

Whatman **Biometra**[®]



Manual

Software Version 4.01

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050-900 T1 48

050-901 T1 96

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050-903 T1 in situ

Biometra

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Whatman **Biometra**[®]

1 Introduction

The T1 Thermocycler was designed to meet the highest standard of a today molecular biology laboratory. The instrument combines the very successful Biometra silver block concept with an advanced block architecture. The result is a thermocycler that provides extremely high temperature ramping rates and an unrivalled temperature uniformity. High ramping rates ensure specific reaction and the perfect temperature uniformity guarantees identical conditions in any position of the block.



The T1 Thermocycler is available with different modules that support a broad range of tubes, strips and microplates. There is also an in situ-module for up to 4 microscopic slides.

The new module architecture together with a high precision heated lid enables heat sealing of microplates within the instrument. There is no need for additional hardware. The BIOMETRA smart lid technology ensures a perfect fitting of tubes in the block, no matter what plasticware is used.



The T1 thermocycler is adjusted to match the BIOMETRA TGradient cycling characteristics. Thus protocols, that have been optimized with an Tgradient, can be operated without the need for modifications. This makes the T1 the perfect instrument to increase sample throughput together with an existing Tgradient.

2 Before you start

2.1 Safety warnings

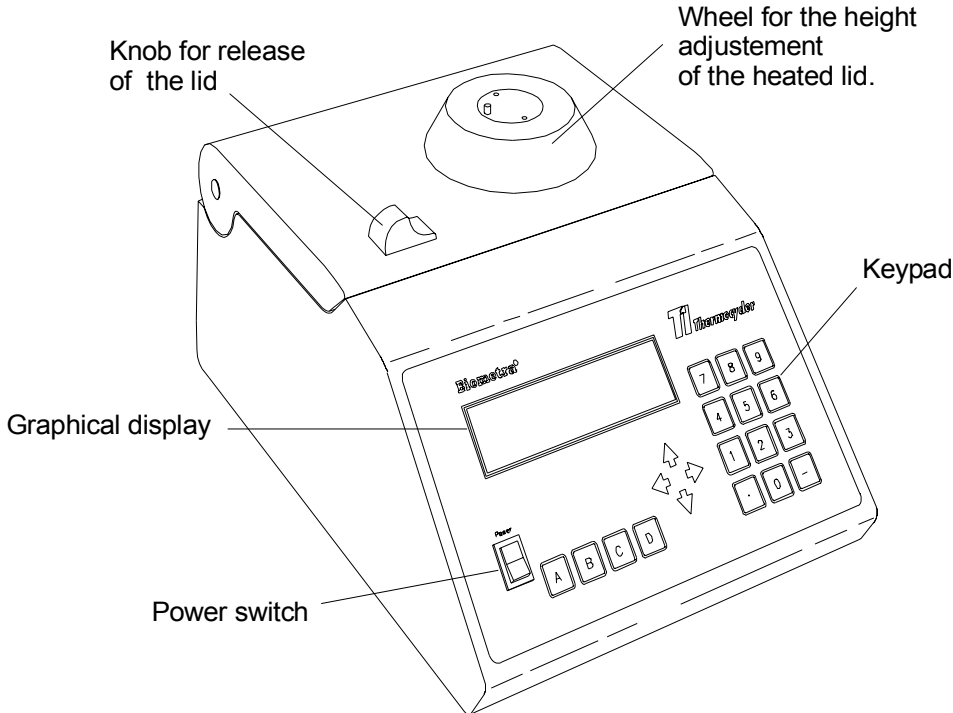
	<p>Before connecting the unit to the power source please ensure that the voltage selector at the back side of the instrument is set to the required voltage. Danger of electric shock! Unplug the power cable before you open the T1 THERMOCYCLER.</p>
	<p>It is not necessary to utilize oil into the opening 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.</p>

2.2 Warning symbols

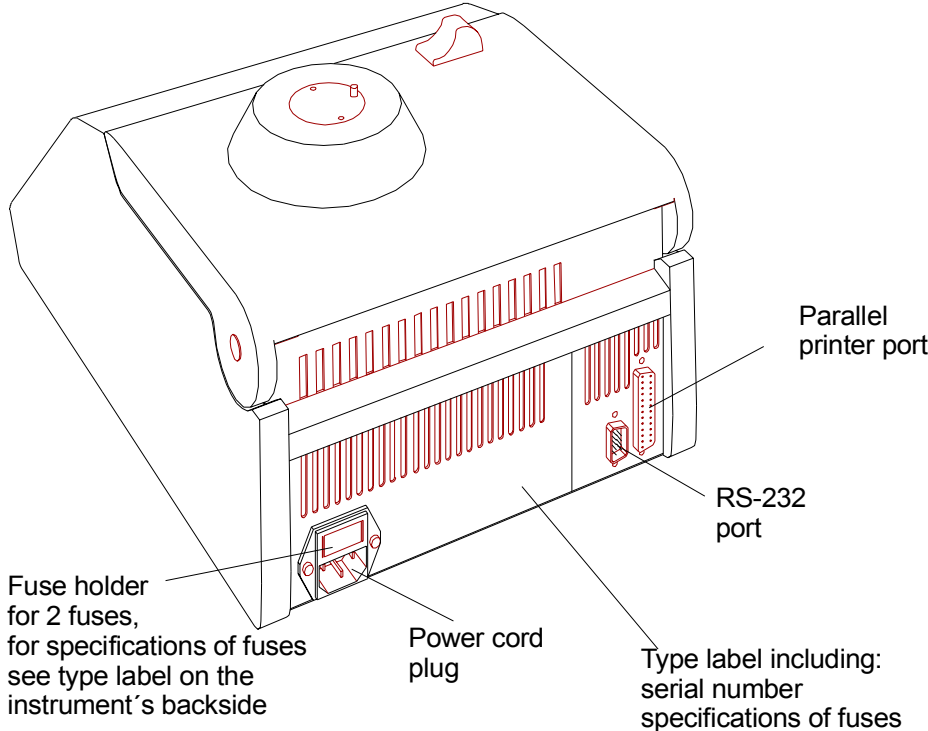
	<p>The thermoblock and the heated lid will reach high temperatures during operation. Both thermoblock and heated lid can burn you. Rapid heating of the thermoblock can cause liquids to boil explosively. Always wear safety goggles during operation. Close the lid before starting a program.</p>
	<p>Ensure that both the rear and bottom ventilation slits of the rear and bottom of the instrument are unobstructed. Insufficient ventilation can cause overheating of the instrument.</p>

3 First steps with the T1 THERMOCYCLER

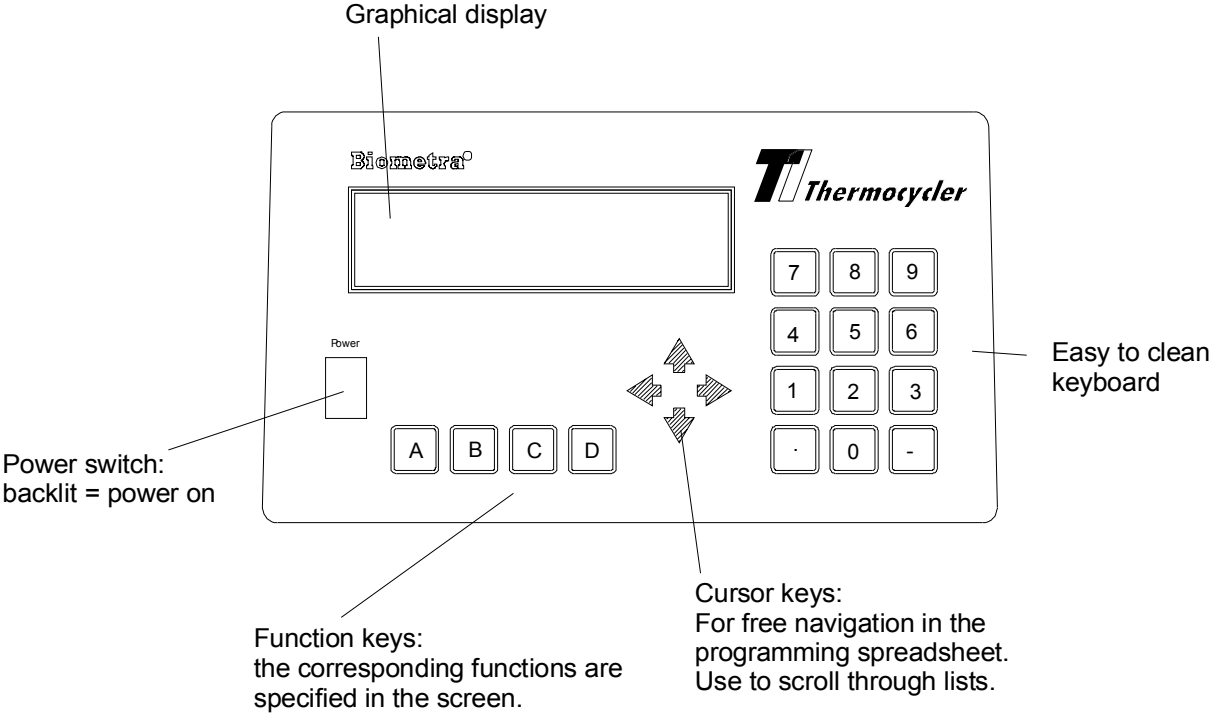
3.1 The T1 THERMOCYCLER front View



3.2 The T1 THERMOCYCLER rear view



3.3 The T1 Thermocycler control panel



3.4 Initial self test

After switching on the T1 THERMOCYCLER the serial number of the instrument and the software version is displayed.

```
T1 Thermocycler
Serial No 1234567
Vers. 4.01
```

The T1 THERMOCYCLER checks the programs in all directories (so called RAM check).

3.5 The T1 Thermocycler display

The T1 THERMOCYCLER display provides information about the instrument and about the status of the active program.

```
prog
step
temp[ °C]    25.2°C
time
lid          25.4°C
A ?        B start/stop  C programs  D +
```

The individual function of the special keys **A**, **B**, **C** and **D** are specified in the display and depend on the context.

3.6 Handling of the adjustable heated Lid

To achieve optimum pressure on the tubes the T1 THERMOCYCLER is equipped with an height adjustable heated lid (smart lid technology).

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 optimize 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 must not be opened under pressure because this leads to damage of the locking mechanism.

4 Creating a Program

4.1 Select a directory

In the T1 THERMOCYCLER programs can be stored both in the main directory and in individual subdirectories. For easy identification of the selected storage place, the subdirectories can be named (see section 4.3).

Start with the main screen.

```

Prog
step
temp[°C]  25.2°C
time
lid       25.4°C
A ?      B start/stop  C programs  D +

```

Press [C programs] to enter the edit mode.

```

Main direct.--- | -3. subdirect.:
                 | -4. subdirect.:
                 | -5. Subdirect.:
                 | -6. subdirect.:
                 | -7. subdirect.:
A ?             B           C quit   D enter

```

You are now in the main directory. The structure of the subdirectories is displayed.

4.2 Select a program store

Programs can be stored in the main directory or in subdirectories.

To create a program in the main directory press [D enter].

To access a subdirectory move right with the cursor key \Rightarrow and select a subdirectory with the cursor keys $\uparrow\downarrow$. The selected directory will be highlighted.

```

Main direct.--- | -3. subdirect.:
                 | -4. subdirect.:
                 | -5. Subdirect.:
                 | -6. subdirect.:
                 | -7. subdirect.:
A ?             B           C quit   D enter

```

4.3 Enter name for subdirectory

The process for naming a subdirectory and a program is the same. For information about naming programs see section 4.4.

Press [D enter] to enter the highlighted subdirectory

```

directory:          5
program no.        Name:

edit
[A list] [B] [C quit] [D enter]

```

Press [A list] to view a list of all existing files and empty memory in this directory.

Note: If neither program name nor the word “empty” is displayed, this place may be occupied by a program without name. For the programming of new protocols choose an empty memory. Existing programs that are not needed any more can be deleted to provide new memory.

```

0 empty
1 empty
2 empty
3 empty
4 empty
[A list] [B forward] [C quit] [D enter]

```

Scroll through the list with cursor keys $\uparrow\downarrow$ and confirm memory with [D enter].

4.4 Enter a 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.

```

Directory:          3
program no.        0      Name: [ ]
                        ^
                        ABCDEFGHIJKLMNOPQRST
                        UVWXYZ-()#°C/,⟨⟩&+.%!
[A ABC] [B files] [C name OK] [D enter]

```

To enter a name for your program press [A ABC].

```

Directory:          3
program no.        0      Name:
                        ^
                        [ ]ABCDEFGHIJKLMNQRST
                        UVWXYZ-()#°C/,⟨⟩&+.%!
[A name] [B blank] [C quit] [D enter]

```

Choose a letter from the alphabet with cursor keys $\leftarrow\rightarrow\uparrow\downarrow$
 Confirm each letter with [D enter].

```

Directory:      3
program no.    0      Name:   T
                ^
                ABCDEFGHIJKLMNOPQRST
                UVWXYZ-()#°C/,<>&+.%!
[A name] [B blank] [C name OK] [D enter]
  
```

The selected letter will appear in the display and the cursor will move one step to the right. Select the next letter and confirm with [D enter].

Note: What to do, if a wrong letter has been accepted?

To alter the position of the cursor within the name press [A name]. Now you can move the cursor with cursor keys $\leftarrow\rightarrow$ through the name. This is helpful if you have confirmed an wrong letter or if you want to change the name of an existing program.

Once the name is complete, confirm name with [C name OK].

```

Directory:      3
program no.    0      Name:   TEST 1
lid temp:     [ ] °C  preheating: on

edit
[A ?] [B files] [C pgm OK] [D enter]
  
```

4.5 Enter the lid temperature

You can now enter a temperature for the heated lid. **Note:** In general, the lid temperature should be about 10°C above the highest temperature in the protocol. Example: If your denaturation step is at 95°C, enter 105°C for the lid.

```

Directory:      3
program no.    0      Name:   TEST 1
lid temp:     105 °C  preheating: on

edit
[A ?] [B files] [C pgm OK] [D enter]
  
```

Note: For heat sealing of microplates set the lid temperature to 110 °C (see section 9)

4.6 Select / deselect pre-heating of the lid

You can choose whether the lid is pre-heated before the program starts. This is to avoid condensation during the initial heating phase. **Note:** During the preheating of the lid, the block is held constant at 25°C.

```

Directory:      3
program no.    0      Name:  TEST 1
lid temp:     105 °C  preheating: on

edit
A on/off  B files      C pgm OK  D enter

```

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

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

4.7 Enter temperature and time settings

The programming spreadsheet:

```

Temp[°C]  time  ←  #  opt →
1
2:
3:
4:
A ?      B insert/delete  C pgm OK  D enter

```

Note: In this spreadsheet you can enter all parameters for your cycling protocol. Furthermore, you can set special parameters like touch down, ramping rates or time increments. For further details on these special parameters, see section 6.

Note: You can navigate in the spreadsheet without limitations with the four cursor keys
← → ↑ ↓.

Note: Each setting is confirmed with [D 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 [A ?]

Note: In an existing protocol hole program steps can be deleted and inserted. For further information on deleting and inserting program steps see section 5.1.

Now enter temperature for the first step in the protocol:

```

Temp[°C]  time  ←  #  opt →
1  95,0
2:
3:
4:
A ?      B insert/delete  C pgm OK  D enter

```

Confirm temperature with [D enter] or just move on with the cursor key. If you move to the next row, the setting will be stored in the temporary memory.

```

Temp[°C]   time   ←   #                               opt →
1   95.0   [ ]
2:
3:
4:
[A] ?      [B] insert/delete  [C] pgm OK  [D] enter

```

Enter a time for step one.

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

Accept time setting with [D enter] or move to the next field with cursor key.

4.8 Set cycle number

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

```

Temp[°C]   time   ←   #                               opt →
1: 95.0   0h 5m 0s
2: 95.0   0h 0m30s
3: 55.0   0h 0m30s           10°C
4: 72.0   0h 0m30s   [2]
[A] ?      [B] insert/delete  [C] pgm OK  [D] enter

```

In the column labeled with ← you can select the target step for a backloop.

```

Temp[°C]   time   ←   #                               opt →
1: 95.0   0h 5m 0s
2: 95.0   0h 0m30s
3: 55.0   0h 0m30s           10°C
4: 72.0   0h 0m30s   2   [29]
[A] ?      [B] insert/delete  [C] pgm OK  [D] enter

```

Enter the number of backloops. **Note:** total cyclers number = (n backloops) + 1, e.g. enter 29 for a total number of 30 cycles.

4.9 Cool below ambient temperature

```
Temp[°C]   time   ← #                               opt →
2: 95.0   0h 0m30s
3: 55.0   0h 0m30s                               10°C
4: 72.0   0h 0m30s  2   29
5:  4.0   pause
A ?       B insert/delete  C pgm OK  D enter
```

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

Note: The minimum temperature you can set is -3°C .

4.10 Save program

Save program with [C pgm OK]. The program data are stored in the permanent memory.

```
Directory:      3
program no.     0           Name:  TEST 1
number of steps: 5
runtime:       1h10m23s
edit
A             B             C             D
```

The runtime is calculated and displayed.

Note: To view the current remaining runtime at any time of the run press [A info] in the main menu.

5 View/edit program data

You can check any existing program by scrolling through the editing mode with cursor keys $\leftarrow \rightarrow \uparrow \downarrow$. Select the desired program as described in section 4.2.

Note: During operation of the cyclers 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 5.2.

5.1 Delete / insert program steps

The programming spreadsheet:

Temp[°C]	time	←	#	opt →
2: 95.0	0h 0m30s			
3: 55.0	0h 0m30s			10°C
4: 72.0	0h 0m30s	2	29	
5:				
A ?	B insert/delete	C pgm OK	D enter	

To delete or insert a program step press [**B** insert/delete]

insert / delete step: <input type="text"/>				
2: 95.0	0h 0m30s			
3: 55.0	0h 0m30s			10°C
4: 72.0	0h 0m30s	2	29	
5:				
A ?	B delete input	C quit	D enter	

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

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

insert / delete step: <input type="text" value="3"/>				
2: 95.0	0h 0m30s			
3: 55.0	0h 0m30s			10°C
4: 72.0	0h 0m30s	2	29	
5:				
A ?	B delete input	C quit	D enter	

Note: If you have entered a wrong number, the field can be cleared with [**B** delete input].

CONFIRM THE STEP NUMBER WITH [D** ENTER].**

```

insert / delete step: 3
2: 95.0 0h 0m30s
3: 55.0 0h 0m30s          10°C
4: 72.0 0h 0m30s 2      29
5:
A insert  B delete  C quit  D enter

```

Press [A insert] to insert one step at the selected position.

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

Press [B delete] to delete the selected step.

Note: By deleting a step the following steps will be shifted by one position.

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

5.2 Copy program

Select the program you want to copy as described in section 4.1 and 4.2

```

Directory:      3
program no.    0      Name:  TEST 1
lid temp:     105°C   preheating: on

A ?  B files  C pgm OK  D enter

```

Press [B files].

```

Directory:      3
program no.    0      Name:  TEST 1
lid temp:     █°C   preheating: on

edit
A copy  B delete pgm  C quit  D enter

```

To copy this program to another memory press [A copy]

```

copy to:      -3. subdirect.:
              -4. subdirect.:
Main direct.--- -5. Subdirect.:
              -6. subdirect.:
              -7. subdirect.:

A ?  B      C quit  D enter

```

Select the desired subdirectory with the cursor keys ⇨ ⇧ ⇩. The selected subdirectory will highlight.

```

copy to:          -3. subdirect.:
                  -4. subdirect.:
Main direct.---- -5. Subdirect.:
                  -6. subdirect.:
                  -7. subdirect.:
A ?              B          C quit      D enter

```

Confirm your selection with [D enter].

```

copy from directory 3 program 0
      to  directory 6 program
A list          B          C quit      D enter

```

Choose an empty memory from the list with [A list].

```

copy from directory 3 program 0
      to  directory 6 program 6
                        enter = OK
target program contains 0 steps
A list          B          C quit      D enter

```

Note: Before you confirm with [D enter] the target memory is checked. If there is no program in the target, memory the message “target program contains 0 steps” is displayed. If the memory already contains a program the number of steps is displayed.

Note: If you copy a program to a memory that already contains a program, the former program will be deleted!

Save a copy of the program in the new directory with [D enter].

5.3 Delete program

Select program as described in section 4.1 and 4.2

```

Directory:        3
program no.      0      Name:  TEST 1
lid temp:        °C      preheating: on
edit
A copy          B delete pgm  C quit      D enter

```

To delete this program press [B delete pgm].

```
Directory:      3
program no.    0      Name:  TEST 1
lid temp:      °C     preheating: on

delete program 0?      enter = yes
A copy      B delete pgm  C quit      D enter
```

Confirm your selection with [D enter].

Note: Once you have deleted a program it cannot be restored!

6 Further programming options

Temp[°C]	time	←	#	opt →
1: 95.0	0h 5m 0s			
2: 95.0	0h 0m30s			
3: 55.0	0h 0m30s		10°C	
4: 72.0	0h 0m30s		2	
A ?	B header		C pgm OK	D enter

Note: To program special parameters you can scroll the display to the right. Move the cursor to the right side of the display that is labeled with opt →. The following screen will appear:

Main funct.	dT[°C]	dt[s]	↗[°/s]
1: ←			5.00
2: ←			5.00
3: ←			5.00
4: ←			5.00
A ?	B header	C pgm OK	D enter

Note: To get back to the screen with the basic parameters move the cursor to the left side of the display labeled with “Main funct.” Alternatively you can move the cursor to the extreme right.

Temp[°C]	time	←	#	opt →
1: 95.0	0h 5m 0s			
2: 95.0	0h 0m30s			
3: 55.0	0h 0m30s		10°C	+
4: 72.0	0h 0m30s		2	
A ?	B header		C pgm OK	D enter

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 labeled with opt →.

6.1 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 labeled with dt[s]. This value will be added to the time value from cycle to cycle.

Main funct.	dT[°C]	dt[s]	↗[°/s]
2: ←			5.00
3: ←			5.00
4: ←		10	5.00
5: ←			5.00
A ?	B header	C pgm OK	D enter

Note: The 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.

6.2 Program touch down

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

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

Main funct.	dT[°C]	dt[s]	↗[°/s]
2: ←			5.00
3: ←			5.00
4: ←	-0.20		5.00
5: ←			5.00
A ?	B header	C pgm OK	D enter

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.

6.3 Adjust heating and cooling ramps

Since the T1 THERMOCYCLER is a extremely fast thermocycler it may be necessary to reduce the heating and cooling ramp for some applications. For example this is helpful if cycling protocols from other cyclers shall be used.

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

Main funct.	dT[°C]	dt[s]	↗[°/s]
2: ←			5.00
3: ←			5.00
4: ←			5.00
5: ←			5.00
A ?	B header	C pgm OK	D enter

Note: The default is [5.00 °/s], which means maximum ramping speed.

7 Run Program

7.1 Select and start program

Main display:

```

Prog
step
temp[°C]  25.2°C
time
lid        25.4°C
A ?       B start/stop  C programs  D +

```

To select a program press [B start/stop]

```

start      -3. subdirect.:
           -4. subdirect.:
Main direct.--- -5. Subdirect.:
           -6. subdirect.:
           -7. subdirect.:
A ?       B          C quit    D enter

```

Choose directory with cursor keys ⇨ ⇧ ⇩ or enter main directory with [D enter]

Note: The path for the program that was modified most recently is automatically pre-selected

```

Main direct.--- -3. subdirect.:
                -4. subdirect.:
                -5. Subdirect.:
                -6. subdirect.:
                -7. subdirect.:
A ?       B          C quit    D enter

```

Enter subdirectory with [D enter]

```

Directory:  5
program no.  Name:

Edit
A list     B          C quit    D enter

```

Enter the number of the program you want to start. Alternatively, [press A] list to select a program from the list of all programs in this subdirectory.

Scroll through the list with cursor keys ⇧ ⇩.

```

0 test 1
1 empty
2 empty
3 empty
4 empty
A list      B forward      C quit      D enter

```

Confirm highlighted program with [D enter].

The number and name of both subdirectory and the selected program will be displayed.

```

Directory:      3
program no.    0      Name:  TEST 1

                        preheating lid on
start block                    signal on
A list      B          C quit      D start

```

To start the program press [D start].

7.2 Display during operation

During preheating of the lid the following screen is displayed:

```

Prog      0 TEST 1      dir 3
Step      1
temp[°C]  25.0°C      → 95.0
time
lid       preheating
A info    B start/stop C programs D +

```

Note: In the default setting (preheating on) the block is held constantly at 25°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”.

```

Prog      0 TEST 1      dir 3
Step      1
temp[°C]  25.0°C      → 95.0
time
lid       preheating
A info    B start/stop C programs D +

```

As soon as the block has reached the programmed hold temperature, the timer starts to count down.

```

Prog      0 TEST 1      dir 3
Step      1      cycle 1 of 30
temp[°C]  95.0°C      → 95.0
time      0h 2m15s    →0h 5m 0s
lid       104.9°C
A info    B start/stop C programs D +

```

The elapsed time versus programmed hold time is displayed

7.3 View remaining run time

Display during operation:

```

Prog          0 TEST 1      dir 3
Step          1            cycle 1 of 30
temp[°C]     49.9 55.0 60.0 → 50.0 55.0 60.0
time         0h 0m23s      →0h 5m 0s
lid          104.9°C
[A info]     [B start/stop] [C programs] [D +]
```

Press [A info] to call up the current remaining time calculation.

```

Additional information about active pgm
Status:                               Step 2
                                       Cycle 3 of 30
Remaining time: 2h 57m
Stop or pause: key [B] in main menu
[A]         [B]         [C quit]      [D]
```

The current remaining run time id displayed in line 4.

7.4 Pause / stop program

Main display during operation:

```

Prog          0 TEST 1      dir 3
Step          1            cycle 8 of 30
temp[°C]     72.0°C       → 72.0
time         0h 0m18s      →0h 0m30s
lid          104.8°C
[A info]     [B start/stop] [C programs] [D +]
```

To pause or stop the active program press [B start/stop]

```

Stop/pause
directory:    3
program no:   0 test 1
[A ?]        [B pause]  [C quit]      [D stop]
```

Select [B pause] to pause program
 [D stop] to stop program
 [C quit] to return to the program display

When you select [B pause], the following screen is displayed:

```
Prog          0 TEST 1  dir 3
Step          1          cycle 8 of 30
temp[°C]     72.0°C    → 72.0
time                    pause
lid          104.8°C
[A info] [B start/stop] [C programs] [D +]
```

The program pauses in the current state. The word `pause` is displayed and alternates with the elapsed time. You can proceed with the program with `[B start/stop]`.

8 Special functions

Main screen

```
Prog
step
temp[°C] 25.2°C
time
lid      25.4°C
A ?      B start/stop  C programs  D +
```

To change special features of the T1 THERMOCYCLER press [D +].

```
1 print
2 signal
3 language
4 standard mode
5 test mode
A back  B forward  C quit  D enter
```

Scroll though the list with the cursor keys \uparrow \downarrow . Enter desired function with [D enter]

8.1 Print protocols

```
1 graphic protocol*
2 graphic protocols*
3 print program
4 print all programs
A          B          C quit  D enter
```

Scroll through the list with the cursor keys \uparrow \downarrow . Confirm the highlighted function with [D enter].

8.2 Switch beep on/off

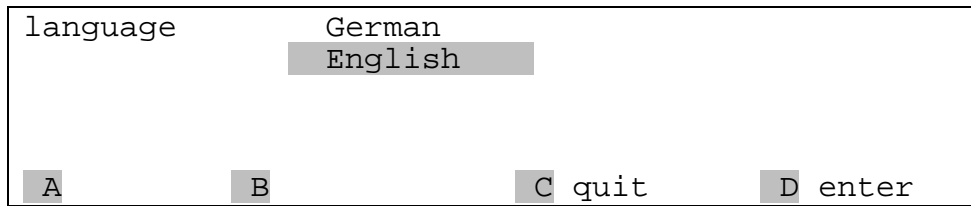
There is an option for an audible signal whenever a program enters a pause and when the program is finished. If this option is active, the beep can be switched off by pressing any key of the keyboard.

```
with signal  yes
              no
A          B          C quit  D enter
```

In this window you can select whether there is a signal or whether there is not. Using the cursor keys you can toggle between signal yes/no. Confirm your selection with [D enter].

8.3 Select language

The display of the T1 THERMOCYCLER can be switched from English to German. Select language with cursor keys ↓ ↑. As you toggle between the two settings the language will change.



To confirm your selection press [D enter]

9 Sealing of microplates

Note: For sealing of microplates we recommend 96 well HSQ (high speed quality) plates (050-230) and heat sealing film (050-234).

Note: There is no special program required for heat sealing. The hard - and plastic ware is designed to provide reliable sealing with a lid temperature at 110°C.

9.1 To seal microplates in the cycler

- Enter a program and set lid temperature to 110 °C. (we recommend an initial denaturation step of 4 minutes at 94°C).
- Load microplate and place it into the cycler.
- Cover plate with heat sealing film.

Important: The dull side of the film must face towards the microplate!

- Close the lid and turn down the wheel until the optimum pressure is applied (you will hear a clicking noise as soon as the clutch mechanism starts)
- start cycler program

9.2 Remove heat sealing film

To remove the heat sealing film, heat the top of the plate in your thermocycler. Set heated lid to 110°C and incubate microplate 2-5 minutes.

10 Maintenance

The T1 THERMOCYCLER was built to operate for a long time without the need for periodical maintenance. The housing may be cleaned from time to time with a smooth cotton cloth. Do not use strong detergents or organic solvents for cleaning.

11 Exchange of modules

For exchange of modules you need two hexagonal keys (number 3 and number 5). These keys are included in the shipment of the module.

Remove module

- Remove power plug
- Place instrument upside down on a soft surface
- Remove the 2 screws that close the shutter (hexagonal key number 3)
- Remove the 4 screws that hold the block (hexagonal key number 4)
- unplug connectors from the block (control and power supply)
- remove module

Install module

Follow description in reversed order.

12 Trouble shooting

12.1 Slow heating and cooling

The T1 THERMOCYCLER 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 cyclor can be attached to the inlet as the fan is in operation). Dirt can be removed easily from the inlet with a conventional vacuum cleaner.

12.2 Adaptation of protocols from other cyclers

Since the T1 THERMOCYCLER is an extremely fast thermocycler 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 6.3. Alternatively, the time settings may be extended.

Note: Protocols that have been optimized with a TGradient thermocycler can be run without changes.

13 Appendix

13.1 Technical specification T1 Thermocycler 96

Thermal range	-3°C – 100°C
Temperature accuracy	± 0.1°C
Thermal homogeneity	± 0.3°C within 15 sec.
Maximum heating speed	4°C/sec.
Max. cooling speed	3°C/sec.
Sample capacity	96 x 0.2ml tubes, 96 well microplates, strips
Line Voltage	115 Volt or 230 Volt
Frequency	50-60 Hz
Power consumption	310 watts maximum
Fuses	see label on the back of the instrument
Display	LCD graphical display, back-lit
Ports	serial: RS232 (bi-directional data transfer) parallel: Centronics (printer) Port for in tube-sensor
memory	Total capacity: 1500 steps in 10 directories with maximum 100 programs each
Dimensions (WxDxH)	25 x 34 x 16,5 cm
Weight	8,8 kg
Storage conditions	
Operating conditions	5°C – 35°C
	10 – 90% humidity

13.2 Ordering information

T1 THERMOCYCLER	Order-No.
T1 THERMOCYCLER 48 for 48 x 0.5ml tubes	050-800
T1 THERMOCYCLER 96 for 96 x 0.2ml tubes, strips or 96 well microplates	050-801
T1 THERMOCYCLER 384 for 384 well microplates*	050-802
T1 THERMOCYCLER in situ for 4 microscopic slides*	050-803
T1 THERMOCYCLER Modules	
T1 THERMOCYCLER 48 Module for 48 x 0.5ml tubes	050-810
T1 THERMOCYCLER 96 Module for 96 x 0.2ml tubes, strips or 96 well microplates	050-811
T1 THERMOCYCLER 384 Module for 384 well microplates*	050-812
T1 THERMOCYCLER in situ Module for 4 microscopic slides*	050-813

available 12/99

For information about tubes, strips, microplates and other consumables please contact BIOMETRA or your local BIOMETRA distributor.

14 Instructions for return shipment

In case of faults occurring with our T1 THERMOCYCLER please proceed as follows:

- Return only defective devices. For technical problems which are not definitively recognizable as device faults please contact the Technical Service Department at **Biometra** (Tel.: +49/551/5068640, Fax: ++49/551/5068666, e-mail: info@biometra.co.uk).
- Important: Cleanse all parts of the instrument of biologically dangerous, chemical or radioactive contaminants. If a 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 16) has to be attached to the outside of the packaging.
- Use the original packing material. If not available, please use a comparable robust box. Be sure that the instrument fits tightly into the box. When packaging, protect the device in a way to avoid scratches.
- 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

15 Warranty

This Biometra instrument has been carefully built, 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 for 12 month as described under the following conditions:

This warranty is valid for 12 month from date of shipment to the customer from Biometra or an authorized distributor. 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.

16 Equipment Decontamination Certificate

To enable us to comply with German law (i.e. §28 StrlSchV, §17 GefStoffV and §19 ChemG) and to avoid exposure to hazardous materials during handling or repair, will you please complete this form, prior to the equipment leaving your laboratory

COMPANY / INSTITUTE _____

ADDRESS _____

TEL NO _____ FAX NO _____ E-MAIL _____

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

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

Hazardous materials used with this equipment

Has the equipment been cleaned and decontaminated? YES / NO (delete)

Method of cleaning / Decontamination

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.

17 Year 2000 conformity declaration

YEAR 2000 Conformity Declaration

We confirm that the

T1 THERMOCYCLER
is YEAR 2000 compatible

In connection with the YEAR 2000 we guarantee that the above mentioned instruments are produced in such a way that they can be used before, during and after calendar YEAR 2000 and that they work properly without failures concerning date fields or functions referring to date fields.

In particular we guarantee that

- ◆ the instruments perform all functions without system crashes and abnormal behavior despite the YEAR 2000 problem,
- ◆ software integrated into the instruments was developed in a way that YEAR 2000 compatibility is warranted,
- ◆ integrated software interprets rules concerning centuries and multiple centuries (like leap years) properly and does not cause system crashes and failure functions,
- ◆ integrated computer chips are YEAR 2000 compatible,
- ◆ the date 9. 9. 1999 does not cause system crashes and failure functions.

Dr. Jürgen Otte
Quality Manager

Dr. Lutz Heine
Quality Manager Assistant

18 EU - Declaration of Conformity

EU - Konformitätserklärung

Göttingen, den 09.03.1999

im Sinne der EG-Richtlinie über elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen 73/23/EWG, Anhang III
following the EC directive about electrical equipment for use within certain limits of voltage 73/23/EWG, appendix 3

und / and

im Sinne der EG-Richtlinie für die elektromagnetische Verträglichkeit 89/336/EWG, Anhang I.
following the EC directive about the electromagnetic compability 89/336/EWG, appendix 1.

Hiermit erklären wir, daß folgende **Thermocycler** und **Thermocycler Module**:
*Herewith we declare that the following **thermocyclers and thermocycler moduls**:*

Typen: T1 Thermocycler 48, T1 Thermocycler 96,
T1 Thermocycler 384, T1 Thermocycler Modul 48,
T1 Thermocycler Modul 96, T1 Thermocycler Modul 384
types: T1 Thermocycler 48, T1 Thermocycler 96,
T1 Thermocycler 384, T1 Thermocycler Modul 48,
T1 Thermocycler Modul 96, T1 Thermocycler Modul 384

Best.-Nr. / *Order No.*: 050-900, 050-901, 050-902, 050-903, 050-910, 050-911, 050-912, 050-913

den grundlegenden Anforderungen der
corresponds to the basic requirements of

EG-Niederspannungsrichtlinie 73/23 EWG i.d.F. 93/68 EWG und der
EC low voltage directive 73/23 EWG in version 93/68 EWG and the

EG-Richtlinie über die elektromagnetische Verträglichkeit 89/336 EWG i.d.F. 93/68 EWG entsprechen.
EC directive about the electromagnetic compatibility 89/336/EWG in version 93/68 EWG.

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

EN 50081-1	EN 50082-1
EN 60555-2	EN 60555-3
EN 61010-1	EN 61010-2

.....
Dr. Jürgen Otte, Quality Manager

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