter 9).

6.3 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 chapter 10).

6.4 GLPs

This dialogue is used for displaying and organizing GLP reports created by the thermal cycler (see chapter 11).

6.5 System

This dialogue is used for changing the general settings of the device and for the user management functions (see chapter 12). The 'System' dialogue is also used for checking serial and version numbers of hardware and software, respectively.

6.6 Help Button

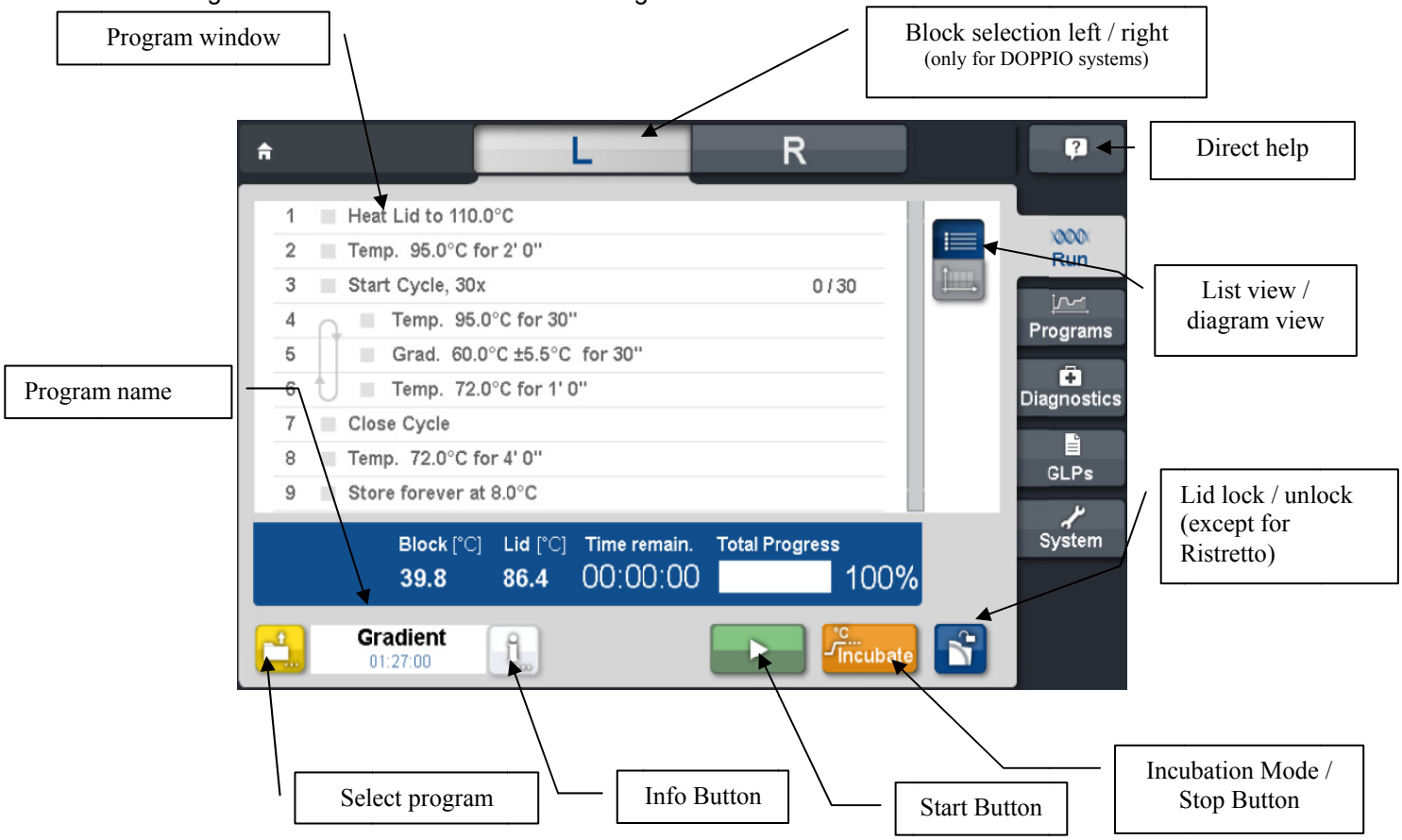
Use this button to activate (deactivate) the direct help mode. The help function is active, when the button appears pressed. If the mouse pointer is visible a question mark appears alongside. By touching a function button or other dialogue element the corresponding help window will appear. Closing the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

7 RUN DIALOGUE

The Run dialogue is used for running and monitoring existing PCR protocols.

7.1 Run dialogue: Overview

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



7.2 Run dialogue: Operating elements

7.2.1 Incubation mode

Using this button the incubation mode can be activated. In this mode block and lid temperatures can be adjusted manually (see chapter 8).

7.2.2 Start

Use this button to start a PCR protocol.

7.2.3 Stop

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

7.2.4 Pause

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

7.2.5 Info button

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

7.2.6 Lid lock / unlock

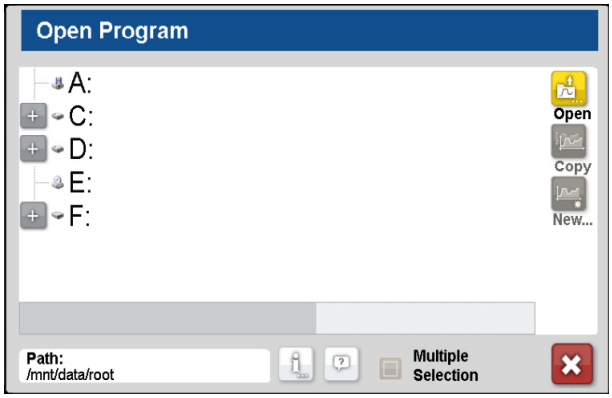
Use this button to lock or unlock the lid. Additionally the button shows the current status of the lid (except Ristretto).

7.2.7 Select program

Using this button a stored PCR protocol can be selected and loaded.

7.3 Select Program dialogue

Stored programs can be selected and loaded by using this button.
If a program is selected the adjoining window appears.
If a program is marked, the 'i' button appears.
By clicking 'Open' the chosen program will be loaded in the run dialogue.



Further information on this dialogue can be found at chapter 9.1.1

7.4 Info Button

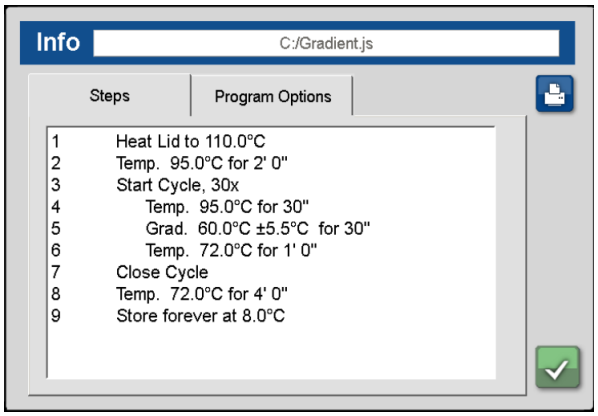
Clicking this button will open a new window, which shows detailed information on the chosen program. This information may be printed. The header contains program name and the link to the program.

You will have the following options:

Steps

7.4.1 Steps

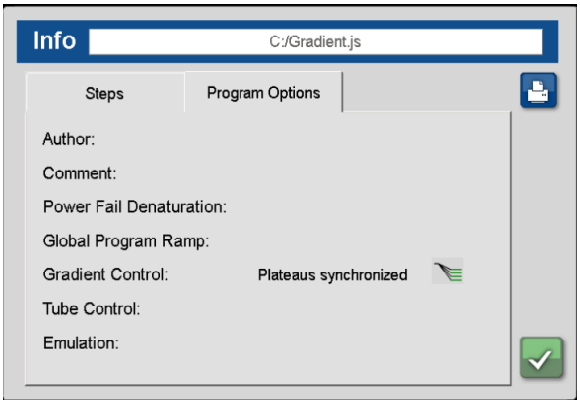
Using this tab, the single steps of the selected program are listed.



Program Options

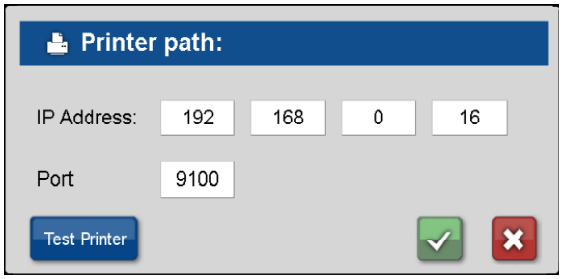
7.4.2 Program Options

By clickin this tab, the settings of the selected program are shown.



7.4.3 Print

With UNO X thermal cyclers, PCR programs and GLPs may be printed on a network printer. Using this dialogue, you can type in the path for a printer in the network. Please refer to your local network administrator for the required settings.



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

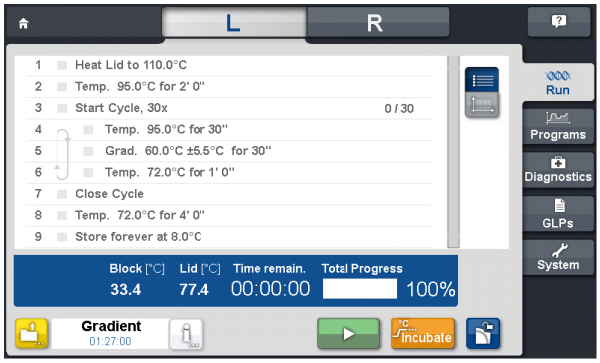
Using the button Test Printer, a test printing will be performed to check the correct settings.

7.5 Lid lock / unlock

Use this button to lock or unlock the lid (except Ristretto).
For systems with HPL lids(High Pressure Lid) there is the option to define the lid pressure in an opening dialogue.

7.6 Starting a program

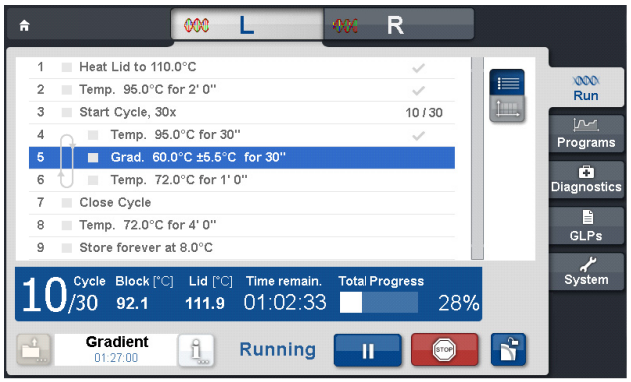
If a program is opened, the contents of the program can be seen in the program window. The loaded program is started by using the 'Start' button.



7.7 A program is running

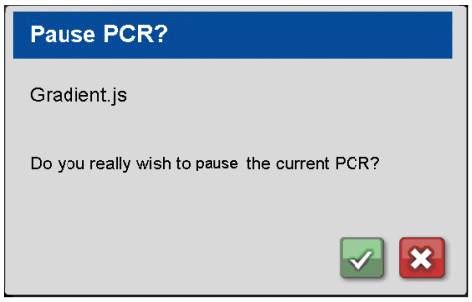
7.7.1 General: 'Pause' and 'Stop' button

After starting the chosen program, you can use these buttons to either pause or to stop the program.



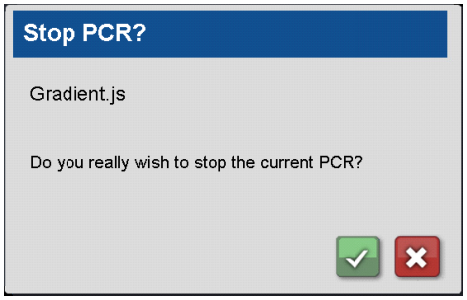
7.7.2 'Pause' button

If the 'Pause' button is pressed during the operating sequence, the adjoining window appears. If this request is confirmed, 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.



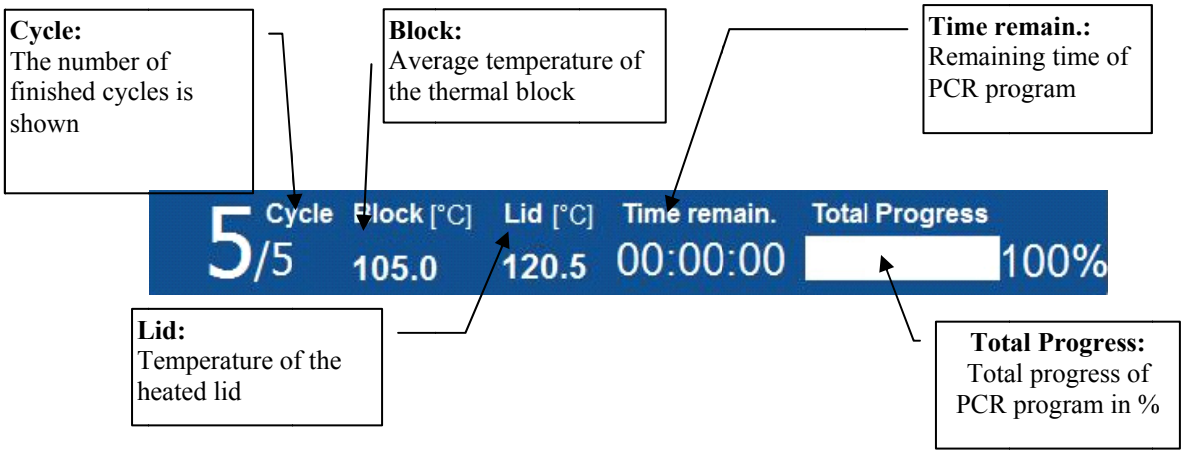
7.7.3 'Stop' button

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.



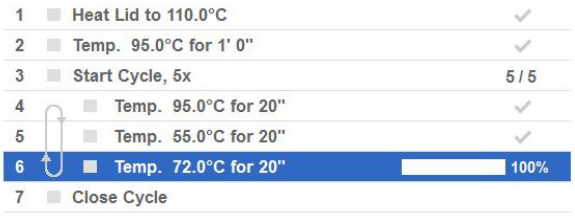
7.7.4 Status Display

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



7.7.5 Program window

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



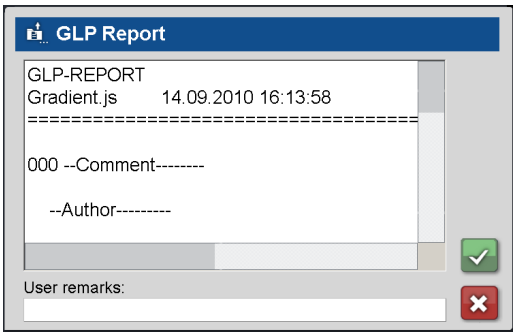
7.7.6 Save GLP Report

If stopping the program after the security query, the adjoining query to create a GLP report appears.

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

If the query is confirmed by 'Yes', a 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.

The GLP report can be opened and printed in the 'GLPs' dialogue (see chapter 11).



7.7.7 Decline GLP Report creation (one time)

There will be no GLP report created for the aborted program. At the next run the GLP report query will appear again. You will return to the 'Run' dialogue, which shows the last chosen program, which can be started again.

7.7.8 Switch off the GLP report query

When you press this button, there will be no GLP reports created in the future. After the abort or end of a program no GLP report query will appear again. The setting can be reset in the system dialogue (see chapter 12.7.1.2).

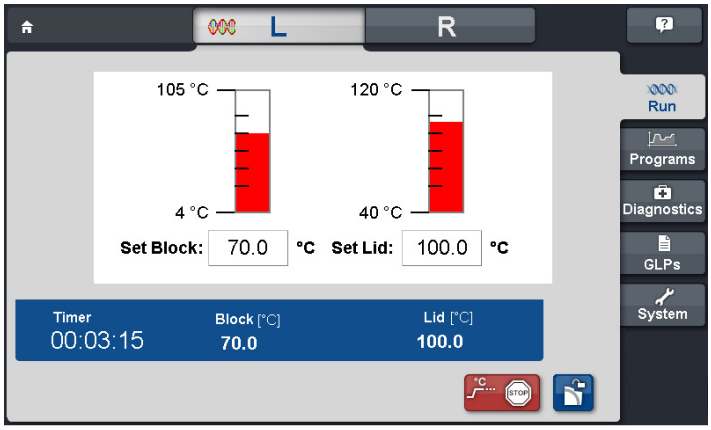
8 INCUBATION MODE

8.1 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.

8.2 Setting the block and lid temperature

Set temperatures of block and lid by entering the values of choice in the corresponding editor fields. By entering values < 40 °C / 104 ºF the lid heating will be turned off.



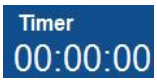
8.2.1 Stop

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

8.2.2 Lid lock / unlock

Use this button to lock or unlock the lid (except Ristretto).
For systems with HPL lids(High Pressure Lid) there is the option to define the lid pressure in an opening dialogue.

8.2.3 Timer



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

8.2.4 Block

Current temperature of the thermal plate.

8.2.5 Lid

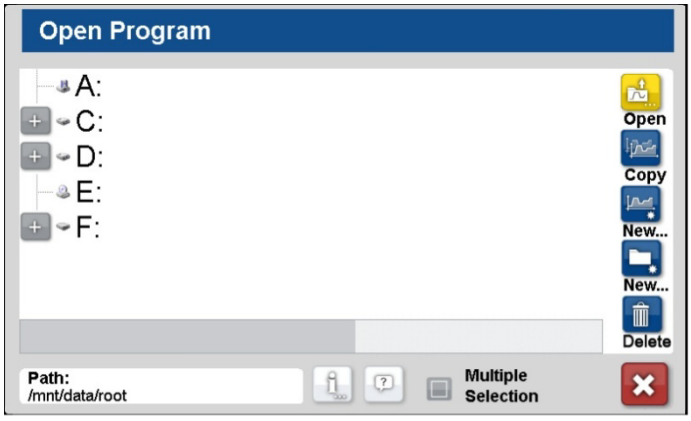
Current temperature of the lid heat.

9 PROGRAMS

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.

9.1 Program selection

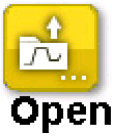
By touching the 'Programs' dialogue the selection dialogue shows up where a new program can be set or an existing program can be opened to edit.



The selection dialogue can be opened at any time in the program editor by using the adjoining button  .

Existing programs can be selected and opened for editing, folders can be created and new programs can be generated, copied and deleted.

The operation of the dialogue is as follows:

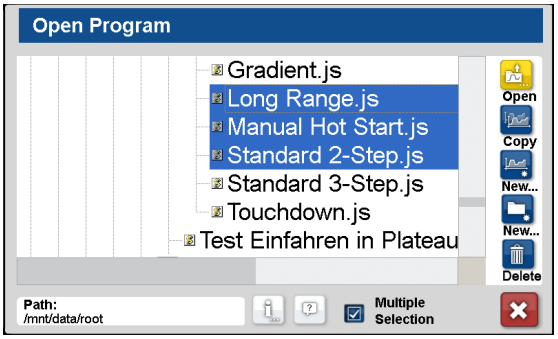


9.1.1 Open a program

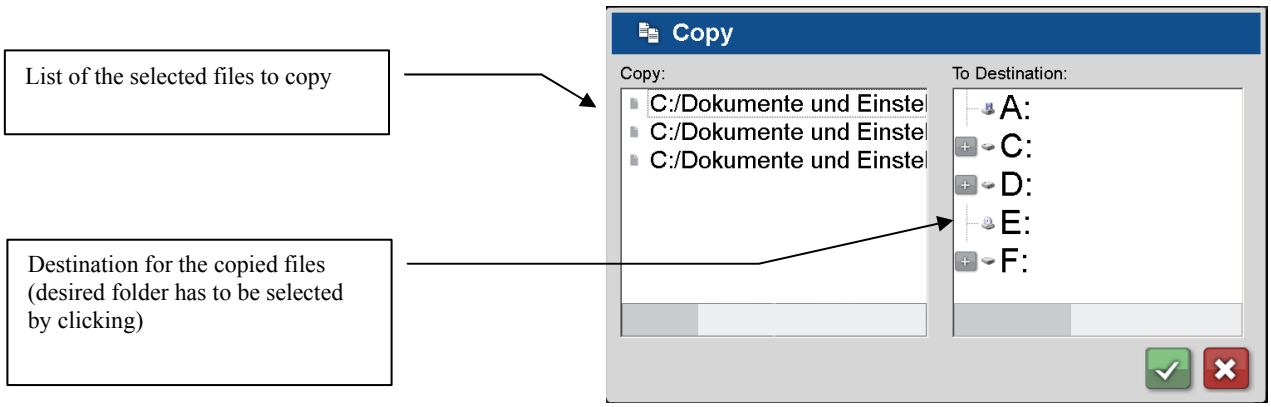
Saved programs can be selected with this button. By touching the desired program it will be selected from the file list and opened by using the 'Open' button. Afterwards the thermal cycler returns to the 'Programs' dialogue. Once a program is selected several operating elements are available, which are described in chapter 9.2 and 9.3.
Note: The command 'Open' is only active, when only one program is marked. Lastly the chosen program will be loaded in the 'Programs' dialogue, via the 'Open' button.

9.1.2 Copy

Pushing the button allows saved programs or folders to be copied. Several programs/folders can be marked via mouse click simultaneously if the option 'Multiple Selection' is chosen. Marked programs/folders are shown with a blue background.



By using the 'Copy' button the following dialogue appears:



In this dialogue the directory can be selected.
Copy the files with 'OK' or quit the operation with 'Cancel'.

9.1.3 New program

By selecting this button, a new program may be generated. A program name must be defined. Author name or comments may be entered on an optional basis 2nd can be retrieved when Running the program.

9.1.4 New folder

Use this button to create a new subfolder after selecting an existing folder, in which the new subfolder should be created.

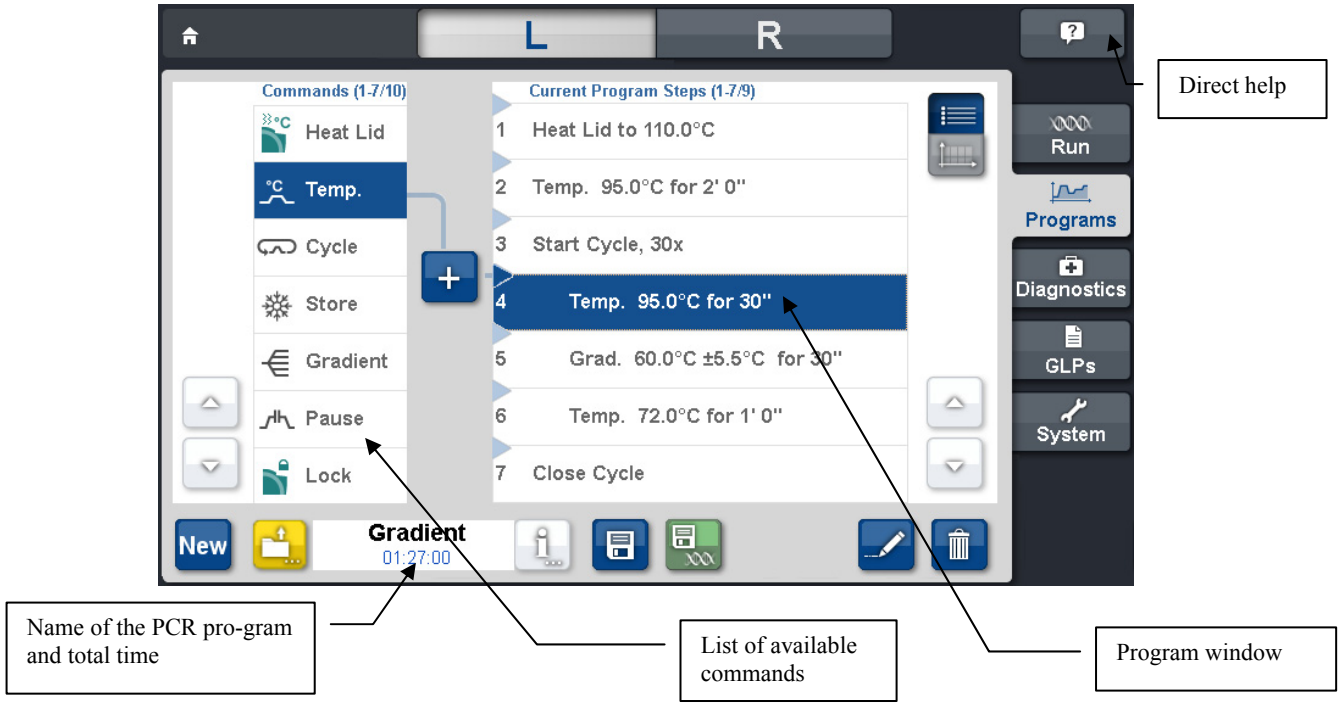
9.1.5 Delete

Programs or folders can be deleted with this button.

9.1.6 'Info' button

Further details at chapter 7.4.

9.2 Operating elements of the 'Programs' dialogue



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 chapter 9.3. The **function buttons** serve for editing of programs (see following section).

Function buttons of the 'Programs' dialogue:

9.2.1 Entering a command

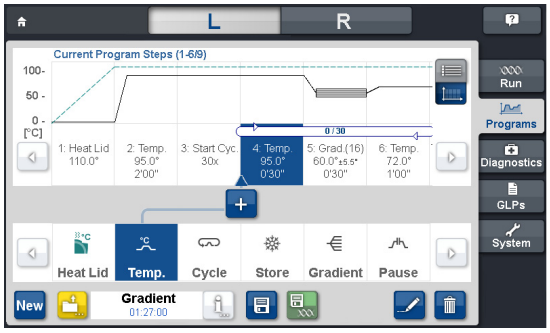
To enter a new command into a program the desired line has to be selected. From the left side of the program window a blue arrow will point to the desired line. After selecting the program command from the list in the left window it can be inserted into the desired place via the '+' button. Alternatively the command can be inserted by double clicking on the program command. Once a command is added the corresponding parameters will need to be filled in. To enter a parameter the desired input field has to be selected. A keyboard will be shown on the screen.

9.2.2 List view

Push this button to view the selected program in list view, like shown in chapter 9.2.

9.2.3 Diagram view

Push this button the selected program to view in diagram view, like shown to the right.



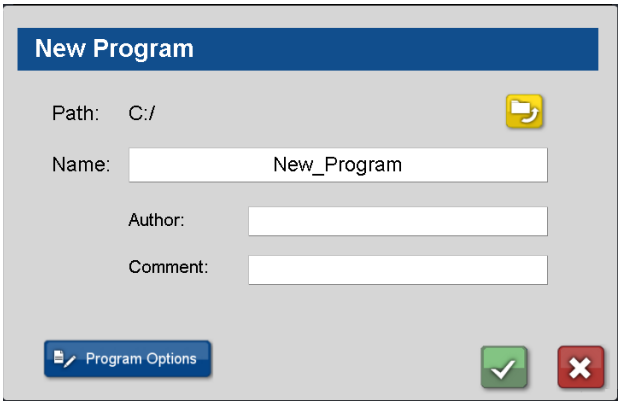
9.2.4 New program

By selecting this button, a new program may be generated. A program name must be defined. Author name or comments may be entered on an optional basis.

9.2.4.1 New Cycler program

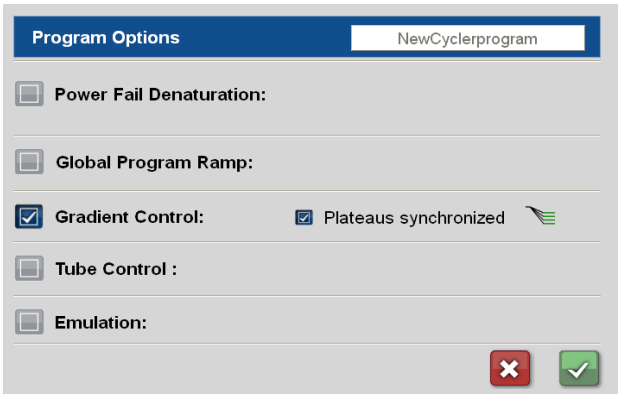
Enter the name of the PCR program.

'Path' shows you the directory where the program is stored. Click the button  to change the path.



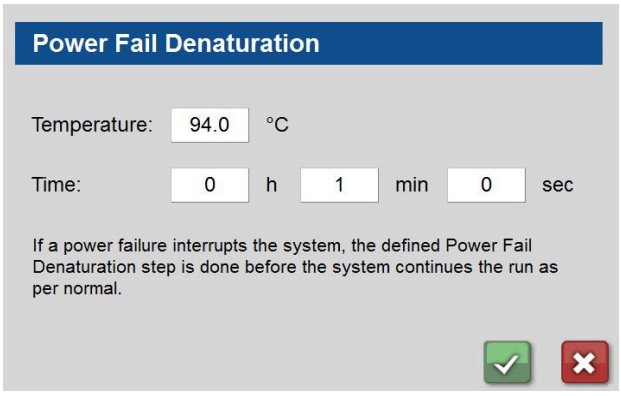
9.2.4.2 Program Options

By selecting the button  the adjoining window appears:



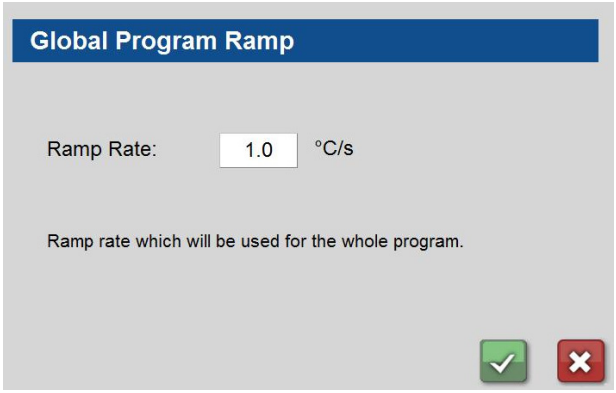
9.2.4.3 Power Fail Denaturation

If 'Power Fail Denaturation' is activated by pushing the 'checkbox'  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 (Autorestart 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.



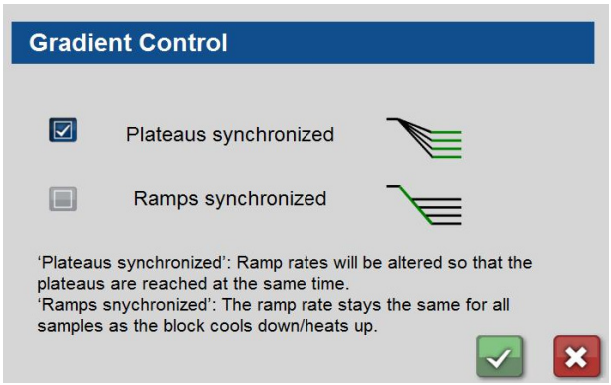
9.2.4.4 Global Program Ramp

Using the 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.



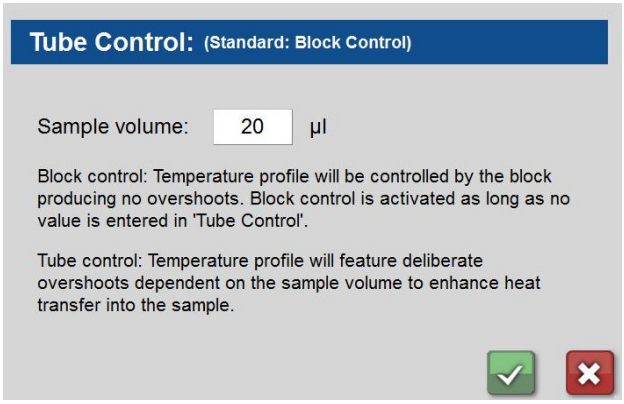
9.2.4.5 Gradient Control

Using the Checkbox Gradient Control: you can decide whether in a gradient step the Plateaus (Plateaus synchronized) or the Ramps (Ramps synchronized) should be synchronized for all rows.



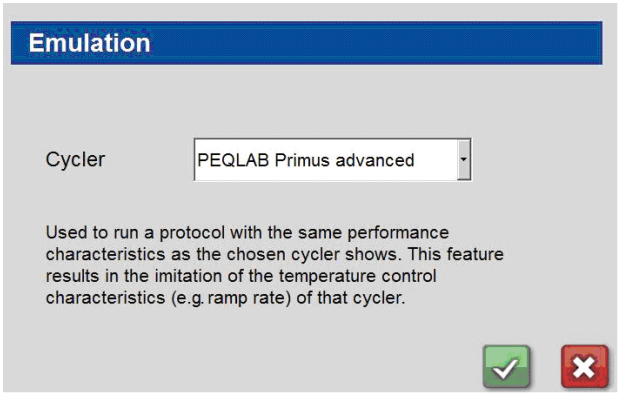
9.2.4.6 Tube Control

With the Checkbox Tube Control : you have the ability to adjust temperature regulation for a temperature step according to sample volume. If necessary, the temperature regulation will perform short-term deliberate overshoots and undershoots depending on the entered sample volume during PCR run.



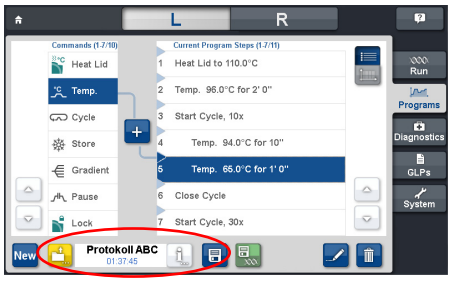
9.2.4.7 Emulation

Using the Checkbox Emulation: the thermal cycler will perform PCR like the chosen cycler, emulating its performance. This function could be useful when transferring a PCR program to the UNO from another type and model of thermal cycler. (Function not available for Ristretto)

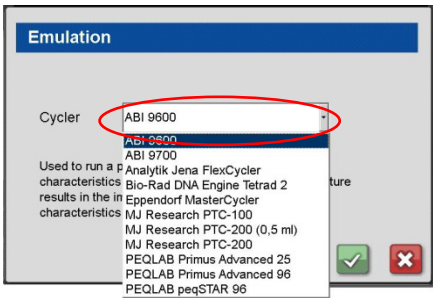


How to emulate a protocol ABC from cycler XY on the UNO

Program: Enter the protocol ABC in the program editor of the UNO

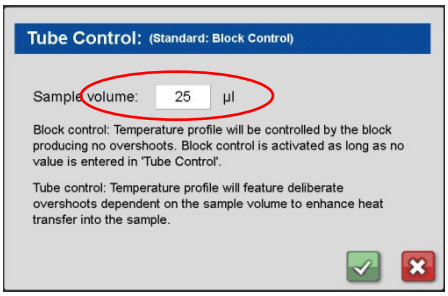


Emulation: Go to ‚Program Options' => ‚Emulation' and choose the cycler XY



Tube Control: Did you have to enter a volume setting in your cycler XY (Tube Control mode)?

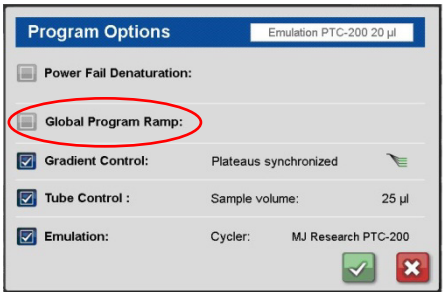
If yes, enter the same volume in the UNO in 'Program Options' under, 'Tube Control'.



Ramp Rate: Did you operate cycler XY at a reduced ramp rate?

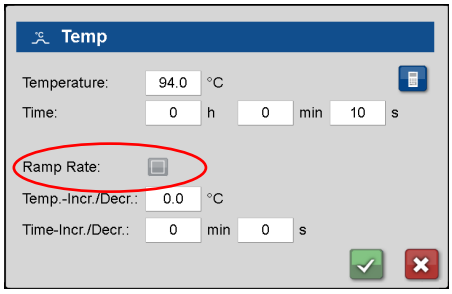
Throughout the whole protocol?

If so, apply the same the ramp rate in the 'Program Options' under 'Global Program Ramp' for the whole protocol.



Or only for single steps in the protocol?

If so adjust the ramp rate as required for each single temperature or gradient step.



9.2.5 Open a program

See chapter 9.1.1.

9.2.6 Info-Button

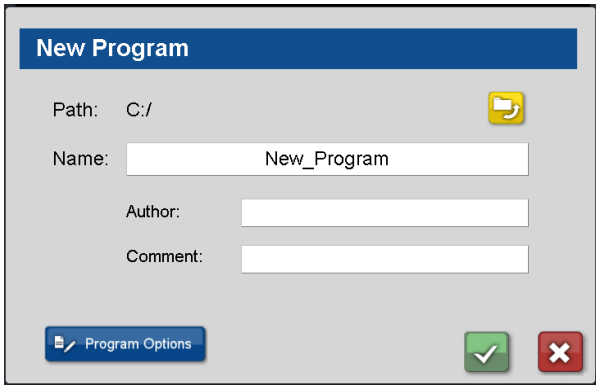
See chapter 7.4.

9.2.7 Deleting a command from the program

Select command to be deleted and then push the 'Delete' button.

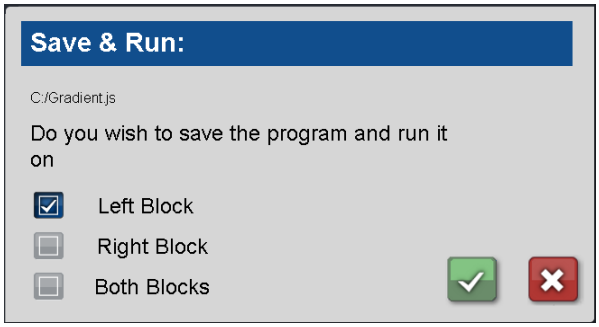
9.2.8 Saving a program

Use this button to save a program. The adjoining window appears and the necessary information can be entered or changed in the dialogue window. Further information regarding program options can be found at chapter 9.2.4.2.



9.2.9 Save & Run

A program can be saved and run immediately using this button. First there will be a security check which needs to be confirmed with 'Yes'. The program is then loaded to the 'Run' tab and started.
In the case of the Doppio the desired block can be chosen by using this dialogue.



9.2.10 Editing a command

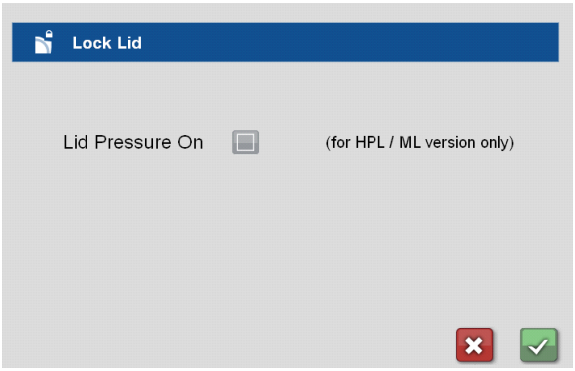
The parameters of a command can be modified by selecting the corresponding command line of the program and changing it with the 'Edit' button. (The same function has a double click on the command line).

9.3 Available commands (program steps)

9.3.1 Lock

Lock

Use this button for lid locking in order to avoid accidental opening while a program is running. Using this command, the adjoining window appears. (except for Ristretto)



9.3.2 Unlock

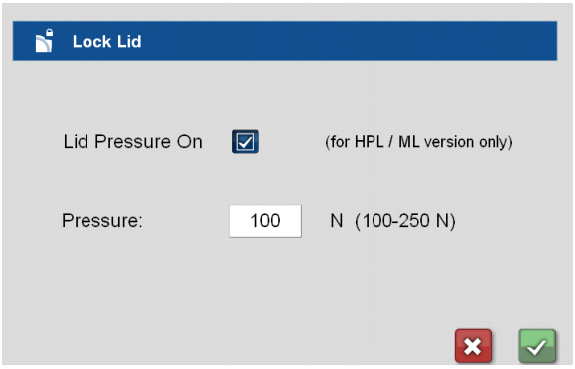
Unlock

Use this command to unlock the lid (except for Ristretto)

9.3.2.1 Lid Pressure On

By activating 

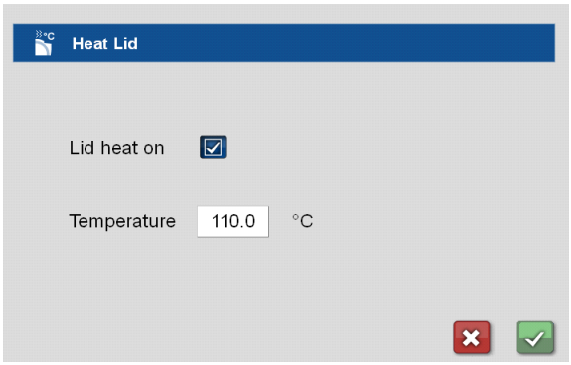
you can set lid pressure on the samples between 100 – 250 N. When using a thermal cycler without High Pressure Lid (HPL) the inserted pressure value will be ignored. When using a thermal cycler with HPL and not inserting any pressure value, the lid will automatically set the pressure on the samples to 50 N.



9.3.3 Heat Lid

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 - 120 °C. When 'Lid heat on' is not activated, the lid heat is switched off.



When creating a new program, the step 'Heat Lid' will be automatically inserted at the beginning. This setting can be changed at the System tab (see chapter 12.7.1.2).

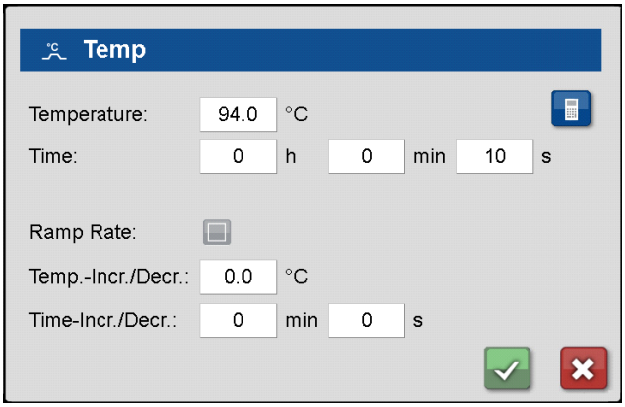
Please note:

- When reaching a 'Store' the 'Heat Lid' is deactivated automatically
- Furthermore the 'Heat Lid' is deactivated automatically during temperature steps < 30 °C. When temperature steps ≥ 30 °C will follow, the 'Heat Lid' is reactivated

Temp

9.3.4 Temperature

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



9.3.4.1 Temperature

Set the required temperature for the step.

9.3.4.2 Time

Set the required hold time for the step.

9.3.4.3 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.

9.3.4.4 Temp-Incr./Decr

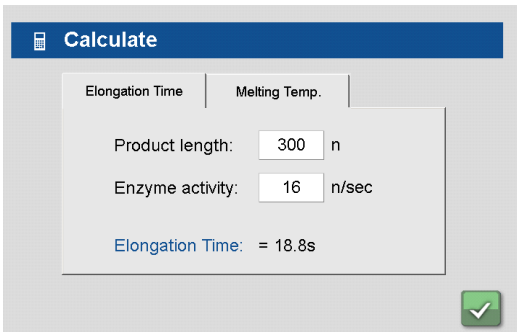
Incremental change of temperature with each successive cycle. The sign indicates whether the temperature will increase or decrease.

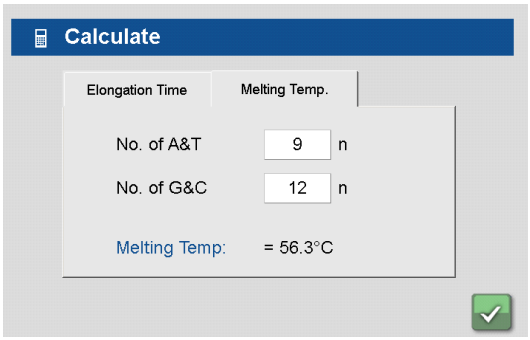
9.3.4.5 Time Incr./Decr

Incremental change of hold time with each successive cycle. The sign indicates whether the hold time will increase or decrease.

9.3.5 '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 3 °C lower than the calculated melting temperature.

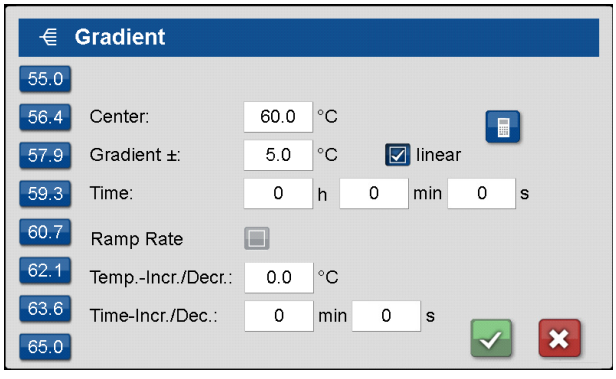




Gradient

9.3.6 Gradient step

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



9.3.6.1 Center

Set the desired temperature for the centre of the gradient.

9.3.6.2 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.

9.3.6.3 Time

Set the desired duration of the gradient step.

9.3.6.4 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. This command will only be available, if 'Ramps synchronized' has been activated in Program Options under 'Gradient Control'.

9.3.6.5 Temp-Incr./Decr.

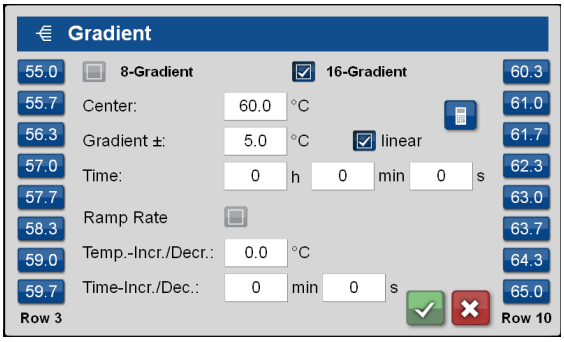
Incremental change of temperature with each successive cycle. The sign indicates whether the temperature will increase or decrease.

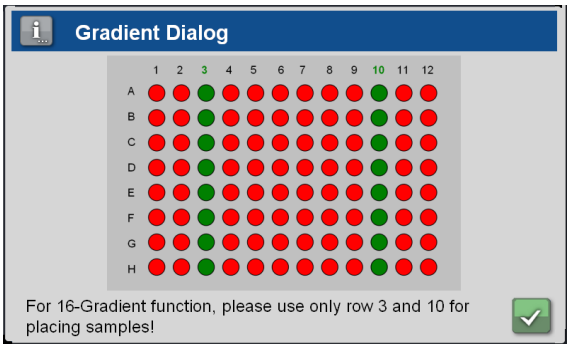
9.3.6.6 Time-Incr./Decr.

Incremental change of hold time with each successive cycle. The sign indicates whether the hold time will increase or decrease.

For the Doppio the gradient is realised over the 8 rows of the block from the top to the bottom (as displayed in 9.3.6.1).

This is also the default setting for gradients in the UNO 96, where the complete row (from well 1 to well 12) has one temperature.
With the UNO 96 it is also possible to have gradients with 16 different temperatures. In this case, row temperatures are regulated differently between the left and right halves of the block, leading to a two-dimensional gradient. However, reported temperatures are correct ONLY for columns 3 and 10 - so the user is prompted to put tubes only in the wells of those two columns.

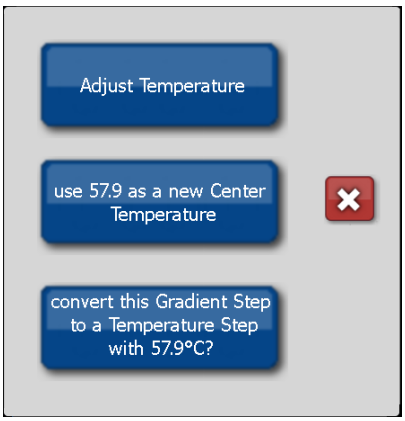




By clicking on one of the temperature buttons different options will appear:

If the checkbox 

is deactivated the temperature can be changed (within a given range) using the button 'Adjust Temperature'.
Moreover the selected temperature can be used as new centre value, or the gradient step can be changed to a regular temperature step using the selected temperature. These two functions are independent of the settings regarding gradient linearity.

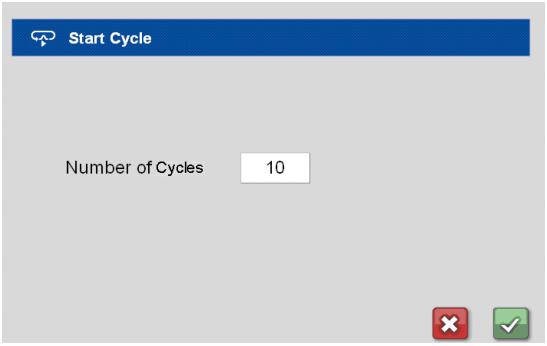


Cycle

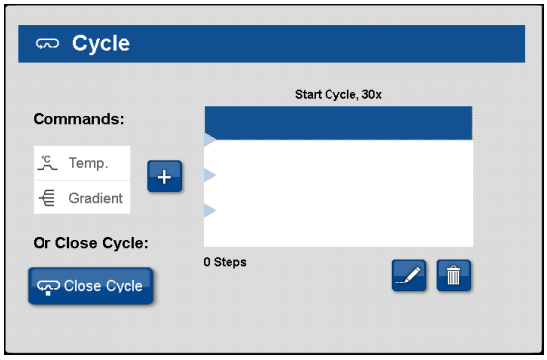
9.3.7 Cycle:

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.



In the following dialogue the commands 'Temp' and 'Gradient' can be entered in the cycle. These values are explained in chapter 9.3.4 and 9.3.6.
When all steps of the cycle have been programmed, exit the dialogue using the button 'Close Cycle'.



Start Cycle

9.3.8 Start Cycle - Manual cycle beginning

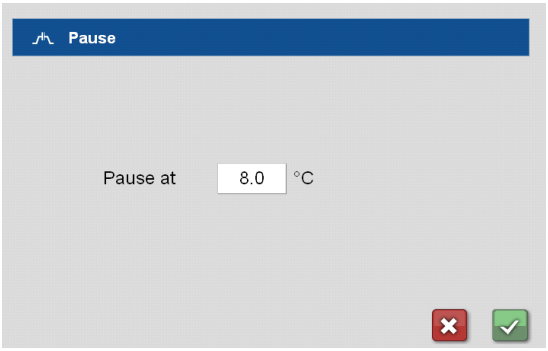
Close Cycle

9.3.9 Close Cycle - Manual cycle ending

Pause

9.3.10 Pause

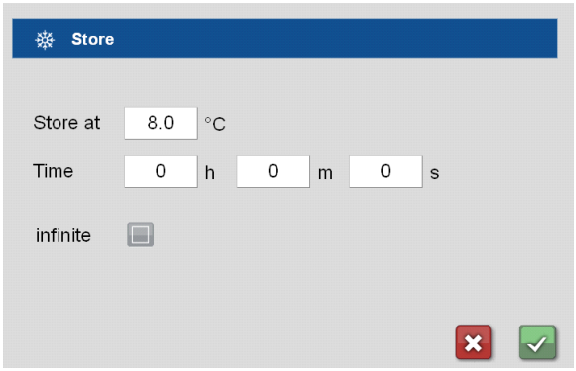
Use this button to interrupt the running program temporarily.
The adjoining window appears where you can enter a temperature value for the pause



Store

9.3.11 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.

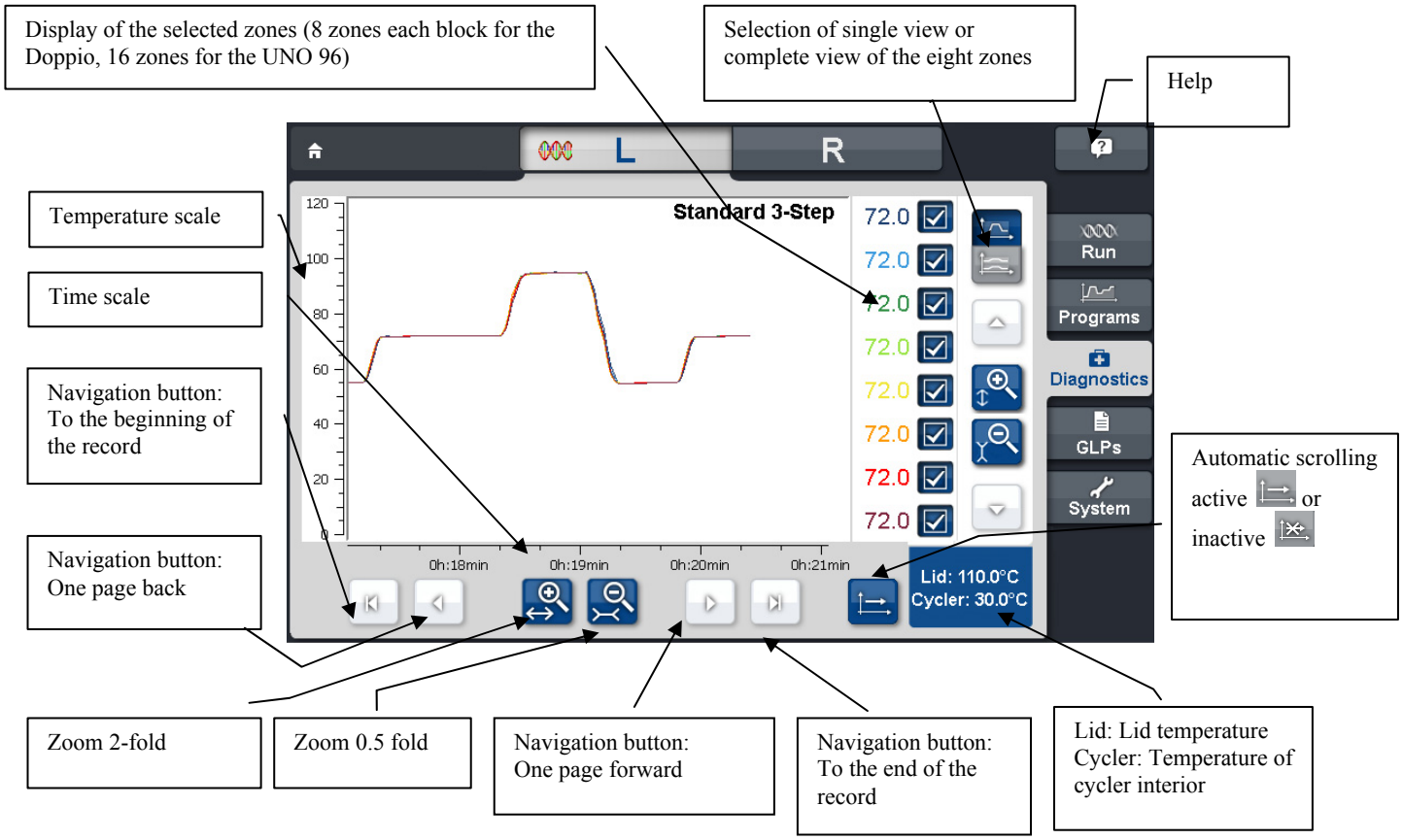


10 DIAGNOSTICS

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.

10.1 Operation of the 'Diagnostics' dialogue

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



10.2 General view

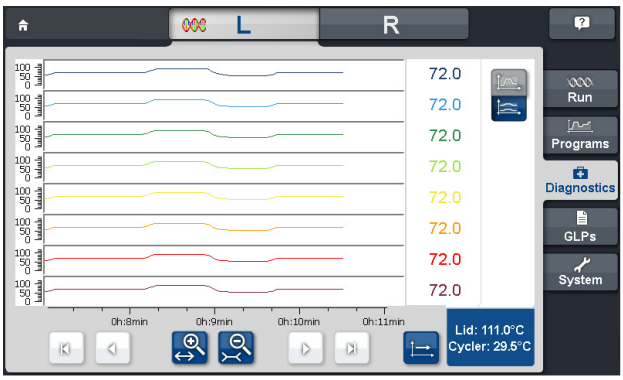
General view of the zones of the thermal plate showing the temperature profile of the eight or 16 zones in one combined diagram (see 10.1) when choosing the 'Diagnostics' dialogue. The temperature profile of the single zones is shown in one window lying upon another.

10.2.1 Zones

By selecting the chosen zones these will be shown or hidden in the general view. Hidden zones won't be shown in the diagram window, but the record of the corresponding temperatures will be continued.

10.2.2 Single view

By pushing the button  the single view of the zones will be shown.
Using the single view of the zones the temperature profile of each zone will be shown in separate diagrams. The arrangement of the single diagrams matches the arrangement of the zones on the thermal plate.



10.2.3 Automatic scrolling active

10.2.4 Automatic scrolling inactive

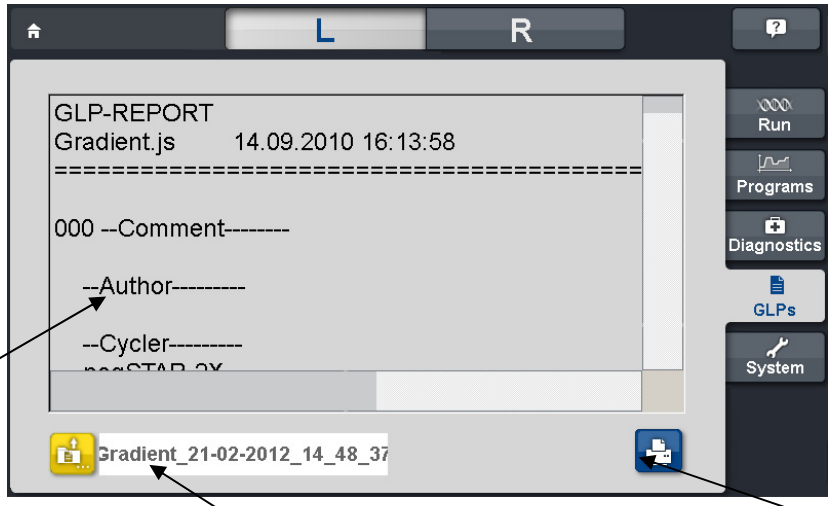
For convenient viewing of the PCR record, the automatic scrolling can be inactivated. Using this function, already recorded parts of the diagram can be looked at without automatic screen scrolling.

11 GLPS DIALOGUE

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

11.1 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  .



This window shows the content of the GLP report.

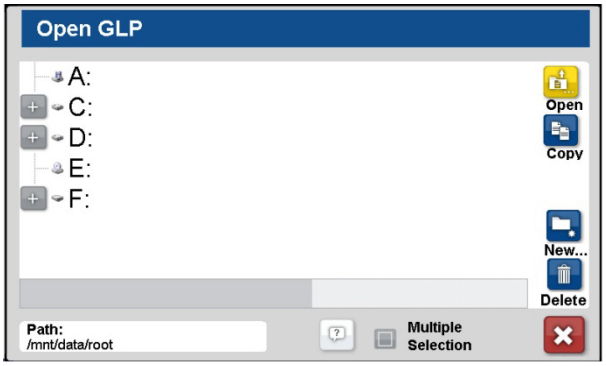
Shows the name of the selected GLP report. The name of the GLP is composed of the name of the PCR program, date and time.

Printing of the GLP report.

11.2 Operating elements of the 'GLPs' dialogue

11.2.1 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.



11.2.2 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 in chapter 11.1.

11.2.3 Printer

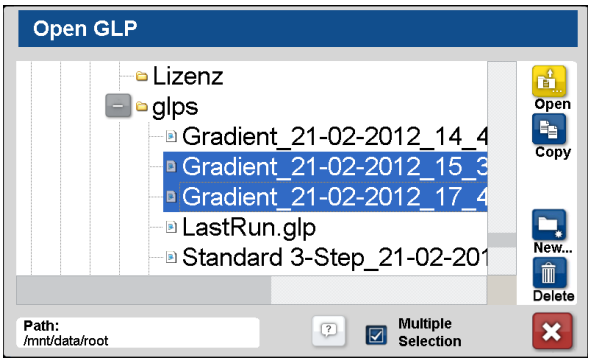
Use this button to print out the selected GLP report.

11.2.4 Delete

Use this button to delete a GLP report.

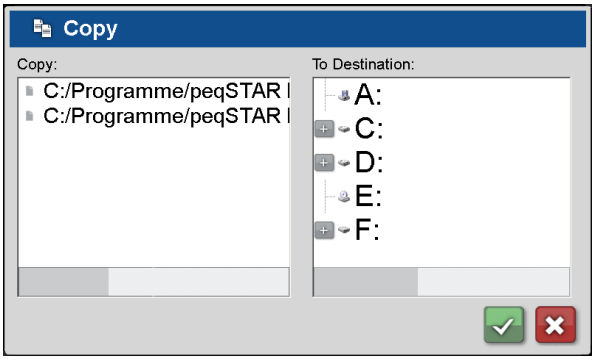
11.2.5 Copy

By pushing this button saved GLP reports or files can be copied. Several GLP reports/files can be marked via mouse click simultaneously if the option 'Multiple Selection' was chosen. Marked GLP reports/files are shown with a blue background.



By using the 'Copy' button the adjoining dialogue appears.

By pushing 'OK' the files will be copied; the operation can be aborted with Cancel.



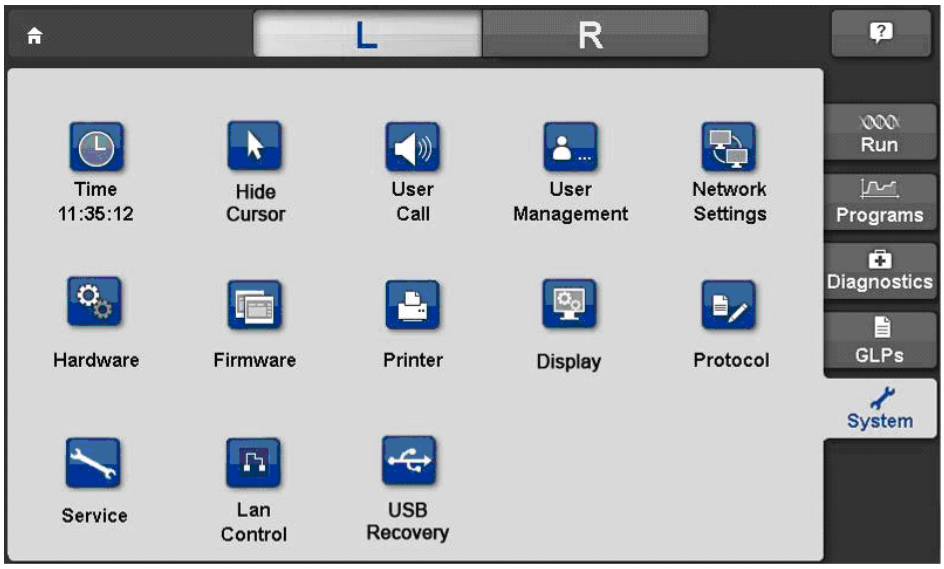
11.2.6 New folder

A new folder can be created using this button.

12 SYSTEM

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

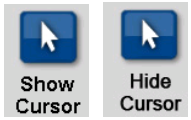
Elements of the 'System' dialogue: Overview



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.

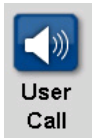
12.1 Time / Date

Setting of time and date:
By pushing the clock button, the adjoining window appears and time and date can be set.



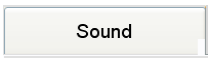
12.2 Show/Hide mouse cursor

Use the button to show or hide the cursor on the screen.



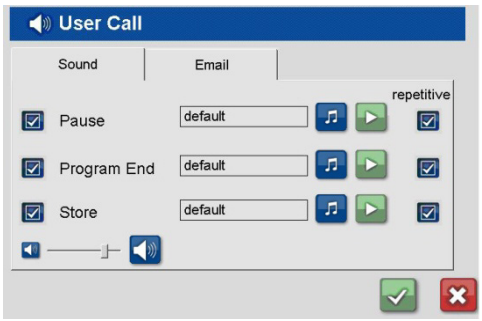
12.3 User Call

Using this button different user calls can be set.



12.3.1 Sound

Selecting the tab 'Sound', the adjoining window opens and the settings for sounds can be changed:
To activate sound for the desired event, mark the relevant checkbox. Each sound may be selected to play once (standard setting) or repetitively.



12.3.1.1 Repetitive

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

12.3.1.2 Sound intensity:

Set the desired sound intensity.

12.3.1.3 Select sounds

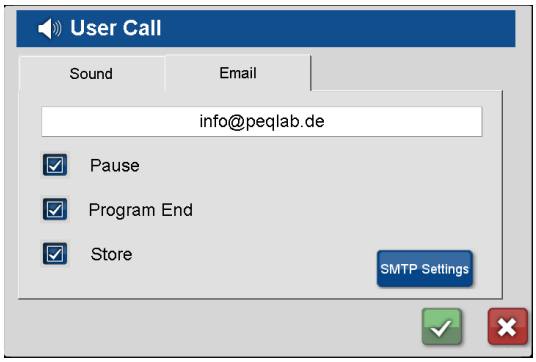
By pushing the button  a selection window will appear. Different MP3 sounds can be chosen and stored for the events 'Pause', 'Store' and 'Program End'.

12.3.1.4 Play sound

The selected sound can be listened to when pushing this button.

12.3.2 Email

By selecting the tab 'Email' the adjoining window appears. According to the checkbox selections made, an Email will be sent upon the occurrence of an event.

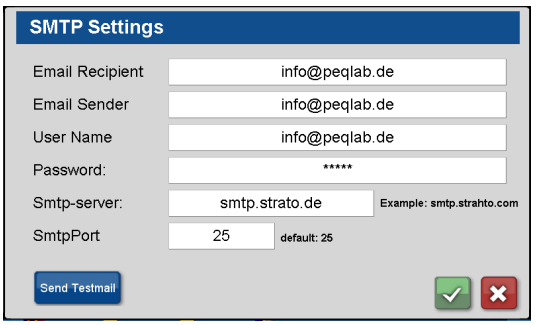


Note: To send email, the UNO needs to be installed in a network with access to the internet. Please check settings under System → Network: for example, the DNS Server information must be present

Please ask your network administrator for the required settings.

By pushing the button 

the settings can be entered.



12.3.2.1 Email Recipient:

Please enter the email address to which the alert should be sent from the cycler in case of occurrence of an event.

12.3.2.2 Email Sender:

Here you may enter the name of the email sender, e.g. the cycler name or the same email address as for 'Email Recipient':

12.3.2.3 User name

Please enter the user name of the email account.

Password:

12.3.2.4 Password

Please enter the email password of the used email account.

Smtp-server:

12.3.2.5 SMTP-Server:

Please enter the outgoing mail server which should be used for sending the email.

SmtpPort

12.3.2.6 SMTP Port:

Please enter the SMTP port which should be used for sending the email. Standard setting for the port is 25.

Send Testmail

12.3.2.7 Send Testmail:

By pushing this button a test mail is sent, to check that the settings are correct and that emails can be sent by the cycler.
In case the test mail cannot be sent successfully, please ask your network administrator for the required settings.

User Management

12.4 User Management

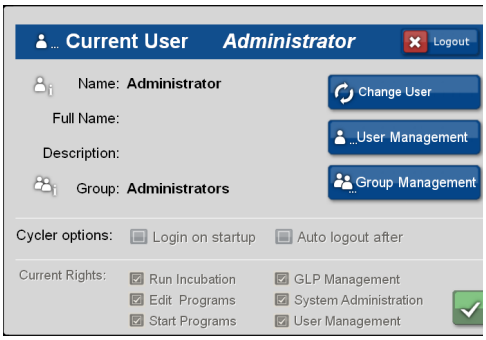
In the user accounts management, user groups or single users can be configured and their settings e.g. right of access (reading programs, edit programs etc.) administered. The users are assigned to given or predefined user groups to which are assigned rights of access.

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  button the adjoining dialogue appears:



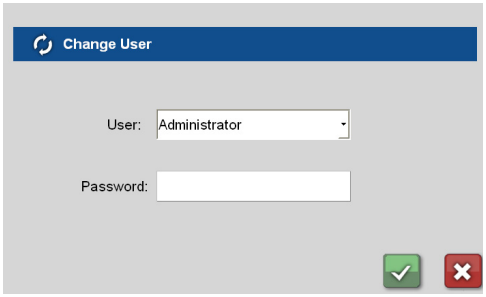
To call up User Management the user has to log in with his password. The user (in general the administrator) must have appropriate administration rights. The thermal cycler is delivered with Administrator access preconfigured.

Using the 'Logout' button the current user can log out. The user 'Guest' is then automatically logged in, who has only minimal rights as factory settings. The administrator can change these settings (see 12.4.3.1 and 12.4.3.3).

At 'Cycler options' you can activate the function 'Login on startup' with the checkbox. With this option activated, when turning on the instrument, an obligatory Login request appears.
By using the checkbox 'Auto logout after' the user can define a time span when the logged in user is automatically logged out.

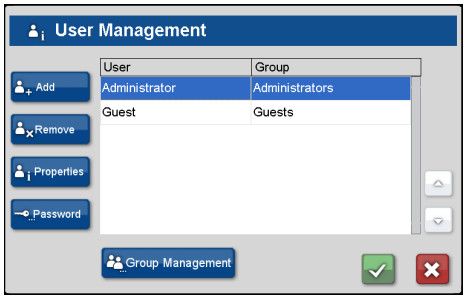
The factory-set password for the Administrator is admin.

12.4.1 Change User



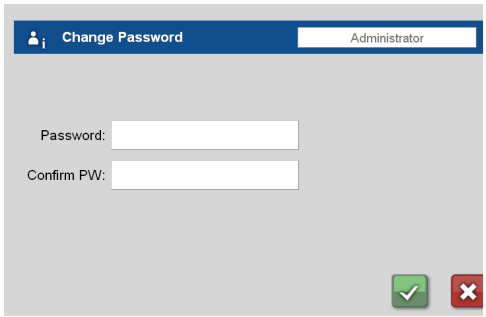
Using this dialogue window, users can be changed.
Please select the user and enter the appropriate password.
The factory-set password for the Administrator is admin.

12.4.2 User Management



The adjoining dialogue window appears. In this dialogue single users can be added, changed or deleted. Use the button 'Group Management' to call up the administration of groups.

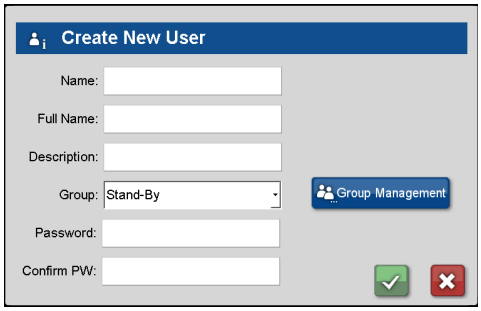
12.4.2.1 Change Password



In case that any user forgot his password or wants to change it, the administrator can allocate a new password. This could also be done by a user with the right for 'User Management'. Select the user and allocate a new password by pushing the button 

.

12.4.2.2 Set up a new user and assign a password



Use this button to set up a new user. The adjoining dialogue window appears where user details can be added.

Save the data with the button  and the newly set up user is displayed in the user list in the relevant user group.

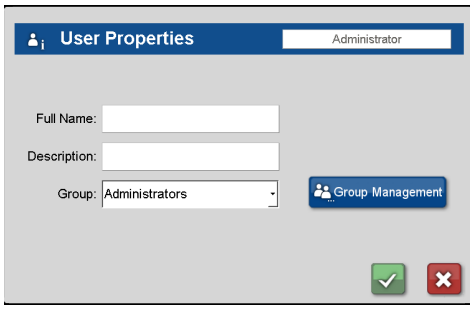
Important: If a new user should only have limited rights, it might be useful to set up a new user group with the appropriate rights to access. (see chapter 12.4.3)

12.4.2.3 Administration of user groups

See chapter 12.4.3.

12.4.2.4 User Information

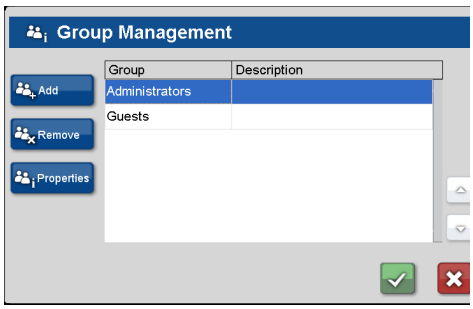
Use this button to get further information on the user (user name, full name, description and
group membership).



12.4.2.5 Delete a user

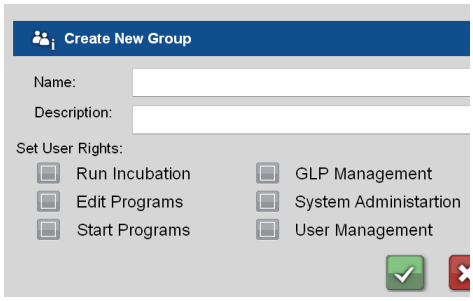
Select a user and remove with this button. For safety reasons this must be confirmed before taking effect.

12.4.3 Setting up a new user group



12.4.3.1 Add a new user group

Using this button a new user group and its description can be set up.
It is possible to allow/refuse access to certain functions of the instrument.



List of available rights:

Run incubation	Run incubation mode
Edit programs	Edit programs
Start programs	Start programs
GLP management	Watch GLP reports
User management	Administrate user and user groups
System administration	Modify/administrate configurations

12.4.3.2 Delete a group

Select the group and delete it using this button.
For safety reasons this must be confirmed before taking effect.

12.4.3.3 Show and change group information

12.4.4 User logout

If a user logs out by using the button 'Logout' the user 'Guest' is automatically logged on. The user 'Guest' initially does not have any rights. This is to make sure that a new user, who wants to work with the UNO X, must log in first. The Administrator or other users with the right 'User Management' can assign more rights to the user 'Guest' if required (see 12.4.3.1).

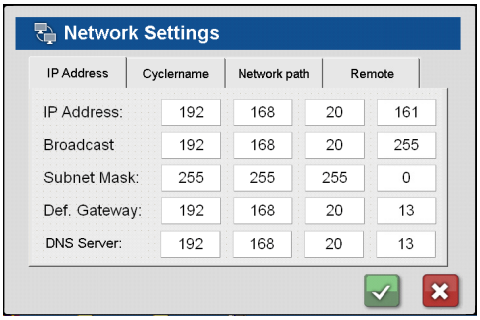
12.5 Network Settings

Using this button, network settings can be changed.

IP Address

At the tab **IP Address** the adjoining dialogue appears and the required settings for network integration can be entered.

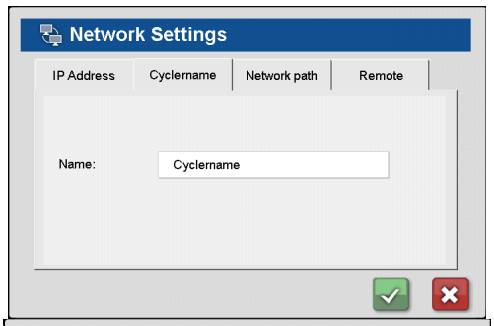
Please ask your network administrator for the required settings.



Cyclername

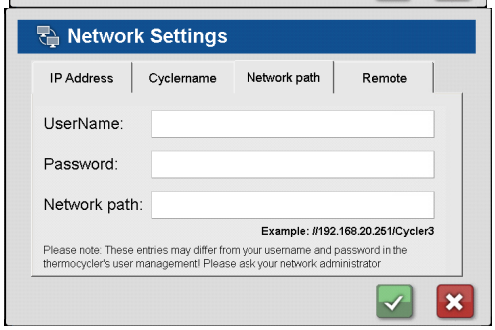
At the tab **Cyclername** the adjoining dialogue appears:

The entered cycler name appears in the sent mail notification when using the email function in User Call.



Network path

At the tab **Network path** the adjoining dialogue appears and the required settings for access to a released network device can be entered.
Username: to log on the network
Password: to log on the network
Network path: which is available for the user as additional path for cycler pro-- grams and GLP reports after the successful network connection.

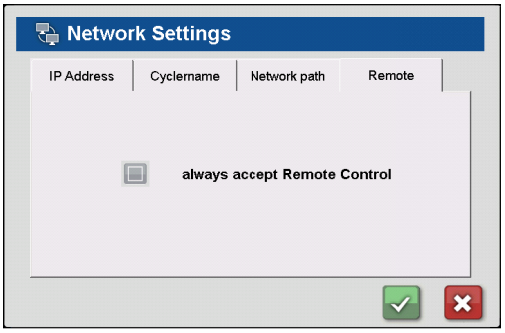


This path is assembled of:
//<IP address, with access to, where the network path is located>/<directorypath>
Please note that necessary access rights (read and write) for the intended path must be in place.
Please ask the administrator for the required settings.

Remote

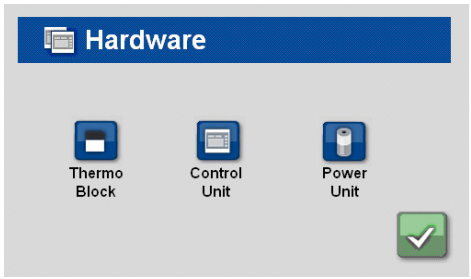
At the tab **Remote** the adjoining dialogue appears:

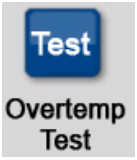
By activating the checkbox ‘always accept remote control’, it is no longer necessary to confirm cycler access when performing PC or master/slave control.



12.6 Hardware

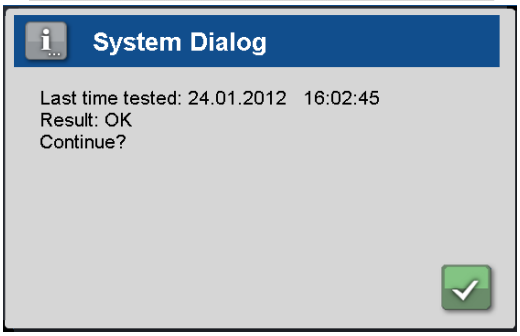
Shows actual version of thermal block, control and power unit.
Changes can only be made by authorized technical service.

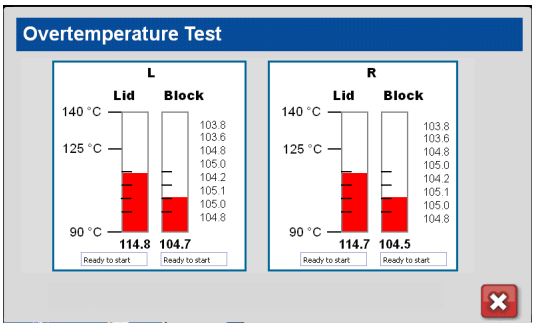




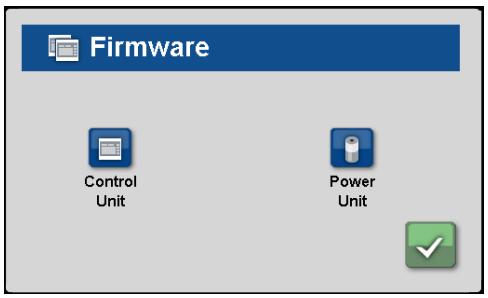
12.6.1 Overtemp test

At Hardware => Thermo Block => Overtemp Test a periodical test (e.g. every month) of the overtemperature protection can be found according to the following procedure:
First the result of the last check of the overtemperature protection is reported. To continue with the test, confirm the dialogue with 'Yes'. Initialization and overtemperature test is done automatically for both blocks at the Doppio.
Press OK after the test has finished.
If one or both results are not "OK", the overtemperature protection is damaged. **In this case, the thermal cycler must not be used anymore and must be sent back to the manufacturer for a check.** (see chapter 13.1).





12.7 Firmware

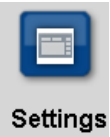


12.7.1 Control Unit

Display and administration of the firmware versions of the control unit with the adjoining dialogue.

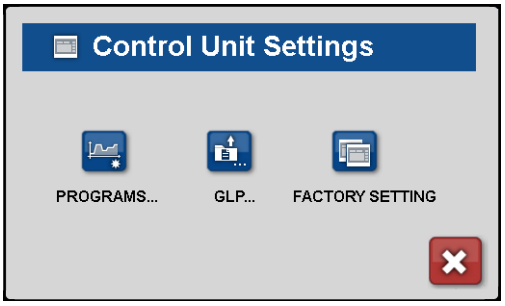
12.7.1.1 Info Button

Shows the current version of the control unit firmware.



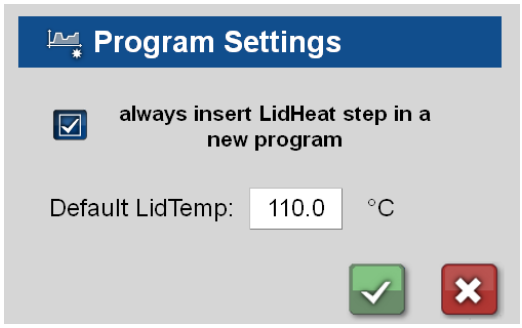
12.7.1.2 Settings

By pushing this button the adjoining dialogue appears. The following menu items are available: 'Programs…', 'GLP…' and 'Factory Settings'.



12.7.1.2.1 Programs Settings

When this box is checked, a 'Lid Heat' step will be automatically inserted as first step when generating a new program. In the field next to 'Default LidTemp' the desired temperature can be entered. This value can be changed manually in the PCR program if required.

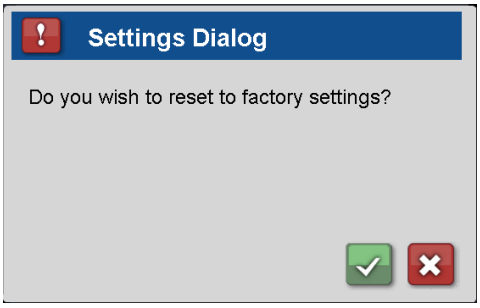


12.7.1.2.2 GLP Settings

When this box is checked, a GLP report will be created after every run, after confirmation. If the box is not marked, no GLP report will be created and no confirmation dialogue will appear.

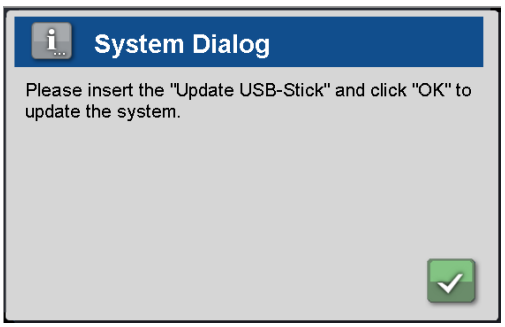
12.7.1.2.3 Factory Setting

The configurations set under Firmware > Control Unit >Settings can be changed to the factory settings.



12.7.1.3 Update

Updates the firmware of the control unit. The firmware must be available on a USB memory stick connected to the device.

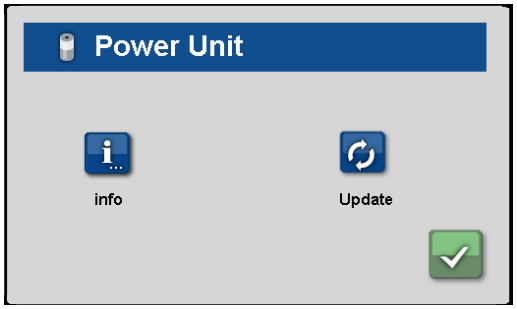


On pressing the green button, a dialogue will appear asking whether the software of control unit should be updated. If you confirm with 'Yes' the update starts.

Important:
The USB memory stick must not be removed during update process!
After a successful update the display shows the corresponding message and the software starts again. The USB memory stick can be removed then.

12.7.2 Power Unit

Display and administration of the firmware version of the power unit. The adjoining dialogue appears.



12.7.2.1 Info

Shows the current version of the power unit firmware.

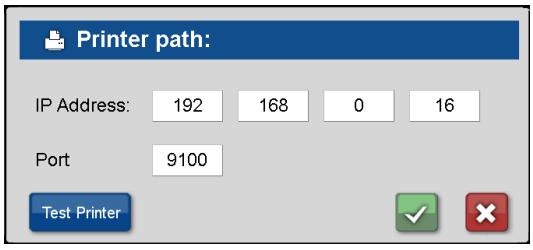
12.7.2.2 Update

Updates the firmware of the power unit. The firmware must be available on a USB memory stick connected to the device.

On pressing the green button, a dialogue will appear asking whether the software of power unit should be updated. If you confirm with 'yes' the update starts.
Important:
The USB memory stick must not be removed during the update process!
After a successful update the display shows the corresponding message and the USB memory stick can be removed then. After the successful update the instrument has to be switched off and on again.

12.8 Print

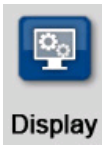
The UNO X thermal cyclers can print PCR programs and GLPs on a network printer. Using this dialogue, the path for the network printer, can be entered.



Please refer to your network administrator for the correct printer path.

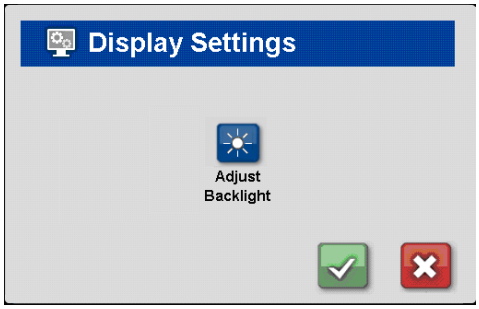
Use the button 

to produce a test print.



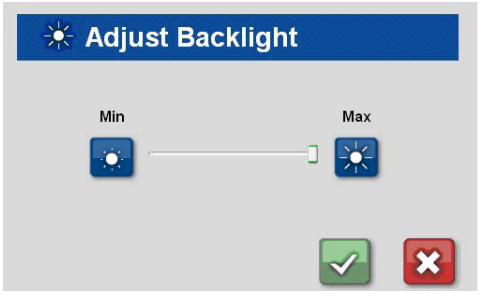
12.9 Display

Pushing this button, the adjoining window opens:



12.9.1 Brightness

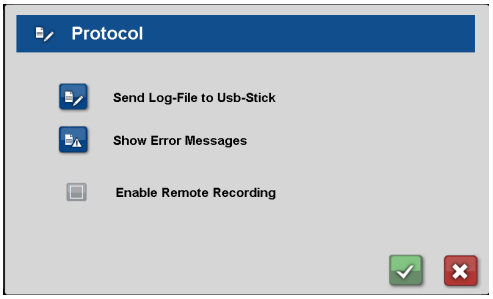
The following dialogue appears after pressing the button:

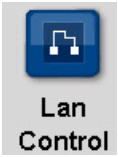


By pressing the  and  buttons or moving the roll bar the backlight of the display can be adjusted.

12.10 Protocol

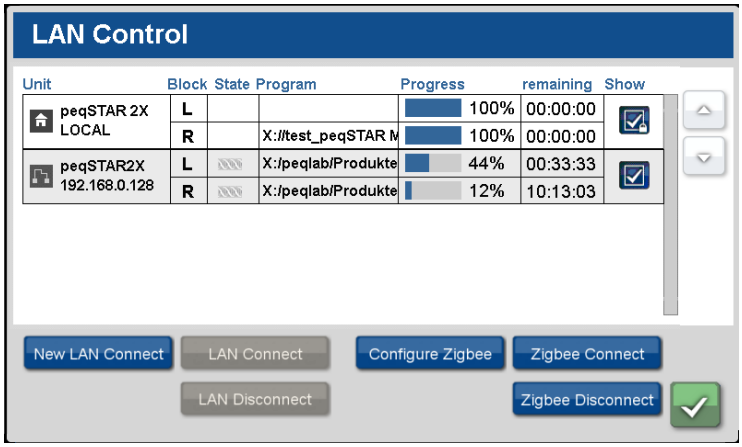
For troubleshooting, the thermal cycler can record its own internal communication. The protocol file „log.txt“ can be stored on a USB stick. By using the button 'Send Log-File to Usb-Stick' the protocol file 'log.txt' can be saved on a USB stick. Alternatively possible error messages can be shown by pressing the button 'Show Error Messages'.





12.11 LAN Control

This dialogue is used to connect with a thermal cycler via network, to be able to remote control the instrument.
When instruments should be visible at the top of the display, the checkbox under 'Show' needs to be activated.



The following command buttons are available:

12.11.1 New Lan Connect

Using this button a LAN connection to a new cycler for remote control can be set up. Enter the IP address of the target cycler, in the input box.

The following message appears, when the connection starts:

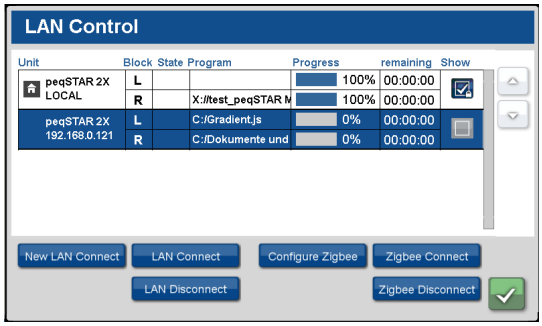
'The connection to *IP Address Remote Cycler* will be done as soon as the other part confirms the request.'

The target cycler shows the following message:
'Do you want to accept connection to *IP Address Control Unit*?'
By confirming this message with 'Yes', the display of the control unit shows the following message:
'User from *IP Address Remote Cycler* has accepted LAN remote.'

If a check mark is set at 'Always accept remote control' under 'System' => 'Network Settings' => 'Remote' the link connection is carried out without any further queries.
The cycler will then be entered in the display overview and is marked with the LAN sign  , which confirms the active LAN connection.

When the instrument should be available visible at the top of the display, the checkbox under „Show“ needs to be activated.
As soon as the cycler is displayed, it can be remote controlled by the control unit.

12.11.2 Lan Connect



Once a remote control connection has been made via LAN the target cycler will be displayed in the LAN control window (in our example: 192.168.0.121).
To reconnect with this cycler, mark it in the overview and use the button 'LAN Connect' to start a new connection.

12.11.3 Lan Disconnect

To disconnect a LAN connection with a cycler, mark the chosen unit in the overview and use the button 'LAN 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.

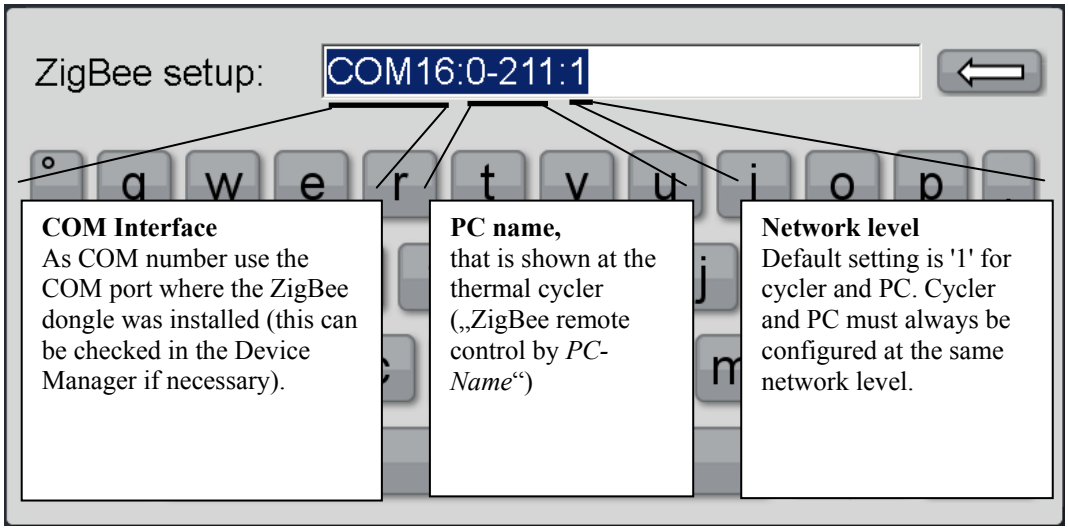
12.11.4 Zigbee Configure

The optional ZigBee module is needed for wireless remote control. It consists of one module which is installed in the remote cycler and a ZigBee dongle for the PC as control unit.

To start a connection between the remote cycler and the PC, both ZigBee modules need to be configured.

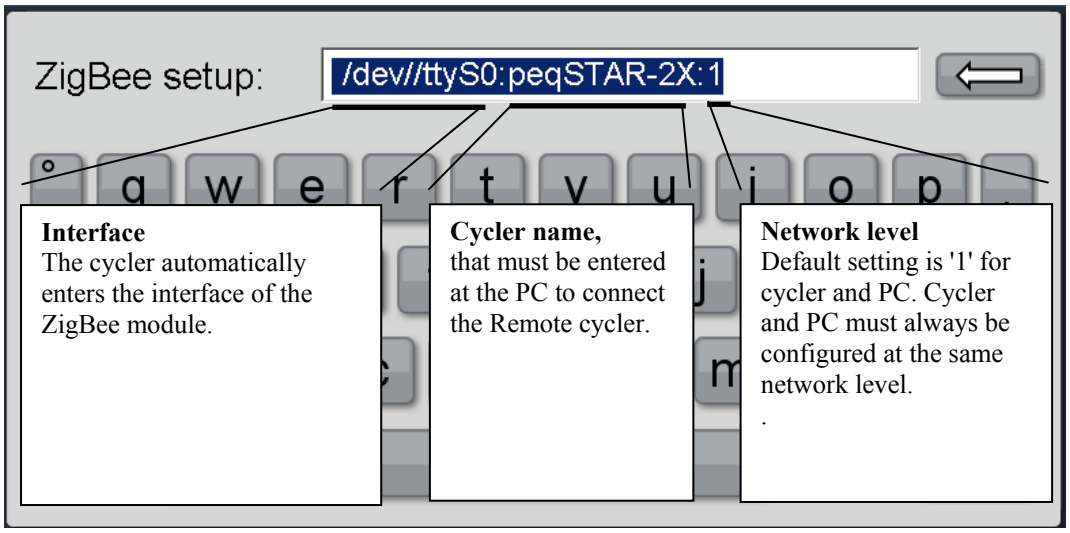
At the PC:
When the UNO Manager software is open and the ZigBee dongle is connected, the message 'ZigBee dongle detection' appears. The message also shows on which COM port the ZigBee dongle is installed.
To configure the ZigBee dongle choose 'ZigBee Configure' at 'System' => 'LAN Control' in the 'UNO Manager' software. A dialogue will appear with an automatic Setup window.
Enter the required information:

Enter: COM#:PC name:Network level
Example: COM16:0-211:1



At the Remote Cycler:
To configure the ZigBee dongle choose 'ZigBee Configure' at 'System' => 'LAN Control' in the 'UNO Manager' software. A dialogue will appear with an automatic Setup window. Enter the required information:

Enter: Interface:Cycler name:network level
Example: /dev/ttyS0:UNO-2X:1



The adresses for PC and remote cycler need to be different.

12.11.5 Zigbee Connect

To start the wireless connection between PC and remote cycler, push the button 'ZigBee Connect' at the PC.
Enter the name of the remote cylcer, e.g. 'UNO-2X'.
If the connection is successful the following message appears:
'The connection to IP Address Remote Cycler will be done as soon as the other part confirms the request.'
Then the following message appears on the cycler:
'Do you want to accept connection to *IP Address Control Unit*?'

If this message is confirmed with 'Yes' and therefore the remote control authorized, the following message appears on the control unit.

'User from IP Address Remote Cycler has accepted LAN remote.'

If a check mark is set at 'Always accept remote control' under 'System' => 'Network Settings' => 'Remote' the link connection is carried out without any further queries.

The cycler will then be displayed in the overview and is marked with the ZigBee sign , which shows the active wireless connection.

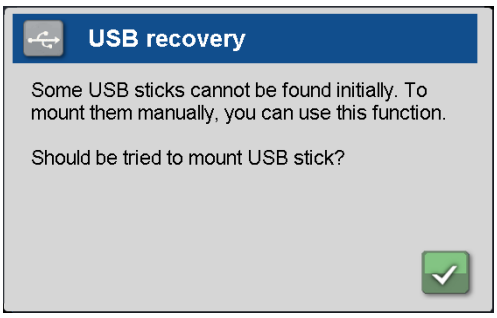
In order to access the cycler directly through the buttons at the top of the screen, the corresponding check mark must be set at 'Show'. As soon as the cycler is displayed, it can be controlled via operating software as usual.

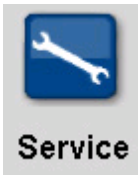
12.11.6 Zigbee Disconnect

To disconnect a ZigBee connection with a cycler, mark the chosen unit in the overview and use the button 'Zigbee Disconnect'. The cylcer can then be controlled again via touch screen.
Alternatively the connection will be stopped when the cycler is switched off or the software at the PC is closed.

12.12 USB Recovery

USB sticks are differently formatted by manufacturers. The actual type of format is not obvious to the customer. Therefore some USB sticks are not automatically detected by the UNO system. In this case the USB stick can be manually installed by using the function 'USB recovery'.





12.13 Service

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

13 MAINTENANCE & REPAIR OF THE THERMAL CYCLER

13.1 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 penetrates 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 (test of the overtemperature shutdown and temperature check-up see 13.2. and 13.3) should be carried out regularly to detect possible technical failures.
The electric fuses are placed at the back of the device between the power switch and the mains plug. After pulling off the mains plugs and pushing upwards a safety catch the fuses can be changed. Use only fuses with correct values (indications about the fuse type are placed at the back of the device).
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.**

13.2 Over temperature protection test

A periodical test of the over temperature protection is recommended (see chapter 12.6.1).

13.3 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 (ΔT = ±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.

13.4 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 respesentative.

13.5 **Technical service**

13.5.1.1 Web Resources
Visit the VWR website at **www.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
Contact us For information or technical assistance contact your local VWR representative or visit.
www.vwr.com

14 WARRANTY

VWR 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.

15 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, so as 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

16 TECHNICAL DATA

16.1 General characteristics

- 8, 2 x 8 or 16 Peltier elements with Long-Life-technology and 8, 2 x 8 or 16 control circuits with Pt 1000 temperature sensors, respectively (at Ristretto, Doppio and UNO)
- Maximal heating and cooling rate: 5 °C/s (3 °C/s for Ristretto)
- Block uniformity (at 72 °C): ± 0.2 °C
- Temperature range thermoblock: 4 to 105 °C
- Control accuracy thermoblock: ± 0.1 °C
- Variable ramping: 0.1 to 3.0 °C/s
- Increment/Decrement time: 0:00:01 to 9:59:59
- Increment/Decrement temperature: 0.1 to 9.9 °C
- Lid heating temperature range: 40 to 120 °C
- Programmable Lid locking mechanism (except Ristretto)
- 4 x USB (1x USB for Ristretto), 1 x Ethernet interfaces (MS Windows® or Linux), maximal length of USB cords 3 m!
  Note: USB interfaces only support standard USB sticks, cord mouse and keyboards!
- Dimensions (B x H x D): 30 x 28 x 38 cm
- Dimensions Ristretto (B x H x D): 27 x 19 x 33 cm
- Weight incl. block: 13.3 kg (5.2 kg for Ristretto)
- Electrical power supply: 90 – 264 V AC, 50 – 60 Hz, 850 VA (150 VA for Ristretto)
- Fuse: 10 A time lag
- Pollution rate: 2
- Environmental temperature range: +10 °C to +30 °C
- Max. relative humidity: 70 %
- Maximum height above sea level: 2000 m
- For indoor use only!
- Noise level: < 37 dB (A)

16.2 Gradient feature (optional)

- Maximal gradient range over 8 or 16 columns, respectively: 30 °C (± 15 °C)
- Temperature range Gradient: 35 to 105 °C
- Gradient accuracy: ± 0.1 °C

16.3 User interface/functions

- Touch sensitive TFT-Display (VGA, Graphic, 65535 colours), operation via USB mouse possible
- Direct help function, Tm- and elongation time calculator
- Internal flash memory for 500000 typical PCR programs in free configurable folders/subfolders
- Unlimited number of programs via network PC or USB memory 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
- User call per email
- Master-/Slave-control (optionally also wireless available)

16.4 Block capacity

Ristretto:
32 well Universal block with lid heating and automatic height adaption for 32 x 0.2 ml tubes or 16 x 0.5 ml tubes with flat caps

Doppio/ Doppio Gradient:
Two 48 well Universal blocks with lid heating and automatic height adaption for 48 x 0.2 ml tubes, 48 well PCR plates or 24 x 0.5 ml tubes with flat caps.

UNO 96/96 Gradient:
96 well Universal block with lid heating and automatic height adaption for 96 x 0.2 ml tubes, 96 well PCR plates or 48 x 0.5 ml tubes with flat caps.

UNO 96 HPL /96 HPL Gradient:
96 well Universal block with High Pressure lid (HPL, 100 – 250 N) for the safe sealing of 96 x 0.2 ml tubes, 96 well PCR plates or 48 x 0.5 ml tubes with flat caps.

UNO 384:
384 well block with High Pressure lid (HPL, 100 – 250 N) for the safe sealing of 384 Well PCR plates

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