

ES-20 Shaker-Incubator



Operating manual for versions
Certificate V.2AD
V.2AE

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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.
- Do not use a dropped or damaged unit.
- Store and transport the unit in a horizontal position (see package label).
- After transportation or storage and before connecting to electric circuit, keep the unit under room temperature for 2-3 h.
- 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.
- Ensure that the switch and plug are easily accessible during use.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- Disconnect the unit from electric circuit before moving. Switch the unit off and disconnect the power cord plug from power socket to disconnect the unit from electric circuit.
- If liquid penetrates into the unit, disconnect it from electric circuit and have it checked by a repair and maintenance technician.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the Specifications section.

DURING OPERATION

- Do not impede the platform motion.
- Do not load over the maximum load value mentioned in the Specifications section of these operating instructions.
- Do not leave the operating unit unattended.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures. Please contact manufacturer for possible operation of the unit in specific atmospheres.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.

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

The ES-20 is a compact desktop shaker-incubator used for mixing of biological liquids as well as incubation and cultivation of biological liquids according to the program set by the operator.

Built-in microprocessor thermocontroller provides constant temperature control in the incubator chamber. Forced heated air circulation inside the transparent Plexiglas chamber guarantees even temperature distribution. Dismountable construction makes transportation easy.

Orbital shaking is controlled by the digital tachometer (rpm) and digital timer regardless of the temperature. The unit is equipped with the direct-drive system ensuring most reliable stable long-time operation (up to 30 of 24 hour cycles).

The ES-20 is easy to operate. The two-line LCD display shows both set and actual values for temperature, time and speed.

The device consists of a thermal regulator and control block, shaking block and a Plexiglas chamber.

The elements located on the front panel:

- power switch (fig.1/❶);
- display (fig.1/❷);
- control buttons (fig.1/❸).

The elements located on the rear panel:

- shaking block control cable (fig.1/❹);
- socket for connecting the power cord (fig.1/❺);
- fuse holder (fig.1/❻).

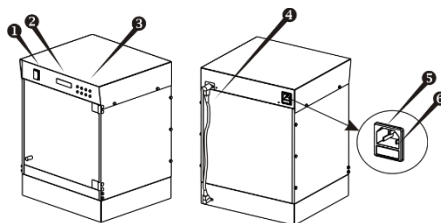


Fig.1. Overall view

Five interchangeable platform types allow using the shaker for:

- Growing cell cultures in flasks and other laboratory glassware.
- Extracting tissue samples at physiological temperatures.
- Other sample preparation processes.

The unit is applicable in all the areas of clinical, biotechnology and microbiology laboratory research.

3. Getting started

3.1. Unpacking.

Remove packing materials carefully and retain for them 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.

3.2. Complete set. Package contents:

Standard set:

- Shaker-Incubator ES-20 1 piece
- Power cord 1 piece
- Control cable 1 piece
- spare fuse (inside the fuse holder) 1 piece
- Operating manual, Certificate 1 copy
- ES-20 Shaker-Incubator Assembling Instruction 1 copy

Optional accessories:

- UP-12 platform ❶on request
- PP-4 platform ❷on request
- P-12/100 platform ❸on request
- P-6/250 platform ❹on request
- P-16/88 platform ❺on request
- HB-200 holding bar ❻on request



- 3.3. Setup.
 - Assemble the unit, using the enclosed ES-20 Orbital Incubator Shaker Assembling Instruction as a guide.
 - Place the unit on a horizontal even working surface.
 - Remove protective film from the display.
 - Connect the shaker control cable (fig.1/④) into the corresponding sockets on the rear of the thermostatic and shaking blocks.
 - Plug the mains cable into the socket on the rear (fig.1/⑤) and position the unit so that there is easy access to the power switch and connector.
- 3.4. Platform installation.
 - Install the platform by inserting the pins on the bottom side of the platform into the holes on the supporting platform on the shaker.



Note! Move the unit carefully and only in a vertical position.

4. Operation

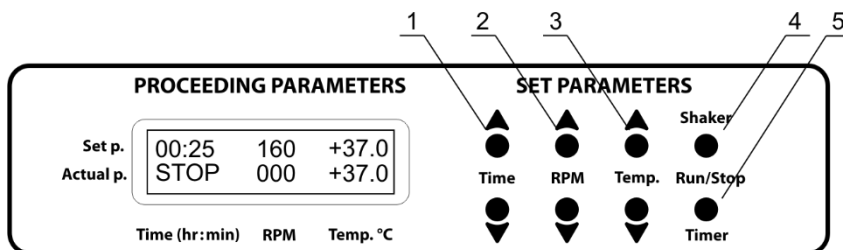


Fig.2 Control panel

- 4.1. Connect the unit to a grounded power socket. Set the **Power** switch to position I (ON).
- 4.2. The display will turn on with the upper line (**Set p.**) showing the previously set time, speed and temperature and the lower line (**Actual p.**) showing current readings of the same parameters (STOP – time, 000 – speed and incubator temperature °C, which automatically starts rising according to the temperature set in the upper line).
- 4.3. **Setting the parameters.** Use the readings in the upper line of the display (**Set p.**), while setting the parameters required. The set parameters can also be changed during operation.
 - 4.3.1. **Setting time (Time).** Using the ▲ and ▼ **Time** keys (Fig. 2/1), set the required working time interval in hours and minutes (increment - 1 min). Pressing the key for more than 3 seconds will increase the increment.
 - 4.3.2. **Setting speed (RPM).** Using the ▲ and ▼ **RPM** keys (Fig. 2/2), set the required shaking speed (increment 10 RPM). Pressing the key for more than 3 seconds will increase the increment.

- 4.3.3. **Setting temperature (Temp.°C).** Using the ▲ and ▼ **Temp.** keys (Fig. 2/3), set the required temperature (increment 0.1°C). Pressing the key for more than 3 seconds will increase the increment.



Caution! The chamber heating can be turned off only by setting the temperature value below 25 °C (the display will show OFF – Temp.°C– Set p.).

4.4. **Program execution.**

- 4.4.1. Place samples on the platform.

- 4.4.2. Press the **Shaker-Run/Stop** key (Fig. 2/4). The platform will start rotating and the timer indicator will start counting the time interval (with 1 min precision).



Note! If the rotation speed is set to zero, pressing **Shaker-Run/Stop** key starts the timer but the platform does not move.

- 4.4.3. 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 **Shaker-Run/Stop** key is pressed.



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. 2/3 – the lower key) till the OFF sign appears in the upper line of the display.

- 4.5. If the working time is not set (the timer indicator in the upper line shows 00:00), pressing the **Shaker-Run/Stop** key will start continuous operation of the unit (with countdown timer in the lower line and indication OFF in the upper line) until the **Shaker-Run/Stop** key is pressed again.

- 4.6. The timer can be reset during operation if required. Press the **Timer-Run/Stop** key twice (Fig. 2/5), first – to stop the timer, second – to restart the timer.

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

- 4.8. After finishing the operation, set the power switch, located on the rear panel of the unit, in position O (Off) and disconnect the external power supply with from electric circuit.

5. Specifications

The unit is designed for operation in cold rooms, incubators (except 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.

Temperature setting range	+25°C ... +42°C
Temperature control range *	5°C above ambient ... +42°C
Temperature setting resolution	0.1°C
Speed control range	50–250 RPM (increment 10 rpm)
Maximum load.....	2.5 kg
Orbit	10 mm
Digital time setting.....	1 min – 96 hrs (increment 1 min)
Continuous operating time, not more	30 days
	Recommended interval between operation sessions not less than 8 hours
Display	2x16 signs, LCD
Dimensions of the inner chamber	305x260x250 mm
Dimensions	340x340x435 mm
Current/power consumption	230 V, 0.7 A / 160 W or 120 V, 1.6 A / 170 W
Voltage	230 V, 50/60 Hz or 120 V, 50/60 Hz
Weight**	13.2 kg

Optional accessories	Description	Catalogue number
PP-4	Metallic flat platform with non-slip rubber mat. Working dimensions 215x215 mm	BS-010108-BK
UP-12	Universal platform with adjustable bars for different types of flasks, with non-slip rubber mat. Working dimensions 265x185 mm	BS-010108-AK
HB-200	Additional holding bar for PUP-12	BS-010108-FK
P-12/100	Platform with clamps for flasks, 100 ml (12 places). Working dimensions 250x190 mm	BS-010108-EK
P-6/250	Platform with clamps for flasks, 250 ml (6 places). Working dimensions 250x190 mm	BS-010108-DK
P-16/88	Platform with spring holders for up to 88 tubes up to 30 mm diameter (e.g. 10 ml, 15 ml, 50 ml tubes). Working dimensions 275x205x75 mm	BS-010116-BK

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

* In cold room, the unit provides stable thermostatic temperature control 30°C above room temperature.

** Accurate within ±10%.

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. Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and decontamination of the unit.
- 6.3.1. The door and side panels are made of organic glass (polymethyl methacrylate, Plexiglas®) and are prone to scuffing and scratches if improperly cleaned. Care during cleaning of the door and side panels is recommended to reduce wear of the Plexiglas surface.



Caution!

Clean the door and side panels with a mild detergent; never use organic based compounds, pure alcohol, alcohol-containing cleaners (more than 15%) or ammonia containing cleaners for Plexiglas! Do not use abrasive pads or cleansers.

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

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

Liquid	Interreaction with Plexiglas
DNA-Exitus Plus™	No reaction.
RNase-Exitus Plus™	No reaction.
Ethyl alcohol 10-15%	No reaction.
Ethyl alcohol 30%	Limited reaction
Ethyl alcohol Pure	Full reaction. Do not use!
H2O2 6%	No reaction.

- 6.4. Fuse replacement

Disconnect from electric circuit.

Remove the power plug from the rear of the unit.

Pull out the fuse holder by applying leverage in recess (A).

Remove the fuse from the holder. Check and replace with the correct fuse if necessary: for 230 V, M 1 A or for 120 V, M 2 A (type **M** - time lag: **Medium**).

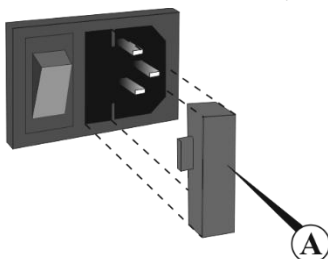


Fig.4. Fuse holder

7. Warranty and Claims. Registration

- 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 (excluding platforms mentioned in the table on page 8). For extended warranty, see p. 7.5.
- 7.3. Warranty covers only the units transported in the original package.
- 7.4. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim shall be compiled, certified and sent to the local distributor address. To obtain the claim form, visit section **Technical support** on our website at link below.
- 7.5. Extended warranty. For **ES-20**, a *Basic Plus* class model, 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.
- 7.6. 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

- 7.7. 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	ES-20, Orbital shaker-incubator
Serial number	
Date of sale	

8. EU Declaration of Conformity

EU Declaration of Conformity

Unit type	Shakers-incubators
Models	ES-20, ES-20/60
Serial number	14 digits styled XXXXXYYMMZZZZ, where XXXXXX 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/EC LVD Directive 2014/35/EC RoHS2 2011/65/EC 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. <u>LVS EN 61010-2-051: 2015</u> Particular requirements for laboratory equipment for mixing and stirring.

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



Signature

Svetlana Bankovska
Managing director

19.07.2016.

Date



Signature

Aleksandr Shevchik
Engineer of R&D

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Date

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