Thermo Scientific Arktik Thermal Cycler

User Manual

Rev. 1.0

Part of Thermo Fisher Scientific

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Thermo Scientific Arktik Thermal Cycler

User Manual

Rev. 1.0, Cat. no. N11467

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Warranty
Finnzymes Instruments Oy warrants that the Arktik™ Thermal Cycler is free from defects in materials and workmanship for 1 year from the date of purchase. Defects that are covered by this warranty and that occur during this warranty period will be repaired, or the system will be replaced, free of charge and at the sole discretion of Finnzymes Instruments Oy or its licensed distributors. Repairs that occur outside this warranty period will be charged for parts, labor and shipping. Fulfillment of warranty obligations is the responsibility of the company that sold the Arktik Thermal Cycler. For specific information regarding warranty coverage please contact said company directly.

This warranty shall not apply to any of the following:
1. Defects caused by repairs or modifications made by anyone other than Finnzymes Instruments Oy or its licensed distributors.
2. Defects caused by improper packaging of returned goods. If necessary, please contact the company that sold the Arktik Thermal Cycler to receive new shipping materials prior to shipment and instructions for proper shipment.
3. Defects caused by use of improper materials, including tubes, plates or sealers not designed and approved for the Arktik Thermal Cycler, or solvents and agents (such as radioactivity or biohazardous agents) not approved for use or allowable for public shipment.
4. Defects caused by negligence, accidents, unreasonable or improper use, natural disasters, or by other causes unrelated to defective materials or workmanship.

No liability for consequential damages
Thermo Fisher Scientific shall not be liable for any damages whatsoever arising out of the use or inability to use this product.

About This User Manual

Intended users

The Arktik Thermal Cycler can be used in research and routine-test laboratories by professional personnel.

How to use this user manual

This user manual is for the following instruments, Arktik Thermal Cycler, base unit (Cat. no. TCA0001) and Arktik Thermal Cycler, base unit without gradient (Cat. no. TCA0002). It has been designed to give you the information you need to:

- Review safety precautions
- Install the Arktik Thermal Cycler
- Operate the instrument
- Adjust the settings and service the instrument
- Troubleshoot the instrument performance

This user manual also describes all the features and specifications of the Arktik instrument.

Read the manual in its entirety before operating the instrument.

All buttons on the keypad are referred to in brackets. The following is an example referring to the "shift block" button on the keypad: "press [SHIFT BLOCK] to shift between the two blocks when a dual block is inserted in the machine."

Bolded words refer to items or functions that may be selected from the programming menu. The following is an example for initiating a protocol: "To run a protocol, first select **RUN** using the function key."

Keep the user manual for future reference. The user manual is an important part of the instrument and should be readily available during use of the instrument. Keep the user manual together with the instrument in case you distribute it onwards.

For more information

For the latest information on products and services, visit our websites at:

`http://www.thermoscientific.com/arktik`

In our efforts to produce useful and appropriate documentation, we would appreciate any comments you may have on this user manual for your local Thermo Fisher Scientific representative.

Safety warnings

These symbols are intended to draw your attention to particularly important information and alert you to the presence of hazards as indicated.

Caution This symbol indicates risk of harm or personal injury. Always consult the User Manual before touching the area of the Arktik Thermal Cycler that displays this symbol. ▲

Caution This symbol indicates a risk of personal injury or harm by electrical shock. Always consult the User Manual before touching the area of the Arktik Thermal Cycler that displays this symbol. ▲

Caution This symbol indicates risk of personal injury or burn by contact with a very hot surface. Avoid touching such surfaces. ▲

WEEE symbol This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. ▲

Note Marks a hint, important information that is useful in the optimum operation of the system, or an item of interest. ▲

Read the User Manual Operating the Arktik Thermal Cycler without first reading the entire User Manual may constitute a risk to your health. Only a person capable of handling electrical equipment should use the Arktik Thermal Cycler. NOT FOR CHILDREN. ▲

Do Not Attempt to Repair Do not remove the cover of the system. Do not try to repair or replace broken components – you put yourself at risk for electrical shock. Removing the cover or replacing/removing components will void the warranty. Contact customer service or your local distributor if your system is not functioning properly. ▲

Do Not Touch the Sample Block Certain components, including the sample block and heated lid, will become excessively hot. Touching these components may cause burns. ▲

Do Not Tamper with Electronics Coming in contact with the electronics, even when the system is off or unplugged, may cause an electrical shock or harm. ▲

Do Not Use Flammable or Hazardous Liquids with the Arktik Thermal Cycler ▲

Electromagnetic interference

This product conforms to the "Class A" standards for electromagnetic emissions intended for laboratory equipment applications. It is possible that emissions from this product may interfere with some sensitive appliances when placed nearby or in the same circuit as these appliances. The user should be aware of this potential risk and take appropriate measures to avoid interference.

Good laboratory practices

The polymerase chain reaction (PCR) is an extremely sensitive assay, and therefore the risk of false positive amplification is high if precautions during sample preparation and reaction setup are not observed.

- Clean lab coats
- Clean gloves
- Clean lab benches and equipment.
- Pre-amplification areas should be separate from the amplification areas
- Pre-amplification and amplification areas should both have their dedicated lab equipment
- Open reagent component tubes only when needed
- Uncap and close tubes carefully

General chemical warnings

This symbol indicates a chemical hazard risk.

Warning Some of the chemicals used with the instrument might be potentially hazardous. Before handling chemicals read through the material safety data sheets provided by the chemical manufacturer. Use protective equipment when handling hazardous chemicals. Do not inhale any fumes from chemicals. Refer to chemicals material safety data sheets for more information about storage handling and disposal. ▲

General biohazard warnings

This symbol indicates a biological hazard (biohazard) risk.

Warning When handling biological material appropriate protective clothing is required. Many biological materials (for example, microorganisms, cell cultures, tissues, body fluids and parasites) have the potential to transmit infectious diseases. Personnel handling biologically hazardous material should be trained beforehand. ▲

Conditions for proper use

This section describes the environmental requirements of the Arktik Thermal Cycler.

Note Important! It is highly recommended that all users of the Arktik Thermal Cycler read the following section carefully. The performance and reliability of the Arktik Thermal Cycler are closely linked to the working conditions in which the system is run. To ensure that your Arktik Thermal Cycler will provide years of top-level performance and have the fewest problems, adhere to the environmental requirements described here. ▲

Absolute environmental requirements

The Arktik Thermal Cycler is rated to operate reliably in the following environmental conditions. Avoid extremes of these environmental ranges to best preserve the long-term performance and life span of the instrument.

- Ambient temperature: 5°C–30°C
- Ambient relative humidity: up to 80%
- Altitude: under 2000 m

Recommended working conditions

The Arktik Thermal Cycler will perform optimally and exhibit highest reliability when the working conditions are as close to "standard" laboratory conditions (20°C, ambient relative humidity 40%).

Airflow

Airflow is paramount to high-speed performance and high reliability. It is important to maintain good heat sink cooling capability. It is best to have a cool source of incoming air and an unobstructed exhaust for outgoing air. Follow these four guidelines to best ensure optimum heat sink function:

- **Obstruction-free intake of air** – Do not place on a hot surface or on laboratory bench paper. Do not slide any paper or other material under the system as this may hamper the airflow or be sucked into the system.
- **Obstruction-free exhaust for outgoing air** – Always keep a distance of at least 10 cm between the exhaust vents and any large solid object such as walls, larger instruments, or other thermal cyclers. Do not have other instruments exhaust blowing directly at the Arktik Thermal Cycler system.
- **Clean fins of heat sink** – Refer to Chapter 6: "*Maintenance*".

Contents

Chapter 1
Arktik™ Thermal Cycler Overview

The Arktik Thermal Cycler (Figure 1-1) suits the needs of a dynamic laboratory where reliability and user-friendliness are appreciated. It accommodates three interchangeable blocks — 96-block, 48-dual block and 384-block — allowing versatile use of the cycler. You control the Arktik Thermal Cycler through a simple user interface. Graphical representation of a cycling routine makes navigation convenient. The USB port enables protocol transfer.

Figure 1-1. Arktik Thermal Cycler

Chapter 2
Arktik Thermal Cycler Main Parts

This chapter describes the main parts of the Arktik Thermal Cycler.

Front view

The front view of the Arktik Thermal Cycler is shown in Figure 2–2.

Figure 2–2. Arktik Thermal Cycler front view

Rear view

The rear view of the Arktik Thermal Cycler is shown in Figure 2–3.

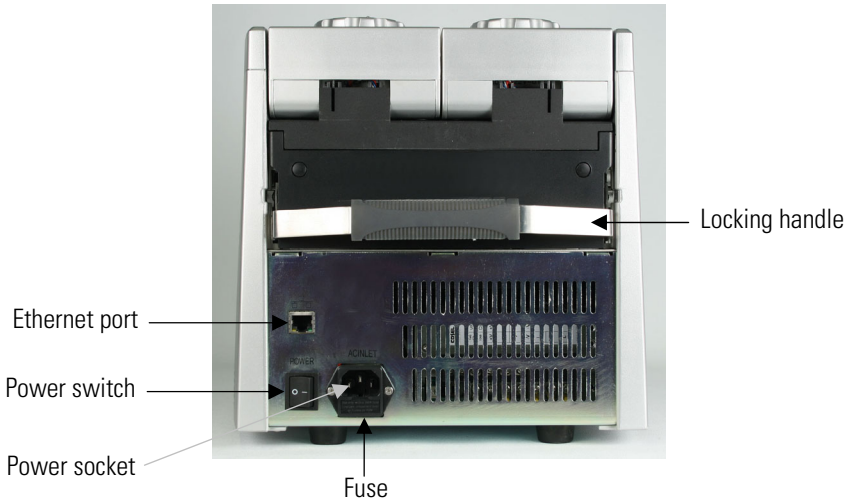


Figure 2–3. Arktik Thermal Cycler rear view

Instrument user interface

The user interface of the Arktik Thermal Cycler is shown in Figure 2–4.

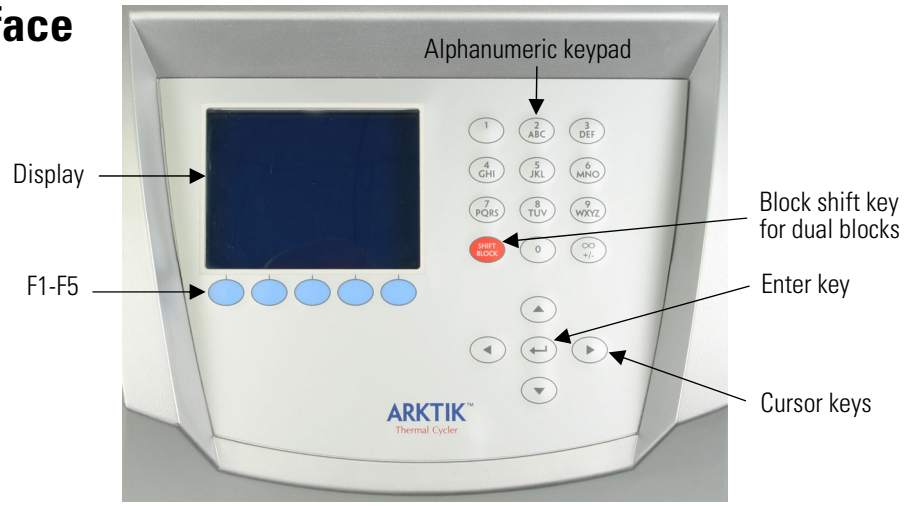


Figure 2–4. Arktik Thermal Cycler user interface

Note The function keys are marked here as F1-F5 to help read the instructions. ▲

Interchangeable blocks

The Arktik Thermal Cycler accommodates three interchangeable blocks — the 96-block, 48-dual block and the 384-block (Figure 2–5 through Figure 2–8).

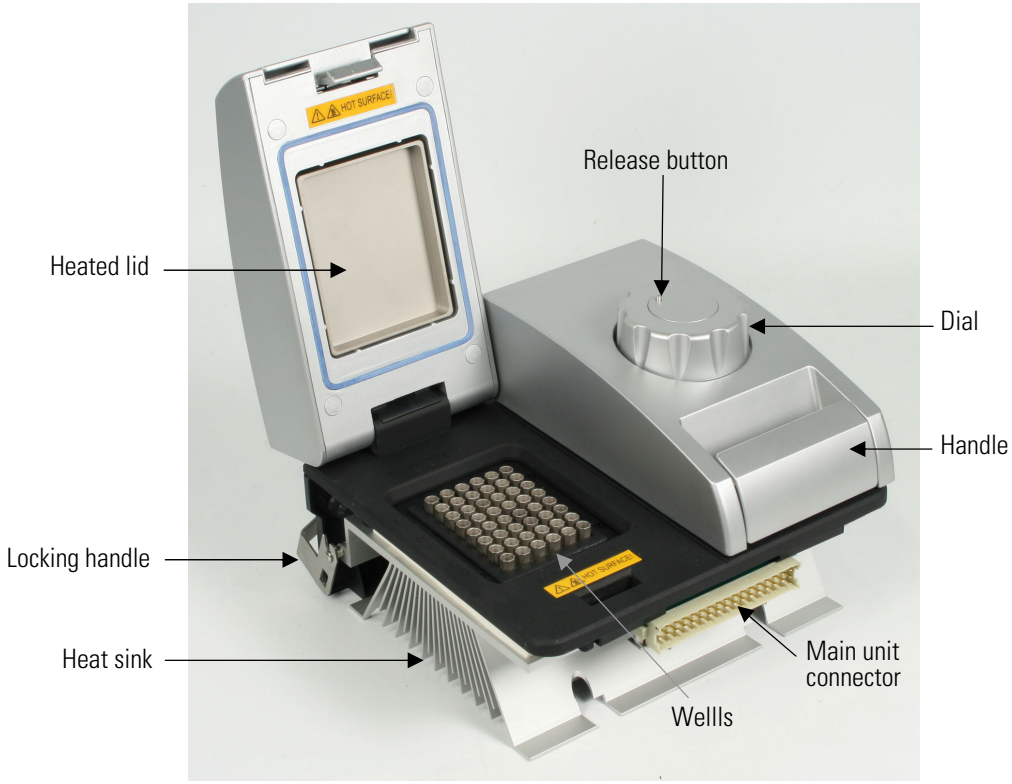


Figure 2–5. Block unit

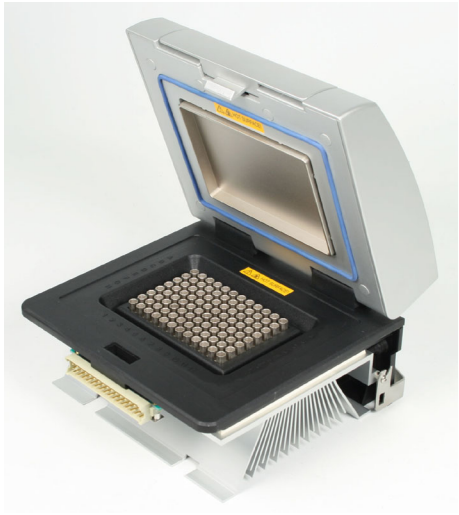


Figure 2–6. 96-block

Figure 2–7. 48-dual block

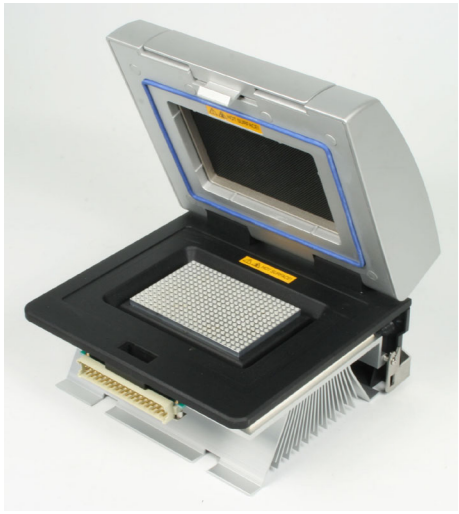


Figure 2–8. 384-block

Arktik Thermal Cycler Main Parts
Interchangeable blocks

Chapter 3
Installation

This chapter describes the installation and setup of the Arktik Thermal Cycler.

Items included

Inside the Arktik Thermal Cycler package you should find the following:

- Arktik Thermal Cycler base unit *)
- Power cord
- Two spare fuses (250 V, fast, 8A, 5x20 mm)
- Quick Reference Guide
- User Manual
- Sample pack of UTW® PCR vessels

*) Required blocks sold separately

If you have not received the above items in your shipment, contact your local distributor or Thermo Fisher Scientific Oy directly. Save all packing material in case you need to return the Arktik Thermal Cycler for maintenance.

Setting up the Arktik Thermal Cycler

Setting up the Arktik Thermal Cycler can be performed in 5 simple steps:

1. Remove all components from the packaging.

2. Place a 96-well block, 384-well block, or a dual block into the Arktik Thermal Cycler base unit (see “Installing blocks in the Arktik base unit” on page 17).

Note Never lift or carry the block only by the handle; always support the block from the side or underneath. ▲

3. Plug the power cord into the back of the Arktik Thermal Cycler.

4. Insert the power cord into the outlet.

5. Turn on the power switch on back of the instrument.

Vessels compatible with Arktik Thermal Cycler

The Arktik Thermal Cycler is compatible with both standard vessels and ultra-thin wall (UTW) reaction vessels.

Chapter 4
Operation

The operation of the Arktik Thermal Cycler is described below.

Installing blocks in the Arktik base unit

1. Make sure that the Arktik base is turned off.

Caution Do not insert or remove a block with the cycler turned on. Doing so can cause electrical arcing that can melt the contacts in the connector joining the Arktik block to the cycler. ▲

2. Raise the handle at the back of the Arktik block and hold the block by the front and back edges. Lower the block into the Arktik base unit, leaving at least 2 cm between the front edge of the block and the front of the Arktik base unit.

Note Never lift or carry the block by the handle only, always support the block from the side or underneath. ▲

3. Slide the block forward as far as it will go, and push the handle down. Do not use force! The block should click into place, and the handle should be completely horizontal.

4. To remove the block, lift the handle, slide the block backwards, and lift out of the base unit.

Figure 4–9. Installing a block in the Arktik base unit

Opening and closing the Arktik blocks

1. To access the sample blocks, open the lid by grasping the handle and pulling it forward.

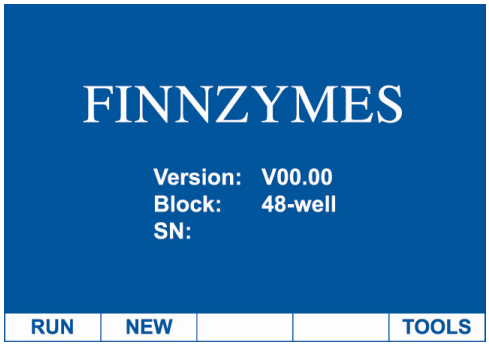
2. To close the sample block, apply downward pressure on the lid while pulling the handle forwards. To tighten the lid, turn the dial clockwise. To prevent over tightening, the lid mechanism will begin ratcheting when the proper pressure has been achieved.

3. To open the block after a run, first turn the dial counterclockwise to raise the heated lid, then open as in Step one. Note that failure to raise the internal heated lid may result in crushing of tubes if the cycler is used with low profile tubes and subsequently used for standard profile tubes.

Note In some cases, a slight expansion of the plate during thermal cycling may occur, and this may cause difficulties in opening the lid. In this case, press the release button on top of the dial down while turning the dial counterclockwise. ▲

Main menu

The Arktik Thermal Cycler user interface features five function keys which are used to select different menu options. Note that the markings from F1 to F5 are not present in the actual user interface but instead are shown is this manual in order to help read the instructions.



The function keys on the **Main** menu have the following actions:

[F1] RUN Runs saved protocols. Allows editing of saved protocols.

[F2] NEW Begins programming of a new protocol.

[F3] STATUS Shows Status screen (when running).

[F4] Not used.

[F5] TOOLS Accesses global settings or diagnostic routines.

SHIFT BLOCK The red button with labeled “SHIFT BLOCK” shifts between the two blocks when a dual block is inserted into the machine. “A” refers to the block on the left and “B” to the block on the right.

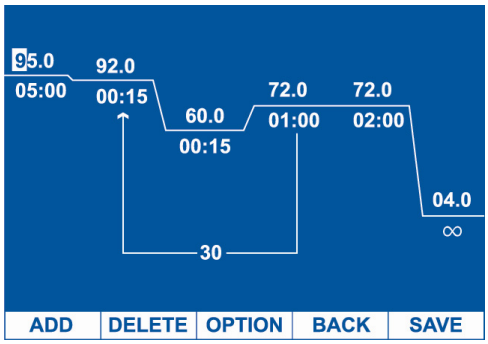
Creating a new protocol

To create a new protocol is described below.

Basic protocol

From the main screen, press the **NEW** button using the second blue function key [**F2**]. This will bring up a DEFAULT protocol. The DEFAULT protocol is a semigraphical representation of a typical PCR temperature cycling routine.

A temperature step is represented by a horizontal line with a temperature value (with a resolution of 0.1, in °C) above the line, and a time value (in mm:ss) below the line. If a step is highlighted, this line will flash. Use the cursor keys ([◀] and [▶]) to toggle between temperature steps.



Function key actions:

[F1] ADD Adds a temperature step to the right of the highlighted step or allows the addition of a GOTO routine (see “Editing a cycling loop” on page 22).

[F2] DELETE Deletes the highlighted temperature step. Also deletes a GOTO routine if it is highlighted.

[F3] OPTION Allows the programming of advanced options into the highlighted step (temperature increment, extend time or slow ramp rate, and temperature gradient in the instruments with this feature enabled; see “Entering advanced programming options” on page 20).

[F4] BACK Exits edit mode without saving.

[F5] SAVE Saves the protocol.

Cursor actions:

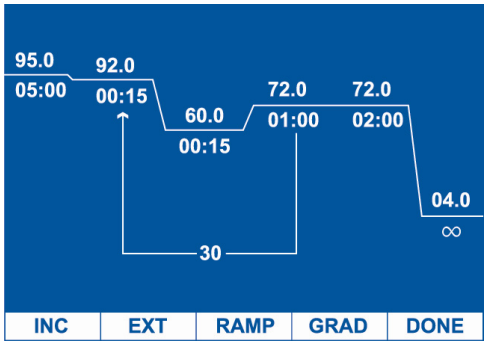
[▲] [▼] [◄] [►] Navigate between temperature, time and cycling loop fields. Use the keypad 0–9 to edit the values.

The temperature or time value may be edited by moving the cursor to the field and then editing it directly. To enter values, use the numbers on the keypad as you would write them. The decimal point will be added automatically. For a temperature of 60.5°C, enter the following: "6, 0, 5." Similarly, for a time value, enter the numbers as you would write them: for a 1 minute and forty-five second hold, enter the following: "0, 1, 4, 5."

Note To enter an infinite hold, press the lower right key on the keypad (with the ∞ symbol). ▲

Entering advanced programming options

From the protocol editing screen, press the **OPTION** selection using the [**F3**] key.



The function key actions:

[**F1**] **INC** Adds (or subtracts) a defined temperature increment to a temperature step, such that the amount of the increment will be added to (or subtracted from) each successive cycle. This is used for Touchdown protocols. Input range = (+/-) 0.1°C to 9.9°C per cycle.

[**F2**] **EXT** Adds (or subtracts) a defined time extension to a temperature step, such that the amount of the extension is added to (or subtracted from) each successive cycle. Input range = (+/-) 1 to 99 seconds per cycle.

[**F3**] **RAMP** Slows the ramp rate going to a highlighted step to a value below the maximum. Input range = 0.1 to 4.0°C/second.

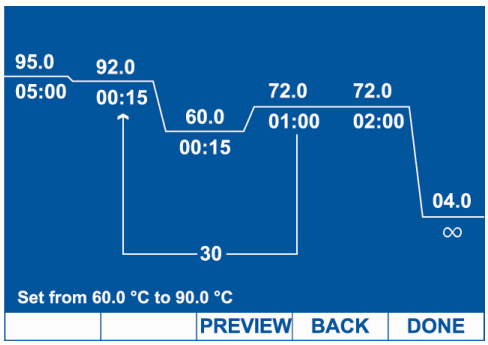
[**F4**] **GRAD** Set gradient (for gradient blocks only). For any hold step, it is possible to set up a horizontal temperature gradient across the block; each column of wells will have a different temperature. To program a gradient step, select this feature from the OPTION menu, and input the desired upper and lower temperatures (the maximum range is 30°C) using keypad 0–9. See "Gradient setup menu" on page 21.

[F5] DONE Accepts advanced option values and returns to protocol editing screen.

Note If advanced options have been entered, the OPTION menu label will be reverse displayed (have a white text) when the modified step is highlighted. This will remind the user that an option has been programmed into that step. ▲

Gradient setup menu

The function keys on the Gradient setup Menu have the following actions:



[F1] No function.

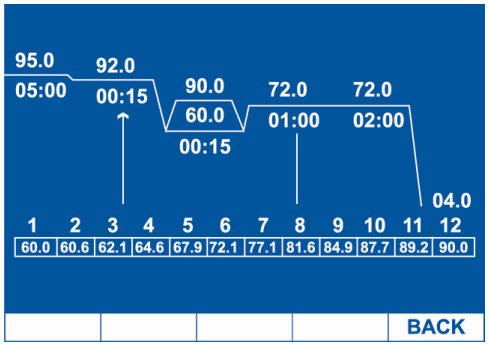
[F2] No function.

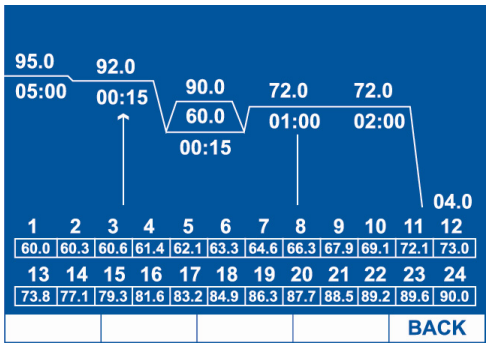
[F3] PREVIEW Displays the temperature setting for each column with the given upper and lower temperatures ([**F3**] back returns to gradient setup screen).

[F4] BACK Exits mode without saving.

[F5] DONE Sets displayed gradient and returns to advanced programming options screen.

Previews for the 96-block and the 384-block, respectively:





The minimum gradient temperature is assigned to the far left column (column 1) of the sample block and the maximum temperature is assigned to the far right column (column 12).

Editing a cycling loop

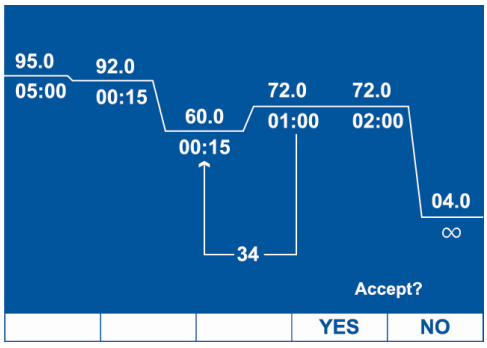
To edit a cycle loop is described below.

Modifying a cycling loop

In the default protocol, edit the cycling loop by highlighting the loop. Use the [◀] [▶] cursor keys to move the arrow to a different temperature step. The number of cycles is displayed in the middle of the loop arrow, at the bottom of the screen. This value may be edited using the keypad.

Adding new cycling loop

From the protocol editing screen, with the cursor on the last step of the desired loop, press the **ADD** selection using the [**F1**] key. Select **GOTO** using the [**F2**] key.



An arrow will appear that will point, by default, to the temperature step directly before the final step in the loop. Use the [◀] [▶] cursor keys to move the arrow to a different temperature step. The number of cycles is displayed in the middle of the loop arrow, at the bottom of the screen. This value may be edited using the keypad. Press the **DEL** selection [**F2**] to delete a cycling routine. Press the **YES** key to accept changes, or press the **NO** key to cancel and go back to the previous screen.

Function key actions:

[**F1**] [**F2**] [**F3**] No action.

[F4] YES Accepts a new cycle loop or edits to the cycle loop.

[F5] NO Cancels and returns to the previous screen.

Cursor actions:

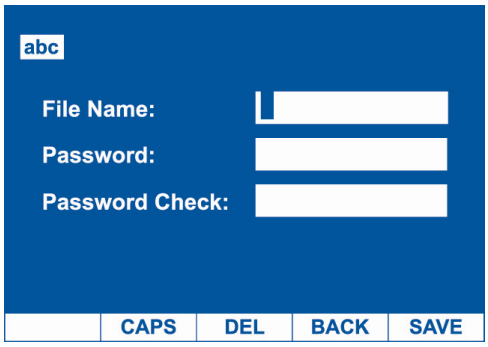
[◀] [▶] Toggles the arrow between steps to select **GOTO** destination for cycling.

Note The GOTO value is the number of repetitions of the loop, which is 1 less than the total number of cycles. For example, to program 35 cycles, 34 repetitions should be entered into the GOTO step. ▲

Note A second GOTO routine can be added outside of the existing GOTO routine only. ▲

Saving a protocol

From the protocol editing screen, press the **SAVE** selection using the [F5] key.

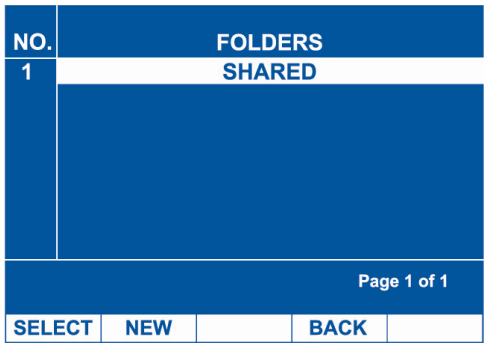


The current file name will be displayed. To save changes to current file name, press **SAVE** [F5]. To change the file name, use the keypad to rename the file, and then press **SAVE** [F5].

Note Text entry is similar to that of a mobile phone. A number or character is automatically entered after a one second delay. Pressing key will toggle through the assigned number and three characters (for example, press the key labeled [2,A,B,C,] once to select "A" and wait 1 second). For capital letters, press **CAPS** [F2]. To delete a letter, press **DEL** [F3]. A file name can be a maximum of 11 characters long. Files may be password protected by entering a password (up to 11 characters) into both the Password and Password Check fields. ▲

Note The passwords in both fields must match exactly. ▲

Press **BACK** [F4] to resume editing the protocol without saving. Press **SAVE** [F5] to save the protocol to a folder. The screen will display the folder options.



Function key actions:

[F1] SELECT Selects the folder to which the protocol will be saved.

[F2] NEW Creates a new named folder (see "Creating a new folder" on page 26).

[F3] No action.

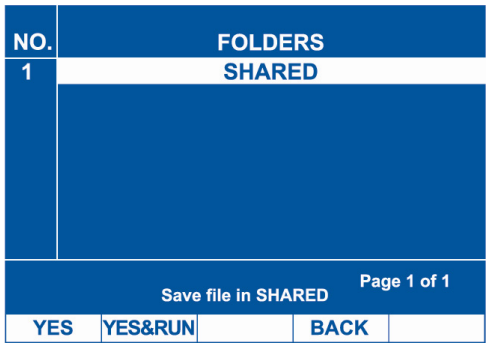
[F4] BACK Returns to the previous screen.

[F5] No action.

Cursor actions:

[▲] [▼] Highlights the folder for selection.

Note A protocol may not be saved to the {RECENT} folder. Before a protocol is saved to a folder, final confirmation will be presented. ▲



Function key actions:

[F1] YES Saves the protocol file to the selected folder and returns to the Main menu.

[F2] YES&RUN Saves protocol file to selected folder, and proceeds to the "Running a protocol" step (see "Running a protocol" on page 27).

[F3] No action.

[F4] BACK Returns to the previous screen.

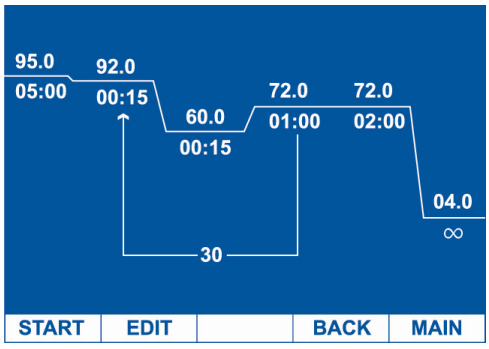
[F5] No action.

Note If a file with the same name already exists in the folder, the user will be warned and offered the choice of overwriting the file or going back to choose a different file name or folder. ▲

Editing a protocol

To edit a protocol:

1. Select RUN [F1] in the **Main** menu.
2. Highlight a folder using the cursor keys.
3. Press OPEN [F1] to open the selected folder.
4. Highlight a protocol file using the cursor keys.
5. Press OPEN [F1] to open the selected protocol file. This will display the semigraphical representation of the protocol.



Function key actions:

[F1] START Begins to run selected protocol.

[F2] EDIT Allows editing of the protocol in semigraphical mode.

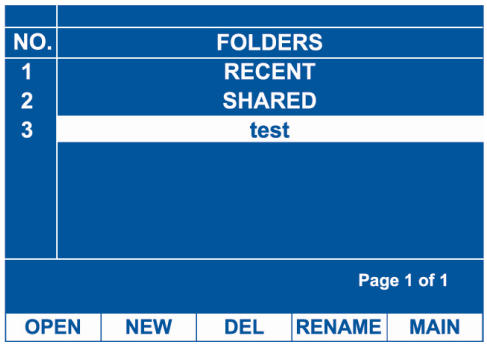
[F3] No action.

[F4] BACK Returns to the previous screen.

[F5] MAIN Returns to the **Main** menu.

Managing folders

Select RUN [F1] in the **Main** menu.



Function key actions:

[F1] OPEN Opens a folder and displays its contents.

[F2] NEW Creates a new folder.

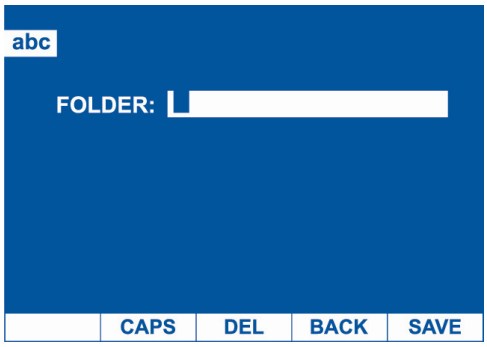
[F3] DEL Deletes a folder.

[F4] RENAME Allows renaming a folder.

[F5] MAIN Returns to the **Main** menu.

Creating a new folder

Press [F1] RUN to access the Managing folders selection. Press NEW [F2], and a prompt will appear in the folder name box. Enter the desired folder name using the keypad (11-character maximum).



Note Text entry is similar to that of a mobile phone. A number or character is automatically entered after a one second delay. Pressing the key will toggle through the assigned number and three characters (for example, press the key labeled [2, A,B, C] once to select "A" and wait 1 second). A folder name can be a maximum of 11 characters long. ▲

Function key actions:

[F1] No function.

[F2] CAPS Toggles between capital and lowercase letters.

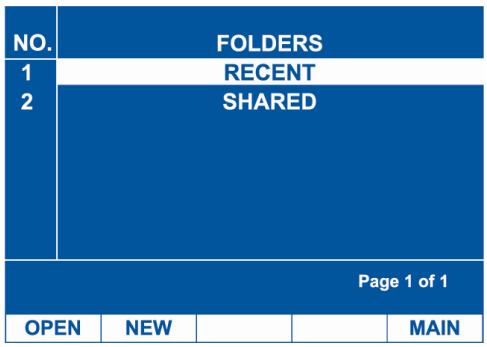
[F3] DEL Deletes a character.

[F4] BACK Returns to the folder selection screen.

[F5] SAVE Saves the new folder and returns to folder selection screen.

Running a protocol

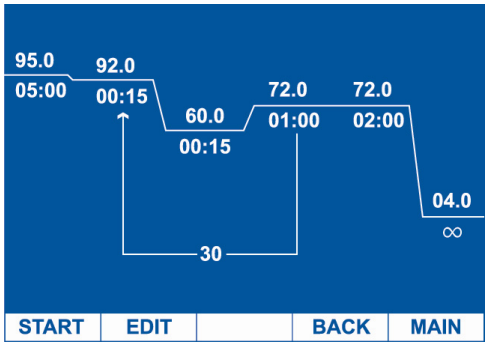
Press **RUN** [**F1**] in the **Main** menu.



There are two permanent folders: the {RECENT} folder stores the last nine protocols that were run on the Arktik Thermal Cycler, and the {SHARED} folder can be saved to and accessed by all users.

Highlight a folder and press **OPEN** [**F1**]. The protocols residing in that folder will be displayed.

Highlight the protocol and press **OPEN** [**F1**]. The protocol will be displayed in semigraphical mode.

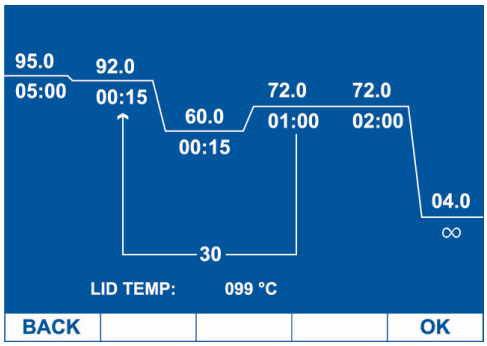


Press **START** [**F1**]. A lid temperature screen will be displayed, showing the default lid temperature.

Note The default lid temperature may be set in the **Tools/Lid** menu (see "Lid" on page 33 for details). Lid temperatures between 30°C and 110°C are allowed. ▲

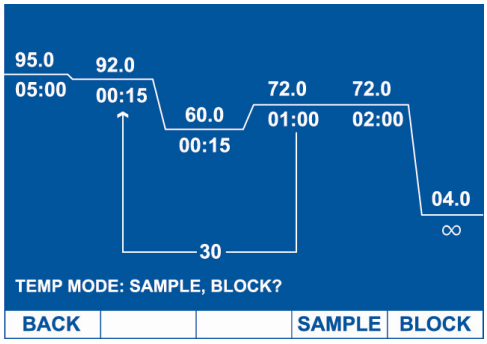
Note The heated lid may be turned off completely by pressing the [∞] button. ▲

Press **OK** [**F5**] to proceed.

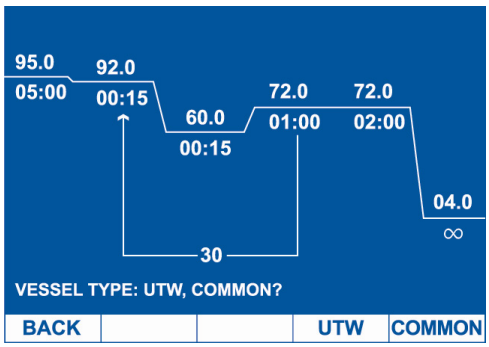


In the next screen, the sample or block mode is specified by pressing **SAMPLE** [**F4**] or **BLOCK** [**F5**].

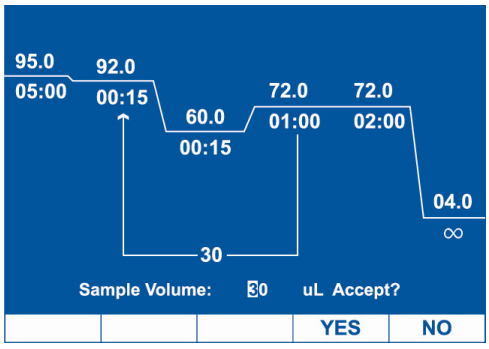
Note Sample mode is strongly recommended for most protocols. ▲



In the next screen, the vessel type is specified by pressing **UTW** [**F4**] or **COMMON** [**F5**].



In the next screen, the sample volume is specified by typing in a volume (5 to 50 µl for 48-dual and 96-blocks; 5 to 20 µl for a 384-block). Confirm the selection by pressing **YES** [**F4**] or return to the vessel section screen by pressing **NO** [**F5**].

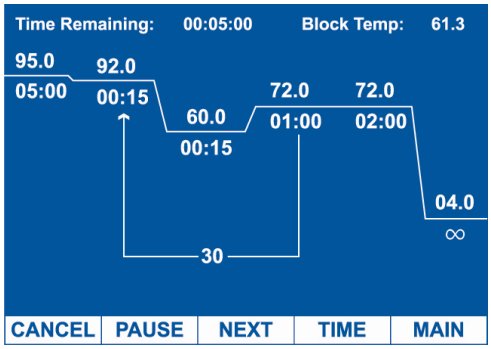


After confirming the volume, the protocol will start immediately (see “Monitoring a run” on page 29).

Note When a run begins, the running protocol will be displayed in semigraphical mode on a Status screen (see “Monitoring a run” on page 29). ▲

Monitoring a run

Upon initiation of a run, the Arktik Thermal Cycler will display the Status screen.



Function key actions:

[F1] CANCEL Terminates the run, after confirming with the user.

[F2] PAUSE Pauses the run on the present temperature step, or the next step if ramping. When paused, this option becomes **RESUME**.

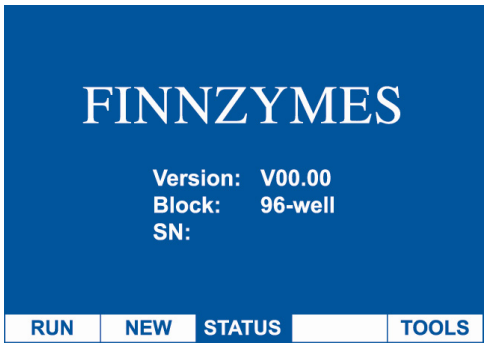
[F3] NEXT Skips to the next step.

[F4] TIME Toggles to the Time Status screen.

[F5] MAIN Returns to the **Main** menu.

Note Returning to the **Main** menu allows users to write or edit protocols while the instrument is running. A **STATUS** [**F3**] option will appear on the **Main** menu screen to return to the Status screen when a protocol is running. The current running temperature step in the protocol is represented by a flashing line, and the protocol and host folders are displayed on the top of the screen. The time remaining in the current step and the current block temperature are displayed below this. ▲

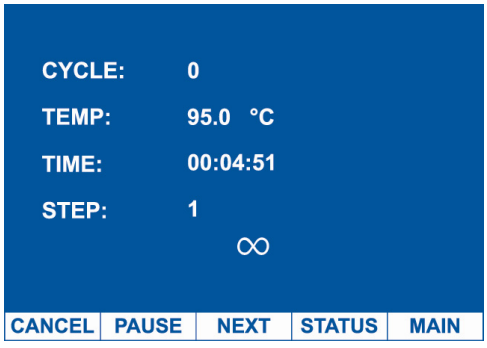
Returning to the **Main** menu allows users to write or edit protocols while the instrument is running. A **STATUS** [**F3**] option will appear on the Main menu screen to return to the Status screen when a protocol is running.



Press **TIME** [**F3**].

The Time Status screen displays additional information about the run. As with the Status screen, the file name and host folders are displayed on the top of the screen. Additionally, the following status parameters are displayed.

- "CYCLE" – Displays the current cycle number (within a GOTO loop).
- "TEMP" – Displays the current temperature of the block.
- "TIME" – Displays the estimated time remaining in the current step.
- "STEP" – Displays the step number of the currently running temperature step.



Note The ∞ symbol is displayed on the screen if programmed into the protocol. If not programmed into the protocol, the time left is displayed. ▲

Function key actions:

[F1] CANCEL Terminates the run, after confirming with the user.

[F2] PAUSE Pauses the run on the present temperature step, or the next step if ramping. When paused, this option becomes **RESUME**.

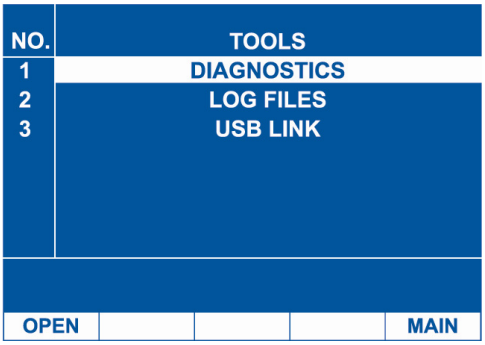
[F3] NEXT Skips to the next step.

[F4] STATUS Toggles to the Status screen.

[F5] MAIN Returns to the **Main** menu.

Chapter 5
Managing Diagnostics, Log Files and USB Link Using the Tools Menu

Select **TOOLS** [**F5**] in the **Main** menu.



The **Tools** menu provides three options which are accessed by scrolling to the desired item (using the cursor keys) and pressing the **OPEN** [**F1**] key:

- "DIAGNOSTICS" – Allows users to check or adjust lid parameters, sensor parameters, sound settings and clock settings (see below).
- "LOG FILES" – Allows users to review log files from previously run protocols.
- "USB LINK" – Allows users to transfer files to or from a USB Flash device.

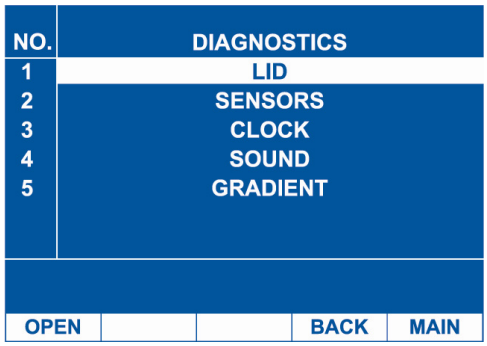
Diagnostics

The adjustment of the lid parameters, sensor parameters, sound settings and clock settings are described below.

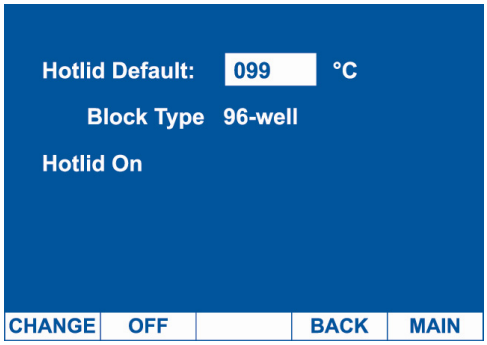
Lid

From the **Tools** menu, highlight "DIAGNOSTICS" and press **OPEN** [**F1**].

Highlight "LID" and press **OPEN** [**F1**].



The Lid screen displays the hot lid default temperature, as well as the setting determining whether the hot lid is ON or OFF by default.



Note These are default settings only. The user has the opportunity to change these parameters each time they begin a new run. ▲

Function key actions:

[**F1**] **CHANGE** Enables the user to change the default hot lid temperature.

[**F2**] **OFF** Toggles the default lid setting to OFF (at this point, the option changes to ON). In order to save the change to this setting, press **CHANGE**.

[**F3**] No action.

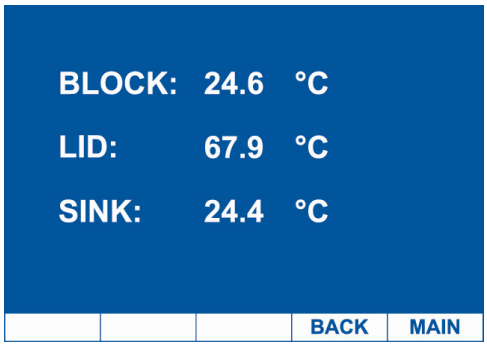
[**F4**] **BACK** Returns to the previous screen.

[**F5**] **MAIN** Returns to the Main screen.

Sensors

Highlight "DIAGNOSTICS" and press **OPEN** [**F1**]. Highlight "SENSORS" and press **OPEN** [**F1**].

The **Sensors** menu simply displays the current sensor reading for the temperature sensors located in the lid, the block, and the heat sink.



Function key actions:

[F1] [F2] [F3] No function.

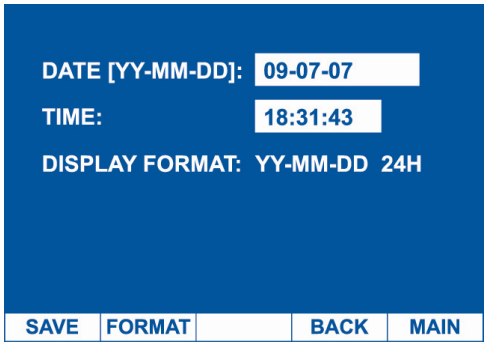
[F4] BACK Returns to the Diagnostics main screen.

[F5] MAIN Returns to the Main screen.

Clock

Highlight "DIAGNOSTICS" and press **OPEN** [F1]. Highlight "CLOCK" and press **OPEN** [F1].

The clock menu allows the editing of the Arktik Thermal Cycler's internal date and time settings.



Function key actions:

[F1] SAVE Accepts date and time changes.

[F2] FORMAT Changes the time and date format displayed.

[F3] No action.

[F4] BACK Returns to the previous screen, without changing the date and time settings.

[F5] MAIN Returns to the Main screen, without changing the date and time settings.

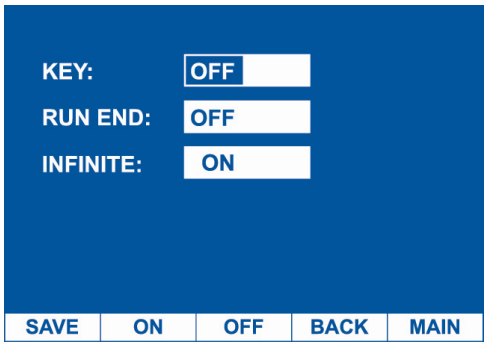
Cursor actions:

[▲] [▼][◄][►] Toggles between editable fields. Use the keypad 0–9 to insert numbers.

Sound

Highlight "DIAGNOSTICS" and press **OPEN** [**F1**]. Highlight "SOUND" and press **OPEN** [**F1**].

The sound menu allows the editing of the Arktik Thermal Cycler's Settings for tones produced during Keystrokes [KEY] at the end of a run [RUN END} and at the beginning of an infinite hold [INFINITE].



Function key actions:

[**F1**] **SAVE** Accepts sound changes.

[**F2**] **ON** Turns on the sound for the highlighted field.

[**F3**] **OFF** Turns off the sound for the highlighted field.

[**F4**] **BACK** Returns to the previous screen, without changing the date and time settings.

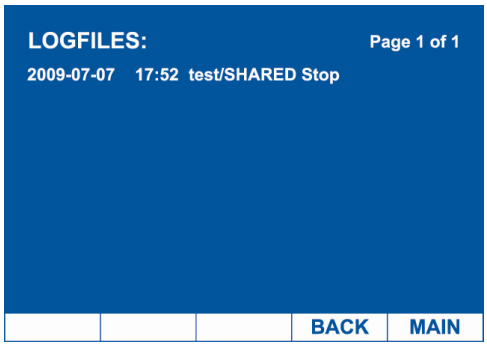
[**F5**] **MAIN** Returns to the Main screen, without changing the date and time settings.

Cursor actions:

[◄][►] Toggles between editable fields.

Log files

From the **Tools** menu, highlight "LOG FILES" and press **OPEN** [**F1**]. The **Log Files** menu displays the recent protocols that were run on the Arktik Thermal Cycler. Each protocol log contains information about the protocol and possible error messages.



Function key actions:

[F1] [F2] [F3] No function.

[F4] BACK Returns to the **Tools** menu.

[F5] MAIN Returns to the Main screen.

Cursor actions:

[◀][▶] Toggles between pages.

USB link

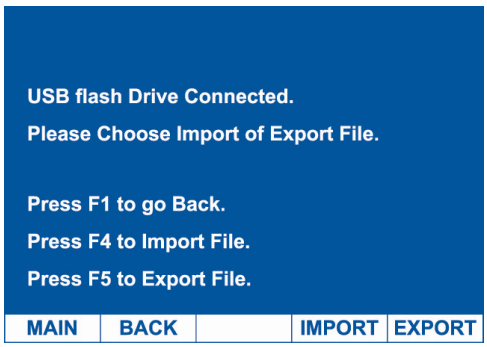
This section describes how to transfer a file to or from a USB flash drive.

Exporting a file to a USB flash drive

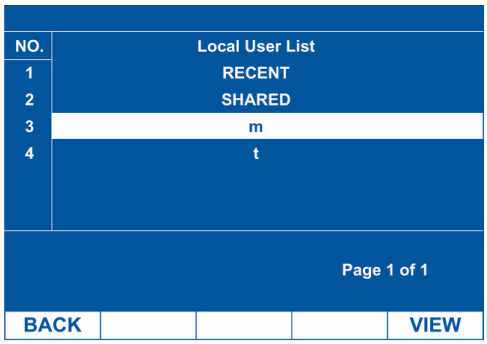
To export a file to a USB flash drive:

Note Files are always transferred with the folder in which they exist. If a file is transferred to or from a USB drive, and its folder does not already exist in that location, the folder will automatically be created. ▲

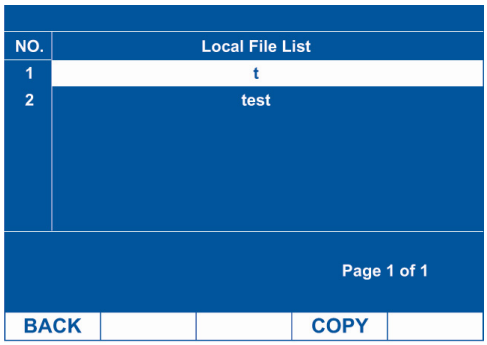
Insert the USB flash drive. From the **Tools** menu, highlight "USB LINK" and press **OPEN** [F1]. Then select **EXPORT** [F5].



Navigate to the desired file and folder and press **VIEW** [F5].



To export the selected file, press **COPY** [**F4**].



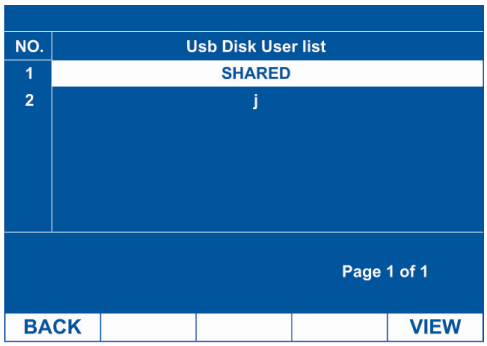
Note A message will be displayed if the same folder/file already exists on the USB drive, giving the option to overwrite the existing file. ▲

When the transfer is complete, the "FILE SAVED" message will be displayed. Press the **BACK** [**F1**] key to transfer additional files to the USB drive, or [**F5**] to return to the main screen.

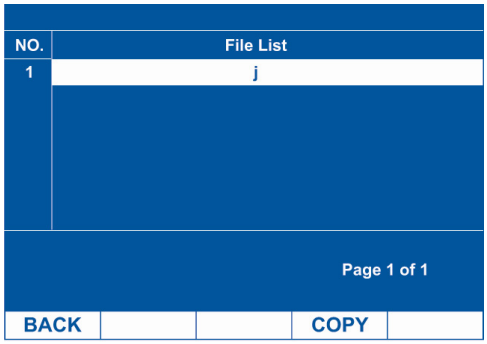
Importing a file from a USB flash drive

Insert the USB flash drive. From the **Tools** menu, highlight "USB LINK" and press **OPEN** [**F1**]. Then select **IMPORT** [**F4**].

Navigate to the desired file and folder and press **VIEW** [**F5**].



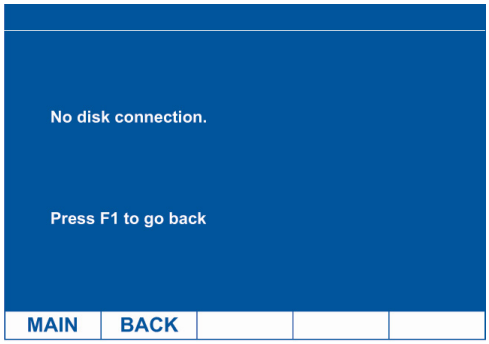
To import the selected file, press **COPY** [**F4**].



Note A message will be displayed if the same folder/file already exists on the Arktik, giving the option to overwrite the existing file). ▲

When the transfer is complete, the "FILE SAVED" message will be displayed. Press the **BACK** [**F1**] key to transfer additional files from the USB drive, or [**F5**] to return to the main screen.

Note If the USB flash drive is not inserted, the "NO DISK CONNECTION" message will be displayed. ▲



Chapter 6
Maintenance

Contact local authorized technical service or your local Thermo Fisher Scientific representative for assistance, if necessary.

Cleaning the fins of the heat sink

Inspect the fins of the heat sink on a regular basis. Dirty heat sinks have a significantly lower capacity to eject heat. Clean the fins if they become dirty or covered in dust. You can use a cotton swab, a brush, or compressed air to remove dust.

Cleaning the Arktik Thermal Cycler

Clean the outside of the Arktik Thermal Cycler with a damp, soft cloth or tissue whenever something has been spilled on it or the cover is dusty. A mild soap solution may be used if needed.

Clean the block wells with swabs moistened with water, 95% ethanol, or a 1:100 dilution of bleach in water.

Replacing the fuse(s)

To replace the fuse(s), you will need the new fuse(s) (250 V, 8A, fast, 5x20 mm) and a slotted screwdriver.

1. First, turn the instrument off and unplug it.
   The fuses are located at the back of the instrument (see Figure 2–3 on page 11).

2. Use the slotted screwdriver to open the fuse holder.

3. Remove the fuse(s) and replace it with the new one.

4. Slide the fuse holder back into the instrument.

5. Plug in the instrument and turn it on.

Disposal of the instrument

If the Arktik Thermal Cycler is exposed to potentially infectious biological samples, toxic or corrosive chemicals or radioactive chemicals, waste management of the complete instrument must be carried out to ensure that there is no risk of contamination.

Follow laboratory and country-specific procedures for biohazardous or radioactive waste disposal.

Warning The used lithium (Li) battery is regulated waste and must be disposed of according to local regulations. The Li battery has to be changed by an authorized service technician only. Instructions for changing the Li battery are described in the service manual. ▲

Dispose of the instrument according to the legislation stipulated by the local authorities concerning take-back of electronic equipment and waste. The proposals for the procedures vary by country.

Pollution degree	2 (see "Safe use guidelines" on page 44)
Method of disposal	Electronic waste Contaminated waste (Infectious waste)

WEEE symbol Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State (European Country), and this product should be disposed of or recycled through them. Further information on Thermo Fisher Scientific's compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at www.thermo.com/WEEERoHS. ▲

Regarding the original packaging and packing materials, use the recycling operators known to you. For more information, contact your local Thermo Fisher Scientific representative.

Chapter 7
Technical Specifications

Instrument specifications

Thermo Fisher Scientific reserves the right to change any specifications without prior notice as part of our continuous product development program (Table 7–1).

Table 7–1. Instrument specifications

Instrument specifications					
Dimensions					
Size	29 cm wide, 38 cm deep, 29 cm high				
Weight	10.5 kg (includes block)				
Electrical					
Power supply	600 W				
Line voltage	100–240 VAC				
Frequency	50–60 Hz				
Power failure recovery	Yes				
Fuses	2 x 250 V F8A				
Type	5020	**Certifications**	CE	**Warranty**	1 year
Instrument configuration					
Interchangeable block formats	96 x 0.2 ml, 384 x 0.03 ml, dual independent 48 x 0.2 ml				
User interface	Semigraphical				
Heated lid	Manually adjustable, advanced lid design ensures proper pressure while preventing over-tightening				
Memory	50 folders with 99 programs in each				
Communications	Ethernet, USB memory port for protocol transfer				
Programming					
Adjustable ramp rate	Yes				
Touchdown	Yes				
Thermal control	Optimized for standard and UTW vessels				
Thermal performance					
Ramp rate	2.5°C/s				
Gradient range	30°C max.				
Thermal uniformity	± 0.4°C at 90°C				
Thermal accuracy	± 0.3°C at 90°C				
Thermal range	4°C to 99.9°C				

Safe use guidelines

The Arktik Thermal Cycler is designed to be used safely under the following conditions:

- Indoor use
- Altitudes up to 2000 m
- Ambient, environmental temperatures between 5°C–30°C
- Up to a maximum, non-condensing humidity of 80%
- Transient over voltage per Installation Category 2, IEC664
- Pollution degree 2, in accordance with IEC664

Chapter 8
Troubleshooting Guide

Note Do not use the instrument if it appears that it does not function properly. ▲

Error log

If an error message (Table 8–2) appears in the display window of the Arktik Thermal Cycler, it may indicate that the system cannot complete the requested action (for example, "Heatsink temperature is too high."). Should you receive an error message regarding block sensors, contact Thermo Fisher Scientific Oy for support.

Table 8–2. Error codes reported

Block sensor error	Suggested action
Single block (96G, 384G)	
Heatsink temperature is too high.	Ensure that airflow is unobstructed (see "Conditions for proper use" on page 6).
Heatsink temperature is too low.	Do not run the instrument immediately if it has been stored in a cold location. Allow to warm to room temperature before operation.
Temperature sensor No. 1 is disconnected (block left temperature sensor).	Contact Thermo Fisher Scientific.
Temperature sensor No. 1 is shorted.	Contact Thermo Fisher Scientific.
Temperature sensor No. 2 is disconnected (block mid temperature sensor).	Contact Thermo Fisher Scientific.
Temperature sensor No. 2 is shorted.	Contact Thermo Fisher Scientific.
Temperature sensor No. 3 is disconnected (block right temperature sensor).	Contact Thermo Fisher Scientific.
Temperature sensor No. 3 is shorted.	Contact Thermo Fisher Scientific.
Hotlid sensor is disconnected.	Contact Thermo Fisher Scientific.
Hotlid sensor is shorted.	Contact Thermo Fisher Scientific.
Dual block (48D)	
Heatsink temperature is too high.	Ensure that airflow is unobstructed (see "Conditions for proper use" on page 6).
Heatsink temperature is too low.	Do not run the instrument immediately if it has been stored in a cold location. Allow to warm to room temperature before operation. If not working, contact Thermo Fisher Scientific for support.
Temperature sensor is disconnected.	Contact Thermo Fisher Scientific.

Continued

Block sensor error	Suggested action
Temperature sensor is shorted.	Contact Thermo Fisher Scientific.
Hotlid sensor is disconnected.	Contact Thermo Fisher Scientific.
Hotlid sensor is shorted.	Contact Thermo Fisher Scientific.
USB input/output error	
File Input error.	Disconnect the USB stick, go back to the Main screen, attach the USB drive and try again. If not working, contact Thermo Fisher Scientific for support.
File Output error.	Confirm that there is enough free space on the USB drive. Disconnect the USB stick, go back to the Main screen, attach the USB drive and try again. If not working, contact Thermo Fisher Scientific for support.
Memory error	
Memory is full.	Delete older protocols or back them up into a USB drive and then delete the protocols.
File find error	
File not found.	The protocol is corrupted or removed. Try again or create a new protocol.

Chapter 9
Ordering Information

Arktik

Contact your local Thermo Fisher Scientific representative for ordering and service information (Table 9–3).

Table 9–3. Instrument catalog number

Code	Item
TCA0001	Arktik Thermal Cycler, base unit
TCA0002	Arktik Thermal Cycler, base unit without gradient
TCA0096	Arktik 96 well block
TCA4848	Arktik 24 well dual block
TCA0384	Arktik 384 well block

Glossary

gradient PCR A protocol in which the temperature across the sample block is varied column by column for a particular hold step.

PCR Polymerase chain reaction.

touchdown PCR A protocol in which time and/or temperature is changed in small increments and are added or subtracted to each step in a loop. These changes continue to progress from cycle to cycle throughout the entire loop section of the protocol.

UTW Ultra-thin wall reaction vessel provided by Thermo Fisher Scientific.

Notes

Notes

Notes

Thermo Fisher Scientific Oy
Ratastie 2, P.O. Box 100
FI-01621 Vantaa
Finland

www.thermoscientific.com

N11467