

# Thermo-shaker PHMT

*Operating instructions*

*For version V.1GW*





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# 1. Safety

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The following symbols mean:



**Caution:** Read these operating instructions fully before use and pay particular attention to sections containing this symbol!



**Caution:** Surfaces can become hot during use!

## GENERAL SAFETY

- ☞ Use only as specified in the operating instructions provided.
- ☞ The unit should be saved from shocks or drops.
- ☞ The unit must be stored and transported in a horizontal position (see package label).
- ☞ After transport or storage allow the unit to dry out (2-3 hrs) before connecting to the mains.
- ☞ Use only standard qualitative tubes.
- ☞ Before using any cleaning or decontamination method 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 the mains with a voltage corresponding to that on the serial number label. Use only the external power supply unit provided with this product.
- ☞ Ensure that the mains switch and external power supply are easily accessible during use.
- ☞ Do not plug the unit into the mains outlet without grounding, and do not use extension lead without grounding.
- ☞ Before moving the unit, disconnect it from the mains outlet.
- ☞ To turn off the unit, disconnect the external power supply from the mains outlet.
- ☞ If liquid is spilt inside the unit, disconnect it from the external power supply and have it checked by a competent person.

## **DURING OPERATION**

- ☞ Do not leave the operating unit unattended.
- ☞ Do not impede the platform motion during operation.
- ☞ Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- ☞ Do not operate the unit if it is faulty or been incorrectly installed.
- ☞ For indoor use only.
- ☞ Do not use outside laboratory rooms.
- ☞ Do not check the temperature by touch. Use a thermometer.

## **BIOLOGICAL SAFETY**

- ☞ It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilled on or inside the equipment.

## 2. General Information

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Thermo-shaker PHMT provides mixing and temperature control of samples in microtest tubes or PCR plate. Functions of heating and mixing can be performed both simultaneously and independently, i.e. the unit implements three devices in one:

1. Shaker;
2. Thermostat;
3. Thermostat shaker.

PHMT is used for DNA analysis sample preparation, for extraction of proteins, polysaccharides, lipids and other cellular components.

Heating source is a printed heating board (12 V). Mixing is provided by movement of orbital type.

The instrument is applicable in:

- DNA, RNA analysis — DNA, RNA extraction;
- Biochemical study of enzymatic reactions and processes;
- Extraction of metabolites from cellular material.

# 3. Getting started

## 3.1 Unpacking

Remove packing materials carefully, and retain for future shipment or storage of the unit.

## 3.2 The Thermo-shaker PHMT set includes:

- Thermo-shaker PHMT ..... 1 piece
- Microtube block ..... 1 piece
- External Power Supply ..... 1 piece
- Spare rubber drive belt ..... 1 piece
- Operating instructions; CE Certificate ..... 1 copy

## 3.3 Optional thermoblocks

- Spare thermoblock PSC15 ..... for 20 x 1.5ml microtubes
- Spare thermoblock PSC18 ..... for 20 x 0.5ml plus 12 x 1.5ml microtubes
- Spare thermoblock PSC20 ..... for 20 x 2.0ml microtubes
- Spare thermoblock PSC24 ..... for 24 x 2.0ml microtubes
- Spare thermoblock PSC32 ..... for 20 x 0.2ml plus 12 x 1.5ml microtubes
- Spare thermoblock PSC96 ..... 96-well microplate for PCR

## 3.4 Set up:

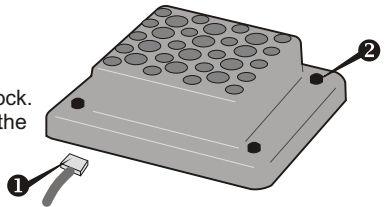
- place the unit upon even horizontal non-flammable surface away from any flammable materials.
- to provide optimum ventilation ensure clearance around the device - 20 cm on side faces.
- plug the external power supply into the socket at the rear side of the unit and position the unit so that there is easy access to the power switch and external power supply.

## 3.5 Installing blocks (if thermoblock is not installed at the moment of delivery).

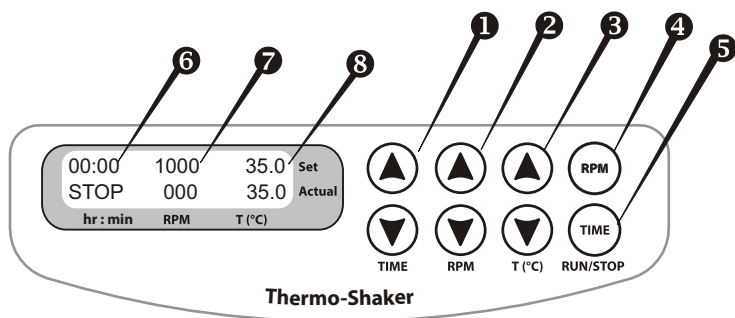
Connect the plug ❶ to the contact terminal on the underside of the thermoblock. Align the thermoblock so that the warning label is facing the front of the unit and secure with the four knurled screws ❷.

## 3.6 Changing blocks

Disconnect the external power supply from the mains. Remove the four knurled screws ❷, disconnect the plug ❶. Select the new thermoblock. Connect the plug. Align the thermoblock so that the warning label is facing the front of the unit and secure with the four knurled screws.



## 4. Operation of PHMT



### Recommendations during operation

- Please check the tubes/microwell plates before using, be sure that tubes/microwell plates are chemically resistant. Don't heat the tubes/microwell plates over the melting point of the material they are made of (use thermoresisting polypropylene tubes). Remember that thin-walls tubes have a higher thermoconducting factor.
- Under the action of high temperature (> 85°C) tube caps can open, 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.
- For efficient mixing it is recommended to fill test tubes up to 75% of the rated volume.

- 4.1 Connect external power supply to the mains and switch ON the power switch located on the rear panel of the unit.
- 4.2 The display will turn on with the upper line (set) showing time, RPM and temperature set earlier and the lower line (actual point) showing current readings of the same parameters (thermoblock temperature °C, which automatically starts rising according to the temperature set in the upper line). The time of temperature stabilisation depends on the initial temperature.

### How to set the necessary parameters

Use the readings in the upper line of the display (set), while setting the necessary parameters.



### Time set (TIME)

- 4.3 With the help of “▲” and “▼” keys (①) set the required working time interval (⑥) in hours and minutes (increment - 1 min). If the key is pressed for longer time the increment becomes bigger.

### Speed set (RPM)

- 4.4 With the help of “▲” and “▼” keys (②) set the required speed (⑦ increment 10 RPM). If the key is pressed for longer time the increment becomes bigger.

### Temperature set (T, °C)

- 4.5 With the help of “▲” and “▼” keys (③) set the necessary temperature (⑧ increment 0.1°C). If the button is pressed for longer time the increment becomes bigger.

**Note!** It is possible to turn off heating of the thermoblock by setting the required temperature below 25 °C (the display will show OFF - T, °C - set point). In this mode unit can be used in the cold rooms as a mixing device without thermoregulation.

The set parameters can also be changed during operation.

### Program execution

After the thermal stabilisation of the Thermo-shaker (when the set and current temperature readings become the same):

- 4.6 Insert tubes into the thermoblock sockets or place the microwell plate on the thermoblock and close the lid.
- 4.7 Press the **RPM-RUN/STOP** key (④). The thermoblock will start rotation and the timer indicator will start counting up the time interval (with 1 min precision).

**Note!** If the rotation speed is set to zero, pressing **RPM-RUN/STOP** key starts the timer but the thermoblock does not move.

- 4.8 At the end of the program (after the set time elapses) the thermoblock motion stops and the timer shows the flashing reading STOP accompanied by the repetitive sound signal until the **RPM-RUN/STOP** key is pressed.
- 4.9 If the working time is not set (or deleted) and the timer indicator in the upper line shows 00:00, pressing the **RPM-RUN/STOP** button cause the Thermo-shaker to operate continuously until the **RPM-RUN/STOP** button is pressed again.
- 4.10 If required, there is possibility to restart the timer when it is running. Press the **TIME-RUN/STOP** key once (⑤) to stop the timer. Press the **TIME-RUN/STOP** key again to restart the timer.
- 4.11 The thermoblock motion can be stopped at any time by pressing the **RPM-RUN/STOP** key. In this case the program realisation and the thermoblock motion stops and timer is set back to zero switching into the STOP mode. Press the **RPM-RUN/STOP** key to repeat the operation with the same time and speed.

**Note!** At the end of the set time period the thermoblock movement is stopped automatically, but the heating can be stopped only manually by reducing the temperature with the “▼” T, °C key (Fig. 2/3 - lower button) till the OFF sign appears in the upper line of the display.

- 4.12 At the end of operation turn OFF the unit with power switch at the rear panel and disconnect the external power supply from the mains.

# 5. Specifications

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## 5.1 Thermo-shaker PHMT provides:

- Soft, but intensive rotational stirring of the samples,
- Smooth regulation, stabilisation and indication of rotation speed (time and speed regulation)
- Even amplitude over all thermoblock,
- Setting up and indication of the required working time; shaking mode,
- Automatic stop of the rotation after the time expiration,
- Indication of the current working time,
- Setting up and indication of the required temperature over the thermoblock.

## 5.2 Operating conditions

The product is designed for operation indoors in a laboratory at altitudes up to 2000 m, with ambient temperature from +4°C to +40°C and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

## 5.3 Temperature specifications

- Temperature setting range .....+25 to +100°C
- Temperature control range .....5 above RT to +100°C
- Temperature setting resolution .....0,1°C
- Temperature stability.....±0.1°C
- Temperature accuracy
  - at +25°C .....±0.3°C
  - at +37°C .....±0.5°C
  - at +60°C .....±1.0°C
  - at +100°C .....±2.5°C
- Temperature uniformity over the thermoblock at + 37°C.....±0.1°C
- Average heating speed on PSC20 from +25°C to +100°C .....4 °C/min
- Time of thermoblock heating from +25°C to +37°C .....6 min

## 5.4 General specifications

- Speed range .....250 -1400 RPM
- Speed setting resolution .....10 RPM
- Maximal speed deviation
  - for 250 RPM.....2%
  - for 1400 RPM.....0.7 %
- Digital time setting .....1 min - 96 hrs
- Time setting resolution .....1 min
- Maximum continuous operation time.....max. 96 hours  
(recommended interval between operation sessions not less than 8 hours).
- Orbit .....2 mm
- Display .....16x2 signs, LCD
- Dimensions .....205x230x130 mm
- Input current/power consumption .....12V, 3,5 A / 42W
- External power supply ..... input AC 100-240 V 50/60Hz, output DC 12V
- Weight with thermoblock w/out external power supply, not more .....3.4 kg

Optional accessories	Description
PSC15	Thermoblock for 20 x 1.5 ml tubes
PSC29	Thermoblock for 20 x 2 ml tubes
PSC18	Thermoblock for 20 x 0.5 ml + 12 x 1.5 ml tubes
PSC32	Thermoblock for 20 x 0.2 ml + 12 x 1.5 ml tubes
PSC24	Thermoblock for 24 x 2.0ml microtubes
PSC96	Thermoblock for 96-well microplate for PCR (without skirt or with half skirt, low and high profile)

Replacement parts	Description
Rubber belt	117x5x0.6 mm

Grant is committed to a continuous programme of improvement, specifications may be changed without notice.

# 6. Guarantee and Service

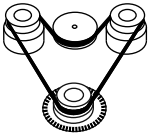
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## 6.1 Guarantee

When used in laboratory conditions and according to these working instructions, this product is guaranteed for TWO YEARS against faulty materials or workmanship.

## 6.2 Service

For service, return for repair to our Service Department in the UK or, in other countries, to our distributor.



### 6.2.1 Rubber belt replacement

1. Disconnect the external power supply from the mains.
2. Remove 4 fixation screws on the shaker bottom and remove the bottom plate.
3. Replace the rubber belt.
4. Re-assemble the unit.

# Declaration of Conformity

Manufacturer:	BIOSAN LTD. Ratsupites 7, build.2, Riga, LV-1067, Latvia
Equipment name/type number:	PHMT
Description of Equipment:	Thermo Shaker
Directives:	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC

Applied Standards	
Harmonized Standards:	<u>EN 61326-1</u> Electrical equipment for measurement, control and laboratory use General requirements  <u>EN 61010-1:</u> Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements  <u>EN 61010-2-010:</u> Particular requirements for laboratory equipment for the heating of materials.

I declare that this apparatus conforms to the requirements of the above Directive(s)

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Svetlana Bankovska  
Executive Director  
Biosan Ltd.

Dated 06.04.2011.....





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