TProfessional Thermocycler

User manual

070-901  TProfessional 96
070-801  TProfessional Gradient
070-902  TProfessional 384
TProfessional

User manual

February 2006

Order-No
070-901    TProfessional 96
070-801    TProfessional Gradient
070-902    TProfessional 384

Biometra
biomedizinische Analytik GmbH
Rudolf-Wissell-Str. 30, D-37079 Goettingen
Tel.: 0551/50 686-0; Fax: 0551/50 686-66
email: info@biometra.com
www.biometra.com
Introduction ...................................................................................................................................1
1.1 TProfessional Thermo block ................................................................................................1
1.2 TProfessional Lid ...............................................................................................................1
1.3 TProfessional User interface ............................................................................................1
1.4 TProfessional Housing ....................................................................................................1
2 Safety precautions ..............................................................................................................2
3 Installation ...........................................................................................................................3
3.1 Content of delivery ..........................................................................................................3
3.2 Operation Voltage ..........................................................................................................3
3.3 Setting up the TProfessional ..........................................................................................4
3.4 Initial self test (power on self test) ................................................................................4
4 Getting familiar with the TProfessional ............................................................................5
4.1 TProfessional Thermocycler front view .........................................................................5
4.2 TPROFESSIONAL Thermocycler rear view .................................................................5
4.3 Exchange of block module ..............................................................................................6
4.4 The TProfessional control panel ...................................................................................6
4.5 High Performance Smart Lid (HPSL) ............................................................................7
4.6 Releasing blocked lid wheel ...........................................................................................7
5 The TProfessional User Interface ......................................................................................9
5.1 TProfessional Menu Buttons ........................................................................................9
5.2 TProfessional Soft Keys .................................................................................................9
5.3 Log in Menu ..................................................................................................................10
5.4 Block Menu ...................................................................................................................10
5.5 System Menu ................................................................................................................11
5.6 Program Menu ...............................................................................................................11
5.7 Navigation within software menus ................................................................................12
6 Login In ..............................................................................................................................12
6.1 Log in existing User ........................................................................................................13
6.2 Create new user account ...............................................................................................14
6.3 Supervisor Log in ..........................................................................................................15
6.4 Delete User ....................................................................................................................16
7 Create program ...................................................................................................................17
7.1 Set Block Type ..............................................................................................................17
7.2 Heated lid settings ........................................................................................................18
7.2.1 Set lid pre-heating mode ...........................................................................................18
7.2.2 Set lid temperature .................................................................................................19
7.3 Enter step temperature and time ................................................................................19
7.4 Set loop ........................................................................................................................20
7.5 Cool below ambient temperature ..............................................................................21
7.6 Program Pause .............................................................................................................21
7.7 Save program ................................................................................................................21
8 Set Gradient .......................................................................................................................24
9 Edit programs .....................................................................................................................25
9.1 Insert program step .......................................................................................................25
9.2 Delete program step .....................................................................................................26
9.3 Copy program ...............................................................................................................28
9.4 Delete program .............................................................................................................29
9.5 Editing programs in the graphical mode .......................................................................30
10 Change program options .......................................................................................................................... 32
  10.1 Heating and cooling rate ......................................................................................................................... 32
  10.2 Time increment $\rightarrow \Delta t(s)$ ........................................................................................................... 33
  10.3 Temperature increment or decrement $\rightarrow \Delta T(°C)$ ........................................................................ 33
11 Run program ................................................................................................................................................. 35
  11.1 Select program for start from User directories ....................................................................................... 35
  11.2 Quick start programs from the block Menue ........................................................................................... 35
    11.2.1 View program prior to start .............................................................................................................. 36
  11.3 Display during operation ........................................................................................................................ 37
  11.4 Pause Program during run ..................................................................................................................... 38
  11.5 Continue program .................................................................................................................................... 38
12 Stop program ............................................................................................................................................... 39
  12.1 Stop Program from a pause ..................................................................................................................... 39
13 System settings ............................................................................................................................................. 40
  13.1 User configuration ................................................................................................................................... 40
    13.1.1 Set language ...................................................................................................................................... 40
    13.1.2 Change individual PIN ...................................................................................................................... 40
    13.1.3 Delete Account ................................................................................................................................. 41
  13.2 System configuration ................................................................................................................................ 41
    13.2.1 Configure beep .................................................................................................................................. 42
    13.2.2 Configure Contrast ............................................................................................................................ 42
    13.2.3 Set time and date ................................................................................................................................ 43
  13.3 System info ................................................................................................................................................ 43
    13.3.1 System info ........................................................................................................................................ 43
    13.3.2 View Log files of the last five runs ................................................................................................. 44
  13.4 Service ..................................................................................................................................................... 45
    13.4.1 View log files of Power on self test ................................................................................................. 45
    13.4.2 Execute extended self test ................................................................................................................ 45
    13.4.3 View log files from extended self test ............................................................................................. 46
    13.4.4 View Error log files .......................................................................................................................... 46
    13.4.5 Create Info file for Biometra Service Department ........................................................................... 46
  13.5 How to contact Biometra ........................................................................................................................ 46
14 Maintenance ................................................................................................................................................ 47
  14.1 Cleaning and Decontamination .............................................................................................................. 47
  14.2 Trouble shooting ...................................................................................................................................... 47
    14.2.1 Slow heating and cooling .................................................................................................................... 47
    14.2.2 Restart due to unrecognised power failure ....................................................................................... 47
    14.2.3 Adaptation of protocols from other cyclers ..................................................................................... 47
    14.2.4 Releasing wheel in case of blocked lid ............................................................................................. 47
  14.3 Service and repair .................................................................................................................................... 48
  14.4 Firmware update ..................................................................................................................................... 48
15 Instructions for return shipment .................................................................................................................. 49
16 Equipment Decontamination Certificate ..................................................................................................... 50
17 Technical specification ................................................................................................................................. 51
18 Warranty ....................................................................................................................................................... 52
19 Declaration of Conformity .......................................................................................................................... 53
Introduction
The Biometra TProfessional Thermocycler is 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.

1.1 TProfessional Thermo block
The TProfessional Thermocycler offers three different block modules. To achieve ultimate performance the 96 well modules are made of Silver. Due to its excellent heat conductivity Silver equilibrates extremely quickly, thus providing maximum speed and temperature uniformity. To protect the valuable silver blocks against corrosion, the block surfaces are Gold plated. The 96 well silver block is designed for daily routine work and can be used with 0.2 ml tubes, strips or microplates. For rapid optimisation of new protocols, a 96 well Gradient version is available. The third block module is designed for use with 384 well plates. All block modules can be easily exchanged in less than 10 seconds.

1.2 TProfessional Lid
The TProfessional lid has been optimised to achieve two essential requirements: prevention of condensation and reliable contact between samples and thermoblock. The lid is powered by Biometras well know smart lid technology which automatically limits lid pressure to save tubes from damage. In addition, the new design of the High Performance Lid ensures an even temperature distribution between samples thus significantly improving temperature uniformity. With one press on the front button, the lid gently swings open and arrests in its end position.

1.3 TProfessional User interface
The TProfessional user interface incorporates Biometras proven spreadsheet-programming philosophy. Avoiding endless serial program windows, all steps of a program are entered in a single screen. This makes the creation of new or editing existing programs fast and easy. One touch leads from the spreadsheet to an alternative graphical programming mode. The TProfessional manages up to 30 individual users (all password protected) and provides for a large program store.

1.4 TProfessional Housing
The elegant TProfessional housing is designed for heavy use. Due to an optimised air stream design even higher efficiency and better temperature uniformity is achieved. The instrument works quietly and consumes little power, which in turn leads to low heat emission. The compact footprint saves valuable bench space. Keyboard and display have been set to an angle that ensures reflection-free viewing and ergonomic programming. To facilitate servicing the TProfessional housing can be completely removed from the chassis.
2 Safety precautions

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

- General safety precautions for laboratory work must be observed when working with the TProfessional thermocycler.
- 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 heat samples without having the lid locked securely.
- Before opening of the lid, release lid pressure (see section 4.5)
- Do not place fingers between lid and housing when opening or closing the lid.
- Do not touch the heated lid.
- 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.
- Use only suited plastic ware in the TProfessional 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 TProfessional 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.
- The TProfessional Thermocycler must not be used with explosive, flammable or volatile liquids.
- Appropriate safety regulations must be observed when working with infectious or pathogenic material.
- The Tprofessional 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.

⚠️ 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.
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 TProfessional shipping box provides a specially developed system for contact-free transport of this electronic device.

3.2 Operation Voltage

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

The TProfessional 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 TProfessional, switch off the instrument and disconnect the mains plug.

**STEP 1** Use a coin or another round shape item to turn the adjustment slot of the Voltage selector to the new Voltage.

![Diagram of Voltage selector](image)

**Important:** After changing the operation Voltage, the instrument fuses have to be replaced. Fuse specifications for each Voltage are shown on the type label on the instrument backside.

**STEP 2:** Insert Fuses according to selected Voltage at the backside of the instrument.

![Diagram of backside](image)
3.3 Setting up the TProfessional

- Place the TProfessional Thermocycler on a stable surface in a dry environment.
- Let equilibrate the TProfessional 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 rear 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 the rear side of the Thermocycler and a wall or another instrument (min 10 cm).

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.

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

- The display contrast can be adjusted to local lightning conditions (13.2.2)

3.4 Initial self test (power on self test)

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

A log file of the power on self test is stored in the Thermocycler memory (see section 13.4.1).
4  Getting familiar with the TProfessional

4.1  TProfessional Thermocycler front view

4.2  TPROFESSIONAL Thermocycler rear view
4.3 Exchange of block module

Switch off the instrument.

Lift release lever on the backside (1) then pull block slowly to the back (2).

To install a new block module insert module carefully from the back in the base unit (2) until the plugs at the front of the module are in contact with the socket inside the instrument. Then carefully push down the release lever (1).

Switch on instrument. During boot up the block module (block format and serial number) is automatically recognized.

4.4 The TProfessional control panel
4.5 High Performance Smart Lid (HPSL)

To achieve optimum pressure on the tubes the TPROFESSIONAL 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 optimised 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 lid:

First: Release pressure by turning the wheel counter clockwise. As soon as there is no more resistance the pressure has been released.
Then: Open the lid with by pushing the front button.

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

4.6 Releasing blocked lid wheel

Note: When the lid is in the very 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 overrides the automatic clutch mechanism. Thus, care must be taken not to apply excessive pressure.
Release lid in upper position:

1) press pin
2) carefully turn wheel while holding the pin down 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).

Release lid in down position:

1) press pin
2) carefully turn wheel while holding the pin down 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 lid pressure. This would lead to damage of tubes and instrument!
5 The TProfessional User Interface
The TProfessional User interface provides four **Menu Buttons above** the screen and four **Soft Keys below** the Screen,

5.1 TProfessional Menu Buttons

The four **MENU BUTTONS** allow quick access to the TProfessional Main Menus. These are:

- Login /out Menu
- System Menu
- Block Menu
- Program Menu

The active menu is indicated by a graphical link to the respective menu button.

The example shows Program Menu is active.

The four **Menu Buttons** are permanent and always have the same function. This is in contrast to the **Soft Keys**. The Soft Key functions change depending on the current software menu.

5.2 TProfessional Soft Keys

Below the Display there are four **SOFT KEYS**.
In contrast to the Menu Buttons, the Soft Keys have changing functionalities, which are shown in
the above display line.

5.3 Log in Menu

To enter the Log In menu, press the Menu Button [Log in/out] above the display.

When the instrument is switched on, the Log in screen is displayed. To use the instrument a user
has to be selected. Alternatively, a new user can be created.

5.4 Block Menu

To enter the Block Menu, press the Menu Button [Block] above the display.
The block menu shows the current status of the block. The block can be active with a program or free.

If the block is free (not running), the five most recently used programs (by the active User) are listed. These programs can be started directly from the block menu (select with cursor and push [start] Button).

5.5 System Menu

To enter the System Menu, press the System Menue Button above the display.

The System Menu allows global settings and provides information about the instrument. The power on self test log files can be retrieved and service files generated, a detailed description of this menu is shown in section 13, page 40.

5.6 Program Menu

To enter the Program Menu, press the Program Button above the Display.
In the Program Menu, existing programs can be edited or new programs can be created. Each User has his own program directory, where individual programs are saved. Programs from other user directories can be used, but not modified.

5.7 Navigation within software menus

Four navigation keys provide easy navigation within the software screens. The [left] and the [right] key have additional functionalities as described below:

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

This cursor can also be used to confirm 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" key.

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

6 Login In

The TProfessional manages up to 30 individual users. For each user a directory is created, where programs are stored. Programs from other directories (i.e. users) can be read but not modified. This allows to use all programs that are in the cycler memory, but to write only in the own user directory.

Each User is identified by User Name plus Initials (2-3 letters).

Each User account can be protected by a PIN consisting of 1-7 digits. If no PIN protection is wanted, leave the field “Enter PIN” empty and confirm with [Enter].
Note: If no PIN protection is used, programs in the User directory may be changed or deleted by unauthorized persons.

6.1 Log in existing User

Press Menu Button [Log in/out] above the Display. A list of Users is shown.

Select User with cursor keys, or enter first initial. The cursor jumps to the first account starting with this letter.

Press Soft Key [log in] and enter your PIN.
Confirm PIN with button [PIN code ok]. The current User is shown:

To proceed with editing or running a program, select one of the Menu Buttons above the display.

6.2 Create new user account

Press Menu Button[Log in/out] above the Display.
To create a new User account, press Soft Key [New User].

Enter your name and 2-3 initials. Enter a personal identification number (PIN) consisting of 1-7 digits. For security reasons, you are requested to repeat the entry of your PIN.

Note: PIN entry is optional. If no password protection is wanted, just confirm with [User data OK]. However, if no PIN is entered, your account containing all of your programs can be modified by unauthorized personal.

Note: Your PIN can be changed any time in the System menu (see section 0, page 40).

6.3 Supervisor Log in

Only the Supervisor is authorized to change global instrument settings. This includes update of firmware and the deletion of user accounts.

To log in as Supervisor, press the Log in/out Menu Button above the Display. Press Soft Key [Supervisor Log in] and enter Supervisor PIN.
The default Supervisor PIN is 000 000 0 (do not enter blanks).

6.4 Delete User

Once logged in, you can delete your own account in the System Menu (see section xxx).

In addition, any user can be deleted by the Supervisor. To delete an user, log in as Supervisor an select option “delete user”.

Note: By deleting a User Account all programs in the referring user directory will be deleted. It is therefore recommended to safe the programs in a different directory prior to deleting a User account.
7 Create program

To create a new or edit an existing program, press the [Program] Menu Button above the Display (see section 5.6).

To create a new program move cursor to your directory and press Soft Key [Open directory].

Press Soft Key [New Program].

7.1 Set Block Type

The TProfessional Thermocycler automatically recognizes the installed block module. This module is the default block type for creating a new program.
However, it is also possible to write a program for an alternative block type (i.e. w/o gradient). The block type can thus be set manually by pressing the Soft Key [block Type].

To create a program for a block type other than the one currently installed, please select one of the listed block types.

### 7.2 Heated lid settings

#### 7.2.1 Set lid pre-heating mode

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:** After reaching the set lid temperature, there is a 40 second equilibration phase before the block starts.

**Note:** The default setting, which is recommended for most applications, is preheating: On.
However, if the program should start while the lid is heating, this can be set by pressing the Soft Key [preheat on/off].

After Lid settings have been made, confirm with [Enter] to enter the programming spreadsheet.

### 7.2.2 Set lid temperature

**Note:** Thanks to the design of the new High Performance Smart Lid, lower lid temperatures can be used for thermocycling than in the past. Thanks to the lower lid temperature a higher temperature uniformity between samples can be achieved.

The recommended lid temperature is 99.0°C.

Enter temperature and confirm with [Enter] or step to the next field with cursor key.

### 7.3 Enter step temperature and time
Use cursor keys to navigate in the programming table.

**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.

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

**Note:** Minutes and seconds can be separated by “dot”, but this is optional. You can also enter the digits one after the other. Example: to set 2 minutes, 30 seconds enter “2”, “3”, “0”

### 7.4 Set loop

**Note:** In general, loops are entered in the **LAST STEP** of the loop. A loop is defined by selecting the **FIRST STEP** in the loop plus the number of back loops.

Enter the number of the first step within the loop in the row “go to” and confirm with [Enter].

Enter the number of back loops in the row “loops”.
The loop is shown as a bracket at the left side of the spreadsheet.

**Note:** Total cycler number = (number of back loops) + 1, e.g. enter 24 for a total cycle number of 25.

### 7.5 Cool below ambient temperature

After the program has been finished, samples can be kept at below ambient temperature.

Note: To save lifetime of Peltier elements, a temperature of 15°C for the final step rather than 4°C is recommended.

### 7.6 Program Pause

To hold a temperature for an indefinite time enter “0”. After confirming with [Enter] the word “pause” is shown.

### 7.7 Save program

Press button [Save / Save as].
The first available program number is automatically pre-selected. Use cursor keys (or enter two digits) to move to a different program store.

To enter a program name press button [edit name].

Enter program name and confirm name with button [ok].
Confirm program store number with Soft Key [Save].

Program number, name and date are shown in the file directory.

To run this program press Menu Button [block] above the display.
Press the (illuminated) [Start] Button on the left side of the keypad.

8 Set Gradient

The easiest way to define a gradient is to enter the two temperatures of the block (left and right side) separated by “-“.

Confirm with [Enter] or move cursor to the next field.

Alternatively, move cursor to the field for temperature setting and press Soft Key [Gradient].

In the Gradient Screen you can enter a new, or edit an existing Gradient. Enter new settings for Row01 (left side) and Row12 (right side) and confirm with Enter.

To go back to the spreadsheet, press Soft Key [Table].
9 Edit programs

Programs can be edited in the Table or Graphical mode [Graph]. To change between these two modes click on the Soft Key [Table] or [Graph] respectively. The graphical mode is intended for easy modification of existing programs, which can then be saved under a new program number and name. To edit programs in the graphical mode see section 9.5, page 30.

Note: During operation of the Thermocycler 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 9.3, page 28.

9.1 Insert program step

Move cursor to the position, where a new step should be inserted

To insert a program step press Soft Key [Insert/Del]. The step at which a new step will be inserted is highlighted.
Press Soft Key [insert step].

Confirm with Soft Key [Yes]. Enter temperature and time settings for new step.

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

9.2 **Delete program step**

Move cursor to the step that should be deleted and press Soft Key [insert/delete step].
To delete the highlighted step press Soft Key [Insert/Del]

Confirm deletion of step number 4 with Soft Key [YES]
The total step number is reduced by one, the loop now contains 3 steps only.

9.3 Copy program

Press Menu Button [Program] and enter User directory.

Move cursor to the program you want to copy.

Press Soft Key [Copy Program]. The cursor automatically jumps to the next available (free) program store.

The program copy can be stored at any storage number. To change program number move the cursor to the wanted location or directly enter a storage number (two digits) over the keypad.

Edit name and confirm with Soft Key [Save Copy]
9.4 Delete program

Select a program from your user directory

Press Soft Key [Delete program].

Confirm Deletion with Soft Key [Yes].
This program store is now free.

9.5 Editing programs in the graphical mode

Programs are created in the spread sheet mode where new steps are easily defined by Temperature and Time. In addition, programs can be edited in the graphical mode which provides a schematic temperature plot of the different steps.

To enter this mode, press Soft Key [Graph].

Spread Sheet Mode [Table]  
Graphical Mode [Graph]

To change temperature and time settings, move cursor to the respective field and enter new values with the key pad. Once confirmed with enter, the temperature graph is updated.

**Note:** The steps are automatically spread over the whole range to give maximum resolution (thus steps height does not represent the real temperature).

**Note:** To set loops, go to the Spread Sheet Mode (press [Table])

**Note:** To insert or delete program steps, go to the Spread Sheet Mode (press [Table])
**Note:** To edit or enter gradients, move cursor to the respective step and press Soft Key [Gradient]. Enter gradient temperatures as described in section 8, page 24.
10 Change program options

For each step additional options can be defined.

To change program options, move the cursor to the right side of the spreadsheet, labelled with “Options”. A new table is displayed.

To go back to programming sheet, move the cursor to the left side of the display.

If options have been changed from the default values, there is an indication in the options field.

10.1 Heating and cooling rate

Since the TProfessional is a very fast thermocycler it may be necessary to reduce the heating and cooling ramp to adopt protocols from slower thermocyclers.

The heating or cooling ramp respectively can be set in the row labelled with $\text{[}^\circ\text{C/s}]$. 

Whatman Biometra
Note: This entry specifies the speed at which the referring step is achieved. I.e. to heat from step 1 to step 2, the heating rate in step 2 has to be lowered.

Note: To reduce the overall speed of the Thermocycler, the heating rate has to be modified in all steps. The speed settings will be only valid for this individual program.

10.2 Time increment → Δt(s)

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.

<table>
<thead>
<tr>
<th>Step</th>
<th>ΔT(°C)</th>
<th>Δt (s)</th>
<th>Δ(°C/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>--</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>2</td>
<td>--</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>3</td>
<td>5.0</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>4</td>
<td>--</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>5</td>
<td>--</td>
<td>--</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Note: A time increment will increase 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.

10.3 Temperature increment or decrement → ΔT(°C)

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 a temperature from cycle to cycle enter a negative temperature increment in the row labelled with $\Delta T[^{\circ}C]$.

<table>
<thead>
<tr>
<th>$\Delta T[^{\circ}C]$</th>
<th>$\Delta t$ (s)</th>
<th>$\gamma[^{\circ}C/s]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>-</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>-0.1</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>-</td>
<td>--</td>
<td>5.0</td>
</tr>
<tr>
<td>--</td>
<td>--</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**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.
11 Run program
To start program press [Start] Button (see section 4.4, page 6).

This button is only active, when a program for start has been selected. This is indicated by the green LED in the Start button.

11.1 Select program for start from User directories
Any program in the cycler memory can be used to start the thermocycler. In addition to the programs in the own User account, also programs from other User directories can be started.

To select a program for start press [Program] Menu Button above the Display.

Select directory and program with cursor keys and press [Start] Button.

11.2 Quick start programs from the block Menu
The TProfessional provides the last 5 programs that haven been run for quick start.

Push the [block] Menu Button above the Display.
Select one of the last five programs with the cursor keys.

Press the (illuminated) Start button on the left side of the keypad (see section 4.4, page 6).

**11.2.1 View program prior to start**

To check the program prior to start press the [View Program] Soft Key.

The current program is shown.

Press [View Graph] Soft Key for alternative display.
Note: In the view program mode, a program cannot be edited. To edit program press [Program] Menu Button above the Display.

11.3 Display during operation

After the instrument has been started, the below display is shown.

To show detailed information about the running program, press one of the Soft Keys [Show Graph] and [Show Table].

There are three different display modes available during the run.
11.4 Pause Program during run

To pause program press Soft Key [Pause Block].

The message “PAUSE” is shown in the display and alternates with the elapsed time.

11.5 Continue program

To continue paused program press Soft Key [Continue]
12 Stop program

To stop the active program press [stop] Button.

To abort the active program confirm with [Yes].

12.1 Stop Program from a pause

If the last step in a program is a pause, the program has to be stopped by pressing the [Stop] Button before switching off the instrument.

Note: If the instrument is switched off during a pause step, this will be recognized as a power failure (a referring error message is written to the log file).
13 System settings

To change global settings press the [System] Menu Button above the screen.

Main screen

13.1 User configuration

This option allows changes of your individual user account.

13.1.1 Set language

The language settings are part of each User account. Available languages are English and German (second software release)

13.1.2 Change individual PIN

This option allows changing the PIN of the current User.
13.1.3 Delete Account

Any user can delete his or her own account.

**Important:** Deleting an User account will automatically delete the user file directory together with all programs stored in this directory.

Prior to deleting an account, ensure that the User directory is empty, or save a copy of the programs for further use to a different User directory (see section 9.3).

13.2 System configuration

This option allows setting of the signal tone (beep), Display contrast and time settings.
13.2.1 Configure beep

To switch beep on/off toggle between On and OFF and confirm with Soft Key [Set Beep].

13.2.2 Configure Contrast

The Display contrast can be set individually for each User.

Change settings with Cursor keys and confirm with Soft Key [Save Contrast].
13.2.3 Set time and date

Enter settings for Date and Time and confirm with Soft Key [Set Time and Date].

13.3 System info

This Menu provides information on the instrument and on the Log files of the last five runs.

13.3.1 System info

Use this option to Display the instruments serial number, block type and software version.
13.3.2 View Log files of the last five runs

During each run a log file is stored in the Thermocycler memory. The log files of the last five runs can be viewed in this window.
13.4 Service

13.4.1 View log files of Power on self test

During boot up (Power on) the TProfessional hardware is checked (Self test). Here you can see the results of the last five self tests.

13.4.2 Execute extended self test

In addition to the regular Power on –Self test, a more comprehensive test can be triggered by the user. This test takes several minutes. During the test no programs can be run on the thermocycler.

It is recommended to execute an extended self test regularly. The results of the extended test can be viewed in the following menu:
13.4.3 View log files from extended self test
Display results of the extended self test.

13.4.4 View Error log files
A history of all software and hardware errors are shown in this menu.

Note: Sever errors that require action by the User are displayed in the User Software Menu.

13.4.5 Create Info file for Biometra Service Department
This option creates a Service file containing technical details for the Biometra Service Department.

13.5 How to contact Biometra

<table>
<thead>
<tr>
<th>User: FRA</th>
<th>12.01.06</th>
<th>12:22</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 How to contact Biometra</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Biometra GmbH
Rudolf-Wissell-Str. 30
37079 Goettingen
Germany

+49 (0)551 / 50686 - 0
+49 (0)551 / 50686 - 66

e-mail: info@biometra.com
www.biometra.com
14 Maintenance

14.1 Cleaning and Decontamination

The TProfessional was built to operate for a long time without the need for periodical maintenance. 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.

14.2 Trouble shooting

14.2.1 Slow heating and cooling

The TPROFESSIONAL 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.

14.2.2 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.

14.2.3 Adaptation of protocols from other cyclers

Since the TProfessional 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 10.1. Alternatively, the time settings may be extended.

14.2.4 Releasing wheel in case of blocked lid

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 overrides the automatic clutch mechanism (see section 4.6, page 7). Thus, care must be taken not to apply excessive pressure.

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

The TProfessional 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.

14.4 Firmware update

For instruction for firmware upgrade, please contact the Biometra Service Department.
15  Instructions for return shipment

In case of an instrument failure that cannot be fixed by the procedures described in section 14.2 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.: +49/551/5068640, Fax: ++49/551/5068666, e-mail: info@biometra.com).

- **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 16) 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
16 Equipment Decontamination Certificate

To comply with German legislation (i.e. §28 StrlSchV, §17 GefStoffV and §19 ChemG) and to avoid exposure to hazardous materials during handling and repair, please complete this form, prior to shipping the equipment.

<table>
<thead>
<tr>
<th>COMPANY / INSTITUTE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS</td>
<td></td>
</tr>
<tr>
<td>TEL NO</td>
<td></td>
</tr>
<tr>
<td>FAX NO</td>
<td></td>
</tr>
<tr>
<td>E-MAIL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Model</th>
<th>Serial No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For demo instruments | Start Date | End Date |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Typ of hazardous materials used with this equipment: 

Has the equipment been cleaned and decontaminated? (please mark) | YES | NO |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
<pre><code>                          |     |    |
</code></pre>

Describe method of cleaning / decontamination:

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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 Technical specification

<table>
<thead>
<tr>
<th>Order Number</th>
<th>070-901</th>
<th>070-801</th>
<th>070-902</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TProfessional 96</strong></td>
<td>TProfessional 96</td>
<td>TProfessional 96</td>
<td>TProfessional 384</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>96 tubes 0.2 ml, 96 well microplates</td>
<td>96 tubes 0.2 ml, 96 well microplates</td>
<td>384 well microplates</td>
</tr>
<tr>
<td><strong>Block</strong></td>
<td>Silver</td>
<td>Silver</td>
<td>Aluminum</td>
</tr>
<tr>
<td><strong>Block coating</strong></td>
<td>Gold</td>
<td>Gold</td>
<td>Special Alloy</td>
</tr>
<tr>
<td><strong>Block exchange</strong></td>
<td>quick-X-change</td>
<td>quick-X-change</td>
<td>Quick-X-change</td>
</tr>
<tr>
<td><strong>Block exchange time</strong></td>
<td>less than 10 sec</td>
<td>less than 10 sec</td>
<td>less than 10 sec</td>
</tr>
<tr>
<td><strong>Heating</strong></td>
<td>5.0 °C/sec</td>
<td>5.0 °C/sec</td>
<td>1.7 °C/sec</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>3.5 °C/sec</td>
<td>3.5 °C/sec</td>
<td>1.0 °C/sec</td>
</tr>
<tr>
<td><strong>Gradient</strong></td>
<td>-</td>
<td>40 °C</td>
<td>-</td>
</tr>
<tr>
<td><strong>Temperature Uniformity</strong></td>
<td>95 °C: +/- 0.40 °C within 15 sec</td>
<td>+/- 0.6°C</td>
<td>70 °C: +/- 0.25 °C within 15 sec</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>-3 °C to 99 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control Accuracy</strong></td>
<td>+/- 0.1 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>Quickstart of the last five programs, view program prior to start, toggle between spreadsheet and graphical mode, extended self test, generate service files, adjustable ramp rates, view gradient temperature graph, PC control over RS 232</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Programming mode</strong></td>
<td>Spreadsheet or graphical</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Programm memory</strong></td>
<td>total capacity of 350 programs in 30 user directories (password protected)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>½ VGA screen, 320 x 240 pixel</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Auto restart after power failure</strong></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cool samples to 4°C</strong></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smart Lid Technology</strong></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lid Temperature Range</strong></td>
<td>30 to 99 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>480 Watt</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>100, 115, 230 Volt, 50-60 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Noise emission</strong></td>
<td>Very low</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>RS232 serial port</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Working conditions</strong></td>
<td>15 °C to 35 °C, 70 % air humidity, max 2000 m NN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Measured inside the block
18 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 24 months as described under the following conditions:

This warranty is valid for 24 month from date of shipment to the customer from Biometra or an authorised 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.

Whatman Biometra
19 Declaration of Conformity

EU – Konformitätserklärung

EC - Declaration of Conformity

Göttingen, February 2006

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: TProfessional 96, TProfessional 96 Gradient, TProfessional 384
Best.-Nr. / Order No.: 070-801, 070-901, 070-902

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:

EN61326 : 2004

EN 61010-1 : 2001 EN 61010-2-010 : 2003

Dr. Jürgen Otte
Quality Manager
Note for the disposal of electric / electronical waste.

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 symbole (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´applique 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.