Medical–Biological
Research & Technologies

ES-20/60

Orbital Shaker-incubator

Operating Manual
Certificate

for version:
V.2AD
V.2AE

Contents

1. 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.

GENERAL SAFETY

- Use only as specified in the operating manual provided.
- The unit should be saved from shocks and falling.
- The unit must be stored and transported only in a vertical position (see marking on the package).
- After transportation or storage keep the unit under room temperature for 2-3hrs before connecting it to the electric circuit.
- Use only cleaning and decontamination methods recommended by the manufacturer.
- Do not make modifications in 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 power switch and plug are easily accessible during use.
- Disconnect the unit from the electric circuit before moving.
- Disconnect the plug from power socket to turn off the unit.
- If liquid penetrates into the unit, disconnect it from the electric circuit and have it checked by a repair and maintenance technician.
- Do not operate the unit in premises where condensate formation is possible.

DURING OPERATION

- Do not impede the platform motion.
- Do not operate the unit in premises with aggressive or explosive chemical mixtures. Please contact manufacturer for possibility of unit operation in specific atmosphere.
- Do not use outside laboratory rooms.
- Do not place a load exceeding the maximum load value mentioned in the Specifications section of this Manual.
- Do not operate the unit if it is faulty or has been installed incorrectly.

BIOLOGICAL SAFETY

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

2. General Information

ES-20/60 Orbital Shaker-incubator for biotechnological and pharmaceutical laboratories is a professional category equipment designed for cultivation of micro organisms cells and eukaryotic cells, including animal, plant and insect cells. Shaker is equipped with a direct-drive mechanism for platform motion. It provides reliable and stable operation for the long term experiments needed for cell cultivation.

ES-20/60 Orbital Shaker-incubator provides smooth (or intensive) mixing in flasks installed on the platform. Built-in thermoresistant brushless fan provides precise temperature distribution inside the chamber (from 10°C above ambient up to +80°C). The inner chamber is made of stainless steel. State-of-the-art motor, newest thermal insulation materials used, program provided soft start of the platform motion and temperature regulation PID-control decrease the energy consumption and make the shaker-incubator highly energy efficient despite its relatively large size.

3. Getting started

3.1. 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.

Caution! Due to its size and weight (41 kg) the unit requires two people to lift or move it.

3.2. Complete set

Package contents:

Standard set

- ES-20/60 Orbital Shaker-Incubator .....1 piece
- power cord .....1 piece
- spare fuse (inside fuse holder) .....1 piece
- four screws and a wrench .....1 set
- Operating Manual; Certificate .....1 copy

Optional accessories

- P-30/100 platform ① .....on request
- P-16/250 platform ② .....on request
- P-9/500 platform ③ .....on request
- P-6/1000 platform ④ .....on request
- PP-400 platform ⑤ .....on request

3.3. Set up:

- place the unit upon even horizontal non-flammable surface at least 30 cm away from any flammable materials;

  Note! Ensure that the unit is placed on solid, level surface, which is able to support it's weight.
- remove protective film from the display;
- plug the power cord into the socket on the rear, and position the unit so that there is easy access to the power switch and plug.

3.4. Platform installation:

- remove the silicone mat from the platform;
- secure the platform on the stands on top of the unit with the four screws using the provided hex driver and cover the platform with the silicone mat.

4. Operation

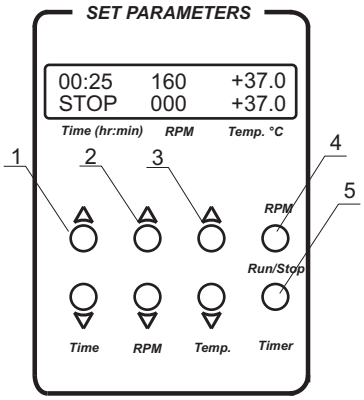


Fig.1 Control panel

4.1. Connect the unit to a grounded power socket. Set the **Power** switch on the front side to position I (ON).

4.2. The display will turn on with the upper line showing the previously set time, speed and temperature and the lower line showing current readings of the same parameters (chamber temperature °C, which automatically starts rising according to the temperature set in the upper line).

Setting the parameters

Use the readings in the upper line of the display, while setting the parameters required.

Setting time (Time)

4.3. Using the ▲ and ▼ **Time** keys (Fig. 1/1) set the required working time interval in hours and minutes (increment 1 min). Pressing the key for more than 3 sec will increase the increment.

Speed set (RPM)

4.4. Using the ▲ and ▼ **RPM** keys (Fig. 1/2) set the required shaking intensity in revolutions per minute (increment 10 rpm). Pressing the key for more than 3 sec will increase the increment.

Temperature set (Temp.°C)

4.5. Using the ▲ and ▼ **Temp.** keys (Fig. 1/3) set the required temperature (increment 0.1ºC). Pressing the key for more than 3 sec will increase the increment.

The set parameters can also be changed during operation.

Caution: The chamber heating can be turned off only by setting the temperature value below 25 °C.

Program execution

4.6. Fix the glassware with samples on the platform.

4.7. Press the **RPM-Run/Stop** key (Fig. 1/4). The platform will start rotating and the timer indicator will start counting up the time interval (with 1 min precision).

Note: If the speed is set to zero, pressing the **RPM-Run/Stop** key will start the timer, but the platform will not move.

4.8. After finishing the program (after the set time elapses) the platform motion will stop and the timer will be showing 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 (the timer indicator in the upper line shows 00:00), pressing the **RPM-Run/Stop** key will start continuous operationof the unit (with countdown timer in the lower line and indication OFF in the upper line) until the **RPM-Run/Stop** key is pressed again.

Caution: At the end of the set time period the platform movement is stopped automatically, but the heating can be stopped ONLY manually by reducing the temperature using the ▼ **Temp.** key (Fig. 1/3 - lower key) till the OFF sign appears in the upper line of the display.

4.10. The timer can be restarted during the unit operation if necessary. Press the **Timer-Run/Stop** key once (Fig. 1/5) to stop the timer. Press the **Timer-Run/Stop** key again to restart the timer.

4.11. The platform motion can be stopped at any time by pressing the **RPM-Run/Stop** key. In this case the program realisation and the platform motion will stop and the timer will switch into the STOP mode saving previously set time. Press the **RPM-Run/Stop** key to repeat the operation with the same time and speed.

4.12. At the end of operation set the **Power** switch in position O (Off). Disconnect the power cord from electric circuit.

5. Specifications

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

5.1. Temperature specification

- Temperature setting range .....+25°C ... +80 °C (increment 0.1°C)
- Temperature control range .....10°C above ambient ... +80°C
- Temperature stability .....±0.5°C
- Heat up time till max. temperature inside the flasks .....90 min

5.2. General specification

- Speed control range .....50 - 250 rpm (increment 10 rpm)
- Digital time setting .....1 min - 96 hrs (increment 1 min) / non-stop
- Maximum continuous operation time .....30 days

  Recommended interval between operation sessions not less than 8 hours
- Maximum load.....8 kg
- Orbit .....20 mm
- Display .....2x16 signs, LCD
- Dimensions .....590x525x510 mm
- Dimensions of the inner chamber .....460x350x400 mm
- Operating voltage/ power consumption .....230 V, 50/60 Hz / 450 W (2 A) or 120 V, 50/60 Hz / 450 W (4,5 A)
- Weight* .....41.1 kg

  * Accurate within ±10%.

Optional accessories	Description	Catalogue number
P-30/100	Platform with clamps for 30x100 ml flasks, working dimensions 360 x 400 mm	BS-010135-BK
P-16/250	Platform with clamps for 16x250 ml flasks, working dimensions 360 x 400 mm	BS-010135-CK
P-9/500	Platform with clamps for 9x500 ml flasks, working dimensions 360 x 400 mm	BS-010135-AK
P-6/1000	Platform with clamps for 6x1000 ml flasks, working dimensions 360 x 400 mm	BS-010135-DK
PP-400	Flat platform with non-slip silicone mat, working dimensions 360 x 400 mm	BS-010135-FK

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

6. Maintenance

6.1. If the unit requires maintenance, disconnect the unit from the electric circuit and contact Biosan or your local Biosan representative.

6.2. All maintenance and repair operations must be performed only by qualified and specially trained personnel.

6.3. **Care and Cleaning**

Standard ethanol (75%) or other cleaning agents recommended for cleaning and decontamination of the stainless steel surfaces.

The door's window is made of of organic glass (poly methyl methacrylate Plexiglass®) and is prone to scuffing and scratches if improperly cleaned. Care during cleaning of the door's window is recommended to reduce wear of the Plexiglass surface.

Caution! Clean the door's window with a mild detergent; never use organic based compounds, pure alcohol, alcohol-containing cleaners (more than 15%) or ammonia containing cleaners for Plexiglass! Do not use abrasive pads or cleansers.

For decontamination, it is recommended to use a special DNA/RNA removing solution (e.g. DNA-Exitus PlusTM, RNase-Exitus PlusTM).

The table below shows the interreaction of Plexiglass with ethyl alcohol and other solutions.

Liquid	**Interreaction with Plexiglass**
DNA-Exitus PlusTM	No reaction.
RNase-Exitus PlusTM	No reaction.
Ethyl alcohol 10-15 %	No reaction.
Ethyl alcohol 30 %	Limited reaction.
Ethyl alcohol Pure	Full reaction. Do not use!
H_2O_2 6%	No reaction.

6.4. **Fuse replacement.** Disconnect the power cord from electric circuit. Disconnect the power cable from the socket on the rear of the shaker-incubator. Open the fuse holder. Replace with the correct fuse (for 230 V, 50/60 Hz – T3.15 A, for 120 V, 50/60 Hz – T5.0 A).

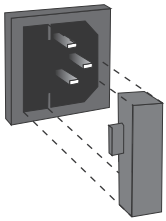


Fig.2 Fuse replacement

7. Warranty and Claims

7.1. The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.

7.2. The warranted service life of the unit from the date of its delivery to the Customer is 24 months. Contact your local distributor to check availability of extended warranty.

7.3. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim shall be compiled, certified and sent to the local distributor address. Please visit www.biosan.lv, Technical support section to obtain the claim form.

7.4. 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	ES-20/60 Orbital Shaker-incubator
Serial number	
Date of sale	

8. Declaration of Conformity

DECLARATION OF CONFORMITY

Manufacturer: **BioSan Ltd.**
Address: **Ratsupites Str., 7, build.2, Riga, LV-1067, Latvia**
Product name: **Shaker-Incubator**
Type: **ES-20/60**

We, BioSan Ltd., certify that the above mentioned product has been manufactured according to the regulations of the following European directives proven through complete compliance with the following standards:

№	Directive
Low Voltage Directive 2006/95/EC	ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS
EMC Directive 2004/108/EC	ELECTROMAGNETIC COMPATIBILITY

№	Standard
EN 61010	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1 - General requirements Part 2 -010 - Particular requirements for laboratory equipment for the heating of materials
EN 61326	Electrical equipment for measurement, control and laboratory use – EMC requirements Part 1 - General requirements

Vasily K. Bankovsky
President,
Head of R&D Department
Biosan Ltd.

Riga 15.06.2009

How to choose a proper Shaker, Rocker, Vortex

biosan
Medical–Biological
Research & Technologies

PSU-20i

ES-20/60
(with heating)

Applications:
- Microbiology
- Extraction
- Cell growing

PSU-10i

ES-20
(with heating)

MR-12

Multi Bio RS-24

Multi RS-60

Applications:
- Microbiology
- Extraction
- Cell growing

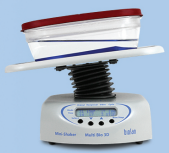
RTS-1

V-1

MR-1

Applications:
- DNA–analysis
- Genome sequence

Applications:
- Agglutination
- Extraction
- Gel staining/
  destaining



Multi Bio 3D

Applications:
- Agglutination
- Extraction
- Blot hybridisation
- Gel staining/destaining

PST-60HL
PST-100HL
(with heating)

PST-60HL-4
(with heating)

PSU-2T

Applications:
- ELISA analysis
- Hybridization

MPS-3500

TS-100 (with heating)
TS-100C (with heating
and cooling)

V-32

Volume of liquids

10^3 ... 10^2 ml

Erlenmeyer flasks, Cultivation flasks and 50 ml tubes

10^1 ml

Petri dishes, vacutainers and tubes up to 15 ml

10^0 ... 10^{-3} ml

PCR plates, microtest plates and Eppendorf type tubes

www.biosan.lv

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