Biometra
An Analytik Jena Company

T3000 Thermocycler

Instruction Manual

Ver. 09/10

Model	Ord. No.
T3000 Thermocycler 20	**050-720**
T3000 Thermocycler 48	**050-723**
T3000 Thermocycler combi	**050-724**

Please read these instructions carefully before using this apparatus!

Biometra GmbH

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This document describes the state at the time of publishing. It needs not necessarily agree with future versions.

Subject to change!

Contents

1 Introduction

1.1 Field of Applications

The Biometra T3000 is a Thermocycler that is licensed for PCR applications (research use only) and intended to be used for performing polymerase chain reactions. The development of the instruments was inspired by the wish to simplify molecular biology research. To reach this goal the instrument housing, lid and block were totally redesigned, providing so far unrealised speed and temperature uniformity. Innovative user software was developed, driven by Biometras 15 years experience in interface design. The result is an easy to use Thermocycler with excellent technical specifications.

1.2 Special features

1.2.1 Three independent Thermocyclers in one instrument

The T3000 Thermocylcer offers three independent blocks in one housing, thus different protocols can be run at the same time. This makes the T3000 Thermocycler the perfect instrument for laboratories where high flexibility is needed. With a maximum capacity of 3 x 48 wells the T3000 also offers high throughput in parallel operation. The T3000 Thermocycler is available in three different block versions for 0.2ml tubes, 0.5ml tubes or both in the combi block.

1.2.2 Easy programming

The T3000 Thermocycler offers intuitive programming and a new memory structure. New programs are easily created using the spread sheet layout that shows all important parameters on one screen. Four softkeys directly below the display offer quick access to all functions needed in the individual context. For easy retrieval, programs can be stored in individual subdirectories. Software options include both incremental and decremental temperature and time, automatic restart after power failure and extended incubation at sub-ambient temperatures.

1.2.3 High speed

The T3000 Thermocycler has been equipped with the latest in Peltier technology. In addition, the heat sink and ventilation system have been completely revised. Thanks to these improvements the T3000 achieves faster heating and cooling performance. High ramping rates provide both short experimental times and increased specificity.

1.2.4 Smart lid technology

Like all Biometra Thermocyclers the T3000 provides heated lids with automatic pressure control. The temperature can be set for each lid individually between 30 and 99°C. The unique design ensures the tubes are not damaged in any way by allowing the heated lid to be lowered until the optimum pressure is achieved. This enables close contact between lid and tubes, and reliably prevents excessive pressure.

1.3 Technical specifications T3000 Thermocycler

Order number	**050-720**	**050-723**	**050-724**
	T3000 Thermocylcer 20	T3000 Thermocylcer 48	T3000 Thermocylcer combi
Capacity	3 blocks for 20 x 0.5ml tubes each	3 blocks for 48 x 0.2ml tubes or 48 well microplates or 6 x 8er strips each	3 combi blocks for 18 x 0.5ml tubes** or 48 x 0.2ml tubes, or 48 well microplates or 6 x 8er strips
Heating rate*	2.1 °C/sec	2.2 °C/sec	1.4 °C/sec
Cooling rate*	1.7 °C/sec	2.0 °C/sec	1.2 °C/sec
Temperature Uniformity*	+/- 0.5 °C		
Temperature range	-3°C to 99.9°C		
Control accuracy	0.1°C		
Blocks	Aluminium		
Software	Program steps are easily entered in a spread sheet Options: time increment, temperature increment, set ramping rate, direct mode (for use as thermoblock), program storage in 10 individual subdirectories		
Program memory	10 individual subdirectories, total capacity of 1.500 program steps (equivalent to 250 average programs)		
Display	High brightness CFL backlight graphical LC Display, viewing area 124 mm x 34 mm, resolution 256 x 64 dots		
Auto restart after power failure	Yes		
Cool samples at 4°C	Yes		
Heated lid	High Precision Smart Lid for optimum lid pressure and excellent temperature uniformity		
Lid temperature range	30.0 – 99.0°C		
Power consumption	420 Watt		
Noise emission	Very low		
Interfaces	Serial RS232 port (data interface)		
Dimensions (W x D x H)	30 cm x 38 cm x 19 cm		
Weight	11.9 kg		
Working conditions	5 – 35°C, 70% relative humidity		

* According to Biometra standard procedure.
** Capacity increases to 35 x 0.5 ml tubes by use of small cap tubes

1.4 Legal Notes

1.4.1 PCR License – Legal Disclaimer

Purchase of a Biometra Thermocycler conveys a limited non-transferable immunity from suit for the purchaser's own internal research and development and applied fields other than human in vitro diagnostics under one or more of US Patents Nos. 5,038,852, 5,656,493, 5,333,675, 5,475,610, and 6,703,236, or corresponding claims in their non-US counterparts, owned by Applera Corporation.

No right is conveyed expressly, by implication or by estoppel under any patent claim, reagents, kits, or methods such as 5´ nuclease methods, or under any other apparatus or system claim, including but not limited to US Patent No. 6,814,934 and its non-US counterparts, which describe and claim thermal cyclers capable of real-time detection.

Further information on purchasing licenses may be obtained by contacting the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

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- PCR licensed and authorized

1.4.2 Copyright

1.4.3 Liability

Biometra is not liable for damages and injuries caused by use not considering these operating instructions in parts or completely.

1.4.4 Meaning of the Instructions

Biometra recommends that you first read these instructions carefully. This operation instruction is part of the product and should be kept over the full life-time of the instrument. It should also be forwarded to subsequent owners and users. Make sure that additions and updates are inserted into the operation instructions.

2 Safety and Warning Notices

2.1 Definition of Symbols

Symbol	Definition
	Caution! Refer to instruction manual!
	Danger! High voltage!
	Fragile!
	Danger! Hot surface!

2.2 General Safety Instructions

Please read this manual carefully before starting operation of the T3000 Thermocycler. The T3000 Thermocycler is intended for sample incubation at varying temperatures.

- General safety precautions for laboratory work must be observed when working with the T3000 Thermocycler.
- The T3000 does not produce a sound power level that could be hazardous for the user.

The thermoblock and the heated lid will reach high temperatures during operation. Both thermoblock and heated lid can burn you.

Rapid heating of the thermoblock can cause liquids to boil explosively. Always wear safety goggles during operation. Close the lid before starting a program.

Do not heat samples without having the lid locked securely.

Be aware that samples are reaching high temperatures. Do not touch or open hot tubes or microplates, because hot liquid may quickly spill out.

Do not touch the heated lid.

Use only suited plastic ware in the T3000 thermocycler. Tubes and plates must show good fit when placed in the thermoblock. Only use tubes that are suited for high temperatures (tight lids).

The T3000 Thermocycler contains no user serviceable parts. Do not open the housing instrument. Service and repair may only be carried out by the Biometra Service department or otherwise qualified technical personal.

Do not use the instrument when damages of the housing, block, cable or other parts are visible.

Prior to connecting the unit to the power source please ensure that the voltage selector at the bottom of the instrument is set to the required voltage.

Make sure that the main supply voltage is in accordance with the label above the power connection (see section 4.2)

Unplug the power cable before you open the T3000 Thermocycler. Danger of electric shock!

Make sure that the appliance connector and the plug of the supply cord are accessible, so you can separate the instrument from the mains.

Connect the T3000 Thermocycler to a grounded socket.

When only few samples are put in the block place additional tubes in the four corner positions. This is to evenly distribute the lid pressure and prevents single tubes from excessive pressure. Use of few tubes may result in damage of the tubes by excessive pressure.

Appropriate safety regulations must be observed when working with infectious, pathogenic or radioactive material. Ask the responsible local safety inspector for details.

The T3000 Thermocycler must not be used with explosive, flammable or volatile liquids.

Do not place fingers between lid and housing when opening or closing the lid.

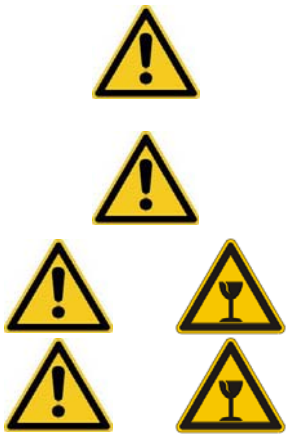
Before opening of the lid, release lid pressure (see section 4.4)

It is not necessary to apply oil into the opening of the block in order to improve the heat transfer between the block and the sample tubes.
If you still decide to use oil, **do not** use silicon oil. Mineral oil may be used.

Ensure that both the rear and bottom ventilation slits not clogged by dust or other material. Danger of overheating!

Let equilibrate the T3000 Thermocycler to room temperature before starting operation.

There must be sufficient distance between the ventilation slots on the side of the Thermocycler and a wall or another instrument (min 10 cm). Danger of overheating!



This instrument is designed and certified to meet EN 61010-1 safety standards. It should not be modified or altered in any way. Alteration of this instrument will void the warranty, void the EN61010-1 certification, and create a potential safety hazard.
Place the T3000 Thermocycler on a stable, non flammable surface in a dry, safe environment. For details see working conditions in table “Technical specifications” (see chapter 1.3).

Do not use alcohol (e.g. methanol, ethanol), organic solvents or abrasives to clean the instrument.

For transports always use the original Biometra box.

3 Installation

3.1 Content of delivery

1) Thermocycler with exchangeable block module
2) Mains connector
3) Manual
4) Short Manual

Please keep the original packaging material for return shipment in case of servicing. The T3000 shipping box provides a specially developed system for contact-free transport of this electronic device.

3.2 Unpack and Check

Unpack and carefully examine the instrument. Report any damage to Biometra. Do not attempt to operate this device if physical damage is present.

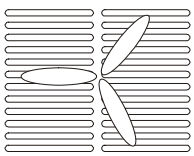
Please keep the original packing material for return shipment in case of service issues

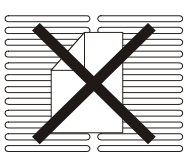
!! Attention !!

Please fill out and send back the warranty registration card. This is important for you to claim full warranty.

3.3 Installation Conditions

- Place the T3000 Thermocycler on a stable surface in a dry, safe environment. For details see working conditions in table “Technical specifications” (see chapter 1.3).
- Let equilibrate the T3000 Thermocycler to room temperature before starting operation (1 to 6h).
- Make sure that the appliance connector and the plug of the supply cord are accessible, so you can separate the instrument from the mains.
- Make sure that the ventilation slots on the bottom and the sides are not obstructed (see section 4.2). Make sure that there is no object underneath the thermocycler that may block the ventilation slots at the bottom (e.g. a piece of paper etc.)
- There must be sufficient distance between the ventilation slots on side of the Thermocycler and a wall or another instrument (min 10 cm).





Ensure that both the side and bottom ventilation slits of the side and bottom of the instrument are unobstructed.

Insufficient ventilation can cause overheating of the instrument.

- Make sure that the main supply voltage is in accordance with the label above the power connection (see section 3.4)
- Connect the T3000 Thermocycler to a grounded socket.

Prior to connecting the unit to the power source please ensure that the voltage selector at the back side of the instrument is set to the required voltage.

Danger of electric shock! Unplug the power cable before you open the T3000 Thermocycler.

- The display contrast can be adjusted to local light conditions (5.7.4).

3.4 Operation Voltage

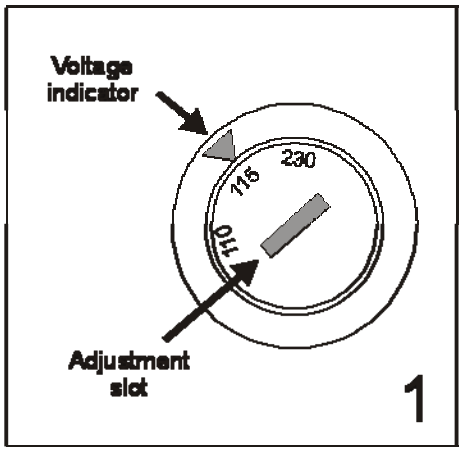
Important: Prior to connecting the T3000 to the mains, make sure that the setting of the Voltage selector is in accordance with your mains Voltage.

The T3000 Thermocycler can operate at 100, 115 or 230 Volt. The operation Voltage is shown on the Voltage selector which is located at the instrument bottom.

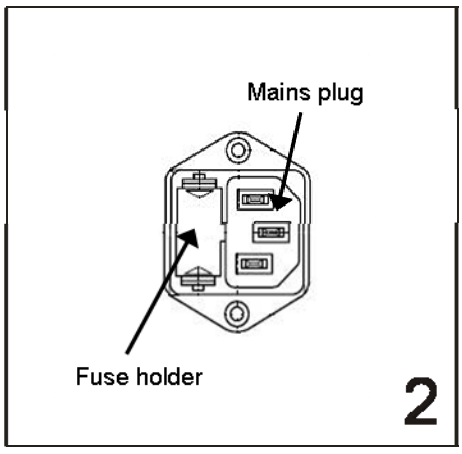
To change operation Voltage of the T3000, switch off the instrument and disconnect the mains plug.

Use a coin or another round shape item to turn the adjustment slot of the Voltage selector to the new Voltage.

Instrument bottom



Instrument backside



3.5 Initial self test

After switching on the T3000 the serial number of the instrument and the software version is displayed.

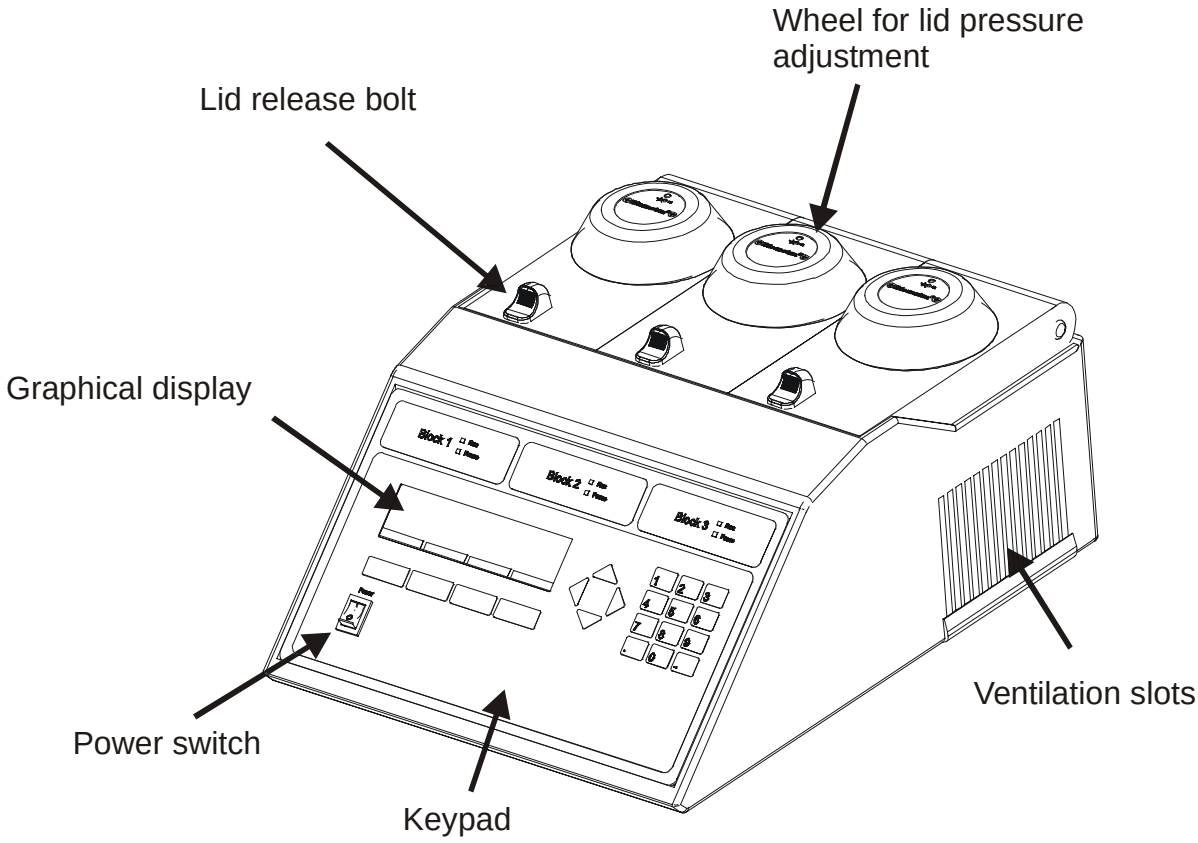
```
          T3000 Thermocycler

             Serial number
              Block type
Vers.                        (c) Biometra 2004
```

The T3000 then checks all programs in all subdirectories (so called RAM check).

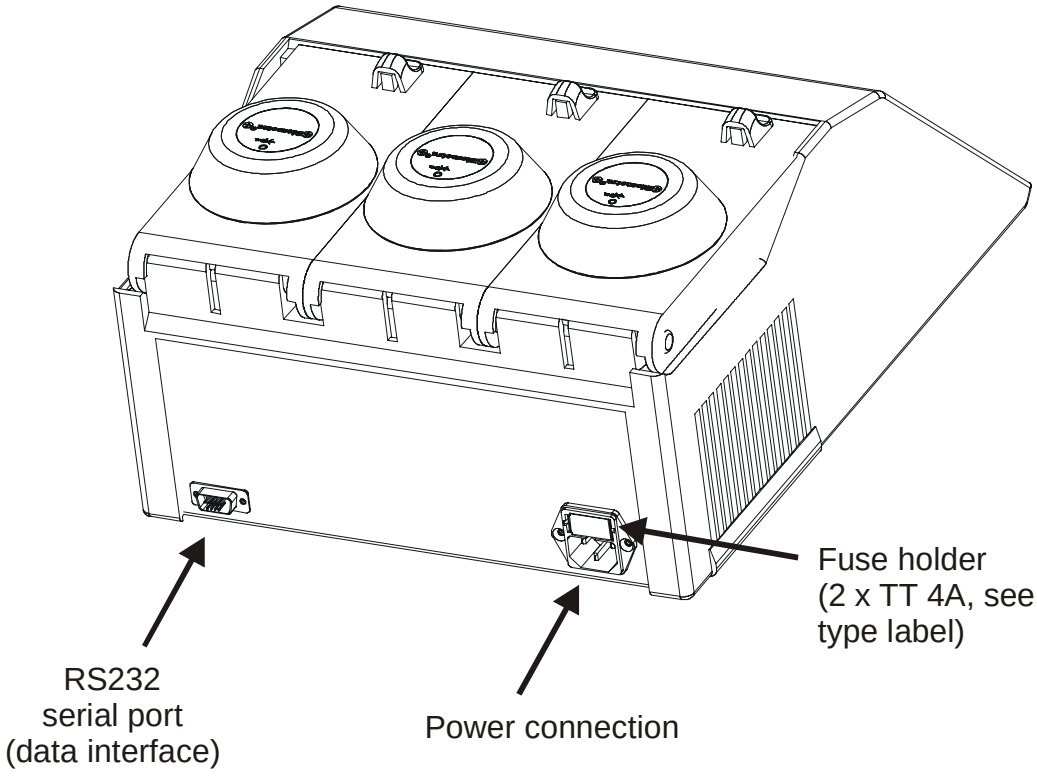
```
          T3000 Thermocycler

             Serial number
              Block type
Checking directory 7 program 4
```

4 Operating elements

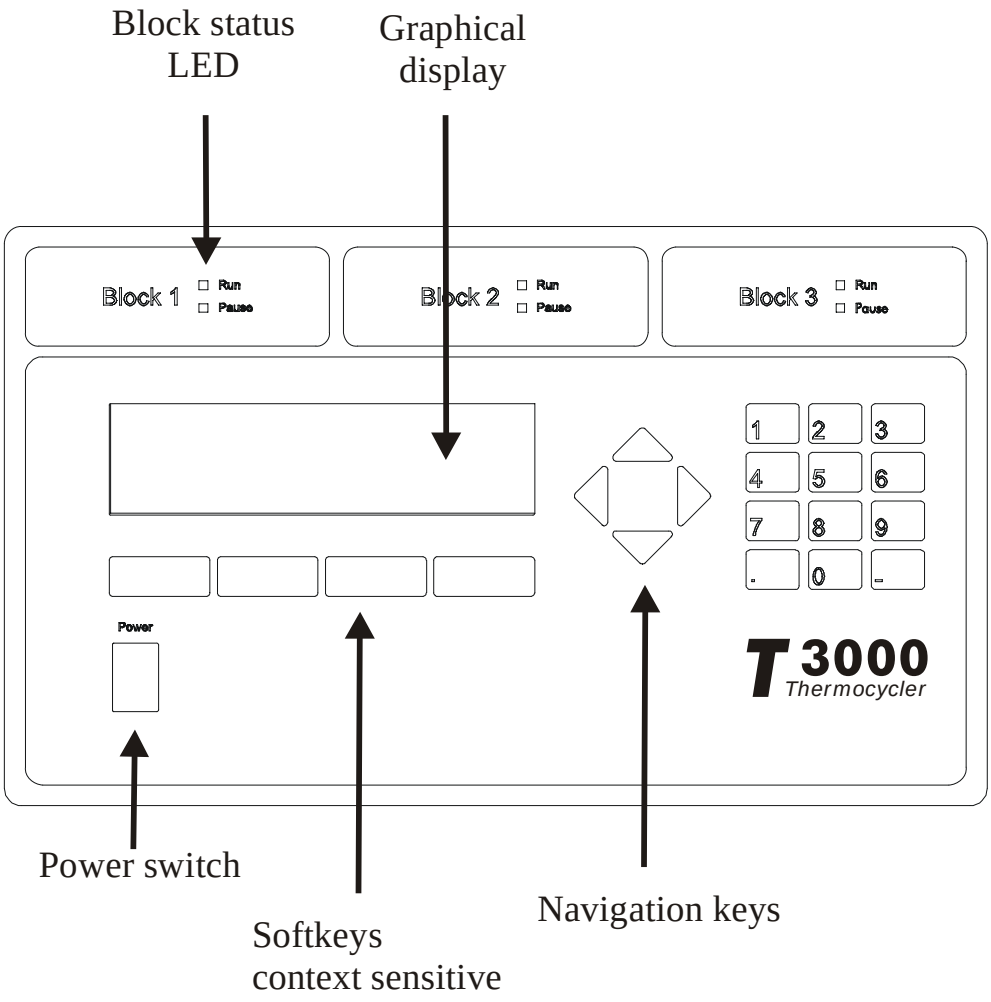
4.1 The T3000 Thermocycler front view



4.2 The T3000 Thermocycler rear view



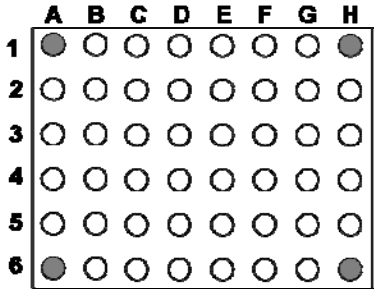
4.3 The T3000 control panel



4.4 The high performance smart Lid (HPSL)

To achieve optimum pressure on the tubes the T3000 is equipped with a height adjustable heated lid.

Close the lid:
After the samples have been placed in the block close the lid. Turn the wheel clockwise until you hear a clicking noise. In this mode the pressure will not increase further, even when you keep on turning the wheel.



Note: The pressure of the lid has been optimized for a fully loaded block. If only very few tubes are loaded to the block you should place dummy tubes in the four corner positions to avoid damage of tubes by excessive pressure.

Open the heated lid:

First: Release pressure by turning the wheel counter clockwise. As soon as there is no more resistance the pressure has been released.

Then: Now you can open the lid with the knob.

Important: The lid should not be opened under pressure because this leads to damage of the locking mechanism.

5 Operating

5.1 The T3000 display

The T3000 display provides information about the instrument and about the status of the active program.

Prog Step Temp Time Lid	 23.9C 24.0C	 23.8C 23.9C	 23.9C 23.9C
Info	System	Start/Stop	Edit

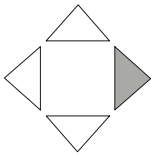
Softkey 1	Softkey 2	Softkey 3	Softkey 4

The function of the four soft keys beneath the display is context sensitive. The respective function is shown in the display. The function of each key can differ from screen to screen.

5.2 Navigation within the T3000 software

The T3000 thermocyclers provides spread sheet programming. This means that all program parameters are entered into a simple central spreadsheet.

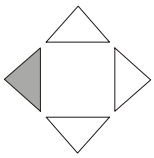
Four navigation keys provide easy navigation within the software. The back and the forward key have additional functions as described below:



The right cursor key moves the cursor to the next field.

This cursor can also be used to complete data entry. By pressing the right cursor settings will be saved and the cursor moves to the next field.

In the file directory, this key moves to cursor forward to the next (lower) level.



The left cursor key moves the cursor back to the previous field.

In most screens this cursor is equivalent to the "**back"** softkey.

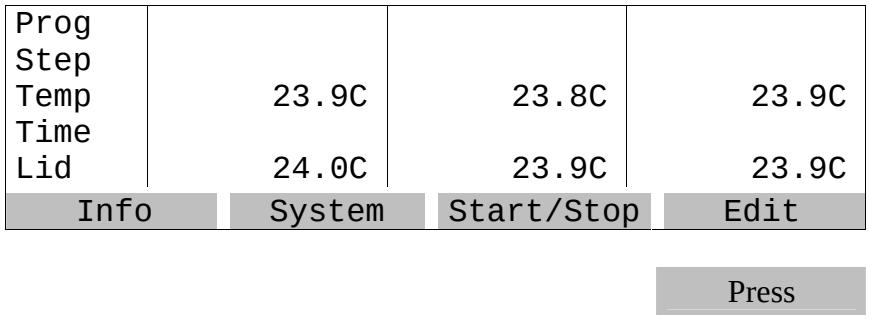
In the file directory, this key moves the cursor back to the higher level.

5.3 Create program

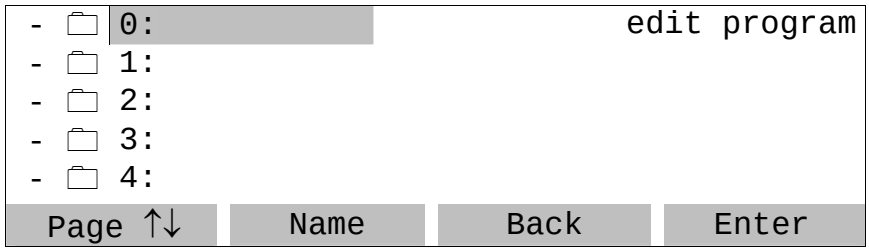
Prior to writing a new program, a program store has to be chosen. The T3000 Thermocycler provides 10 subdirectories of which each can store up to 99 different programs. For easy identification of the selected storage place, the subdirectories can be named (see section).

5.3.1 Select directory

Start with the main screen.

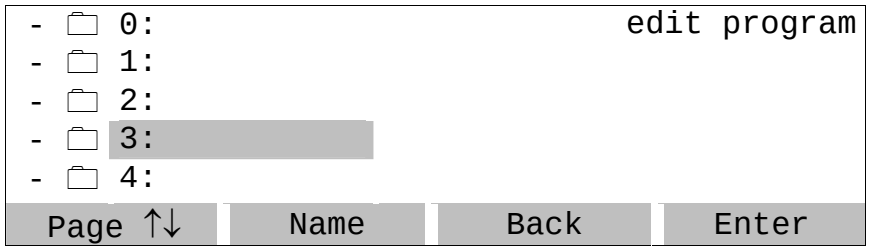


Press [Edit] to enter the edit mode.

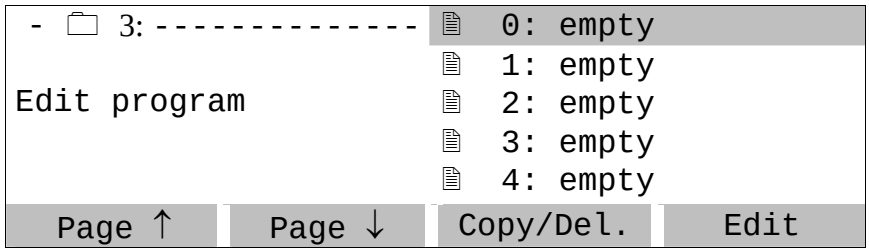


You are now in the directory structure of the edit mode.

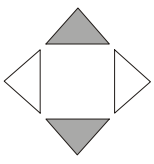
Use cursor keys to select a subdirectory.



Press [Enter] to enter highlighted subdirectory. The program storages are displayed.



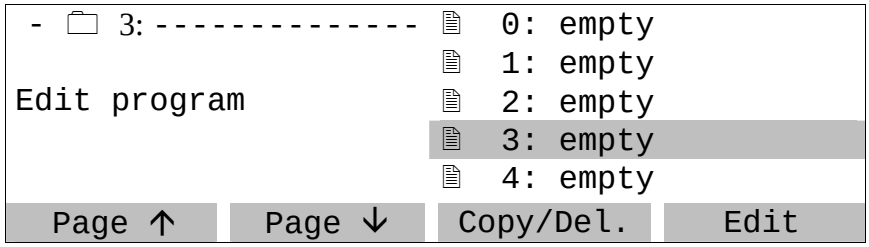
5.3.2 Select program store



Use cursor keys to select a program store.

Tip: Use numeric keypad to directly enter program number.

For numbers smaller than 10 enter “0” plus number.

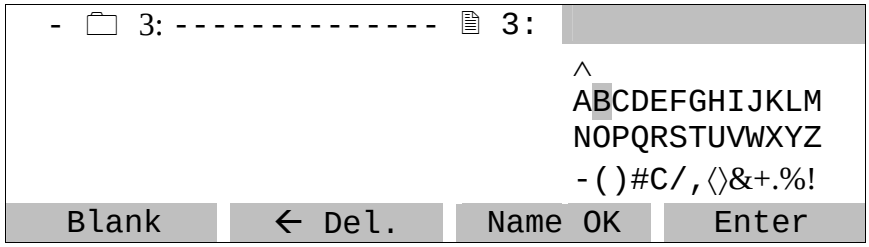


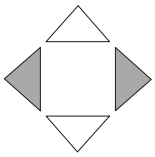
Using the softkeys [Page ↑] and [Page ↓] you can scroll through the list in 5 program steps.

Press [Edit] to write new program in Program store 03.

5.3.3 Enter program name

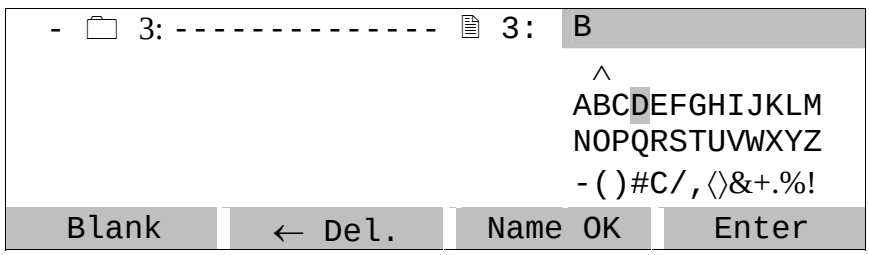
Each program is specified by a program number and a subdirectory number. To make retrieval of a program easier, you can enter a name for each program existing of letters, numbers and symbols.

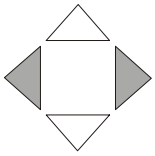




Use cursor keys to select a letter.

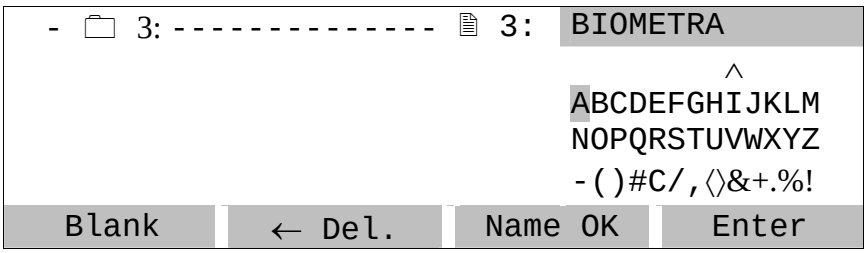
Accept letter with [Enter].



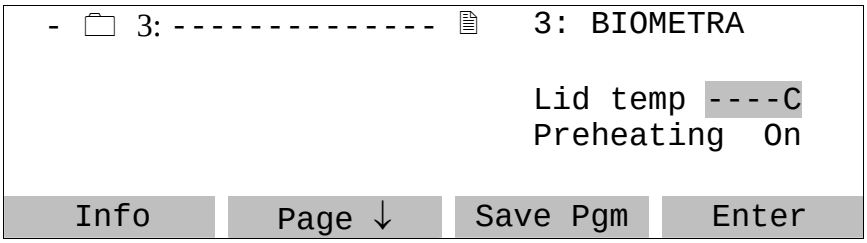


Use cursor keys to select next letter.

Accept letter with [Enter]. Repeat until name is completed.



Once the name is completed, confirm name with [name OK].

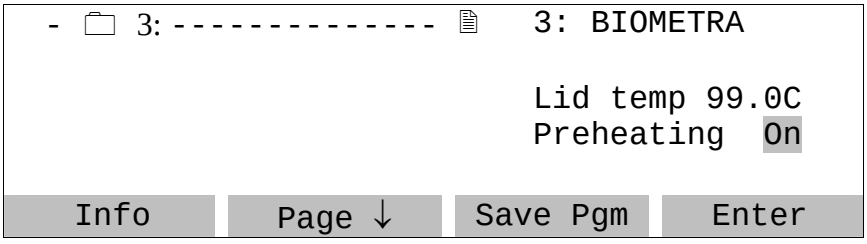


5.3.4 Enter lid temperature

You can now enter a temperature for the heated lid.

Note: Thanks to a new lid design, significantly lower lid temperatures than in the past can be used for thermocycling. The lower lid temperature leads to a higher temperature uniformity within the lid and thus to a more even temperature distribution in the tubes.

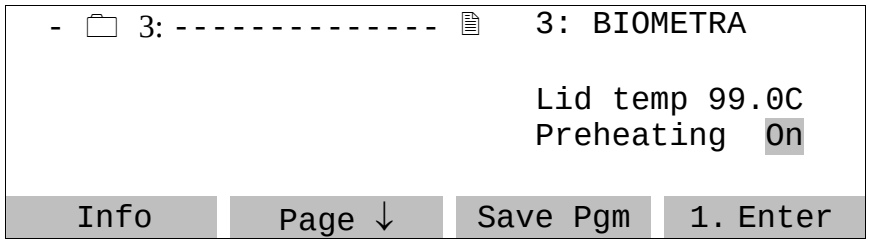
For instruments featuring the new lid design, a maximum temperature of 99.0°C should be used.



5.3.5 Select / deselect lid pre-heating

You can choose whether the lid is pre-heated before the program starts. This is to avoid evaporation during the initial heating phase.

Note: During the preheating of the lid, the block is held constant at 25°C.

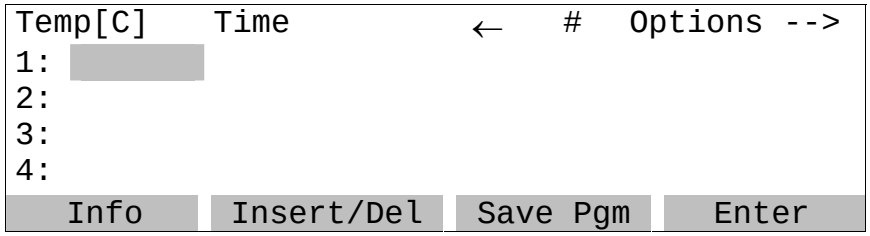


Note: The default setting, which is recommended for most applications, is preheating: On.

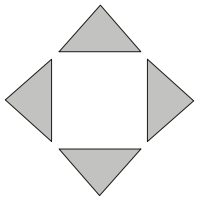
After all pre-settings have been made, press [Enter] to open the programming spreadsheet.

5.3.6 Enter temperature and time settings

The programming spreadsheet:



Note: In this spreadsheet you can enter all parameters for your cycling protocol. In addition, you can set special parameters like touch down, ramping rates or time increments. For details on these special parameters, see section 5.4.1.



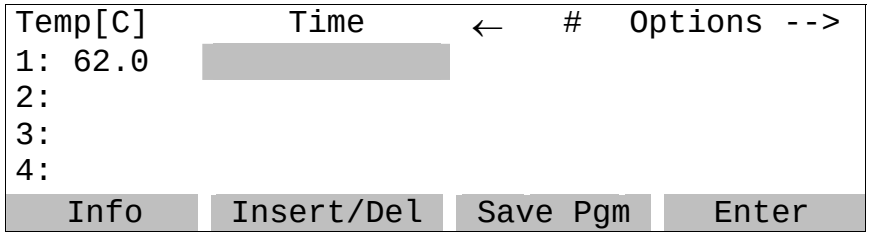
You can navigate in the spreadsheet without limitations with the four cursor keys

Note: Each setting is confirmed with [Enter]. The cursor moves automatically to the next field. Alternatively, you can confirm a value by moving forward with the cursor keys.

Note: At any time you can call up the help function with [Info]

Note: In an existing protocol program steps can be deleted and inserted. For further information on deleting and inserting program steps see section 5.4.1.

Now enter temperature for the first step an press [Enter]. In the next row you can enter the time for this temperature:



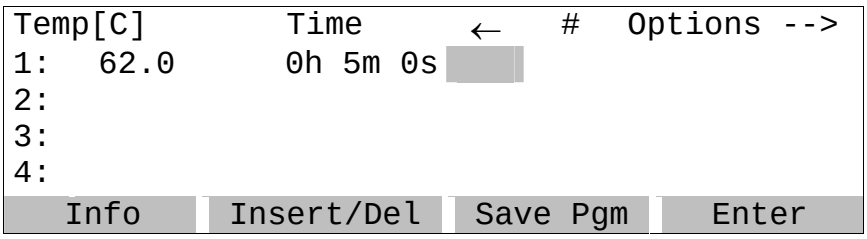
Note: There is a convention on how time settings are entered in all BIOMETRA cyclers:

hours ● minutes ● seconds

If you enter a number without “dot” this value will be interpreted as seconds (“300” => 5 minutes). To program minutes enter a “●” after the number of minutes. To enter hours enter ● ● after the number. You can also enter any combination of hours, minutes and seconds. Example: for 1 hour, 30 minutes, 20 seconds enter 1● 30 ● 20.

The time values will be displayed in the following format: 0h 00 m 00s

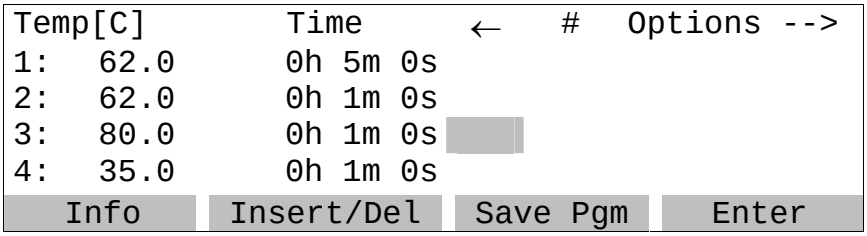
Enter “5” “dot” for 5 minutes initial denaturation. Press [Enter]



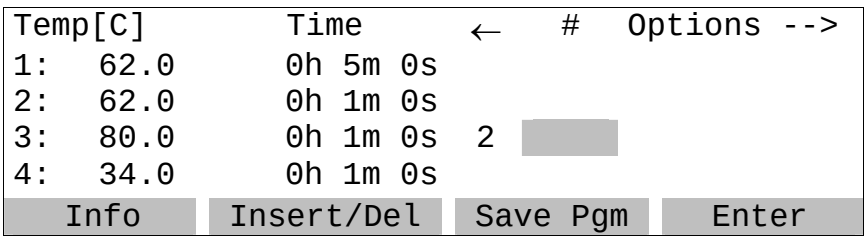
Repeat for all temperature steps in the program.

5.3.7 Set loop

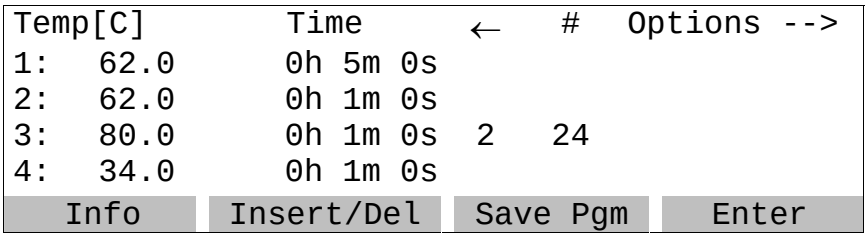
Note: In general, loops are defined by selecting the target for the back loop and the number of backloops.



In the row labelled with ← enter the target step for a backloop and press [Enter].

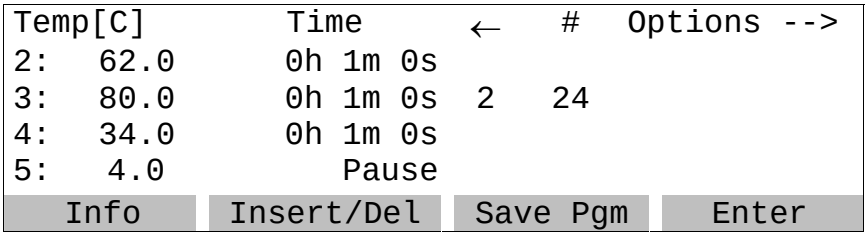


In the row labelled with # you can enter the number of backloops. **Note:** total cycler number = (n backloops) + 1, e.g. enter 29 for a total number of 30 cycles.



This protocol now contains 25 cycles between step 2 (62.0°C for 1minute) and step 3 (80.0 °C for 1 minute).

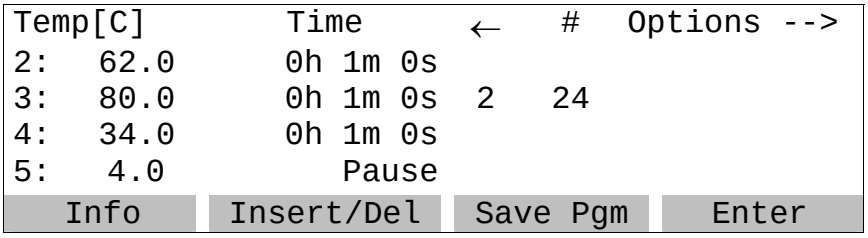
5.3.8 Cool below ambient temperature



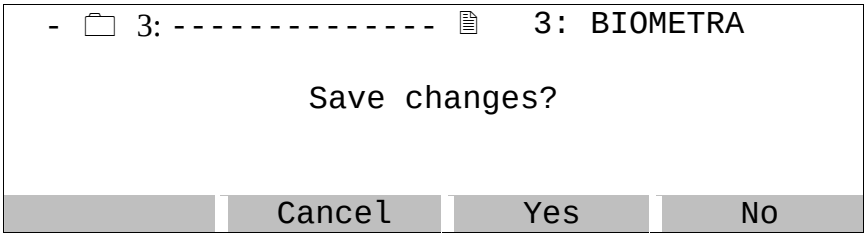
To hold the temperature for an indefinite time enter “0”. After pressing [Enter] “pause” is displayed.

5.3.9 Save program

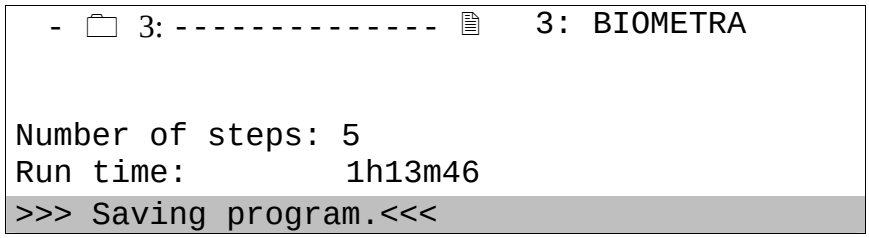
Save program with [Save Pgm]. The program data are written to the permanent memory.



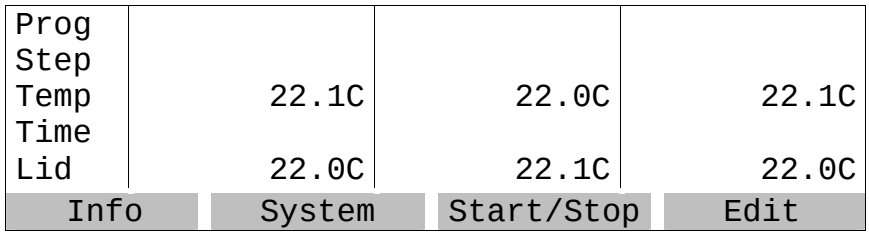
Save program with [Save Pgm].



Confirm changes with [Yes]. The run time is calculated.



Note: The run time is calculated according to the block type. Please be aware that different block types provide different ramping rates (see section 1.3, Technical specifications).



Note: To view the remaining runtime during a run press [Info] in the main menu.

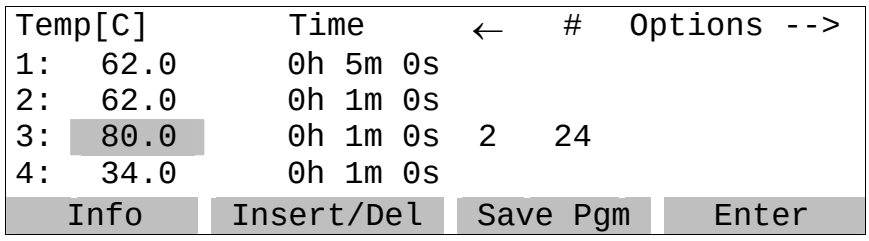
5.4 Edit programs

Select program as described in section 5.3.2.

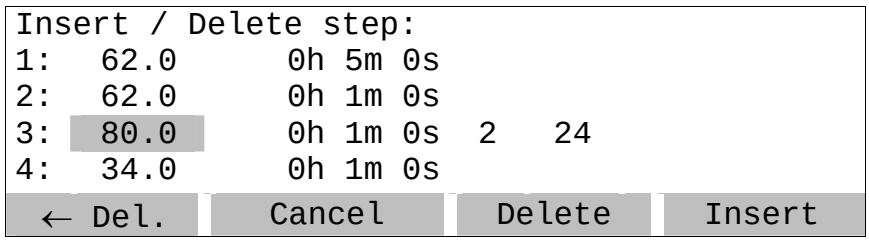
Note: During operation of the cycler the active program can be viewed but not modified. If you want to change settings of the active program for further experiments you have to save a copy of this program to another memory. For further information about copying programs see section 5.4.3.

5.4.1 Delete program steps

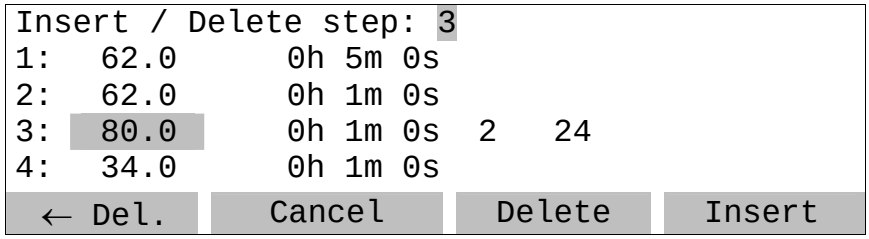
The programming spreadsheet:



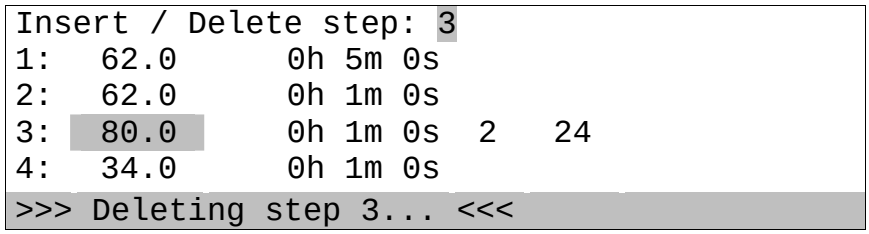
To delete a program step press [Insert/Del]

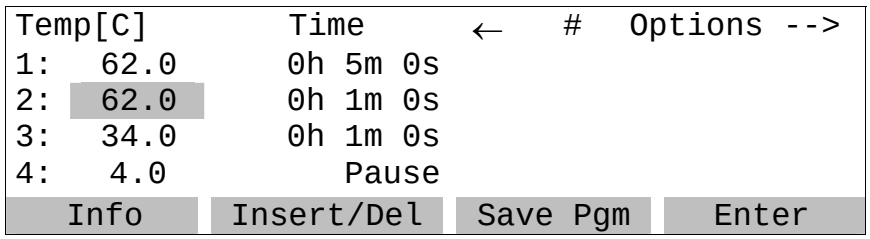


Enter the number of the step that you want to delete.



Press [Delete]

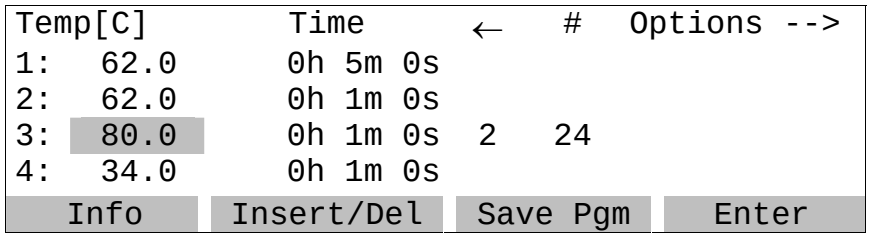




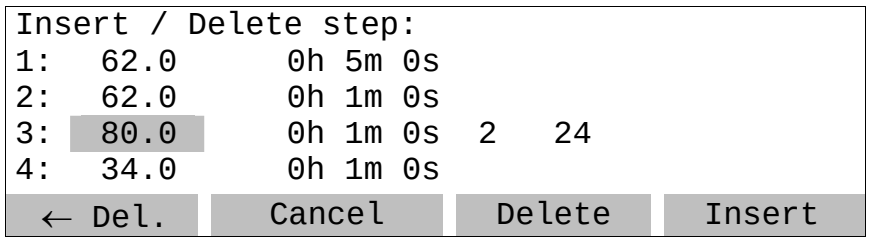
Note: The loop has been deleted together with steps three.

5.4.2 Insert program steps

The programming spreadsheet:

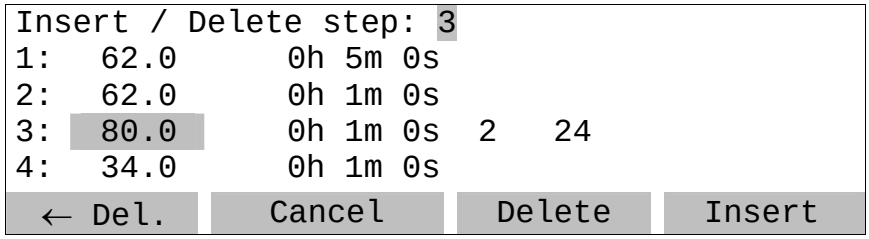


To insert a program step press [Insert/Del]

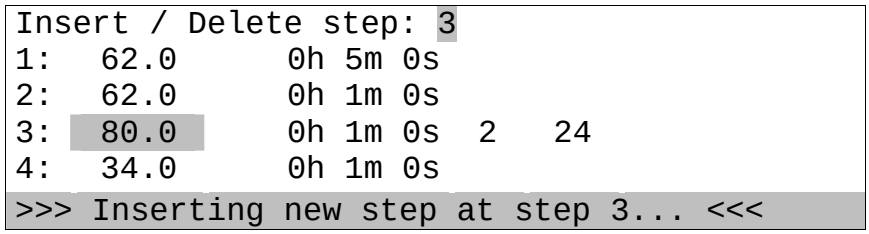


Enter the number of the step that you want to insert / delete.

Example: To insert new step at step 3, Enter “3”

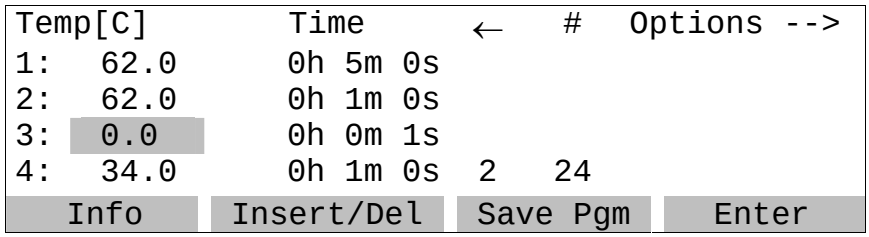


Press [Insert]



A new step is inserted (Temp 0°C, Time 0h 0m 1s).

Note: The new step has been entered within an existing loop, this loop now consists of three steps.



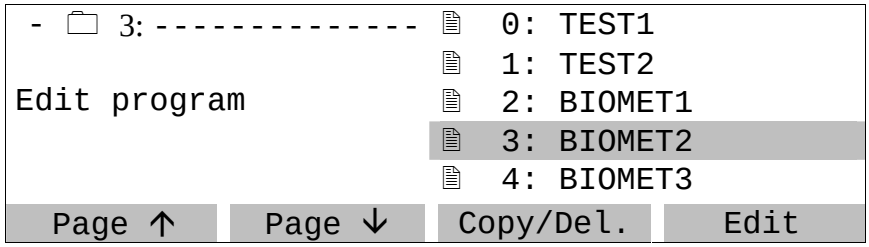
Enter temperature and time for new step.

Note: Additional steps will be inserted before the selected step. The following steps are shifted by one position.

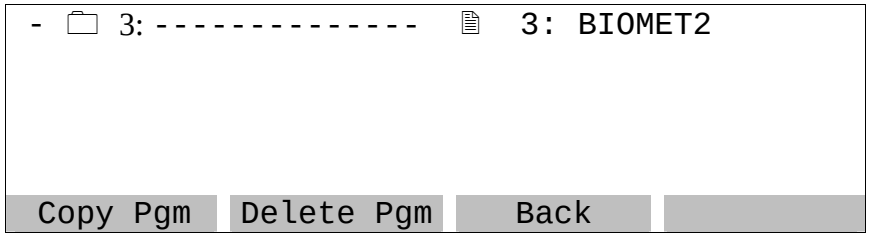
Note: The insertion and deletion of steps may have an influence on existing loops. Be sure that all settings are updated to maintain a correct cycle.

5.4.3 Copy program

Select the program you want to copy as described in section 5.3.2



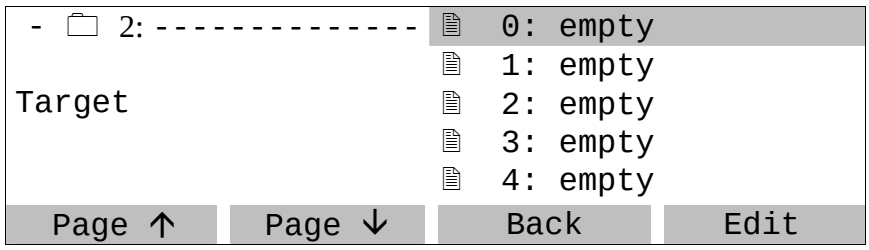
Press [Copy/Del.]



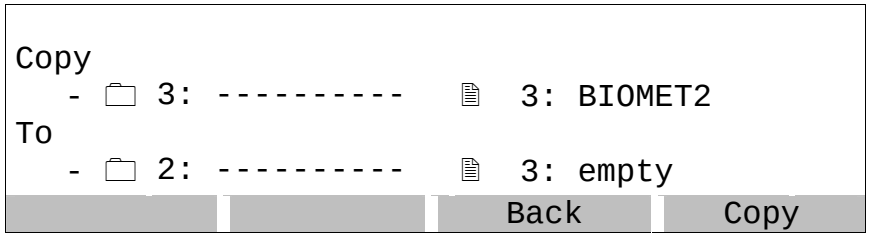
To copy this program press [Copy Pgm]

Select the subdirectory with the cursor keys, or enter number on the keypad:

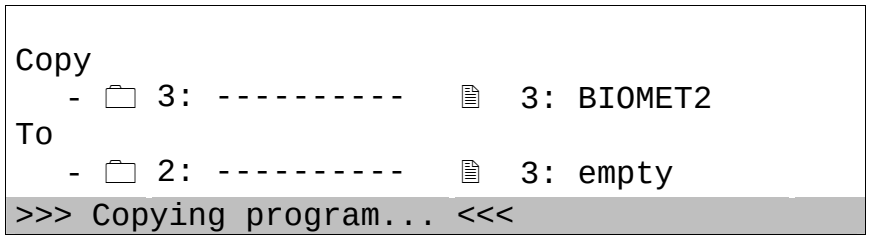
Press [Enter]

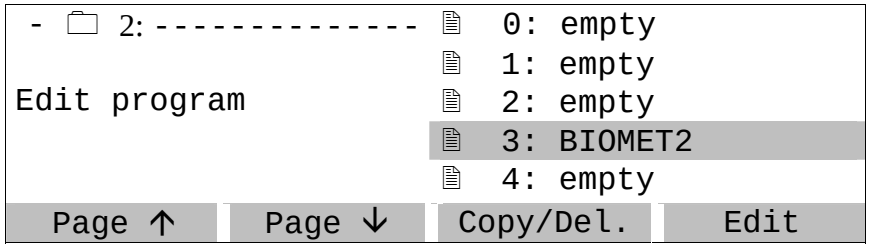


Select program number for the program copy and confirm with [Enter]:



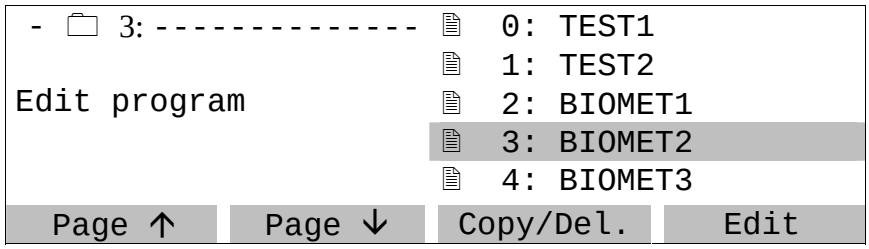
Press [Copy]



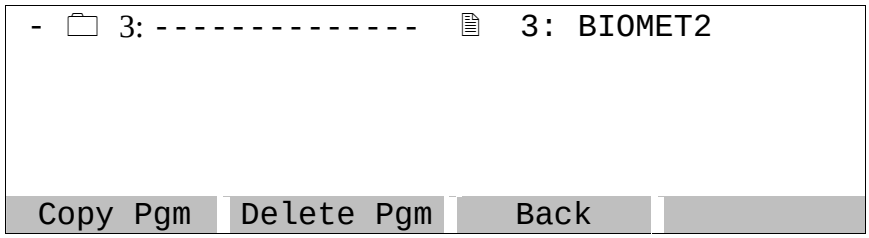


5.4.4 Delete program

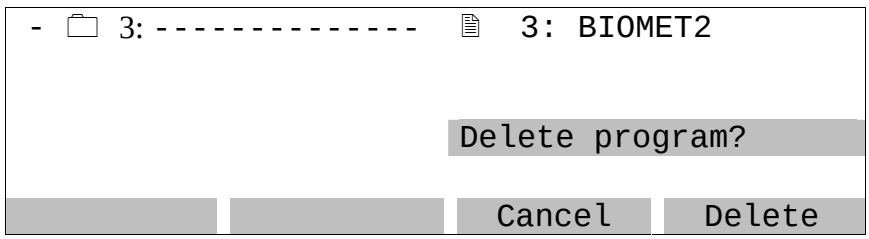
Select program as described in sections 5.3.1 and 5.3.2



Press [Copy/Del.]

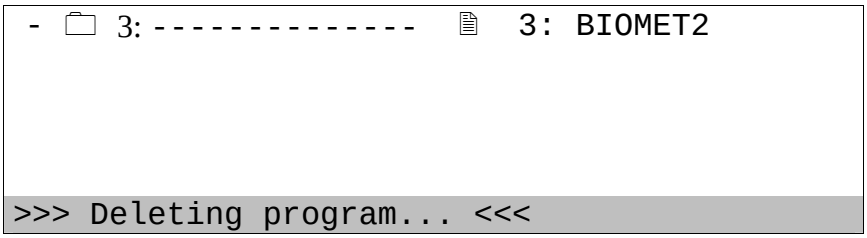


To delete this program press [Delete pgm]

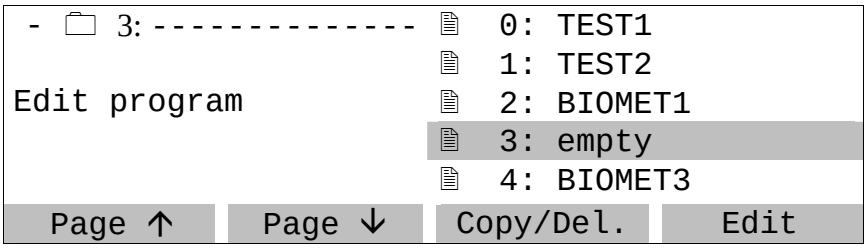


Note: Once a program has been deleted, it cannot be restored!

Press [Delete]



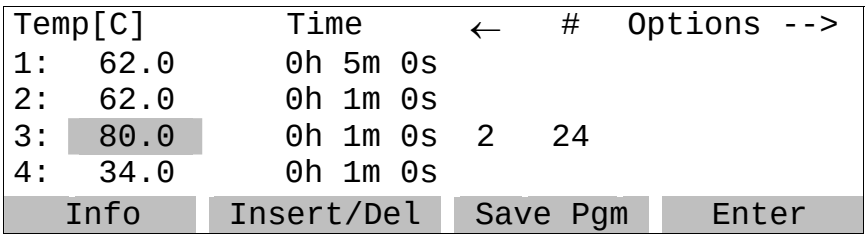
In the directory structure the program is displayed as empty.



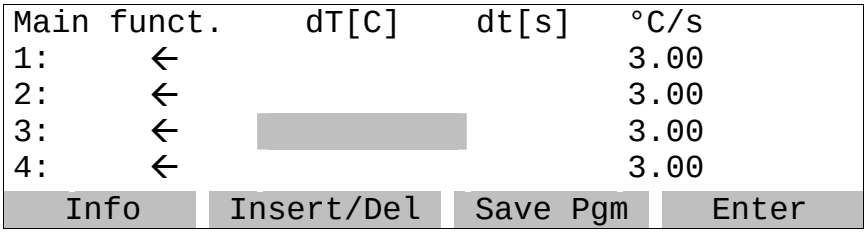
You can enter a new program.

To get back to the main screen, 2 x press cursor key [←]

5.5 Further programming options

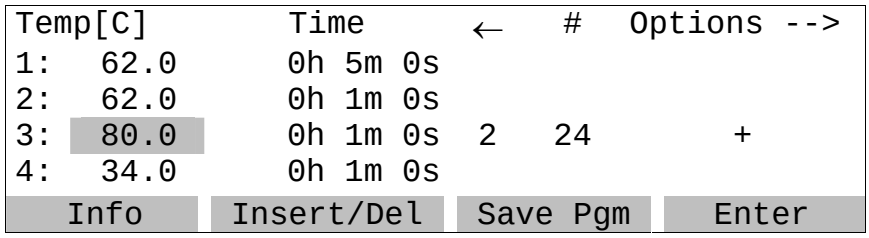


Note: To program special parameters you can scroll the display to the right. Move the cursor to the right side row of the display (Options →).



Note: To go back to programming sheet, move the cursor to the very left side of the display (row “Main funct.”).

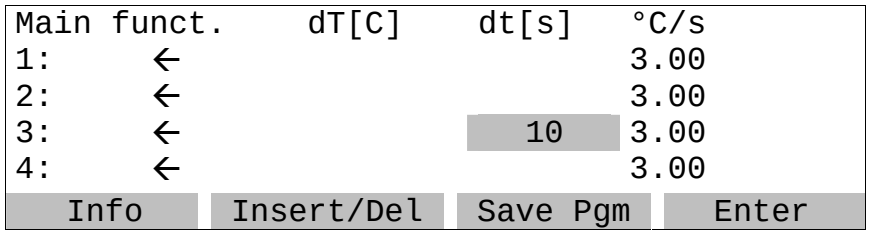
Alternatively you can move the cursor to the very right.



Note: In the main screen you will find an information that a special parameter has been modified. This is indicated by a + in the row labelled with opt →.

5.5.1 Program time increments

To compensate for loss in enzyme activity each step within a loop can be extended from cycle to cycle. Enter the desired time increment [seconds] in the row labelled with dt[s]. This value will be added to the time value from cycle to cycle.

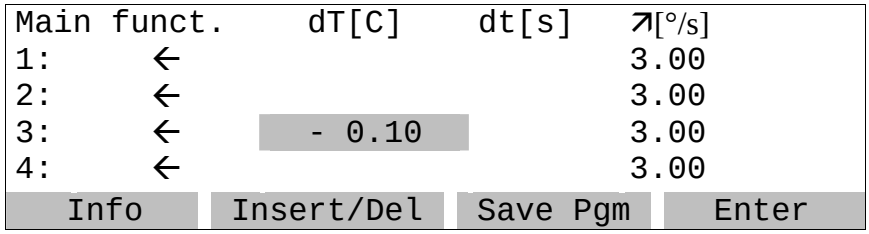


Note: A time increment will have an impact on the total runtime depending on the numbers of cycles and the size of the increment. A program with many cycles and large time increments will take a significantly longer time than a standard protocol.

5.5.2 Program touch down

For some applications it is useful to start with a higher temperature and to decrease this temperature from cycle to cycle. This subsequent lowering of a temperature is called touch down.

To decrease the temperature from cycle to cycle enter a negative temperature increment in the row labelled with dT[s].



Note: Be sure that the temperature decrease is set in a step that lies within a loop. Otherwise there will be no iterative temperature decrease.

5.5.3 Adjust heating and cooling ramps

Since the T3000 is a fast Thermocycler it may be necessary to reduce the heating and cooling ramp for some applications. For example this is helpful if protocols from other Thermocyclers shall be used.

The heating or cooling ramp respectively can be set in the row labelled with ↗[°/s].

Main	funct.	dT[C]	dt[s]	↗[°/s]
1:	←			3.00
2:	←			1.00
3:	←			3.00
4:	←			3.00

Info | Insert/Del | Save Pgm | Enter

Note: The default setting [3.00 °/s] indicates maximum ramping.

5.6 Run program

5.6.1 Select and start program

Main display:

Prog			
Step			
Temp	23.9C	23.8C	23.9C
Time			
Lid	24.0C	23.9C	23.9C

Info | System | Start/Stop | Edit

To run a program press [Start/Stop]

	Block 1	Block 2	Block 3
	Inactive	inactive	inactive
	Start	Start	Start

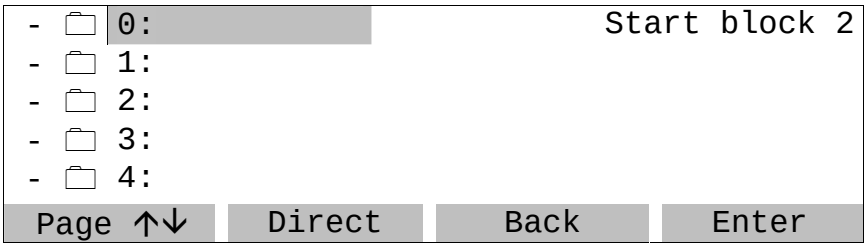
Info | Direct | Back | Enter

Select block with cursor keys [→] and [←].

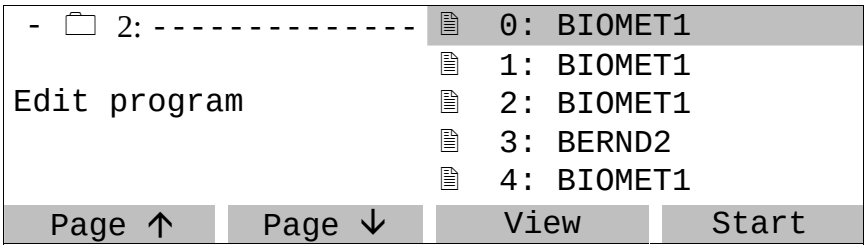
	Block 1	Block 2	Block 3
	Inactive	Inactive	inactive
	Start	Start	Start

Info | Direct | Back | Enter

Press [Enter]



Select directory with cursor keys [↑] [↓]or enter directory number and press [Enter].

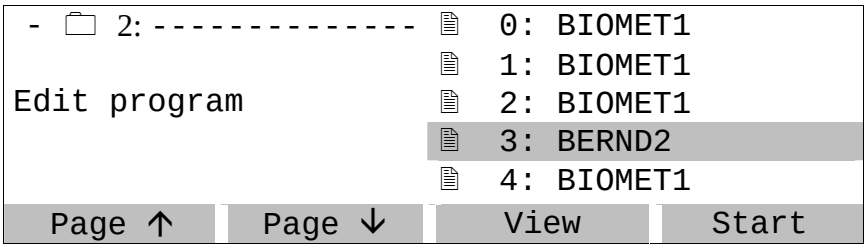


Select program with cursor keys or enter program number.

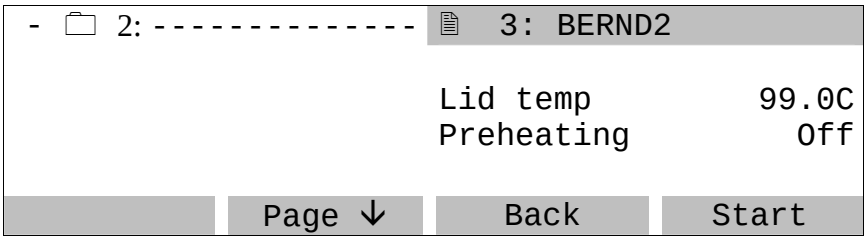
Note: To be sure that the correct program is selected, it can be displayed by pressing [View] (see section 5.6.2).

Press [Start] to run program.

5.6.2 View program prior to start



To check a program prior to start, it can be displayed by pressing [View]



Scroll through the program with [page ↑] and [page ↓↑]

Temp[C]	Time	←	#	Options -->
1: 62.0	0h 5m 0s			
2: 62.0	0h 1m 0s			
3: 80.0	0h 1m 0s	2	24	
4: 34.0	0h 1m 0s			
	page ↑↓	Back		Start

To run program press [Start].

5.6.3 Display during operation

During preheating of the lid the following screen is displayed:

Prog		3: Biometra	
Step		1	
Temp	20.3	62.0→62.0C	20.3
Time		0h 1m13s	
Lid	20.2	99.0	20.2
Info	System	Start/Stop	Edit

Note: While lid preheating, the block is held constantly at 25.0°C. The program starts as soon as the lid has reached the set temperature. During the preheating phase the display of the lid temperature alternates between the current lid temperature and “preheating”.

5.6.4 View remaining run time

Display during operation:

Prog		3: Biometra	
Step		1	
Temp	20.3	62.0→62.0C	20.3
Time		0h 1m13s	
Lid	20.2	99.0	20.2
Info	System	Start/Stop	Edit

To view remaining run time press [Info].

Info	Block 1	Block 2	Block 3
Dir		3	
Prog		3: BIOMETRA	
Remain		1h13m	
Status	Inactive	Active	Inactive
		Back	

The current remaining run time id displayed in line 4 [Remain].

5.6.5 Pause / stop program

Display during operation:

Prog		3: Biometra	
Step		1	
Temp	20.3	62.0→62.0C	20.3
Time		0h 1m13s	
Lid	20.2	99.0	20.2
Info	System	Start/Stop	Edit

To pause or stop one of the three blocks press Start/Stop]

	Block 1	Block 2	Block 3
	inactive	active	inactive
	Start	Pause/Stop	Start
Info	Direct	Back	Enter

Move cursor to desired block and press [Enter]

		Block 2	
		active	
		Pause/Stop	
Info	Pause	Back	Stop

Press [Pause] to pause block
Press [Stop] to stop block

Prog		3: Biometra	
Step		1	
Temp	20.3	62.0→62.0C	20.3
Time		Pause	
Lid	20.2	99.0	20.2
Info	System	Start/Stop	Edit

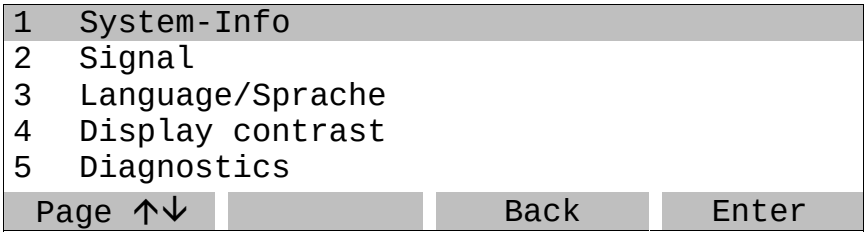
Note: The program pauses in the current state. The word “Pause” is displayed and alternates with the elapsed time. You can continue the run with [Start/Stop].

5.7 System settings

Main screen

Prog			
Step			
Temp	23.9C	23.8C	23.9C
Time			
Lid	24.0C	23.9C	23.9C
Info	System	Start/Stop	Edit

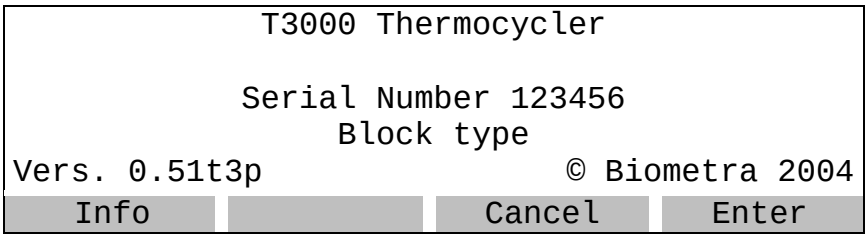
To change instrument settings press [System]



Scroll though the list with the cursor keys [↑] [↓]. Enter selected function with [Enter]

5.7.1 System Info

Select System info, Press [Enter]

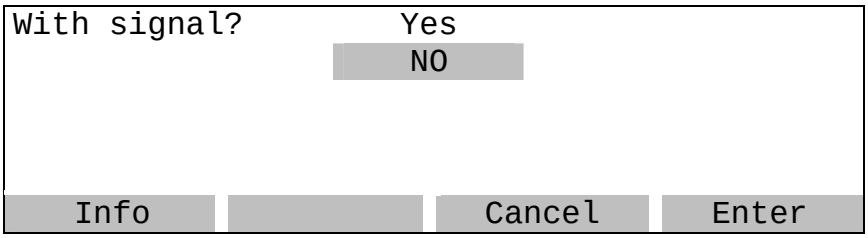


This page shows the serial number of the instrument and software version.

5.7.2 Switch beep on/off

There is an option for an audible signal whenever a program enters a pause and when the program is finished. If this option is active, the beep can be switched off by pressing any key of the keyboard.

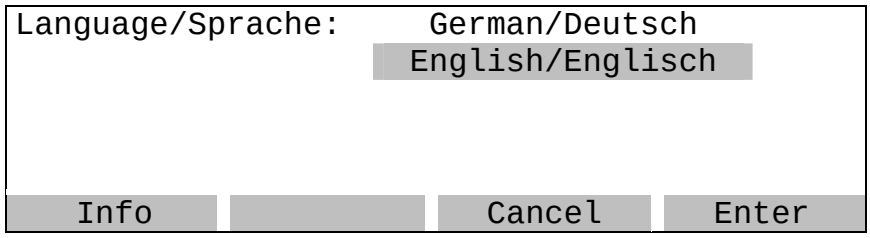
Select Signal, Press [Enter]



5.7.3 Select language

The display of the T3000 can be switched from English to German.

Select Language/Sprache, Press [Enter]

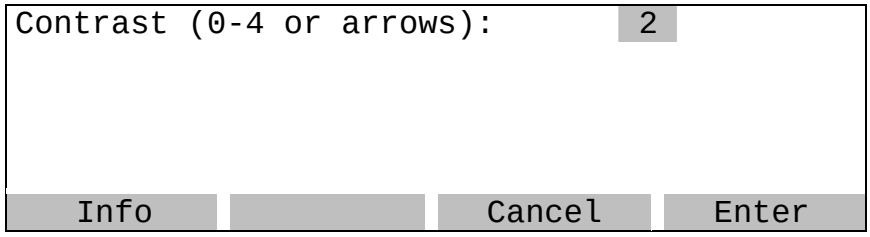


To confirm your selection press [Enter]

5.7.4 Display contrast

The display contrast can be set in 4 levels to achieve optimum visibility under individual light conditions.

Select Display Contrast, press [Enter]



User cursor keys to in/decrease contrast value or directly enter setting.

The default setting is “2” which meets average conditions.

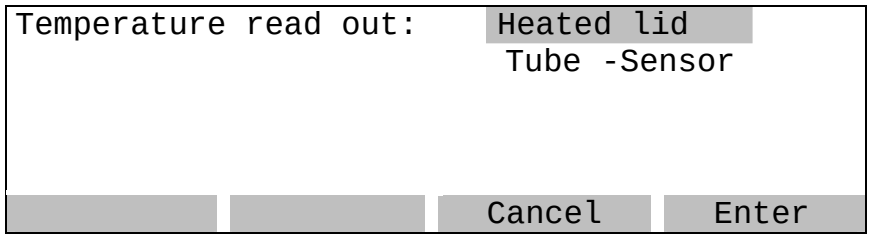
5.7.5 Diagnostics

The diagnostic screen contains internal information used by the Biometra service department for servicing.

5.7.6 Temperature readout

Each T3000 block can be equipped with an in tube-temperature sensor (050-408 for 0.2ml wells; 050-409 for 0.5ml wells). This sensor is to monitor the temperature inside a test tube.

The temperature of the in tube-sensor can be shown in the T3000 display. The sensor display will replace the display of the lid temperature.



Note: The in tube sensor is NOT used to control the instrument.

6 Short manual

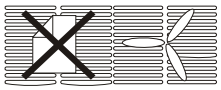
Safety Warnings

Do not open the instrument unless you are authorised to do so. Check the label at the backside if the instrument has correct voltage configuration (100 V, 115 V or 230 V).

The thermoblock and the heated lid are reaching high temperatures during operation. Both thermoblock and heated lid can burn you.

Rapid heating of the thermoblock can cause liquids to boil explosively. Always wear safety goggles during operation. Close the lid before starting a program.

It is not necessary to apply oil into the opening of the block in order to improve the heat transfer between the block and the sample tubes.
If you still decide to use oil, **do not** use silicon oil. Mineral oil may be used.



Ensure that both the rear and bottom ventilation slits at the rear and bottom of the instrument are unobstructed. Insufficient ventilation can cause overheating of the instrument. **Tip:** At regularly intervals clean the bottom's ventilation slits from dust to ensure maximum venting capability.

Thermocycler main menu

Prog Step Temp Time Lid	23.9C 24.0C	23.8C 23.9C	23.9C 23.9C
Info	System	Start/Stop	Edit

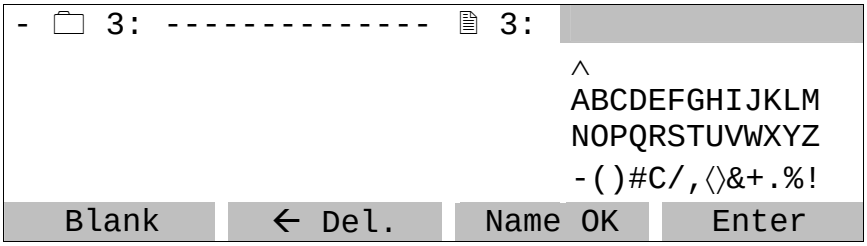
Softkey 1	Softkey 2	Softkey 3	Softkey 4

The function of the four soft keys beneath the display is context sensitive. The respective function is shown in the display. The function of each key can differ from screen to screen.

Create program

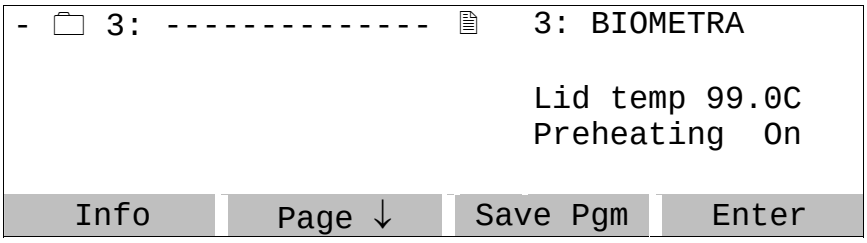
- ➲ Press [Edit] to enter the edit mode.
- ➲ Select a subdirectory with the cursor keys ⇨⇧⇩. → Press [Enter]
- ➲ Select a program with cursor keys or by number → Press [Edit]

Enter program name



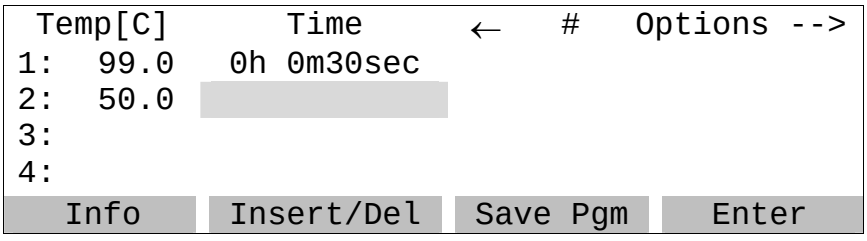
- ➲ Select letter with cursor keys and accept with [Enter]
- ➲ Accept name with [Name OK]

Enter lid temperature



- ➲ Set lid temperature for the Biometra High Precision Lid. For most applications, a lid temperature of 99.0°C is recommended. Confirm with **[Enter]**.
- ➲ Accept preheating mode “on” → block starts after the lid has reached the programmed temperature. **Note:** Prior to block start, there is a 40 sec temperature equilibration
- ➲ Press **[Enter]**

The programming spreadsheet



Use cursor keys ⇦⇨⇧⇩ to navigate in the spreadsheet:

- ➲ Enter **temperature** and **time** for each step and confirm with [Enter].
  Hours, minutes and seconds are separated by dot (.). To enter for example 1 minute 30 seconds type “1” dot “30”. To enter 1 hour type “1” followed by two dots.
- ➲ To program a **PAUSE** enter zero: “pause” will be displayed after moving forward to the next step.
- ➲ **Set Loop:** Enter the target step for a backloop in column “←”. The number of backloops (total cycle number –1) is entered in column “**#**”.
- ➲ Save program with **[save pgm]**

Start program

- ➲ Press **[start/stop]** the main screen
- ➲ Select block with cursor keys, press **[Enter]**
- ➲ Select directory and program with cursor keys or enter program number.
- ➲ Start selected program with **[start]**.

Note: After the High Precision Lid has reached the programmed temperature, there is a 40 second equilibration phase before the program starts (preheating mode “on”).

Display during operation

Prog		3: Biometra	
Step		1	
Temp	20.3	62.0→62.0C	20.3
Time		0h 1m13s	
Lid	20.2	99.0	20.2
Info	System	Start/Stop	Edit

Note: While lid preheating, the block is held constantly at 25.0°C. During the preheating phase the display of the lid temperature alternates between the current lid temperature and “preheating”.

View remaining run time

- ➲ Press **[info]** for remaining run time

Stop / pause program

- ➲ To stop / pause active program press **[start/stop]**
- ➲ Select block with cursor keys.
- ➲ Press [**pause**] to pause the block or [**stop**] to stop the block.
- ➲ Confirm with [**Enter**].

Programming options

To set special parameters you can scroll the display to the right.

- ➲ Move the cursor to the very right row of the display, labeled with “opt →”.

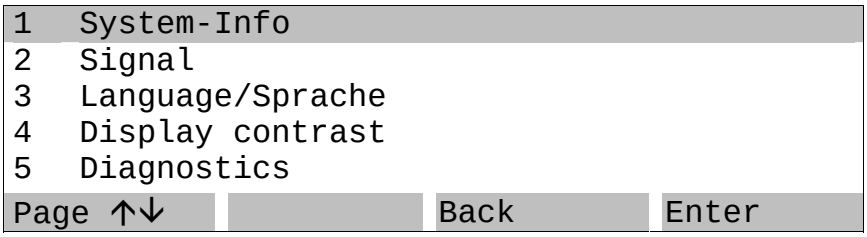
Main funct.	dT[C]	dt[s]	°C/s
1: ←			3.00
2: ←			3.00
3: ←			3.00
4: ←			3.00
Info	Insert/Del	Save Pgm	Enter

- **dt[s]: Time increments**. To compensate for loss in enzyme activity each step within a loop can be extended from cycle to cycle. Enter the desired time increment [seconds] in the row labeled with dt[s]. This value will be added to the time value from cycle to cycle.
- **dT[C]: Touch down**. For some applications it is useful to start with a higher temperature and to decrease the temperature from cycle to cycle. To decrease the temperature from cycle to cycle enter a negative temperature increment in the row labeled with dT[s].
- **[°C/s] Adjust heating and cooling ramps.** Since the T3000 is a very fast thermocycler, it may be necessary to reduce the heating and cooling rates. This can be helpful to adapt protocols from other older. Enter heating / cooling rate [°C/second] in the row labeled with dT[sec]. (The default value “3.0” indicates maximum rate)
- To navigate back to programming spread sheet, move the cursor to the very left side of the display (“main functions”).

System settings

To set global parameters like display contrast, instrument language and others:

- Press [**System**] in the main menu



- Select option from the list and press [**Enter**]

7 Trouble shooting

7.1 Slow heating and cooling

The T3000 is equipped with a strong ventilator for the cooling of the heat sink. The inlet of this fan is located at the bottom side of the instrument. Be sure that the inlet is not clogged by dust or other material (e.g. a sheet of paper placed under the cycler can be attached to the inlet as the fan is in operation). Dust can be removed easily from the inlet with a conventional vacuum cleaner.

7.2 Restart due to unrecognised power failure

High voltage fluctuation can lead to an automatic restart of the thermocycler. In this case the cycler restarts at the step where there power failure has occurred. To avoid voltage fluctuation, do not connect the cycler to a socket shared by a strong power consumer like a refrigerator or a centrifuge.

7.3 Adaptation of protocols from other cyclers

Since the T3000 is a fast instrument it may be necessary to reduce the heating and cooling ramps to run protocols from other cyclers. For the setting of the heating and cooling ramps see section 5.5.3. Alternatively, the time settings may be extended.

7.4 Releasing wheel in case of blocked lid

Note: When the lid is in the extreme up or down position, it may happen that the wheel is uncoupled. In this situation the clutch mechanism is active in both directions (clicking noise in either direction).

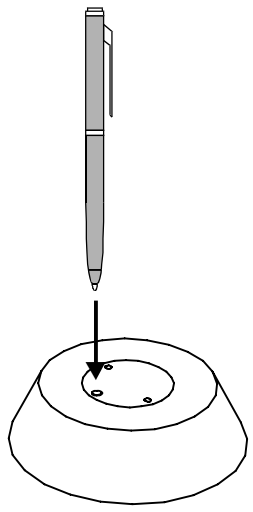
To unlock wheel, press down metal pin with a ball pen and turn wheel carefully. This pin overcomes the automatic clutch mechanism. Thus, care must be taken not to apply excessive pressure.

Lid arrested in upper position:

carefully turn wheel with pressed pin **CLOCKWISE**, until you feel normal resistance (no more clicking noise, clutch is released). Release pin and turn lid down, until the clutch mechanism is activated (clicking noise, optimum pressure applied).

Lid arrested in down position:

carefully turn wheel with pressed pin **COUNTER CLOCKWISE**, until you feel normal resistance (no more clicking noise, clutch is released). Release pin and turn wheel counter clockwise until pressure is completely released. Open lid.



Important: When the clutch mechanism is active (= optimum pressure is applied), Do not use pin to further increase pressure. This MAY lead to damage of tubes and instrument!

7.5 Service and repair

The T3000 Thermocyler contains no user serviceable parts. Do not open the housing instrument. Service and repair may only be carried out by the Biometra Service department or otherwise qualified technical personal.

8 Maintenance and repair

8.1 Cleaning and Maintenance

The T3000 was built to operate for a long time without the need for periodical maintenance. Nevertheless, occasionally cleaning of the air inlet may be necessary to maintain the efficiency of the Thermocycler. Insufficient airflow may lead to reduced heating and cooling rates. The inlet for the airflow is located at the bottom side of the instrument. Be sure that the inlet is not clogged by dust or other material (e.g. a sheet of paper placed under the cycler can be attached to the inlet as the fan is in operation). Dust can be removed easily from the inlet with a conventional vacuum cleaner. Additionally, the Thermocycler housing may be cleaned from time to time with a smooth cotton cloth. Do not use strong detergents or organic solvents for cleaning. Never treat silver block with abrasive agents.

Important: Appropriate safety regulations must be observed when working with infectious or pathogenic material.

8.2 Servicing and repair

The T3000 Thermocycler contains no user serviceable parts. Do not open the housing instrument. Service and repair may only be carried out by the Biometra Service department or otherwise qualified technical personal.
The Service department offers Thermocycler maintenances and temperature verifications. Biometra recommends an annual maintenance and a biannual temperature check for all Thermocyclers. Please call the following phone number for detailed information: +49 551-50881-10/12.

8.3 Firmware update

For instruction for firmware upgrade, please contact the Biometra Service Department or your local distributor/sales representative.

8.4 Replacement of Spare Parts

Only original spare parts mentioned in these operating instructions are allowed.

9 Accessories

9.1 Plasticware

Biometra offers a broad range of plasticware for the use in PCR. The following table provides an overview for the product portfolio:

Cat. no.	Description	Quantity
	Single tubes	
050-310	0.2 ml tubes with caps	1000 pcs.
050-320	0.5 ml tubes with caps	1000 pcs.
	Tube strips	
050-254	Strips 8 tubes and flat caps	125 pcs.
050-255	Strips 8 tubes and domed caps	125 pcs.
	48 well plates	
050-225	48 well microplate	50 pcs.
	96 well plates	
050-232	96 well skirted	25 pcs.
050-213	96 well non-skirted (low profile)	25 pcs.
050-253	96 well non-skirted	25 pcs.
	384 well plates	
050-231	HSQ 384 well skirted	50 pcs.
050-240	384 well microplate	50 pcs.
	Miscellaneous	
050-237	Silcone mat	50 pcs.
050-256	Adhesive film	100 pcs.
050-257	Heat Sealing Film	100 pcs.
050-236	Heat Sealing Film Aluminium	10 pcs.
050-194	96 well aluminium plate	1 pcs.
050-694	384 well aluminium plate	1 pcs.
050-251	Nop mat 96 well	20 pcs.
050-252	Nop mat 384 well	20 pcs.

10 Service

Should you have any problems with this unit, please contact our service department or your local Biometra dealer:

Biometra GmbH
Service Department
Rudolf-Wissell-Straße 14 - 16
D-37079 Göttingen
Phone:++49 (0)5 51 50 68 6 - 10 or 12
Fax: ++49 (0)5 51 50 68 6 -11
e-mail: Service@biometra.com

If you would like to send the unit back to us, please read the following return instructions in chapter 10.1.

10.1 Instructions for return shipment

In case of an instrument failure that cannot be fixed by the procedures described in section 7 please proceed as follows:

- Return only defective devices. For technical problems which are not definitively recognisable as device faults please contact the Technical Service Department at Biometra (Tel.: +49 551-50881-10/12, Fax: +49 551-50881-11, e-mail: service@biometra.com).

- Please contact our service department for providing **a return authorization number (RAN)**. This number has to be applied clearly visible to the outer box. **Returns without the RAN will be not be accepted!**

- Important: Carefully clean all parts of the instrument of biologically dangerous, chemical or radioactive contaminants. If an instrument is contaminated, Biometra will be forced to refuse to accept the device. The sender of the repair order will be held liable for possible losses resulting from insufficient decontamination of the device.

- Please prepare written confirmation that the device is free from biologically dangerous and radioactive contaminants. The declaration of decontamination (see section 11) must be attached to the outside of the packaging.

- Use the original packing material. If not available, contact Biometra or your local distributor.

- Label the outside of the box with “CAUTION! SENSITIVE ELECTRONIC INSTRUMENT!”

- Please enclose a note which contains the following:

  a) Sender’s name and address,

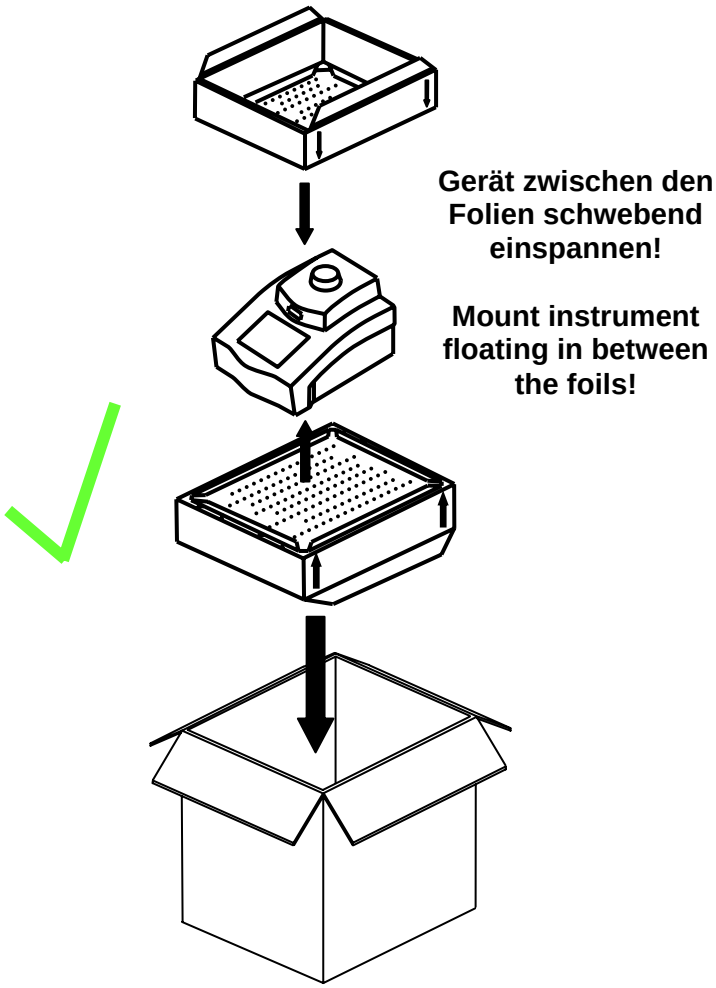
  b) Name of a contact person for further inquiries with telephone number,

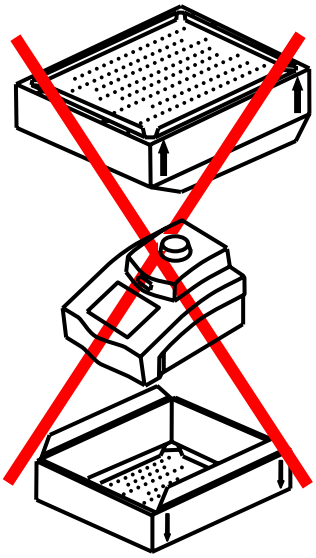
  c) Description of the fault, which also reveals during which procedures the fault occurred, if possible

10.2 Packing of the Thermocycler

Biometra uses an extra designed packaging system where the instrument is mounted in between two tearproof foils. The Thermocycler is put onto the lower inlet and is fixed in between the foils by pressing the upper inlet down.

Note: The Thermocycler is only protected from transport damage if the packing instructions are followed and the instrument is mounted in between the foils. Biometra will not be responsible for transport damage by improper packing.





11 Equipment Decontamination Certificate

To enable us to comply with german law (i.e. §71 StrlSchV, §17 GefStoffV and §19 ChemG) and to avoid exposure to hazardous materials during handling or repair, please complete this form, prior to the equipment leaving your laboratory.

COMPANY / INSTITUTE _____

ADDRESS _____

PHONE NO _____ FAX NO _____

E-MAIL _____

EQUIPMENT	Model	Serial No
	_____	_____
	_____	_____
	_____	_____
	_____	_____

If on loan / evaluation Start Date: _____ Finish Date _____

Hazardous materials used with this equipment:

_____

_____

_____

Method of cleaning / decontamination:

_____

_____

_____

The equipment has been cleaned and decontaminated:

NAME _____ POSITION _____
(HEAD OF DIV./ DEP./ INSTITUTE / COMPANY)

SIGNED _____ DATE _____

PLEASE RETURN THIS FORM TO BIOMETRA GMBH OR YOUR LOCAL BIOMETRA DISTRIBUTOR TOGETHER WITH THE EQUIPMENT.
PLEASE ATTACH THIS CERTIFICATE OUTSIDE THE PACKAGING. INSTRUMENTS WITHOUT THIS CERTIFICATE ATTACHED WILL BE RETURNED TO SENDER.

General Information for Decontamination:

Please contact your responsible health & safety officer for details.

Use of radioactive substances:

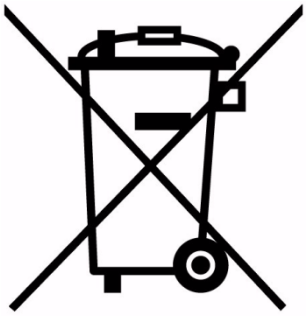
Please contact your responsible person for details.

Use of genetically change organism or parts of those:

Please contact your responsible person for details.

12 Note for the disposal of electric / electronic waste.

Note	**for disposal of electric / electronic waste**
Hinweis	**für die Entsorgung von Elektroaltgeräten**
Renseignement	**du traitement des déchets des appareils électrique / électronique**



This symbol (the crossed-out wheelie bin) means, that this product should be brought to the return and / or separate systems available to end-users according to yours country regulations, when this product has reached the end of its lifetime.

For details, please contact your local distributor!

This symbol applies only to the countries within the EEA*.
EEA = European Economics Area, comprising all EU-members plus Norway, Iceland and Liechtenstein.

Dieses Symbol (die durchgestrichene Abfalltonne) bedeutet, dass dieses Produkt von der Firma Biometra für eine kostenlose Entsorgung zurückgenommen wird. Dies gilt nur für Geräte, die innerhalb Deutschlands gekauft worden sind.

Kontaktieren Sie für die Entsorgung bitte die Biometra Service-Abteilung!
Außerhalb Deutschlands wenden Sie sich bitte an den lokalen Händler.

Dieses Symbol gilt nur in Staaten des EWR*.
***EWR = Europäischer Wirtschaftsraum, umfasst die EU-Mitgliedsstaaten sowie Norwegen, Island und Liechtenstein.**

Cet symbol (conteneur à déchets barré d´une croix) signifie que le produit, en fin de vie, doit être retourné à un des systèmes de collecte mis à la disposition des utilisateurs finaux en conséquence des régulations par la loi de votre pays.
Pour des information additionel nous Vous demandons de contacter votre distributeur!

Cet symbole s´ápplique uniquement aux pays de l´EEE*.
EEE = Espace économique européen, qui regroupe les États membres de l´UE et la Norvège, Islande et le Liechtenstein.

13 EU – Konformitätserklärung / EU - Declaration of Conformity

Göttingen, den 20. 08. 2004

im Sinne der EG-Richtlinie über elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen 73/23/EWG
following the EC directive about electrical equipment for use within certain limits of voltage 73/23/EEC

und / *and*

im Sinne der EG-Richtlinie für die elektromagnetische Verträglichkeit 89/336/EWG.
following the EC directive about the electromagnetic compatibility 89/336/EEC .

Hiermit erklären wir, daß folgende **Thermocycler:**
*Herewith we declare that the following **Thermocyclers:***

Typen / *types*:	T3000 Thermocycler 20, T3000 Thermocycler 48, T3000 Thermocycler combi
Best.-Nr. / *Order No.:*	050-720, 050-723, 050-724

den grundlegenden Anforderungen der

corresponds to the basic requirements of

EG-Niederspannungsrichtlinie 73/23/EWG und der
EC low voltage directive 73/23/EEC and the

EG-Richtlinie über die elektromagnetische Verträglichkeit 89/336/EWG entsprechen.
EC directive about the electromagnetic compatibility 89/336/EEC .

Folgende harmonisierte Normen wurden angewandt:
The following harmonized standards have been used:

EN 55011:1998 + A1:1999 + A2:2000
EN 61000-3-2:2000
EN 61000-6-1:2001
EN 61010-1: 2001

EN 55022:1998 + A1:2000 + A2:2003
EN 61000-3-3:1995 + A1:2001

EN 61010-2-010: 1994 + A1: 1996

Dr. Jürgen Otte
Quality Manager

Formular 006, Ver. 03

14 Warranty

This Biometra instrument has been carefully build, inspected and quality controlled before dispatch. Hereby Biometra warrants that this instrument conforms to the specifications given in this manual. This warranty covers defects in materials or workmanship as described under the following conditions:

This warranty is valid for 24 months from date of shipment to the customer from Biometra. This warranty will not be extended to a third party without a written agreement of Biometra.

This warranty covers only the instrument and all original accessories delivered with the instrument. This warranty is valid only if the instrument is operated as described in the manual.

Biometra will repair or replace each part which is returned and found to be defective. This warranty does not apply to wear from normal use, failure to follow operating instructions, negligence or to parts altered or abused.

15 Subject Index