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**Safety information**

**Electrical symbols**
The following table describes the electrical symbols displayed on the Streck Philisa Thermal Cycler and in the Operator’s Manual.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Power On]</td>
<td>Indicates the power ON position of the main power switch. Located on the back of the instrument.</td>
</tr>
<tr>
<td>![Power Off]</td>
<td>Indicates the power OFF position of the main power switch. Located on the back of the instrument.</td>
</tr>
<tr>
<td>![Grounding Terminal]</td>
<td>Indicates a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument. Located inside of the instrument.</td>
</tr>
</tbody>
</table>

**Safety symbols**
The following table describes the safety symbols displayed on the Philisa Thermal Cycler and in the Operator’s Manual. Each symbol may be included with text or by itself. These symbols may appear next to the identified potential danger or text describing the potential danger.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Hot Surface]</td>
<td>The symbol indicates the location of a possible hot surface or hot temperature hazard. Continue with caution. Located at the top of the instrument.</td>
</tr>
<tr>
<td>![Warning]</td>
<td>Indicates a potentially hazardous situation which, if not avoided, could result in a minor or serious injury or possibly death.</td>
</tr>
<tr>
<td>![Electrical Hazard]</td>
<td>Electrical hazard. A hazardous situation which, if not avoided, could cause physical injury or death as a result from working on an instrument when the high voltage power supply is operating.</td>
</tr>
</tbody>
</table>

**Environmental symbols**
The following symbol applies to all Streck electrical and electronic products for sale on the European Market after August 13, 2005.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![WEEE]</td>
<td>This product should not be disposed as unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE). Located on the back of the instrument.</td>
</tr>
</tbody>
</table>

**Safety precautions**

**Important!** You must read the following before using the Streck Philisa Thermal Cycler. The precautions set forth are for your safety and to help reduce the risk of injury to persons and property. Failure to follow the precautions could increase the risk of electrical shock, overheating, fire or some other potentially dangerous condition. Failure to follow the precautions also shall violate any warranty you may have from Streck.

- You must make sure that the Philisa Thermal Cycler is electrically grounded. Use a properly grounded three-terminal power receptacle for the thermal cycler. Do not remove the grounding pin on the three-prong power cord or use an adapter that does not provide the ground protection.
- Your Philisa Thermal Cycler includes all required fuses. If a fuse must be replaced, contact Streck Technical Service.
- You must assure that the power you supply to the Philisa Thermal Cycler satisfies the power supply requirements specified by Streck. Excessive power may cause the instrument to malfunction and become damaged.
- The Philisa Thermal Cycler must be operated with its cover properly installed. Do not disassemble the thermal cycler nor operate with the cover removed. Do not attempt to service the thermal cycler or access internal components.
- As with any other electrically powered device, you must not operate the Philisa Thermal Cycler under any wet conditions. Keep the thermal cycler, the computer, and all electrical cords away from water and other liquids. Severe electrical shock could occur if any parts of the instrument come in contact with water or other liquids. Do not submerge any parts of the instrument into water or other liquids. Do not place or operate the system near any liquid or sink. Clean only with the approved cleaning method, refer to “Chapter 7, Maintenance,” and do not operate the thermal cycler until the cleaning solution has thoroughly dried. Do not operate the thermal cycler or touch the power cord with wet hands.
- If the power cord or USB data cord is broken, cut, cracked or damaged, contact Streck Technical Service for replacement part(s). To prevent electric shock, do not use the cycler if either cord is damaged.

**Instrument set-up**

- The Philisa Thermal Cycler must be operated on a sturdy, flat surface.
- Ensure the power cord and power switch are easily accessible. Secure the power cord and USB cord to prevent a tripping hazard.
- The Philisa Thermal Cycler will not properly cycle if the side cooling fan does not have adequate air flow. Do not place the thermal cycler within...
0.3 m (1 ft) of any wall or other object that may block the side air slots or impede access to the power switch. Improper air flow will result in unexpected cycling behavior and may cause the machine to overheat.

- Do not place the thermal cycler in an environment which is outside of the temperature or humidity requirements in the specifications list. Do not place the thermal cycler next to equipment such as heating devices or radiators that may affect the immediate area.
- Do not place the thermal cycler in an environment that is conducive to fire or explosion.

Moving the instrument
- Unplug both the power cord and USB cable from the instrument prior to moving.
- Do not move the instrument during or immediately following thermal cycling. Wait at least 30 minutes or at least until the parts of the thermal cycler have cooled to room temperature before moving the thermal cycler to a new location.
- Place the instrument in a proper location as described above under “Setting up the instrument.”

Operating the instrument
- If biohazardous material is used in the thermal cycler, then universal precautions appropriate for the biohazard should be taken.
- Wear appropriate personal protective equipment when handling chemical hazards with the thermal cycler. Consult the relevant safety data sheet (SDS) for chemical safety and handling guidelines for the specific chemicals used.
- The Philisa Thermal Cycler will not operate properly if you prevent the side cooling fan from functioning. Do not stick objects into the fan or place objects near the fan which may fall into the air slots. Improper fan function will result in unexpected cycling behavior and may cause the instrument to overheat.
- The heat block area will become hot during operation. Use caution when inserting and removing PCR tubes from the heat block area.

Cleaning or decontaminating the instrument
- Turn off the Philisa Thermal Cycler and unplug the power cord before attempting to clean the instrument.
- Do not submerge the Philisa Thermal Cycler in water or any cleaning agent.
- Do not pour or spray water or any cleaning agent onto or into the thermal cycler.
- Use only approved chemicals and methods to clean the instrument. Refer to “Chapter 7, Maintenance.”

Safety standards
The Philisa Thermal Cycler has been tested to and complies with standards:

US & Canada safety standards
- UL 61010-1 - SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - PART 1: GENERAL REQUIREMENTS - Edition 2 - Revision Date 2008/10/28
- CSA C22.2 NO. 61010-1 - SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE, PT. 1, GENERAL REQUIREMENTS - Edition 2 - Revision Date 2008/10/01
- IEC 61010-1 (2ND ED.) - SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - PART 1 : GENERAL REQUIREMENT - Edition 2 - Issue Date 2001/02/01
- IEC 61010-2-010 - SAFETY REQUIREMENTS FOR ELECTRICAL MEASUREMENT, CONTROL, AND LABORATORY USE. PT. 2-010, PARTICULAR REQUIREMENTS FOR LABORATORY EQUIPMENT FOR THE HEATING OF MATERIALS - Edition 2 - Issue Date 2003/06/01
- CSA C22.2 NO. 61010-2-010 - SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE. PT. 2-010, PARTICULAR REQUIREMENTS FOR LABORATORY EQUIPMENT FOR THE HEATING OF MATERIALS - Edition 2 - Issue Date 2004/07/01

Canadian EMC standard

European safety and EMC standards
Safety

EMC
This instrument meets European requirements for emission and immunity (EMC Directive 2004/108/EC). This instrument has been tested to and complies with standard EN 61326 (Group 1, Class B), “Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements” and LVD 2006/95/EC.

Australian EMC standards
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- Computer specifications .....................................30
Introduction
The Philisa® Thermal Cycler is an innovative high speed polymerase chain reaction (PCR) instrument with the potential to improve laboratory efficiency and flexibility. Precise thermal control, short hold times, and thin-walled plastic tubes enable labs to perform rapid and reliable PCR.

The speed you need
PCR amplification time can be significantly reduced with the Philisa Thermal Cycler. While other thermal cyclers offer ramp rates of 5°C/s, Philisa achieves heating ramp rates as fast as 15°C/s and cooling ramp rates as fast as 12°C/s.

The flexibility you want
• Easily create complex protocols with Philisa’s intuitive Windows®-based software. Developed with input from industry experts, the simple yet versatile program will meet your protocol design needs both now and in the future.
• Perform fast PCR under a diverse range of assay conditions, variable reaction volumes, various nucleic acids, and different enzyme brands while still achieving fast amplification.

The reliability you expect
• Reproducibility between wells and specific, high-yield results are critical to successful PCR. Philisa’s temperature accuracy and short hold times enable specific high-yield PCR for even the most difficult templates.
• Streck offers a two-year instrument warranty and a Technical Service team to answer any questions.
Philisa PCR Tube features
- Validated reaction volumes: 10-50 µL
- Thin wall design for efficient heat transfer
- Attached, tight-locking lids with writeable surface
- DNase, RNase free and packaged in quality sealed containers

Applications
The Streck Philisa Thermal Cycler is intended for use as a general laboratory device for the amplification of nucleic acids in clinical and research laboratories.

How Philisa Works
The Streck Philisa Thermal Cycler achieves ultra-fast ramp rates due to its innovative design including dual Peltier modules, low mass silver block, advanced thermal control, and thin wall Philisa PCR Tubes.

Need more information?
To obtain additional documentation, visit www.streck.com.

About Streck
Founded in 1971 and headquartered in Omaha, Nebraska, Streck manufactures hematology, chemistry, immunology, and molecular laboratory products. Recognized worldwide as a leader in cell stabilization, Streck has an extensive list of patented products. The company continues to invest significant resources in research and development to meet the evolving needs of laboratories around the world.

Streck’s Quality Management System complies with the FDA Quality System Regulation (QSR) and is registered compliant with ISO 9001, ISO 13485, and SOR/98-282 (Canadian Medical Devices Regulations). In addition, Streck manufactures 30 products that have been declared compliant with 98/79/EC, which is the European Union’s In Vitro Diagnostic Medical Devices Directive.
CHAPTER 2

Getting Started

Need help? Call Streck Technical Service

The Philisa Thermal Cycler is supported by a staff of experienced Medical Laboratory Scientists who welcome the opportunity to assist you. Our technical service representatives have immediate access to the Philisa Thermal Cycler and are an excellent resource to answer your product questions or assist with setup and troubleshooting.

Call Streck Technical Service during business hours Monday-Friday from 8 a.m. to 5 p.m. Central time at 1-800-843-0912, e-mail technicalservices@streck.com, or send a fax to 1-402-691-7518.

Site requirements

See Appendix - Instrument Specifications for more information.

For indoor use only.

The Philisa Thermal Cycler is designed to operate safely under the following conditions:

<table>
<thead>
<tr>
<th>Operating Temperature:</th>
<th>10°C to 30°C (50°F to 86°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Relative Humidity:</td>
<td>20% to 60%, non-condensing</td>
</tr>
<tr>
<td>Operating Altitude:</td>
<td>-100 m to 2000 m (6562 ft)</td>
</tr>
</tbody>
</table>

For optimal performance and longevity of the Philisa Thermal Cycler, the following working conditions are recommended:

<table>
<thead>
<tr>
<th>Operating Temperature:</th>
<th>15°C to 25°C (59°F to 77°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Relative Humidity:</td>
<td>20% to 60%, non-condensing</td>
</tr>
<tr>
<td>Operating Altitude:</td>
<td>up to 1500 m (4921 ft)</td>
</tr>
<tr>
<td>Voltage:</td>
<td>100-120 VAC or 200-240 VAC and 50 / 60 Hz</td>
</tr>
<tr>
<td>Power Consumption:</td>
<td>400 VA max (thermal cycler); 50 W max (computer)</td>
</tr>
</tbody>
</table>

Ventilation Requirements: Keep at least 0.3 m (1 ft) of clearance between the side vents and any large object that may restrict the air flow. Allow adequate space to access the power cord and power switch.

*If the Philisa Thermal Cycler is used in ways other than specified in this manual, the protection provided by the equipment may be impaired. Streck cannot take any responsibility for injuries or accidents that might occur as a consequence.*
Unpacking the Philisa Thermal Cycler

**Important!** Retain all packaging materials for shipping, storing or moving the instrument.

**Packing materials list**
Please contact Streck Technical Service if any items are missing or damaged **1-800-843-0912**.

- Philisa Thermal Cycler
- Philisa Thermal Cycler power cord
- Philisa Thermal Cycler Operator Manual & Quick Start Guide
- Certificate of Conformance
- Philisa PCR Tubes
- Computer
- Computer power cord
- USB cord
- Philisa PCR tube rack
- Well label identifiers
- Flash drive
- Thin-tip Sharpie®

**Unpacking instructions**
1. Remove the thermal cycler, computer, and accessories from shipping boxes.
2. Place the thermal cycler and computer side-by-side on a flat, level surface with at least 0.3 m (1 ft) of airspace on either side of the thermal cycler. See Figure A. See the Safety Information section regarding safe locations for the equipment.

**Instrument set-up**
**Connecting supplied cords**
- Connect the Philisa Thermal Cycler power cord and computer power cord to each instrument and a properly grounded wall outlet.
- Connect the USB cord to the Philisa Thermal Cycler and the computer. See Figure B.

**Applying well label sticker**
If desired, apply a well label sticker underneath the wells as shown in Figure C. You have the option of applying labels 1-8 or A-H depending on your preference. Make sure the numbers or letters are aligned under each well. Once applied to the unit, the sticker is removable.

**Powering ON the computer**
Turn on the computer by opening the lid and pressing the power button in the upper left corner. See Figure D.
The Philisa software will automatically launch when the computer is turned on.

Tip! This manual can be opened on the computer at any time by pressing the blue “Help” button in the upper right hand corner of the software screen.

Important! To ensure proper functioning, it is imperative that no additional programs are installed on the computer by users. Adding programs will void the computer warranty. Do not connect the computer to the Internet.

Powering the instrument
Toggle the power button located at the back of the unit to the ON position ( | symbol is on, 0 symbol is off). See Figure E. A blue light on the front left corner will illuminate and the fan will begin to rotate. To power down the Philisa Thermal Cycler, toggle the button on the back of the unit to the OFF position. The blue light will turn off and the fan will stop rotating.
Philisa PCR Tubes
Philisa PCR Tubes are required for use with the Philisa Thermal Cycler. Each tube is manufactured by a certified DNase and RNase free process. One container of tubes is included with the instrument purchase and additional tubes can be obtained by contacting Streck at 1-800-843-0912.

Philisa PCR Tubes are for single use and should be stored at 18°C to 30°C and shipped at ambient temperature.

GLOSSARY OF HARMONIZED SYMBOLS

<table>
<thead>
<tr>
<th>LOT</th>
<th>REF</th>
<th>Catalog Number</th>
<th>Consult Instructions For Use</th>
<th>Temperature Limitation</th>
<th>Single Use Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Warning! Use universal precautions for biohazardous materials.

Warning! Wear appropriate personal protective equipment when using chemical hazards with the thermal cycler. Consult the relevant safety data sheet (SDS) for chemical safety and handling guidelines.

1. Prepare the reaction
   1. Prepare mastermix according to experimental design.
   2. Pipet mastermix and sample into the Philisa PCR Tube using gel loading pipet tips. Utilize the Philisa PCR tube rack to securely hold the tubes during preparation. See Figure A.
   3. Close the lid on the Philisa PCR Tube tightly. You should hear or feel the lid snap shut when it is securely closed.
   4. Label the tube with the Philisa Sharpie or a permanent marker if needed.
2. Insert the tubes in the thermal cycler

1. Open the thermal cycler lid and carefully insert the Philisa PCR Tube into any available well.
2. Press the tube into the well until the reinforced collar comes in contact with the silver block. **You will feel resistance when inserting the tube into the well; however, once the reaction is complete the tubes can be removed easily.** See Figure B.
3. Close the thermal cycler lid and ensure both the Philisa Thermal Cycler and computer are turned on with the Philisa software home screen displayed.

**Warning!** The Philisa Thermal Cycler heat block area will become hot during use. Do not touch the metal heat block until the thermal cycler has cooled to room temperature.

**Tip!** The Philisa Thermal Cycler lid is not heated. When utilizing short hold times for the Philisa Thermal Cycler fast protocols, evaporation is minimized. A mineral oil overlay may be beneficial when long hold times and small reaction volumes are utilized, but otherwise is not required.

3. Create protocol and monitor run - overview
Refer to Chapter 4 for detailed instructions regarding programming protocols.

**Select protocol**
- Select a favorite protocol, saved protocol, create a new protocol, or use a predefined protocol.

**Adjust time, temperature, and cycling settings**
- Enter temperatures and hold times for each PCR step in the Temperature Settings Window.
- Enter the cycling stage conditions with the starting step number, final step number, and the number of cycles.
- Write protocol notes in the protocol instruction box (optional).
- Save protocol. The protocol may also be locked to prevent accidental alteration.
- Add protocol to a favorite list (optional).

**Perform protocol and monitor run**
- Ensure the thermal cycler is turned on.
- Click the Start Run button to run the protocol.

4. Remove PCR reaction from thermal cycler and tube
- Once the PCR run is completed, a pop up message will be displayed indicating “Run has completed.”
- The run data, temperature graph, and optional run notes may be saved (optional).
- Open the thermal cycler lid and remove tubes, avoiding contact with heat block.
- To remove the PCR reaction from the Philisa PCR Tube, utilize gel loading pipet tips. See Figure C.
CHAPTER 4
Software Overview

3-Part process
The Philisa software features a simple design that guides users through the PCR protocol set-up process while still allowing flexibility to create complex protocols as needed.

- Part 1 – Select Protocol
- Part 2 – Enter Temperature Settings
- Part 3 – Start Run

The Philisa software will automatically launch when the computer is turned on or can be launched manually by clicking on the desktop icon. The software home screen will open as shown below.

Important! No other software may be run or installed as other software may harm the computer and void the warranty. Accessing the Internet may expose the computer to software viruses and void the warranty. Verify that USB flash drives used to transfer saved files are virus free prior to inserting into the computer. A USB flash drive that has been infected with a virus from another computer may damage the thermal cycler computer and void the warranty.
Part 1 - Select Protocol

The first time the software is opened, you will see a “New” blank PCR protocol. The next time the software is opened it will default to the last protocol that was either saved or loaded.

You have the option to select a previously designated “Favorite” protocol, open a previously “Saved Protocol,” or start a “New” blank protocol. Alternatively, you may choose a pre-programmed “2-Step” protocol or “3-Step” protocol as a convenient starting point and edit as needed.

Opening a recently used or favorite protocol
Click the blue “Favorites” button to display the favorites window which is subdivided into three sections: Recently used protocols, Favorite protocols, and the Add/Delete User or Category section.

• **Recently used protocols** – Display up to ten of the most recently saved or opened protocols. The date the protocol was last saved is shown to the right of the protocol name. Click on the protocol name to open.

![Recently used protocols table]

• **Favorite users or categories** - Display up to ten user defined categories or user names, and up to ten favorite protocols per category or user name. The date the protocol was last saved is shown to the right of the protocol name. Click on the protocol name to open. (Instructions for creating favorite categories and protocols are in Part 2 – Temperature Settings).

![Favorite categories table]

• **Add/delete user or category** - Instructions are in Part 2 - Temperature Settings.

Opening a saved protocol
Click the blue “Saved Protocols” button to open a window displaying previously saved protocols. Click on a protocol name to open.

Creating a new protocol
Click the blue “New” button to display a blank template. Enter temperature and times as described in Part 2 - Temperature Settings.

Opening pre-programmed protocols (2-step or 3-step)
Click the blue “2-Step” or “3-Step” button to display a pre-programmed protocol which can be edited as needed.
**Part 2 - Protocol Settings**

After selecting an existing or a new protocol, modify the temperatures, times, number of steps, and protocol instructions as needed.

**Entering temperatures and hold times:**
- **“Temp”** - Temperatures can range between 15°C and 100°C in 0.1°C intervals.
- **“Time”** - Hold Times must be entered in seconds and can range between 0 s and 3600 s in 0.1 s intervals.

**Tip!** Annealing and denaturation hold times of at least 5 s are recommended.

**Tip!** When entering the temperature or time, do not enter units such as “°C” or “s” in the entry box.

**Adding and deleting steps:**
- **“Add Step”** - To insert a step above the first step, click the blue up arrow button. To add a step below an existing step, click the blue down arrow button or .
- **“Delete Step”** - To delete any PCR step, click the red delete button.

**Software error messages**

**Important!** If a message is displayed indicating an unknown error, please write down the error message and contact Streck Technical Service.
Entering temperature cycling stage

- **“From step”** - Enter the line number of the first step you want to include in the cycle, which is typically denaturation.
- **“Through step”** - Enter the line number of the last step you want to include in the cycle, which is typically extension or, for 2-step PCR, a combined annealing/extension.
- **“# of Cycles”** - Enter the number of times these steps will be repeated. All of the steps in the cycling list are repeated for the number of times marked in the “# of Cycles” box. The number of cycles can range from 1 to 999.

![Temperature Cycling Table]

**Tip!** PCR steps occuring before the first cycling stage are considered to be pre-cycling steps (i.e., hot-start activation, reverse transcription, etc.). PCR steps which are after the cycling stage(s) are considered to be post-cycling steps (i.e., final extension, cooling to stop the PCR reaction, etc.).

**Tip!** The number of cycles listed in the “# of Cycles” box is the exact number of times those temperature stages will be reached. For example, entering 30 in the “# of Cycles” box will result in 30 annealing and denaturations, not 31.

**Tip!** A warning message will appear if any entry is invalid (i.e., alpha characters, symbols). Entries must be corrected before PCR can start and before the protocol can be saved.

- **“Add New Cycle”** - Click “Add New Cycle” to include multiple cycling stages. You can include up to 3 cycling stages in each protocol.

- **Removing a cycle stage:** To remove a cycling stage, click on the grey delete button ✗.

**Tip!** The cycling stages in different cycling boxes can be sequential (for nested PCR, step-down PCR, or step-up PCR) or overlapping (for advanced PCR protocols such as oscillating annealing conditions). In the example protocol below, there is a 95°C pre-hold hot-start step, followed by a step-up PCR. The example protocol has 15 cycles of (94°C denaturation and 58°C annealing) and then 15 cycles of (94°C denaturation and 60°C annealing).
Protocol notes or instructions
Notes can be entered in the “Protocol Instructions” box and saved for future reference.

![Protocol Instructions](image)

Saving protocols
“Save Protocol” - Click the blue “Save Protocol” button to save the protocol and all associated instructions. Enter the protocol file name. Files will be saved in the PCR Protocols folder located in the Documents Library. Subfolders can be created as needed.

![Save Protocol](image)

Tip! A red “Protocol Changed” message appears above the temperature cycling boxes if the protocol has been changed and needs to be saved before continuing.

Locking a protocol
To lock a protocol to prevent accidental alteration, enter the Administrator Password in the Advanced Options tab and then click on the grey lock icon.

![Lock Protocol](image)

Tip! The first time the software is opened, the password is blank.

Tip! Any time the correct administrator password is entered in the Advanced Options tab, protocols can be locked and unlocked. To prevent alteration of existing locked protocols, the password must be cleared from the field.

The following message will be displayed. Click “No” to cancel and “Yes” to continue.

![Lock Protocol Confirmation](image)

After choosing “Yes,” the Save As window will appear allowing you to name and save the protocol that you wish to lock. Click “Save” to lock and save the protocol. The lock icon will turn red, indicating that the protocol is locked, and the protocol fields will no longer be editable.
Unlocking a protocol
To unlock a protocol, enter the administrator password in the Advanced Options tab and click the red lock icon. The protocol will immediately unlock and the lock icon will turn grey.

Tip! The saved version of the protocol will continue to be locked unless an unlocked version is saved as a replacement.

Setting the administrator password
To change the password, type the current password into the “Administrator Password” box under Advanced Options, and click the blue “Change Password” button.

An instructional message will be displayed. Click “OK” to continue.

Type a new password in the New Password and Confirm New Password boxes in the Advanced Options Tab. Click the blue “Set New Password” button to change the password.

Tip! Passwords can be up to 21 characters and are not case sensitive. Any combination of numbers and letters may be used.

Tip! Record the password in a secure location for future reference. If you forget the password, please contact Streck Technical Services at 1-800-843-0912.

Creating a favorite user or category
Create up to 10 common Users or Categories in the Favorites section.

- Click the “Favorites” button.

- Select “Add User or Category”. Type the name of the user or category and click the “Add” button. Press “Cancel” to abandon the new user or category addition.
Deleting a user or category
Click on “Delete User or Category” in the Favorites window. Click on the user or category name you wish to remove and press “Delete.” Alternatively, press “Cancel” to exit the window.

Creating a favorite protocol
After saving the protocol and creating a user or category, click “Add to Favorites” to include the protocol in the Favorites section. Choose a user or category by clicking on the category name. Up to 10 protocols can be saved per user or category.

Removing a protocol from favorites
Click the “Favorites” button and then select “Remove a protocol from Favorites.” A pop up window will be displayed that reads, “Select the protocol to delete from the Favorites menu.” After clicking “OK” a red x will appear with the pointer. Click on the protocol you wish to remove from the Favorites section. The protocol will be immediately removed and the status bar will indicate that the protocol was removed. Alternatively, click on “Cancel removal from Favorites” to cancel this action.

Tip! Removing a protocol from the Favorites section does not permanently delete it. The protocol is still available in its saved location and can be accessed through the “Saved Protocols” button.
Prevising protocol
After a protocol is entered, the graph displays a preview of the entire protocol, providing visual verification that the temperature and times entered are correct. The estimated time required to complete the protocol can be seen on the graph. The default 3-Step protocol graph is shown here.

Part 3 - Start Run
Starting a run
After the protocol is entered and saved, click the green “Start Run” button to execute the protocol.

Tip! Before the PCR protocol begins, diagnostic checks are automatically performed. If there is a protocol issue, such as a blank entry box or an out of range value, the run will not start. Please correct the indicated PCR protocol issue and retry.

Tip! If the diagnostic check finds a hardware issue, the PCR run will not start. The majority of hardware issues can be solved by ensuring that the thermal cycler is properly set up (see Chapter 2 – Getting Started), and that the thermal cycler is turned on by pressing the ON switch at the back of the instrument. For any other hardware issues, please consult Chapter 6 - Troubleshooting and Support.

Monitoring a PCR run
Progress of the run can be monitored in the Run Status bar along the bottom of the main window and by observing the graph as it displays the actual times and temperatures achieved.
Tip! The temperature graph can be expanded for more details by minimizing the “Temperature Settings” window. To do so, press the minimize temperature settings button \(-\). To restore the Temperature Settings window to full size, press the maximize temperature settings button \(+\).

Run Status tab
The “Run Status” tab is located in the bottom center of the software screen. Before and after a run, this tab displays thermal cycler conditions. During a run, this tab displays PCR run information.

- **Temperature** - displays the heat block temperature. “NA” is displayed if the thermal cycler is not plugged into the computer or if a problem occurs (please consult Chapter 6 - Troubleshooting and Support).
- **PCR Time** - displays the time that has elapsed since the PCR run began (minutes:seconds). After the run is complete, the total run time is displayed.
  
  Tip! If the run is paused, the time from the run start to the pause is displayed. Once the run is restarted, the total time from the original run start is displayed.
- **PCR Cycle** - displays the number of PCR cycles that have been fully completed.
  
  Tip! If there are multiple cycling stages, such as with nested PCR, the cycle count resets for each cycling stage.
- **Status** - displays relevant updates to indicate recent activity or thermal cycler status (i.e., created a new 3-step protocol, PCR complete, Thermal Cycler is ready, etc.). During a run, the status will display the temperature or hold that is in progress.
Pausing or stopping a PCR run
While the run is in progress, most software inputs are disabled and the green “Start Run” button will become a red “Stop Run” button.

Tip! Clicking the red “Stop Run” button will immediately pause the run and the reaction will return to room temperature.

After clicking “Stop Run,” a pop-up message will appear (shown below).

- Click “Yes” to stop the run permanently.
- Click “No” to pause the run and edit the protocol (as needed). Note: the run can then be restarted from the beginning or resumed from the point at which it was paused (see To restart a paused run).
- Click “Cancel” to resume the run from the point at which it was paused.

To restart a paused run
Press the green “Start Run” button. A pop-up message will appear (shown below).

- Click “Yes” to resume protocol from the paused step.
- Click “No” to restart protocol from the beginning.
- Click “Cancel” to maintain the pause.
Saving data, images, and run notes
After a PCR run has completed, grey “Save Data” and “Save Image” buttons will appear below the temperature graph along with a “Run Notes” text box.

- **“Save Data”** - click to save run data in a CSV file. A window appears where the data file name and location can be specified. By default, the data will be saved in the “PCR Results” folder in the Documents Library.
- **“Save Image”** - click to save the temperature graph as a bitmap (BMP) image.
- **“Run Notes”** - notes may be entered after the PCR run is complete and saved with the run data file.

Opening saved run data
By default, the saved run data and images are stored in the “PCR Results” folder in the Documents Library. The run data file can be opened as a CSV file in Excel for data graphing or technical investigation.

The file includes the instrument serial number, name and saved location of the temperature protocol, date/time when the file was saved, run notes, protocol temperatures, hold times, cycling parameters, and the actual temperatures and times achieved during the run.

Help, minimize, close

- **Help”** - press the blue button in the upper right hand corner of the software screen to open a PDF of this manual.
- **Minimize** - press the blue minus sign icon to minimize the screen to the taskbar at the bottom of the screen. To restore the software screen, click the Philisa software icon in the taskbar.
- **Close** - press the blue close icon to exit the software and close the screen. The software can be reopened by clicking on the desktop icon.
Advanced Options
Click the “Advanced Options” tab to toggle from the Run Status window to the Advanced Options window.

- “Graph Line Color” – click to change the color of the line displayed on the graph. A color selection box will appear allowing you to select the graph color of your choice and then click “OK.” Press “Cancel” to leave the graph color unchanged.

**Tip!** The newly selected graph color will remain in effect until it is changed again, even if the software is closed.

- **Administrator Password** – enter the administrator password to lock and unlock protocols or to change the set password.

- **Time and temperature status bar** – Place the mouse over the temperature graph line to display the time and temperature at that point on the graph. When previewing a protocol prior to a run, this feature can be used to determine how long the protocol will take to complete by placing the mouse over the end of the preview graph line and viewing the time and temperature information.

Saved log files
Two log files are automatically saved with the Philisa Thermal Cycler Software. Both log files are stored in the “PCR Results” folder in the Documents library and are useful for troubleshooting technical issues or obtaining past test conditions.

- The “PCRLog.txt” file stores the date and time that each PCR run is started, paused, and stopped. It also stores the instrument serial number, temperature protocol name and conditions.

- The “ErrorLog.txt” file stores major software error messages, including the date/time of the error.

**Tip!** If the computer malfunctions, the error cannot be recorded to the error log file.
Rapid thermal cycling can be far more precise and sensitive than slower thermal cycling, especially for difficult PCR assays. However, modifications of the thermal cycling protocol and reagent components are typically recommended for conversion of an assay to rapid PCR. The following section provides guidance on adapting or creating protocols for rapid PCR.

**Tip!** The “2-Step” and “3-Step” buttons at the top center of the software provide generic protocols that are often appropriate for shorter-length DNA amplicons (< 250 bp). The times and temperatures can be edited or steps added from these default protocols.

### PCR Protocol Guidelines

- **Polymerase activation:** Hot start polymerases are highly recommended because of their ability to reduce primer-dimer formation and non-specific amplification during the preparation of the PCR reaction. Review polymerase product literature for guidance.

- **Denaturation:** Typically, sufficient denaturation occurs with a 5-10 s denaturation hold at 94°C to 95°C. Rapid heating and short denaturation times reduce target DNA degradation due to thermal damage. Long amplicons, GC-rich amplicons, and human genomic DNA may require longer hold times.

- **Annealing:** Short annealing times can provide better specificity and amplicon yield than longer annealing times. Lengthy annealing holds have a higher probability of primer misannealing, especially with GC-rich regions. Primer-template annealing is a dynamic process that occurs over a temperature range and not at a fixed temperature; therefore, the programmed annealing time and temperature are linked. A change in the annealing time may require an adjustment in the annealing temperature for optimal PCR (and vice versa). It is therefore best to optimize these parameters together when performing rapid PCR rather than the common approach of optimizing one parameter and then the other.

  **Tip!** For rapid PCR, increasing the magnesium and primer concentrations can increase the rate of primer annealing. Typically, MgCl₂ or MgSO₄ concentrations of 3-5 mM and primer concentrations of 0.4-0.5 µM provide good starting points for optimizing rapid PCR.

  **Tip!** The optimal annealing temperature and time will vary with magnesium concentration, choice of primers and the selected amplicon; it is recommended that different annealing conditions be tested when developing an assay to optimize product yield and specificity.

  **Tip!** The recommended minimum annealing hold time is 5 seconds. To utilize a short hold time of about 5 seconds, the annealing temperature set-point may need to be lowered by a few degrees.

  **Tip!** If the annealing set-point is near to the Tₘ of the primers, hold times should be extended.

- **Extension:** The optimal extension time depends on the particular polymerase used and amplicon length. In general, yields increase with longer extension times. However, good extension efficiencies can still be obtained with optimized short extension times.

For short amplicons (<250 bp), in many instances, the extension step can be completely eliminated or set at only a few seconds to briefly allow the reaction mixture to pause near the
optimal extension temperature. This is because extension begins during the annealing step once the polymerase binds to the primer-template complex and continues while heating to the extension temperature.

For amplicons >200 bp, the extension rate of the specific polymerase should be used to estimate hold times. Review polymerase product literature for guidance.

Tip! The optimal extension temperature for most polymerases is between 68°C and 75°C. Usually 72°C can be employed without optimization efforts.

• **Final extension** - A final hold at the programmed extension temperature may improve the yield of the final product. In this step, amplicons that were only partially extended in previous cycles can be fully extended. In general, set the final extension step to twice the cycle extension time if a final extension is desired.

• **2-step protocols** - As noted previously, the extension step may be removed for short targets amplified with a relatively fast polymerase. Existing primers with lower melting temperatures can be employed in this manner. When designing new primers, it may be advantageous to choose those with higher melting temperatures (i.e., longer primer lengths) so the optimal annealing temperature is approximately 68-72°C. This allows primer annealing and polymerase extension to be combined in a single step. There are a number of sophisticated primer design tools available on the Internet to assist in design and Tₘ estimation.

• **GC-rich templates** - Shorter annealing times can limit non-specific annealing of GC-rich templates. Chemical additives such as DMSO and betaine have also been shown to facilitate enhanced specificity and yield.⁷

Tip! Certain enzymatic reactions have specific time regardless of the thermal cycler. For example, reverse transcriptase may require at least 10 minutes at 50°C.

References
**Streck Technical Service**

The Philisa Thermal Cycler is supported by a staff of experienced Medical Laboratory Scientists who welcome the opportunity to assist you. Our technical service representatives have immediate access to the Philisa Thermal Cycler and are an excellent resource to answer your product questions, or assist with setup and troubleshooting.

Call Streck Technical Service during business hours Monday-Friday from 8 a.m. to 5 p.m. Central time at 1-800-843-0912, e-mail technicalservices@streck.com, or send a fax to 1-402-691-7518.

**Instrument and software troubleshooting**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause(s)</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal cycler will not turn on</td>
<td>The thermal cycler is not plugged into the wall securely.</td>
<td>Check that the power cord is plugged into a working wall outlet.</td>
</tr>
<tr>
<td></td>
<td>The thermal cycler is too hot.</td>
<td>Turn off the thermal cycler and wait 15 minutes before trying again.</td>
</tr>
<tr>
<td></td>
<td>A fuse has blown.</td>
<td>Unplug the thermal cycler and contact Streck Technical Service.</td>
</tr>
<tr>
<td>Computer will not turn on</td>
<td>The computer has no battery life left and is not plugged into the wall.</td>
<td>Check that the computer power cord is properly connected to the computer and a working wall outlet.</td>
</tr>
<tr>
<td>Software is not recognizing thermal cycler</td>
<td>The computer and thermal cycler are not communicating properly.</td>
<td>Turn off the thermal cycler, unplug the USB cable from the thermal cycler. Wait 30 s and plug in the USB cable. Repeat this step if necessary.</td>
</tr>
<tr>
<td>PCR Protocol will not start</td>
<td>The thermal cycler is turned off.</td>
<td>Turn the thermal cycler on with the power switch at the back of the thermal cycler.</td>
</tr>
<tr>
<td></td>
<td>The computer and thermal cycler are not communicating properly.</td>
<td>Unplug the USB cable from both the computer and the thermal cycler. Wait 30 s and plug in the USB cable.</td>
</tr>
<tr>
<td></td>
<td>The thermal cycler needs to be reset.</td>
<td>Unplug both the USB cable and the power cable from the thermal cycler. Wait 30 s and plug in both cables.</td>
</tr>
<tr>
<td></td>
<td>The software needs to be reset.</td>
<td>Close the thermal cycler software. Reboot the computer. Restart the software.</td>
</tr>
<tr>
<td></td>
<td>The thermal cycler is too cold.</td>
<td>Allow at least 30 minutes for the thermal cycler to reach appropriate operating conditions.</td>
</tr>
<tr>
<td></td>
<td>The thermal cycler is too hot.</td>
<td>Turn off the thermal cycler and wait 15 minutes before trying again.</td>
</tr>
<tr>
<td></td>
<td>The computer battery is too low.</td>
<td>Check that the computer power cord is properly connected.</td>
</tr>
<tr>
<td></td>
<td>Temperature sensor has failed or needs to be calibrated.</td>
<td>Contact Streck Technical Service.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause(s)</td>
<td>Corrective Action</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>Thermal cycler shuts off during run</td>
<td>The thermal cycler is too hot.</td>
<td>Check that the operating conditions are appropriate and that the fan is running. Make sure no obstructions are present that restrict air flow. If problem persists, contact Streck Technical Service.</td>
</tr>
<tr>
<td>Fan is not operational or makes whining sound</td>
<td>Cooling fan failure.</td>
<td>Contact Streck Technical Service.</td>
</tr>
<tr>
<td>Heating or cooling is slow to reach setpoint. Runtimes are much longer than normal</td>
<td>Peltier failure.</td>
<td>Contact Streck Technical Service.</td>
</tr>
<tr>
<td>Temperatures exceed set-point at annealing and denaturation</td>
<td>Temperature deviations of &lt; 1.0°C are normal during beginning of hold.</td>
<td>No changes are necessary.</td>
</tr>
<tr>
<td></td>
<td>Background software interference.</td>
<td>Close and disable any background software including screen savers, virus scanners, automatic updating, drive defragmentation, and similar software.</td>
</tr>
</tbody>
</table>

**PCR troubleshooting**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause(s)</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No product or weak product amplification</td>
<td>Denaturation conditions are not optimal.</td>
<td>Increase the denaturation temperature and/or increase the denaturation hold time.</td>
</tr>
<tr>
<td></td>
<td>Annealing conditions are not optimal.</td>
<td>Decrease the annealing temperature and/or increase the annealing hold time.</td>
</tr>
<tr>
<td></td>
<td>Extension hold is too short.</td>
<td>Increase the extension hold time.</td>
</tr>
<tr>
<td></td>
<td>Activation time is too short.</td>
<td>Increase the initial activation time.</td>
</tr>
<tr>
<td></td>
<td>Reagents need to be adjusted.</td>
<td>Increase the Mg++ concentration (typically 3-5 mM works well). Increase the primer concentration. Increase the enzyme concentration.</td>
</tr>
<tr>
<td>Number of PCR cycles is too low.</td>
<td>Add more PCR cycles.</td>
<td></td>
</tr>
<tr>
<td>Strong primer-dimer or non-specific amplification</td>
<td>Annealing conditions are not optimal.</td>
<td>Increase the annealing temperature and/or decrease the annealing hold time.</td>
</tr>
<tr>
<td></td>
<td>Extension hold time is too long.</td>
<td>Decrease the extension hold time.</td>
</tr>
<tr>
<td></td>
<td>Reagents need to be optimized.</td>
<td>Decrease the Mg++ concentration and/or decrease the primer concentration.</td>
</tr>
<tr>
<td>Number of PCR cycles is too high.</td>
<td>Decrease the number of PCR cycles.</td>
<td></td>
</tr>
</tbody>
</table>

**Instrument service**

If after consulting the troubleshooting section of this manual and speaking to Streck Technical Service, the problem is not resolved, it may be necessary to send the unit to Streck for repair. Streck Technical Service will assist with this process.

**Warning:** Only authorized Streck Service personnel may open the instrument to perform maintenance or repair. Do not attempt to repair the instrument or remove covers that require tool access. Unauthorized repairs void the warranty.
Return packaging instructions
The instrument must be decontaminated prior to packaging for return. Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Follow all applicable local, state, and/or national regulations. Refer to Chapter 7 for detailed decontamination instructions.

Demo Returns
Contact your Streck representative at the end of your evaluation period. Streck will provide a return authorization number and arrange for an instrument return.

Repair Shipments
Contact Streck Technical Service for assistance with troubleshooting and/or to make arrangements for shipment to Streck. In most repair cases, only the Philisa Thermal Cycler and the instrument cord need to be shipped for service. Include the cord inside one of the interior boxes and include both interior boxes inside the exterior box to ensure the instrument is secure during shipment. Follow the instructions below for additional packaging details.

Return Packaging Instructions
1. Unplug the instrument from the wall and the computer.
2. Let the instrument cool for at least 30 minutes to allow the instrument block to reach room temperature.
3. Decontaminate the instrument according to the instructions in Chapter 7. If the computer is being returned, wipe down all surfaces with a lint-free cloth.
4. Place the instrument inside the anti-static plastic bag and slide the foam inserts onto either side of the Philisa Thermal Cycler. Figure A.
5. Place the instrument into the bottom of the large exterior box.
6. Place the computer inside the anti-static bubble wrap sleeve and place the computer inside one of the small interior boxes. Include the computer power cord and mouse in the box and seal the box.
7. Place the computer box in the large exterior box on top of the thermal cycler.
8. Place the accessories, which include the Operator's Manual, USB cord, instrument cord and Philisa PCR tube rack, inside the second interior box and seal the box. Place this box on top of the computer box. Figure B.
9. Close the exterior box and seal securely with packaging tape. Write the return authorization number provided by Streck on the outside of the box so it is clearly visible. No packing slip or label is required.
Computer support
If you experience difficulty with the computer or software, please contact Streck Technical Service. Our team can assist with troubleshooting or can offer replacement units as needed under warranty.

Warranty information
Information on warranty conditions is included in your sales contract. Please read the information carefully so you are aware of your rights and you do not void the warranty by unauthorized activities. **Any unauthorized service or modifications to the thermal cycler instrument will void the Streck Philisa Thermal Cycler warranty.**
Cleaning and decontaminating the thermal cycler
For optimal performance, it is recommended to periodically clean both the exterior case and the silver heat block area.

Cleaning the thermal cycler
- To avoid the risk of an electrical shock, turn off the Philisa Thermal Cycler and unplug the power cord before attempting to clean the instrument.
- Allow sufficient time for the sample block area to cool down before cleaning.
- Do not submerge the Philisa Thermal Cycler in water or any cleaning agent.
- Do not pour or spray water or any cleaning agent onto or into the thermal cycler.
- Always wear the appropriate personal protective equipment, (gloves, glasses or face shield), when cleaning the instrument.
- To clean the exterior, wipe the outer surface of the instrument with a cloth dampened with water or an isopropanol solution.
- White thermal paste is used in the manufacture to ensure maximum heat transfer efficiency. Over time, some of this paste may become visible along the edges of the silver heat block from repeated thermal cycling. To thoroughly clean the silver heat block, use a small lint-free cloth dampened with water or an isopropanol solution to remove excess paste.
- Make sure the water or isopropanol solution has evaporated completely before plugging the power cord back into the thermal cycler.

Decontaminating the thermal cycler
It is possible the instrument may come into contact with biohazards or be used in a lab that contains biohazardous materials. Please refer to internal laboratory or institutional processes on proper handling of these agents. Disinfect spills immediately to prevent spreading contamination.

It is possible to decontaminate some exterior parts of the instrument. Clean the black plastic case and metal sample block area with any of the following:
- 1:10 dilution of household bleach (5.2% sodium hypochlorite)
- Ethyl or isopropyl alcohol (up to 90%)
- Quaternary ammonium germicidal detergent solutions

Contact Streck Technical Service if you do not use any of the recommended decontamination methods.
- If the silver heat block, or any other exterior portions of the thermal cycler become contaminated with radioactive materials, use a commercially available decontaminant to remove the contamination. If the thermal cycler cannot be decontaminated, the instrument cannot be returned to Streck for service.
- Do not use UV, beta, gamma radiation, or any other source of high-energy radiation to disinfect the thermal cycler.

Temperature and performance verification
It is recommended that the temperature calibration of the thermal cycler be checked at least once per year. According to laboratory work instructions, run a known test reaction to verify performance of the thermal cycler.

For information on temperature verification or recalibration of the thermal cycler, contact Streck Technical Service at 1-800-843-0912.
### Operating conditions and physical specifications

#### For Indoor Use Only

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Working environment</td>
<td>10°C to 30°C</td>
</tr>
<tr>
<td>Storage environment</td>
<td>-30°C to 50°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Working environment</td>
<td>20% to 60%, noncondensing</td>
</tr>
<tr>
<td>Storage environment</td>
<td>10% to 95%, noncondensing</td>
</tr>
</tbody>
</table>

| Altitude                   | -100 m to 2000 m (-328 ft to 6562 ft) above sea level |

| Ventilation Requirement    | Minimum of 0.3 m (1 ft) clearance on both sides for air flow |

<table>
<thead>
<tr>
<th>Physical Dimensions</th>
<th>Thermal Cycler</th>
<th>Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>285 mm (11.3&quot;)</td>
<td>237.65 mm (9.35&quot;)</td>
</tr>
<tr>
<td>Width</td>
<td>202 mm (8.0&quot;)</td>
<td>329.3 mm (12.96&quot;)</td>
</tr>
<tr>
<td>Height</td>
<td>215 mm (8.5&quot;)</td>
<td>32 mm (1.25&quot;)</td>
</tr>
<tr>
<td>Weight</td>
<td>3.4 kg (7.5 lb)</td>
<td>1.76 kg (3.90 lb)</td>
</tr>
</tbody>
</table>

### Electrical specifications

<table>
<thead>
<tr>
<th>Power Cord</th>
<th>The thermal cycler can be used with a variety of electrical systems as noted below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States 120 VAC</td>
<td>Plug: NEMA 5-15P</td>
</tr>
<tr>
<td></td>
<td>Receptacle: C-13</td>
</tr>
<tr>
<td></td>
<td>Input: 120 VAC, 60 Hz, 5 A minimum, 3-conductor</td>
</tr>
<tr>
<td>International 100 VAC – 240 VAC</td>
<td>Plugs: Varies with country</td>
</tr>
<tr>
<td></td>
<td>Receptacle: C-13</td>
</tr>
<tr>
<td></td>
<td>Input: 100 VAC / 240 VAC, 50 / 60 Hz, 5 A minimum, 3-conductor</td>
</tr>
</tbody>
</table>

| Voltage                     | 100 - 120 / 200 - 240 VAC, 50 / 60 Hz, Single Phase                               |
|                             | Voltage fluctuations not to exceed 10% of the nominal voltage                     |
|                             | Transient over voltages according to installation category II                     |

| Max. Sustained Current      | Varies with Voltage: 5 A at 115 VAC, 2.5 A at 230 VAC                             |

| Power                       | Thermal Cycler: 400 VA max                                                         |
|                             | Computer: 65 W max                                                                |

| Fuse                        | 5 mm x 20 mm, 250V, 5A, Fast Acting, Cartridge, Glass                              |

| USB Cable(s)                | USB 2.0, +5 V, 500 mA maximum                                                     |
### Thermal cycling specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample Capacity</strong></td>
<td>Up to 8 samples per run</td>
</tr>
<tr>
<td><strong>Philisa PCR Tubes Reaction Volume</strong></td>
<td>10 µL to 50 µL</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>15°C to 100°C, programmable in 0.1°C increments</td>
</tr>
<tr>
<td><strong>Temperature Hold Times</strong></td>
<td>0 s to 3600 s (1 hr), programmable in 0.1 s increments</td>
</tr>
<tr>
<td><strong>Number of Steps</strong></td>
<td>1 to 99</td>
</tr>
<tr>
<td><strong>Number of Cycles</strong></td>
<td>1 to 999 per Cycling Protocol, up to 3 Cycling Protocols</td>
</tr>
<tr>
<td><strong>Heating Rate (heat block)</strong></td>
<td>Maximum: 15°C/s, Average: 11°C/s</td>
</tr>
<tr>
<td><strong>Cooling Rate (heat block)</strong></td>
<td>Maximum: -12°C/s, Average: -9°C/s</td>
</tr>
<tr>
<td><strong>Sample Ramp Rates</strong></td>
<td>Maximum: &gt;6°C/s heating and cooling</td>
</tr>
<tr>
<td><strong>Thermal Accuracy</strong></td>
<td>±0.25°C, NIST traceable</td>
</tr>
<tr>
<td><strong>Thermal Uniformity</strong></td>
<td>±0.5°C from setpoint temperature</td>
</tr>
<tr>
<td><strong>Run-Time</strong></td>
<td>Typical: 15 min</td>
</tr>
<tr>
<td></td>
<td>Maximum: 86400 s (1 day)</td>
</tr>
<tr>
<td><strong>Throughput</strong></td>
<td>With 5 min loading and 15 min run-time: 24 samples / hr, 576 samples / day</td>
</tr>
</tbody>
</table>

### Computer specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manufacturer</strong></td>
<td>Dell</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>Inspiron Mini 1018</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>Intel® Atom™ N455, 1.67 GHz</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>1 GB</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Windows® 7 Starter, 32-bit</td>
</tr>
<tr>
<td><strong>Hard Drive</strong></td>
<td>160 GB, 125 GB available</td>
</tr>
<tr>
<td><strong>USB Port(s)</strong></td>
<td>USB 2.0</td>
</tr>
</tbody>
</table>

**OR**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manufacturer</strong></td>
<td>Dell</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>Latitude 3330</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>Intel® Celeron® processor 10007U (2M Cache, 1.5 GHz)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>4 GB</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Windows® 7 Home Premium</td>
</tr>
<tr>
<td><strong>Hard Drive</strong></td>
<td>320 GB 5400rpm</td>
</tr>
<tr>
<td><strong># of USB Port(s)</strong></td>
<td>3</td>
</tr>
</tbody>
</table>