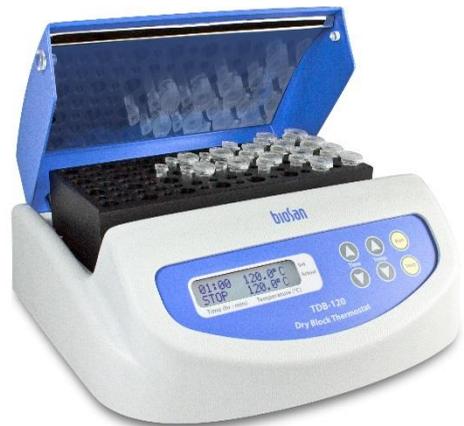
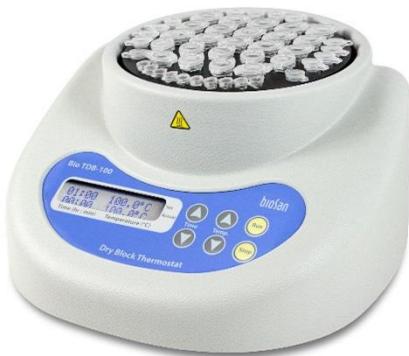


Bio TDB-100 / TDB-120 Dry Block Thermostat



Contents

1.	About this edition of the operating manual	2
2.	Safety precautions	3
3.	General information.....	4
4.	Getting started.....	5
5.	Operation	5
6.	Calibration	6
7.	Specification.....	8
8.	Maintenance.....	9
9.	Warranty and Claims.....	10
10.	EU Declaration of conformity.....	11

1. About this edition of the operating manual

The manual applies to following models and versions of dry block thermostats:

- **Bio TDB-100** versions V.2AD and V.2AE
- **TDB-120** versions V.5AD, V.5AE, V.6AD and V.6AE

2. Safety precautions

The following symbols mean:



Caution!

Make sure you have fully read and understood the present Manual before using the equipment. Please pay special attention to sections marked by this symbol.



Caution!

Surfaces can become hot during use.

GENERAL SAFETY

- Use only as specified in the Operating Manual provided.
- The unit should be saved from shocks or falling.
- Store and transport the unit at ambient temperatures between -20°C and +60°C and maximum relative humidity of 80%.
- After transportation or storage, keep the unit under room temperature for 2-3 h before connecting to electric circuit.
- Before using any cleaning or decontamination methods except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- Do not make modifications to the design of the unit.

ELECTRICAL SAFETY

- Connect only to electric circuit with voltage corresponding to that on the serial number label.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- Ensure that the switch and the plug are easily accessible during use.
- If liquid penetrates into the unit, disconnect it from electric circuit and have it checked by a repair and maintenance technician.
- Disconnect the unit from electric circuit before moving.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the Specification section.

DURING OPERATION

- Use only tubes of standard size.
- Do not check the temperature by touch. Use a thermometer.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures. Please contact manufacturer for possibility of unit operation in specific atmosphere.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.
- Do not leave the operating unit unattended.

BIOLOGICAL SAFETY

- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or penetrates into the equipment.

3. General information

Bio TDB-100 / TDB-120 – compact, easy-to-use thermostat for Eppendorf type microtubes. It is specially designed for long incubation at different temperatures. Thermostat has undeniable advantage working with microquantities of reagents in microtubes. The thermostat possesses unprecedentedly high precision and uniformity of temperature distribution over the block.

With the help of the software-enabled temperature calibration function, the user can calibrate the unit in the range of several percent of the selected temperature to compensate differences in the thermal behaviour of tubes from different manufacturers.

The thermostat can be used in:

Molecular and gene engineering, cell biology	For PCR analyses, for temperature stabilisation in DNA/RNA restriction and denaturation reaction;
Biochemistry	For the enzyme processes analyses;
Microbiology	For the anaerobic microorganism cultivation,
Chemistry	For the preliminary heating of reagents in chromatography (especially when analysing chemical and biological components of fatty acids, which condense in cold microsyringes).

Depending on the model, different quantities of microtubes of different volumes can be placed in the thermostat.

Table 1. Block capacity, by model

Thermostat model	Microtube			
	0.2 ml	0.5 ml	1.5 ml	2.0 ml
Bio TDB-100	10	15	24*	
TDB-120 with A-53	-	21	32	-
TDB-120 with A-103	100	21	32	-

* Microtubes of 1.5 ml in volume fit in the sockets for 2.0 ml microtubes

4. Getting started

- 4.1. **Unpacking.** Remove packing materials carefully and retain them for future shipment or storage of the unit. Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage. Warranty covers only the units transported in the original package.
- 4.2. **Complete set.** Package contains:
- Dry block thermostat with aluminium block 1 pce.
 - Spare fuse (inside fuse holder) 1 pce.
 - Power cable 1 pce.
 - Operating manual, Certificate 1 copy
- 4.3. **Setup.**
- Place the unit upon even horizontal non-flammable surface at least 20 cm away from any flammable materials;
 - Remove protective film from the display;
 - Plug the power cable into the socket on the rear side of the unit, and position it with easy access to the power switch and plug.

5. Operation

Recommendations during operation



Please check the tubes before using, be sure that tubes are heat resistant. Don't heat the tubes over the melting point of the material they are made of. Remember that thin-walled tubes have a higher thermoconducting factor.

- Tube caps can open under the action of high temperature ($> 85^{\circ}\text{C}$), thus causing sample volume shrinkage or potential health risk when working with infected material. To prevent such cases it is recommended to use tubes with cap lock of Safe-Lock[®] type.
- Do not fill tubes more than 3-5 mm over the level they are immersed in the heat block slot.

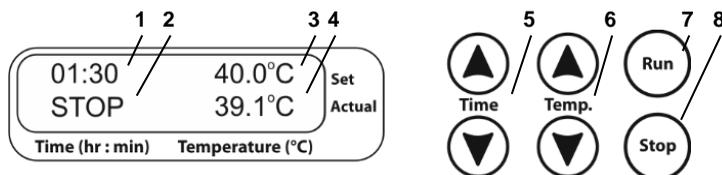


Figure 1. Control panel

- 5.1. Connect the power cord to a grounded power socket and switch ON (position I) the power switch located on the rear panel of the unit.
- 5.2. The unit will turn on and the following readouts will be shown on the display:
- previously set time and temperature in the upper line (Set);
 - timer indication STOP and current temperature in the lower line (Actual).

- 5.3. **Temperature setting.** Use the ▼ and ▲ **Temp.** keys (fig. 1/6) to set the required temperature. Pressing the key for more than 2 s makes values change faster. Set temperature is displayed in the upper line of the display (fig. 1/3)
- 5.4. The heat block starts the heating. The actual temperature will be shown in the lower line of the display (fig. 1/4).
- 5.5. After thermal stabilisation of the unit (i.e. after the set and the current temperature equalize), place tubes into the block sockets.
- 5.6. **Time setting.** The unit is equipped with an independent timer for convenient control over the sample incubation time.

Use the ▼ and ▲ **Time** keys (fig. 1/5) to set the required sample incubation time in hours and minutes (hh:mm). Pressing the key for more than 2 s makes values change faster. Set time is displayed in the upper line of the display (fig. 1/1)



Caution! (For model TDB-120) To avoid deformation of the lid, do not set the time longer than 8 h when setting the temperature above +100°C.

- 5.7. Press the **Run** key (fig. 1/7) to start the timer. The elapsed time will be indicated in the lower line of the display (fig. 1/2). After the set time interval elapses, unit begins beeping and a blinking STOP indication shows on the display. Press the **Stop** key (fig. 1/8) to stop the signal.



Caution! Stopped timer does not stop the heating / temperature maintenance process. The heating can be stopped by lowering the temperature below 25°C using the ▼ **Temp** key (OFF indication shows on the display, fig.1/3).

- 5.8. The timer can be stopped before the set time interval elapses if necessary by pressing the **Stop** key. Press the **Run** key to restart the timer with the same time interval.
- 5.9. The set time interval can be changed at any time during the timer operation - just stop the timer and make the changes required.
- 5.10. If the working time is set to 00:00, the unit will operate non-stop.
- 5.11. After finishing the operation, switch OFF (position O) the unit with the power switch, unplug the power cord from electric circuit.

6. Calibration

- 6.1. The device is precalibrated at the factory (calibrating coefficient is 1.000) for operation with temperatures measured by a sensor in the heating block.
- 6.2. To change the calibration coefficient, hold the **Stop** key (fig. 1/8) pressed for more than 8 s to activate calibration mode. The calibration coefficient appears on the display (fig. 2/1).
- 6.3. **Restoring factory settings.** Set 1.000 value using the ▲ and ▼ **Temp** keys (fig. 1/6) as shown on fig. 2/1 to restore the factory settings. Press the **Run** key (fig. 1/7) once to save the changes and exit the calibration mode.



Note. Coefficient value changes are recommended after the unit has reached 30°C temperature.

6.4. Calibration procedure.

6.4.1. Install independent sensor (0.5°C accuracy) into microtubes placed into the block sockets.

6.4.2. Set the required temperature in operation mode (e.g. 40°C).

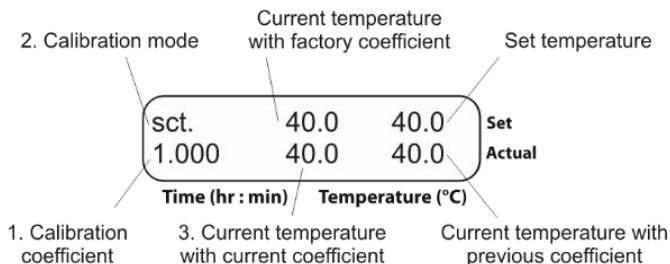


Figure 2. Display in calibration mode

6.4.3. After the unit reaches the set temperature (when the set and current temperature readings equal) leave the unit for 30 min for thermal stabilization.

6.4.4. Let us assume that the readings of independent sensor is 39°C, but the display's actual temperature is 40°C (fig. 1/4). Then it is necessary to add 1°C correction.

6.4.5. Hold **Stop** key (fig. 1/8) pressed for more than 8 s to activate calibration mode. The following parameters will be shown on the display (fig. 2).

6.4.6. Using the **Temp ▲** and **▼** keys (fig. 1/6), change the calibration coefficient (fig. 3/1) so that the new temperature value (fig. 3/2) corresponds to the independent sensor temperature. In our example, the calibration coefficient will be 0.974.



Note.

Calibration coefficient can be changed in range from 0.936 to 1.063 (± 0.063 , for model **Bio TDB-100**) or from 0.968 to 1.031 (± 0.031 , for model **TDB-120**), with increment of 0.001. This calibrating coefficient will correct temperature through all the operation range.



Note.

Coefficient value changes are recommended after the unit has reached 30°C temperature.

6.4.7. After finishing the calibration, press the **Run** key (fig. 1/7) once to save the changes and exit the calibration mode.

6.4.8. The display will show calibrated temperature as shown on fig. 4/1 and the unit will continue thermal stabilization according to the previously set temperature.

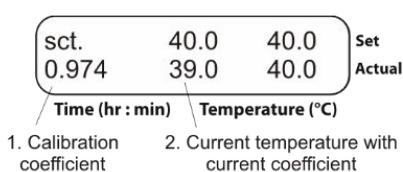


Figure 3. Changing the coefficient

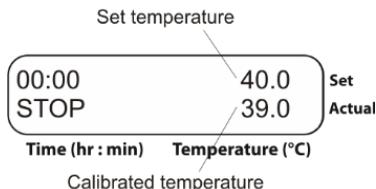


Figure 4. Display after calibration

7. Specification

The unit is designed for operation in cold rooms, incubators (excluding CO₂ incubators) and closed laboratory rooms at ambient temperature from +4°C to +40°C in a non-condensing atmosphere and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

Biosan is committed to a continuous program of improvement and reserves the right to alter design and specifications of the equipment without additional notice.

	Bio TDB-100	TDB-120
Temperature setting range	+25°C ... +100 °C	+25 °C ... +120 °C
Temperature regulation range	5°C above room t° ... +100°C	5 °C above room t° ... +120 °C
Temperature increment	0,1°C	
Stability at +37°C	±0,1°C	
Uniformity at +37°C	±0,1°C	
Heat up time, from +25°C to +37°C	4 min	
Internal thermal breaker	Yes	
Calibration option	Yes	
Calibration coefficient range	0.936 – 1.063 (±0.063)	0.968 – 1.031 (±0.031)
Digital time setting	1 minute - 96 hours or non-stop	
Display	2x16 digit, LCD	
Dimensions	210x230x115 mm	230x210x110 mm
Working current	230 V, 50/60 Hz	
Power and current consumption	870 mA, 200 W	
Weight*	2.8 kg	

Model	Microtube shape	Block capacity	Catalogue number
Bio TDB-100	Cylindrical/ conical	10x0.2 ml, 15x0.5 ml, 24x1.5/2.0 ml	BS-010412-AAA
TDB-120 A-53	Conical	21x0.5 ml, 32x1.5 ml	BS-010401-PAA
TDB-120 A-103	Conical	50x0.2 ml, 21x0.5 ml, 32x1.5 ml	BS-010401-QAA

* Accurate within 10%.

8. Maintenance

- 8.1. If the unit requires maintenance electric circuit, disconnect the unit from electric circuit and contact Biosan or your local Biosan representative.
- 8.2. All maintenance and repair operations must be performed only by qualified and specially trained personnel.
- 8.3. Standard ethanol solution (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and decontamination of the unit.
- 8.4. Fuse replacement.
 - Disconnect from electric circuit.
 - Remove the power plug from the rear side of the unit.
 - Pull out the fuse holder by applying leverage in recess (fig. 5/A).
 - Remove the fuse from the holder.
 - Check and replace with the correct fuse if necessary, **M** 2 A for 230 V or **M** 3.15 A for 120 V, (type **M** - time lag: **Medium**).

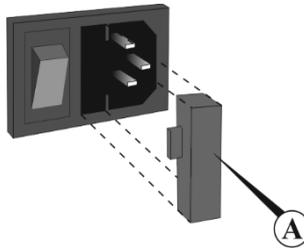


Figure 5. Fuse replacement

9. Warranty and Claims

- 9.1. The manufacturer guarantees the compliance of unit with the requirements of specifications, if the customer follows the operation, storage and transportation instructions.
- 9.2. The warranted service life of unit from date of delivery to the customer is 24 months. For extended warranty, see **9.5**.
- 9.3. Warranty covers only the units transported in the original package.
- 9.4. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment report shall be compiled, certified and sent to the local distributor address. Please visit the **Technical support** section on our website at the link below to obtain the claim form.
- 9.5. Extended warranty. For **Bio TDB-100** and **TDB-120**, the *Basic Plus* class models, extended warranty is a paid service. Contact your local Biosan representative or our service department through the **Technical support** section on our website at the link below.
- 9.6. Description of the classes of our products is available in the **Product class description** section on our website at the link below.

Technical support



biosan.lv/en/support

Product class description



biosan.lv/classes-en

- 9.7. The following information will be required in the event that warranty or post-warranty service comes necessary. Complete the table below and retain for your records.

Model	Bio TDB-100 / TDB-120, dry block thermostat
Serial number	
Date of sale	

10. EU Declaration of conformity

EU Declaration of Conformity

Unit type	Dry block thermostats
Models	Bio TDB-100, TDB-120, CH-100, CH3-150, DB-4S, DB-10C
Serial number	14 digits styled XXXXXYYMMZZZ, where XXXXX is model code, YY and MM – year and month of production, ZZZZ – unit number.
Manufacturer	SIA BIOSAN Latvia, LV-1067, Riga, Ratsupites str. 7/2
Applicable Directives	EMC Directive 2014/30/EU LVD Directive 2014/35/EU RoHS2 2011/65/EU WEEE 2012/19/EU
Applicable Standards	<u>LVS EN 61326-1: 2013</u> Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements. <u>LVS EN 61010-1: 2011</u> Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements. <u>LVS EN 61010-2-010: 2015</u> Particular requirements for laboratory equipment for the heating of materials.

We declare that this product conforms to the requirements of the above Directives



Signature

Svetlana Bankovska
Managing director

10.07.2016.

Date



Signature

Aleksandr Shevchik
Engineer of R&D

19.07.2016

Date

Biosan SIA

Ratsupites 7, build.2, Riga, LV-1067, Latvia
Phone: +371 67426137 Fax: +371 67428101
<http://www.biosan.lv>

Edition 2.-6.01 – December 2016