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CycleManager X50

Software operating manual
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1 Operating instructions
1.1 Using this manual

Two manuals are supplied with the CycleManager X50 software:

- Software manual: The software manual describes how to operate the CycleManager X50 software.
- Hardware manual: The hardware manual describes how to operate the Mastercycler X50 in conjunction with the CycleManager X50 software.

The current versions can be found on our webpage www.eppendorf.com/manuals.

Information on installing the device can be found in the Mastercycler X50 hardware manual.

Information on installing the software can be found as a PDF file on the supplied data carrier.

1.2 Symbols used

<table>
<thead>
<tr>
<th>Depiction</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Actions in the specified order</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>▶</td>
<td>Actions without a specified order</td>
</tr>
<tr>
<td>·</td>
<td>List</td>
</tr>
<tr>
<td>\text</td>
<td>Display or software texts</td>
</tr>
<tr>
<td>\text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional information</td>
</tr>
</tbody>
</table>

1.3 Abbreviations used

**PCR**
Polymerase Chain Reaction

**PDF**
Portable Document Format

**USB**
Universal Serial Bus
2 Safety

2.1 Intended use

The CycleManager X50 is a PC software that allows control and monitoring of the Eppendorf Mastercycler X50 without control panel. The CycleManager X50 may be used for training and research purposes in routine and research laboratories in the fields of life sciences, industry and chemistry. The product is intended for research purposes only and may not be used for diagnostic or therapeutic purposes.

The CycleManager X50 must only be operated by persons trained in laboratory techniques and procedures.

2.2 Antivirus protection

To protect the system against viruses and malware, the use of malware protection software is recommended. Each user is responsible for ensuring the system is not infected with viruses.

- If you have questions regarding malware protection software, contact your administrator or the manufacturer of the software.

2.3 IT security

To prevent unauthorized access, data loss, sample loss and data misuse, secure the CycleManager X50 against undesired access from the Internet.

- Observe the basic security instructions when working with IT systems.
- Contact your network administrator.
- Install a firewall.
- Use a VPN client if you access the internal network from an external source.

This software uses various network interfaces.

- Do not rename, remove or reconfigure network interface while in operation.
3 Installation

Information on installing the software can be found as a PDF file on the supplied data carrier.

API connection

The CycleManager X50 can be controlled with external programs via a software interface. For more information on the interface and detailed interface documentation, contact your local Eppendorf partner.

3.1 System requirements

3.1.1 CycleManager server

- Windows 10 Pro/Enterprise
- 4 GB RAM
- 2 TB of free hard disk space
- Intel Core i5, 2.8 GHz clock frequency (or higher)
- 1 network interface
  If the server is to be incorporated into the intranet, 2 network interfaces are required.

3.1.2 Cycler Bridge

A separate computer is required for the Cycler Bridge component in the following cases:
- The Cyclers are not in the same subnet as the server with the CycleManager X50 software.
- Cyclers in laboratories further away should be connected to a server with the CycleManager X50 software via the intranet.

- Windows 10 Pro/Enterprise
- 1 GB RAM
- 250 GB of free hard disk space
- Intel Core i5, 2.8 GHz clock frequency (or higher)
- 2 network interfaces

3.1.3 Client

- Chrome Internet browser
- Screen resolution 1366 × 768 pixels (or higher)
3.2 Introduction

The CycleManager is a network-based software application and contains the following software components:

- CycleManager bridge
- CycleManager server

Depending on the area of application, these components can be installed together on one PC or distributed within the network infrastructure in various ways.

Prior to installing the CycleManager X50, discuss the following issues with the IT administrator:

- Integration of the CycleManager X50 into the network
- Installation
- Installation requirements, e.g., preparation of the corporate network, availability of the IT administrator on the installation day
- Access rights required for installation

3.3 CycleManager X50 components

3.3.1 CycleManager bridge

The CycleManager bridge runs in the background. The CycleManager bridge connects with the connected devices and forwards communications to the CycleManager server.

The CycleManager bridge must be installed on a computer that is directly connected to the devices or to the device network.

If the connected devices are not located in the same subnet as the server with the CycleManager X50 software, a separate computer is required for the CycleManager bridge.

3.3.2 CycleManager server

The CycleManager server runs in the background. The CycleManager Server receives traffic from at least one CycleManager Bridge.

The CycleManager server can be installed on the same computer as the CycleManager bridge. Alternatively, the CycleManager server can be installed on a different computer in the corporate network.

The CycleManager Server provides the web interface. You can access the CycleManager server with a browser. It can be accessed locally or via a computer in the corporate network.

The computer that hosts the CycleManager server also hosts the CycleManager database. The CycleManager database must be backed up at regular intervals.
3.4 Network configuration

The computer that the CycleManager server is installed on should be set to automatically update the time and date. The CycleManager may cause problems during operation if date or time is changed manually. If you are using a manual date and time display, note the following points:

- Set the date and time before installation of the CycleManager server.
- Do not change the date or time after installation of the CycleManager server.

There are three different ways to install the CycleManager X50 in the network.

3.4.1 Device network

Fig. 3-1: Device network

1 Mastercycler X50
2 Ethernet switch
3 Device network computer

Within the device network, the Mastercycler X50 devices are connected to a device network computer via an Ethernet switch. The device network computer is located close to the devices.

The following software is installed on the device network computer:
- CycleManager bridge and CycleManager server software modules
- CycleManager database
- Chrome browser

Eppendorf AG does not provide an Ethernet switch.
3.4.2 Distributed network

The time and date must be synchronized on all computers in this network configuration.

In a distributed network, the Mastercycler X50 devices are connected to a device network computer via an Ethernet switch. The device network computer is connected to the Ethernet switch and the corporate network via 2 Ethernet interfaces. The device network computer can be accessed by several clients via the corporate network.

The following software is installed on the device network computer:
• CycleManager bridge and CycleManager server software modules
• CycleManager database

The following software is installed on the clients:
• Chrome browser
3.4.3 Multiple distributed network

The time and date must be synchronized on all computers in this network configuration.

Fig. 3-3: Multiple distributed network

1 Device network
(see Device network on p. 13)
2 Device network computer
3 Server
4 Corporate network
5 Client

A multiple distributed network consists of several device networks. In any device network, the Mastercycler X50 devices are connected to a device network computer via an Ethernet switch. The device network computers are connected to the Ethernet switch and the corporate network via 2 Ethernet interfaces. A server that is connected to the corporate network communicates with the device network computers and provides the CycleManager X50 web interface. The installation can be used if the Cyclers are located in separate laboratories.
The following software is installed on the device network computers:
 • CycleManager bridge software module

The following software is installed on the server:
 • CycleManager bridge software module
 • CycleManager server software module

The following software is installed on the clients:
 • Chrome browser

### 3.5 Installing the CycleManager X50

#### 3.5.1 Preparing installation

Prior to installing the CycleManager X50, discuss the following issues with the IT administrator:
 • Integration of the CycleManager X50 into the network
 • Installation
 • Installation requirements, e.g., preparation of the corporate network, availability of the IT administrator on the installation day
 • Access rights required for installation
 • Devices that are to be managed by the CycleManager X50 must not be assigned to a Mastercycler X50 with a touch screen interface. Existing assignments must be canceled before assigning the Mastercycler X50 to the CycleManager X50.

The installation program configures the firewalls of all computers intended for installation of the CycleManager X50.

<table>
<thead>
<tr>
<th>Port number</th>
<th>Log</th>
<th>Direction</th>
<th>Activated for</th>
</tr>
</thead>
<tbody>
<tr>
<td>1887</td>
<td>TCP</td>
<td>in</td>
<td>CycleManager bridge</td>
</tr>
<tr>
<td>5353</td>
<td>UDP</td>
<td>in/out</td>
<td>CycleManager bridge</td>
</tr>
<tr>
<td>3030</td>
<td>TCP</td>
<td>in</td>
<td>CycleManager server</td>
</tr>
</tbody>
</table>

### Energy management

During installation, the computer’s energy management is reconfigured.

If the configuration fails, configure the energy management manually by making the following setting:

*Sleep mode (normal operation) = OFF*
3.5.2 Installing the CycleManager X50

Prerequisites
- You are logged in to the computer as administrator.
- The CycleManager X50 installation file is on a USB stick.

1. Insert the USB stick in the computer.
2. Double-click on the CycleManagerX50_Setup.exe file on the USB stick.
3. Read and confirm the safety instructions.
   Installation is started. You are guided through the installation.

4. Select the software modules to be installed.
   - *All features (default)*: Suitable for all networks. All modules of the CycleManager X50 are installed on the device network computer or the server.
   - *Bridge only*: Suitable for installation on multiple distributed networks. The CycleManager bridge module is intended for installation on a device network computer.
   - *Selected components*: Suitable for installation on multiple distributed networks. The CycleManager server module and other software modules are intended for installation on a server.

   If you selected the *Selected components* option, a list containing all software modules is displayed. In this list, all modules that have already been installed on the computer are deactivated.
   - Click on a triangle to change the selection.
   - Check if the installed modules are overwritten.

5. Restart the computer.
   Once the computer has been restarted, it takes two minutes for all components of the software to start. The installation is then complete and the software can be configured.
### 3.5.3 Configuring CycleManager X50

You will be guided through the configuration process after completion of the installation. The software starts a setup wizard. The setup wizard helps you complete the following tasks:

- **Creating a user**
- **Configuring the network**
  
  Device networks are automatically configured by the software.
  
  For distributed or multiple distributed networks, you need to enter the IP addresses of all device network computers into the setup wizard. To do so, enter the IP address of a bridge computer in the `Bridge IP-Adresse` field. To add a bridge computer, press the + key next to the field.
- **Assigning connected cyclers**
3.6 Performing an update
3.6.1 Performing a software update

Prerequisites
- You are logged in to the computer as administrator.
- The CycleManager X50 is on a USB stick

1. Insert the USB stick in the computer.
2. Double-click on the CycleManagerX50_Setup.exe file on the USB stick.
3. Read and confirm the safety instructions.
   Installation is started.
   The previous software version is deinstalled.
   You are guided through the installation.
4. Restart the computer.
   Once the computer has been restarted, it takes two minutes for all components of the software to start.
   The installation is then complete.
   The update is complete. The CycleManager X50 is up to date.

3.6.2 Firmware update

The firmware is integrated into the CycleManager X50 software.

When connecting a Mastercycler X50 with no operating panel to the CycleManager X50 software, the firmware of the device is automatically updated.

3.7 Deinstalling the CycleManager X50
3.7.1 Deleting the CycleManager X50 program

Prerequisites
- You are logged in on the computer as administrator.

1. In the Windows 10 operating system, select the Windows > Settings > Apps > Apps & features menu path.
2. Select CycleManager X50.
3. Press the Uninstall button.
   You are guided through the deinstallation.
4. Restart the computer.
   The deinstallation is complete.
4  Operation  
4.1  Operating the user interface  
4.1.1  Logging in and out as a user

To protect your login data, note the following points:
• Use a secure password.
• Change your password regularly.
• Do not write down passwords.
• Disable the autofill feature in your Internet browser.

1. Start the Chrome Internet browser.
2. Start the CycleManager X50: localhost:3030 or <Server installation IP>:3030 in the address bar in Chrome.
   The login window appears.

Logging in as a user

3. Enter your user name and confirm with Next.

4. Enter your password and confirm with Login.
   The user is automatically logged in once the correct password has been entered.
   The start window appears.

Logging out as a user

1. Click on Logout in the menu bar.
   The user is logged out and the login window appears again.
4.1.2 Start window

1 Navigation area
The navigation area is used for the management of programs, devices and users. Users with standard rights and administrators can directly access the Program manager in the navigation area.

2 Menu bar

3 Editing window
The editing window is used, for example, for editing PCR programs or controlling the connected devices.
4.2 Menu bar

1 Menu
2 Help
3 Logout
4 Logged-in user

4.2.1 Accessing the menu

1. Click on the Menu button.
   The menu items are displayed.
2. Select the menu item.
4.2.2 Menu > Info, Service Contact, Network, Backup/Restore

• Info
  – Software:
  – Server resources:
    Free hard disk space
  – Copyright
  – User:
    Logged-in user

• Service Contact
  – Service partner contact details

• Network
  – Configure notifications on a mail server. Prerequisite: An e-mail address is entered in the user profile.
    The following notifications can be sent via e-mail:
    The PCR program is in the final hold step.
    The set service function for a device will soon become necessary.
    The device is in an error state.
  – Configure the IP address of the bridge server.
    The server’s IP address is entered by default. You will need to enter additional IP addresses manually.

  Note: The interfaces used on the computer with the bridge server must not be renamed during operation.

• Backup/Restore
  Backup and restore the complete database (login data, programs, etc.).

  **Backup:** The backup of the database can be performed manually or automatically in regular intervals.
  If an automated backup is selected, the first backup is made after the first interval has expired.
  Example: In the event of weekly backups, the database is backed up for the first time after one week.

  **Restore:** Users have 5 minutes to finish all current tasks when the restoration of the database is started.
  After the *Restore*, the PC with the server installation should be restarted.
4.2.3 Menu > Settings

Only the administrator can make settings in the Settings menu item.

- **Firmware**
  - Firmware status: Current firmware version for all the connected devices.
  - Upload date: Date when the firmware was last changed.
  - Upload firmware: Depending on the settings under Menu > Settings > Service > Disqualification, a firmware update may lead to the disqualification of all connected devices.

You can search for and select the file with the firmware via the input line. If the update is performed, the new firmware is installed on all the connected devices.

If devices with a different firmware version are added, their firmware is automatically adjusted to the firmware version of the CycleManager X50.

- **Restart**
  - If the Auto restart function is active, the currently running program is automatically resumed after a mains/power outage. The Max interrupt time parameter defines how long a mains/power outage may last. The current program is not resumed if the device is supplied with power again after this time has elapsed.

- **Service**
  - Reminder functions for self test, verification and assay validation. After the defined parameters (intervals and number of program runs) have elapsed, the device can be checked with these functions. An appropriate test must be carried out depending on the disqualification setting.
    - Disqualification: Specify conditions when the device is no longer qualified.
    - Disqualification on software changes (Mastercycler X50 firmware)
    - Disqualification on hardware changes
    - Disqualification on failed self-test
    - Disqualification when verification expires

- **Assign Devices**
  - Assigned to this cyclemanager: All the devices that are assigned to the CycleManager are displayed.
  - Not assigned to this cyclemanager: All the devices that are detected in the network by the CycleManager and that are not assigned to this CycleManager are displayed.
4.2.4 Menu > Program manager

Program manager (see Programming on p. 33)

4.2.5 Menu > Log/Events/Protocols

The following views can be accessed in the Events window:

- **Log** are notifications that come from the server
- **Events** come from the Cycler and have all notification types: *Alarm, Warning, Notice*
- **Protocols**: List with the logged program runs

---

**Fig. 4-1: Events**

1. Notification or message
2. Search field
3. Filter options
4. Export of the displayed event list to the download folder
Accessing Events
1. Call up the Menu.
2. Select the Events/Log menu item and the Events tab.

Filtering the event list
3. Click on the button for the filter options.
   The selection with the filter options opens.
   • Device number: Number on the device display
   • Serial number: Serial number of the device
   • Priority: Priority of the notification (Warning or higher, Alarm or higher, Error)
   • Timespan: Time of the notification (Start Date, End Date)
   • Acknowledgement status: Status of the notifications (Acknowledged, Not acknowledged)
   • Program: Filtering by program name

4. Select the filter option.
   An input mask appears or a selection with further filter options.

5. Complete the input mask or select the filter option.
6. Confirm your entry with Add Filter or cancel with Cancel.
   The filtered notifications and messages are displayed.

If a filter is enabled, an icon appears next to the filter option.

To deactivate a filter, click on the symbol next to the filter option.

Accessing more information
- Select a notification or message from the event list.
  The window with the information about the selected notification or message appears.
  The window is closed with Close.

Exporting the event list
- Click on the Export button.
  The event list is saved as a CSV file in the download folder.
4.2.6 Menu > Log

**Fig. 4-2: Log**

1 Message

2 Filter options


Accessing Events
1. Call up the Menu.
2. Select the Events/Log menu item and the Log tab.

Filtering the (Log) list
3. Click on the button for the filter options.
   The selection with the filter options opens.
   • Device number: Number on the device display
   • Serial number: Serial number of the device
   • Priority: Priority of the notification (Warning or higher, Alarm or higher, error)
   • Timespan: Time of the notification (Start Date, End Date)
4. Select the filter option.
   An input mask appears or a selection with further filter options.
5. Complete the input mask or select the filter option.
6. Confirm your entry with Add Filter or cancel with Cancel.
   The filtered list is displayed.

If a filter is enabled, an icon appears next to the filter option.

To deactivate a filter, click on the symbol next to the filter option.
4.2.7   Menu > Protocols

Fig. 4-3:  Protocols

1  Protocol entry
2  Search field
3  Filter options
4  Export
Accessing the protocol
1. Call up the Menu.
2. Select the Protocols menu item.
   The list of logged program runs appears.

Filtering the protocol entries
3. Click on the button for the filter options.
   The selection with the filter options opens.
   • Device number: Number on the device display
   • Serial number: Serial number of the device
   • Timespan: Time of the notification (Start Date, End Date)
4. Select the filter option.
   An input mask appears.
5. Complete the input mask.
6. Confirm your entry with Add Filter or cancel with Cancel.
   The filtered protocol entries are displayed.

If a filter is enabled, an icon appears next to the filter option.

To disable a filter, click on the icon next to the filter.

Exporting protocol entries
1. Select the protocol entries for the export.
2. Click on the Export button.
   All the selected protocols are saved in a PDF file in the download folder.
3. To complete the process, confirm the message.
4.3 Self test

Any user can perform a self test.

The self test function provides a simple way of testing the correct function of the thermal cycler without any further tools.

1. Call Self test under Programs > System.
2. Select the device.
3. Continue by selecting Continue.

4. Follow the self test instructions.
   Note: If one of the lid sensor does not automatically detect the closed lid:
   • Press the I confirm that I have closed the lid / all the lids button.
   The self test is resumed.

5. You can save the results of the self test as a PDF file in the download directory with Self-test protocol.
6. End the self test with Close.
5 Programming
5.1 Program Manager overview
5.1.1 Accessing the Program Manager

On the home screen, call the Program Manager. The window with the Program Manager is displayed.

The Program Manager can also be called in the Menu.

The available folders and programs are displayed depending on the user rights.

Toolbar with editing functions
- **Delete** button: Folders or programs can be deleted depending on user rights. Your own folders and programs can always be deleted.
- **Copy** button: Copy programs
- **Paste** button: Paste programs
- **Share** button: Share programs with other users
- **Export** button: Copy programs to the Windows download folder
- **Import** button: Import programs. Programs cannot be imported if the program name contains special characters or umlauts.
- **Rename** button: Rename folders or programs
- **Set as template** button: Save programs as a template
- **Edit** button: Open and edit programs
- **Open** button: Open programs
Folders
- My folder folder: Folders for your own subfolders and programs
- Shared with me folder: Programs that other users have shared with me are shown in this folder.

Adding folders and programs
- + Add folder: Create a new folder
- + Add program: Create a new program

5.2 Creating a new folder

1. Select the folder, e.g., My folders in the folder structure.
2. Click on the + Add folder button.
   An input mask appears.
3. Enter a name for the folder.
4. Confirm the entry.
   The new folder is displayed under My folders.
5.3 Administration of folders

1. On the home screen, tap on the **Program Manager**. The options for editing the folders are displayed. Functions that cannot be selected are displayed in a light font.

2. Select a folder from the folder structure.
3. Click on the editing function. The window with the selected editing function opens.

The following editing functions for folders are available:

- **Delete** button: Folders can be deleted depending on the user rights. Your own folders can always be deleted.
- **Share** button: Share your own folders with other users.
- **Import** button: Import folders from the download directory.
- **Rename** button: Rename your own folders.
- **Open** button: Open the selected folder.
5.4 Creating a new program

Up to 1000 programs can be created and saved.

1. Select the storage location for the new program in the folder structure.
2. Click on the + Add program button. An input mask appears.
3. Select the template.
4. Enter a name for the program.
5. Confirm the entry with Add. The new program is saved in the selected folder.

5.5 Administration of programs

1. Select a program. The options for editing the programs are displayed. Functions that cannot be selected are displayed in a light font.
2. Click on the editing function. The window with the selected editing function opens.
3. Confirm the changes. The changes are saved.

The following editing functions for programs are available:

- **Delete** button: Delete a program
- **Copy** button: Duplicate the program
- **Share** button: Share your own programs with other users
- **Export** button: Copy the program to the Windows download directory
- **Import** button: Import the program
- **Rename** button: Rename the program
- **Edit** button: Edit the selected program
- **Open** button: Open the selected program
5.6 Adjusting program settings

1. Select a program.
2. Click on Edit.
   The window with the header settings and the program steps is displayed.
3. Click with the left mouse button in the header settings.
   The editing window for the header settings is displayed.

- **Name**: Program name
- **Lid Temperature**: Lid temperature settings
  - **Lid Temperature**: Activate or deactivate the heated lid
  - **Temperature**: Set the lid temperature (37 °C to 110 °C)
  - **Energy-saving mode**: If the function is enabled, the heated lid switches off when the block temperature falls below 15 °C.
- **Temperature Mode**: Block temperature control mode
  - Fast (≤10 μL)
  - Intermediate (10 μL–20 μL)
  - Standard (20 μL–50 μL)
  - Safe (>50 μL)
- **Block Settings**: Set the block type and limit the heating and cooling rates. The block type must be set for the correct gradient temperatures to be displayed.
- **Release State**: Select the program status.

Programs with the status "released" cannot be changed and can also be used by users with restricted user rights.
The status "released" can be withdrawn.

- Release programs after detailed examination only.
5.7 Editing programs

5.7.1 Selecting the program step

1. Select a program.
2. Click on Edit.
   The window with the header settings and the program steps is displayed.

3. Select the column with the program step to be edited.
   The window with the editing options appears.
   - Gradient: Set the gradients. Prerequisite: The block type has been correctly selected.
   - Increment or decrement time: Incremental change of the holding time to the next cycle
   - Increment or decrement temperature: Incremental change of the temperature to the next cycle
   - Limit ramp speed: Set the temperature control speed of the thermoblock
5.7.2 Inserting a program step

To the right and left of a program step there is a button with the plus sign (+). This button can be used to add further program steps.

1. Click on the + button to the left or right of a program step.
   A selection menu appears. You can select the following program steps depending on the previous or subsequent program step:
   - *Temperature*: Individual temperature step with adjustable block temperature and holding time.
   - *2-Steps Cycle*: Cycle program step with 2 temperature steps and an adjustable number of repetitions (1 to 99).
   - *3-Steps Cycle*: Cycle program step with 3 temperature steps and an adjustable number of repetitions (1 to 99).
   - *n-Steps Cycle*: Cycle program step with up to 40 temperature steps and an adjustable number of repetitions (1 to 99).
   - *Hold*: Temperature step with adjustable block temperature and indefinite holding time. The set temperature is maintained until the program is manually resumed or ended.

2. Select a new program step.
   The new program step is inserted.

3. Set all the parameters for the program step such as block temperature, holding time or number of repetitions.

4. Insert further program steps if required.

5. Save the finished program with *Save*.

5.7.3 Setting gradients

You can use a gradient step to optimize the specificity and yield in PCR reactions. A vertically or horizontally increasing temperature gradient is generated during the holding time. The temperature control rates before and after the gradient step are constant over the entire thermoblock.
The gradient function is only available if the **Block Settings** in the header settings for the device have been correctly selected. If **Any** is set, the gradient temperatures for the aluminum block 96 are displayed.

The gradient temperature can be set between 30 °C and 99 °C. If a gradient temperature below 30 °C was defined, an error message appears. The gradient spread is max. 30 °C

1. Select the column with the program step to be edited.
2. Switch on the function with **Gradient**.
3. Select a horizontal or vertical gradient function.
4. Define the lower and upper temperature in the left column.
5. Confirm the changes with **Ok**.

### 5.7.4 Defining increments and decrements

You can only define increments and decrements for program steps with several cycles.

1. Select the column with the program step to be edited.
2. Switch on the function with **Increment or decrement time**.
3. Select the increment or decrement for the cycle time.
4. Enter the cycle time under **Value**.
   - The duration of the next cycle will be increased or reduced by the set value.
   - Adjustable from 00:01 min to 01:00 min in 1 s increments.
5. Switch on the function with **Increment or decrement temperature**.
6. Select the increment or decrement for the block temperature.
7. Enter the block temperature under **Value**.
   - Adjustable within the block limits of 4 °C and 99 °C in 0.1 °C increments. An error message will appear if a block limit is exceeded or undershot.
8. Close the window.
9. Confirm the changes with **Ok**.
5.7.5 Defining the ramp

The ramp can be used to set the temperature control speed of the thermoblock.

1. Select the column with the program step to be edited.
2. Switch on the function with Limit ramp speed. The ramp that leads to the selected step is limited.
3. Enter the value for the ramp rate under Value. The maximum ramp rate depends on the cooling rate.
4. Confirm the changes with Ok.
5. Save the finished program with Save.

5.7.6 Deleting a program step

1. Select the column with the program step to be deleted.
2. Delete the program step with the x button.

A program step can also be deleted in the editing window of the program step.
- Click on the program step. The editing window of the program step will appear.
- Delete the program step with Delete step.
6 Device management
6.1 Devices in the navigation area
6.1.1 Devices in the overview

- In the navigation area, select the Devices tab.

All the devices that are assigned to the CycleManager X50 are displayed under All devices. The view can be adjusted. Filter options:
  - **View:**
    - Booking overview
    - Device overview
  - **Filter by:**
    - Filter the device selection
  - **Group by:**
    - Group the devices in the view
  - **Reset:**
    - Reset the filter settings

6.1.2 Devices in the single view

1. Select the device in the selection list.

   A window with information about the selected device appears.
6.1.3 Device information

Status
• Information about the current status of the selected device.

Info
• Device information
  – Name
  – Block
  – Lid type
  – Serial number
  – Firmware
  – Last adjustment
  – Last verification
  – Last self test
  – Last assay validation
  – Last user
  – Last program

Booking
• Booking system. The selected device can be booked with the + icon in the upper right corner:
  – Select the date in the calendar sheet and enter the start time.
  – Enter the duration of the booking.
  – Confirm the booking with Save.
  No further bookings can be created by other users for the booked period.
  In the calendar, in addition to the booking for the device, another booking is generated for the program which the user starts on the device on the booked date.

Events
• Notifications or messages that relate to the selected device are displayed.
  Filtering the event list (see p. 26)

Maintenance
• Self test: Any user can perform a self test.
• Assay validation: Validate the Assay Validation as administrator.
• Qualification: Set qualified status as administrator.
• Verification: Upload or view the verification protocol.
• Manual restart: Restart the device.

Log
• Lists of all activities between the device and the corresponding server.

Assignment
• The number on the device display
• Blink button: The status lamp on the device flashes white. This allows the user to identify the device more quickly.
6.2 Booking of devices

- Booking of programs (see Starting a program at a scheduled time on p. 59)

6.2.1 Displaying the bookings for all devices

- The booking overview displays the bookings for all devices.
  - You cannot create any bookings in the overview.
  - You can open, edit and delete existing bookings via the overview.

1. In the navigation area, select the Devices > All devices tab.
2. Go to the booking overview by using the View button.

6.2.2 Opening the booking page for devices

1. In the navigation area, select the Devices tab.
2. Select the device in the selection list.
   - The booking window for the selected device appears.
3. Select the Booking tab.
   - The booking view appears.
6.2.3 Navigating in the booking view

Bookings are displayed in yellow in the booking view.
Currently running programs are displayed in blue.

The following time views are available in the booking view:

• Yearly view with months
• Monthly view with days
• Daily view with hours

- Click on the top line in the booking view.
  The view changes to a more detailed time representation, e.g., from the monthly view to the yearly view.
- Click on an entry (month, day) in the header of the timeline.
  The view changes to a less detailed time representation, e.g., from the monthly view to the daily view.
- Move the timeline to the left or right using the arrow keys or with the left mouse button held down.
- Double-click on a booking.
  The booking is opened and can be edited or deleted.
  Bookings can be deleted via the x symbol in the top right-hand corner of the booking window.
6.2.4 Creating a new booking

1. Click on the + icon in the upper right corner of the booking view. The input window for bookings appears.

2. Click in the Start time input line. The calendar sheet for the current month appears.

3. Select the date in the calendar sheet and enter the start time.

4. Enter the duration of the booking in the Duration input line.

5. Confirm and save the booking with Save. No other user can book or start the booked device during the booking period. Starting a program is not possible when the program’s end overlaps with a booking.

The booking expires if the device is not started within 15 minutes from the time of booking. A booking is automatically extended when two conditions have been met:
• A program with Start after lid movement is started on the booked device within the booking period.
• The lid is still open 15 minutes after starting.

Both users will be notified if there is a scheduling conflict with a subsequent booking.

In the calendar, in addition to the booking for the device, another booking is generated for the program which the user starts on the device on the booked date.

6.2.5 Editing a booking

1. In the booking view for a device, open a booking by double-clicking on it. The window for editing the booking appears. Alternatively, the booking can also be opened in the overview of all bookings.

2. Change the booking.

3. Select the devices.

4. Confirm your changes with Save. The booking is changed for the selected devices.
6.2.6 Deleting a booking

1. In the booking view for a device, open a booking by double-clicking on it. The window for editing the booking appears. Alternatively, the booking can also be opened in the overview of all bookings.
2. Select the devices.
3. Click on the Remove Cyclers button. The booking is deleted for the selected devices.
7 User administration

7.1 User administration via an LDAP server

User administration can be carried out either locally or via an LDAP server.

If the LDAP server fails, login is no longer possible. As soon as the LDAP server is back online after a failure, user administration will work again. Only an authorized service technician is able to log in if the LDAP server has failed. In this case, contact your local Eppendorf partner.

7.1.1 Configuring the LDAP server

1. Click on the Menu button.
2. Select the Authentication menu item.
3. Select LDAP.
   - User administration via the LDAP server is activated.
   - Local user administration is deactivated and can no longer be used.
4. Complete all the fields for LDAP settings.
   Detailed information on integrating the CycleManager X50 software into an existing LDAP can be found on the server computer in the directory C:\Program Files\CycleManager\Supplementary\.
5. Save the settings with Save.
7.2 The user administration concept

User administration can be used to organize access to PCR programs. There are three user roles:

- Administrator
- User with standard rights
- User with restricted rights

7.2.1 Administrator

The administrator has additional rights:

- Access to network functions and device management.
- Access to user administration

7.2.2 User with standard rights

A user with standard rights is allowed to use the CycleManager X50 without restrictions, create, rename, move and delete programs and folders.

7.2.3 User with restricted rights

A user with restricted rights is allowed to use the CycleManager X50 with restrictions, e.g., select, start and stop a program that has been shared with him and that is released.

7.3 Editing user accounts

 NOTICE! Data loss due to loss of the administrator password

The administrator is only able to change his password using his access data. If the administrator’s access data is lost, changes are no longer possible in the user administration and the system settings.
In this case, the administrator password will have to be reset by an authorized service technician or another administrator.

- Create a second user account with administrator rights.
- Keep the administrator password secure.
7.3.1 Creating a user account

A user account can only be created as an administrator.

1. On the User tab, click on the Add user (1) button. An input mask appears.

2. Complete the mandatory fields (2) and assign access rights.
3. Import an optional photo (1).
4. Optional: Complete the contact details and comments.
5. Confirm your entries with Save or cancel with Cancel.
   The user account has been created.
7.3.2 Editing user accounts

Users with restricted rights or standard rights can only edit their own entries. They can also change their own password. Administrators can change the access rights for user accounts, reset passwords or delete user accounts. The administrator can only change the password for his own user account. The user name cannot be changed by either the administrator or the user.

1. On the User tab, select a user.
2. Click on the Edit (1) button.
   An input mask appears.

3. Enter the changes in the user profile.
4. Assign the access rights.
   • Administrator
   • User
   • Restricted User
5. Confirm the entries with Save.
The changes are saved.
7.3.3 Deleting a user account

User accounts can only be deleted by the administrator. An administrator cannot delete his own user account.

1. On the User tab, select a user account to be deleted.
2. Click on the Edit (1) button.
   An input mask appears.
3. Click on the Delete (1) button.
4. Confirm the deletion of the user account with Delete.
   The user account is then deleted.
7.3.4 Resetting the password for a user account

If the user has forgotten his password, the administrator can create a new password.

The administrator is only able to change his password using his access data. If the administrator’s access data is lost, changes are no longer possible in the user administration. In this case, the administrator password will have to be reset by an authorized service technician or another administrator.

- Create a second user account with administrator rights.

1. On the **User** tab, select a user account.
2. Click on the **Edit** (1) button. An input mask appears.
3. Re-enter the password.
4. Confirm the entries with **Save**. The user can then log on with the reset password and is prompted to create a new personal password.
8 PCR run
8.1 Loading the thermoblock
8.1.1 Selecting the sample tubes

WARNING! Biohazard due to unsuitable reaction vessels, plates and lids.
Unsuitable reaction vessels, plates and lids will get damaged in the Cycler. This will release sample material.

- Only use reaction vessels, plates and lids that meet the requirements specified in the operating manual.

Approved sample tubes for devices with a 96-well thermoblock

The thermoblock can be loaded with the following sample tubes:

- 0.1 mL PCR strips
- 0.2 mL PCR tubes and PCR strips
- 96-well PCR plates

Approved sample tubes for devices with a 384-well thermoblock

The thermoblock can be loaded with the following sample tubes:

- 384-well PCR plates

Approved sample tubes for devices with High Pressure Lid

Devices with a High Pressure Lid can be loaded with the following sample tubes:

- 96-well PCR plates

Compatible PCR plate types

The following PCR plate types are compatible.

<table>
<thead>
<tr>
<th>Semi-skirted PCR plate</th>
<th>Skirted PCR plate</th>
<th>Non-skirted/unskirted PCR plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCR plate with surrounding half-edge.</td>
<td>PCR plate with a surrounding edge.</td>
<td>PCR plate without any surrounding edge.</td>
</tr>
</tbody>
</table>
Requirements for sample tubes

The sample tubes must meet the following requirements:

- Temperature resistance at least 120°C
- Exact fit in the thermoblock

Maximum volumes

The possible sample volumes can vary depending on the tubes used.

For devices with a 96-well thermoblock
- PCR plates: max. 100 μL
- 0.1 mL PCR strips: max. 100 μL
- 0.2 mL PCR tubes and PCR strips: max. 100 μL

For devices with a 384-well thermoblock
- PCR plates: max. 25 μL

8.1.2 Inserting the sample tubes

WARNING! Biohazard due to sample material directly in the thermoblock.

- Do not fill sample material directly into the thermoblock.
- Only use reaction vessels, plates and lids that meet the requirements specified in the operating manual.

WARNING! Biohazard when tempering with the heated lid open.

Observe the following notes:

- Never run a program with an empty thermoblock. Always equip the thermoblock with PCR plates or PCR tubes when running a program.
- Place the tubes or strips into the center of the thermoblock and ensure that they are symmetrically positioned.
- Load the thermoblock with at least 5 tubes. If you have fewer reaction batches, also add empty tubes so the thermoblock is loaded with at least 5 tubes.

Very soft PCR tubes may become deformed at high temperatures. To prevent deformations:
- Increase the number of empty sample tubes in the thermoblock.
- Reduce the temperature of the heated lid.
- Use original Eppendorf PCR consumables. Eppendorf PCR consumables are optimally suited for the device.
8.2 Selecting a program

8.2.1 Selecting a program

Restricted user: The programs that can be used by users with restricted rights are displayed in the Shared with me folder.

1. In the navigation area, select the Programs tab. The available folders with programs are displayed depending on the user rights.
2. Open the My folders folder. Your own folders are displayed.
3. Open one of your own folders. Your own available programs are displayed.
4. Select a program. The editing window displays information about the selected program.

8.2.2 Information about programs

Further information can be called via the tabs in the editing window of a selected program.

Program

Display of the set parameters and the current program release status. The individual program steps of the selected program are displayed next to the parameters.

- Edit: Adjust the program
- Start: Start the program

Infos

Organizational information about the selected program.

Protocols

All the recorded protocols for the selected program.

Comment

Comments edited via the Edit button.
## 8.3 Starting a program

1. Select the program on the **Programs** tab. The editing window displays information about the selected program.
2. Click on the **Start** button.

3. Select **Start now**.
4. Continue by selecting **Continue**. All the devices that are currently connected to the CycleManager X50 are displayed.

With **Schedule start** the program start can be scheduled at a later time and the devices can be booked depending on the program.

5. Select the device. It is possible to select several devices. Multiple devices can also be selected by clicking and dragging a frame around all of their icons. You can use the **Select all current available**/**Deselect all current available** button to select or deselect all the available devices. The selection can be restricted via a drop-down list using the filter function.
6. Continue by selecting **Continue**.
8. Define the start time. The following options are possible:
   • **Start now**: The program starts immediately.
   • **Countdown to start**: The program starts after a defined period of time (1 min - 120 min).
   • **Start after lid movement**: The program starts after the device lid is closed.

8. Start the program.

8.4 Starting a program at a scheduled time

8.4.1 Reserving a device

1. Select the program on the **Programs** tab. The editing window displays information about the selected program.
2. Click on the **Start** button.
3. Select **Schedule start**.
4. Click in the **Date** input line. A calendar sheet for the current month appears.
5. Select the date in the calendar sheet and enter the start time.
6. Confirm the booking and continue with Continue.
   All the devices that are connected to the CycleManager are displayed.

7. Select the device.
   You can select the devices manually. It is possible to select several devices.
   If there is an overlap, the device cannot be selected and the message Status: Device is booked appears.
   You can use the Select all current available/Deselect all current available button to select or deselect all the available devices.
   The selection can be restricted via a drop-down list using the filter function.
8. Continue by selecting Continue.
   All the information about the reservation of the device is displayed.

9. Define the type and time of the notification.

   Possible types of notification:
   • E-mail
   • Notification function from Chrome

10. Close the window.
    The reservation has been completed.
8.4.2 Starting the program at a scheduled time

Prerequisites

- The device has been reserved

A window appears at the scheduled time.

If the program is not executed within 15 min, the reservation will be deleted and the device released.

1. Load the thermoblock.
2. Close the heated lid.
3. Click on the Start button.

The program is executed on the reserved device. You can cancel your reservation by selecting Dismiss.
8.5 Pausing and resuming a program

The Pause, Stop and Resume functions can be executed in the program view, in the device overview and in the single view.

1. Select a program on the Programs tab.
   If the selected program is running on one or more devices, the current information about this program and the devices is displayed in the lower half of the screen.
   - Number of devices on which the program is executed.
   - Program name
   - Device number on which the program is executed.
   - Time remaining
   - Time at which the program is due to finish.

2. Move the mouse pointer to the display of a device. An overlay appears with the Pause and Stop buttons.

   Group actions: With the Pause and Stop buttons, these functions are executed for all devices on which the selected program is running.

3. Click on the Pause button.
   The program is paused.

4. Click on the Resume button.
   The program is resumed.

   Programs can be resumed in the program view and in the device overview.
   Paused programs can be grouped and then all resumed together in the device overview under All devices.
8.6 Aborting the program

You can execute the Pause, Stop and Resume functions in the device overview and in the single view.

1. Select a program on the Programs tab.
2. Move the mouse pointer to the display of a device. An overlay appears with the Pause and Stop buttons.
3. Click on the Stop button.
   A window with a confirmation prompt appears.

Group actions: With the Pause and Stop buttons, these functions are executed for all devices on which the selected program is running.

4. Confirm the program termination with Stop cyclers.
   The program is ended.

8.7 Incubate

The thermoblock and the lid can be temperature controlled independently of a PCR run.

The Incubate function can be set for one, two, multiple or all devices.
Accessing the *Incubate* function

1. Access the *Incubate* function under Programs > System.
2. Set the temperature for the thermoblock.
3. Activate the *Incubate* function for the thermoblock.
4. Set the temperature for the lid.
5. Activate the *Incubate* function for the lid.
6. Confirm the settings with Start.

Assigning a device

7. Select one or more devices.
8. Continue by selecting Continue.

Starting the *Incubate* function

9. Define the start time. The following options are possible:
   • *Start now*: The program starts immediately.
   • *Countdown to start*: The program starts after a defined period of time (1 min - 120 min).
   • *Start after lid movement*: The program starts after the device lid is closed.
10. Start the *Incubate* function.
**Ending the *Incubate* function**

11. Select one or more devices.
12. Use *Stop* to end the *Incubate* function.
PCR run
CycleManager X50
English (EN)
Evaluate Your Manual

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