

Shaker-Incubator ES-20

Operating instructions

For version V.2GD



Contents

1	Safety	4
2	General Information	5
3	Getting Started	6
4	Operation of ES-20	7
5	Specifications	9
6	Guarantee and service	10
7	Declaration of Conformity	11

1. Safety

The following symbols mean:



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







GENERAL SAFETY

- ☞ Use only as specified in the operating instructions provided.
- ☞ The unit should not be used if dropped or damaged.
- ☞ The unit must be stored and transported only in an horizontal position (see marking on the package).
- ☞ After transportation or storage keep the unit under room temperature for 2–3 hrs 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.
- ☞ Ensure that the electric circuit switch and the plug are easily accessible during use.
- ☞ Disconnect the unit from the electric circuit before moving.
- ☞ Disconnect the power cord plug from power socket to turn off the unit.
- ☞ After moving the unit check the shaker control cable connections.
- ☞ Do not plug the unit into an ungrounded the power socket, and do not use an ungrounded extension lead.
- ☞ If liquid penetrates into the unit, disconnect it from the electric circuit and have it checked by a repair and maintenance technician.

DURING OPERATION

-  Do not impede the platform motion.
-  Do not operate the unit in premises with aggressive or explosive chemical mixtures.
-  Do not disconnect the shaker control cable when the unit is switched on.
-  Do not operate the unit if it is faulty or has been installed incorrectly.
-  Do not use outside laboratory rooms.
-  Do not place a load exceeding the maximum load value mentioned in the specifications section of these operating instructions.

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 plexiglass 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 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 plexiglass chamber.

The following elements are located on the front panel:

- power switch (fig. 1/①);
- display (fig. 1/②);
- control buttons (fig. 1/③).

The following elements are located on the rear panel:

- shaking block control cable (fig. 1/④);
- socket for connecting the power cord (fig. 1/⑤);

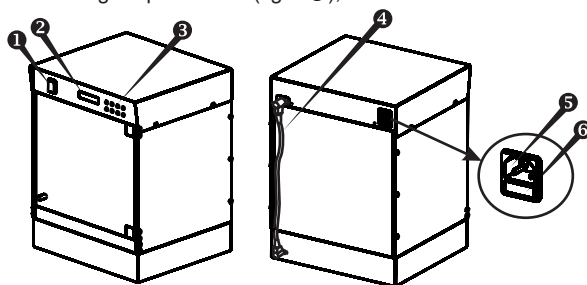


Fig.1 Unit construction

- fuse holder (fig.1/ ⑥).

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 packaging 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.

3.2 The ES-20 set includes

- Shaker-Incubator ES-201 piece
- Power cord1 piece
- Control cable1 piece
- Spare fuse1 piece
- Operating Instructions; Declaration of Conformity1 copy
- ES-20 Shaker-Incubator Assembling Instruction1 copy

Optional accessories:

- PUP-12 platform ❶on request
- PP-4 platform ❷on request
- P12-100 platform ❸on request
- P6-250 platform ❹on request
- P16-88 platform ❺on request
- HB-200 holding bar ❻on request



❶ PUP-12



❷ PP-4



❸ P12-100



❹ P6-250



❺ P16-88



❻ HB-200

3.3. Set up:

- Assemble the unit using the enclosed ES-20 Orbital Incubator Shaker Assembling Instruction as a guide;



Note! ES-20 Orbital Incubator Shaker Assembling Instruction can be found on our web page, please visit the link http://distributor.grant.co.uk/media/19989/assembling%20ES-20_en6_19102012.pdf.

- 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 of ES-20

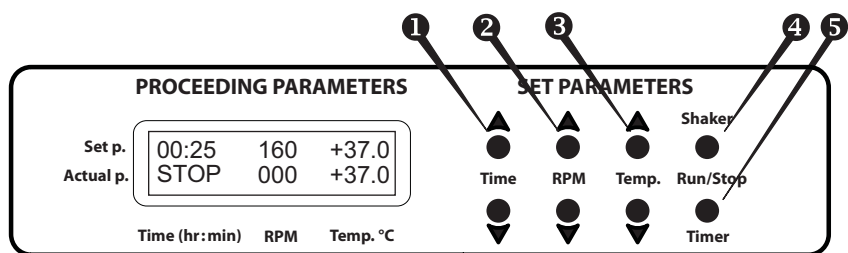


Fig.2 Control panel

- 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 – rpm, incubator 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 (Set p.), while setting the parameters required.

Setting time (Time)

- 4.3. 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 sec will increase the increment.

Setting speed (RPM)

- 4.4. Using the ▲ and ▼ **RPM** keys (Fig. 2/2) set the required shaking speed (increment 10 RPM). Pressing the key for more than 3 sec will increase the increment.

Setting temperature (Temp. °C)

- 4.5. Using the ▲ and ▼ **Temp.** keys (Fig. 2/3) set the required temperature (increment 0.1°C). Pressing the key for more than 3 sec 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.).

The set parameters can also be changed during operation.

Program execution

- 4.6. Place samples on the platform.
- 4.7. Press the **Shaker-Run/Stop** key (Fig. 2/❶). The platform will start rotating 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 **Shaker-Run/Stop** key starts the timer but the platform does 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 **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. 2/❷ – the lower key) till the OFF sign appears in the upper line of the display.

- 4.9. 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.
- 4.10. The timer can be reset during operation if required. Press the **Timer-Run/Stop** key twice (Fig. 2/❸) (first – to stop the timer, second – to restart the timer).
- 4.11. 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.
- 4.12. 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 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.

- Temperature setting range+25°C ... +42°C
- Temperature control range5°C above ambient ... +42°C
- Temperature setting resolution0.1°C
- Speed control range50–250 RPM (increment 10 rpm)
- Maximum load2.5 kg
- Orbit10 mm
- Digital time setting1 min – 96 hrs (increment 1 min)
- Continuous operating time, not more30 days
Recommended interval between operation sessions not less than 8 hours
- Display2x16 signs, LCD
- Dimensions340x340x435 mm
- Current/power consumption230 V, 0.7 A / 160 W or 120 V, 1.6 A / 170 W
- Voltage230 V, 50/60 Hz or 120 V, 50/60 Hz
- Weight*13.2 kg

* Accurate within $\pm 10\%$.

Optional accessories	Description
PP-4	Metallic flat platform with non-slip rubber mat. Working dim. 215x215 mm
PUP-12	Universal platform with adjustable bars for different types of flasks, with non-slip rubber mat. Working dim. 265x185 mm
HB-200	Additional holding bar for PUP-12
P12-100	Platform with clamps for flasks, 100 ml (12 places) Working dim. 250x190 mm
P6-250	Platform with clamps for flasks, 250 ml (6 places) Working dim. 250x190 mm
P16-88	Platform with spring holders for up to 88 tubes up to 30 mm diameter (e. g. 10 ml, 15 ml, 50 ml tubes) Working dim. 275x205x75 mm

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

6. Guarantee and Service

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

There are no user-serviceable parts inside the unit. For all maintenance and repairs (except as defined below) return to our service department in the UK or in other countries, our distributor.

Cleaning

The door and side panels are made of organic glass (polymethyl methacrylate) Plexiglass® 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 Plexiglass 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 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 Plus™, RNase-Exitus Plus™).

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

Liquid	Interreaction with Plexiglass
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!
H ₂ O ₂ 6%	No reaction.

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

Fuse replacement

Disconnect the unit from the mains. Disconnect the power cable from the socket on the rear of the shaker-incubator. Open the fuse holder (fig. 1/⑥). Replace with the correct fuse (for 230 V, – T1 A, for 120 V – T2 A).

6.3 Routine safety tests

If routine tests are to be made, we recommend a test of the integrity of the protective earth conductor and an insulation test at 500 Vdc. Routine flash tests are not recommended for any electrical equipment, because repeated high voltage tests degrade insulation materials.

Declaration of Conformity

Manufacturer:	BIOSAN LTD. Ratsupites 7, build.2, Riga, LV-1067, Latvia
Equipment name/type number:	ES-20
Description of Equipment:	Shaker Incubator
Directive:	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC

Applied Standards

Harmonized Standards:

EN 61326-1:

Electrical equipment for
measurement, control and
laboratory use EMC requirements
General requirements

EN 61010-1:

Safety requirements for electrical equipment
for measurement, control
and laboratory use.
General requirements

EN 61010-2-010:

Particular requirements for laboratory equipment
for the heating of materials.

EN 61010-2-051

Particular requirements
for laboratory equipment for mixing
and stirring

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


Svetlana Bankovska
Executive Director
Biosan Ltd.

Dated 06.04.2011



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