

**Grant-bio**

# **Environmental Shaker-Incubator ES-20**

*Operating instructions*





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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.

 Always observe the following safety precautions

 Use only as specified by the operating instructions or the intrinsic protection may be impaired.



After transport or storage in humid conditions, dry out the unit before connecting it to the supply voltage. During drying out the intrinsic protection may be impaired.

 Connect only to a power supply with a voltage corresponding to that on the serial number label.

 Ensure that the mains switch and isolating device (power supply connector) are easily accessible during use.

 Connect only to a power supply which provides a safety earth (ground) terminal.

 Do not disconnect shaker control cable when the unit is switched on.

 Before moving, disconnect at the power supply socket.

 After moving the unit check the cable shaker connections strength.

 The mains plug is the disconnection device.

 If liquid is spilt inside the unit, disconnect it from the power supply and have it checked by a competent person.

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

 Do not carry out the operation in premises with aggressive and explosive chemical mixtures;

 Do not place a load exceeding 2.5 kg on Shaker.

 As the unit is producing shaking or rotational movement, please ensure that the surface the unit is placed on is flat and stable.

 Before using any cleaning or decontamination method except those recommended by the manufacturer, user should check with the manufacturer that the proposed method will not damage the equipment.

 The unit must be stored and transported only in a horizontal position (see marking on the package).

## 2. General Information

The ES-20 is a compact bench-top shaker-incubator used for mixing of biological liquids as well as the 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 independently of the temperature. The unit is equipped with the direct-drive system ensuring most reliable stable long-time operation (up to 30 daynights).

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

The instrument is built-up of two blocks: 1) thermostating and control block and 2) shaking block.

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);
- fuse holder (fig. 1/6).

Four 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 device is applicable in all the areas of medicine, biotechnology and microbiology laboratory research.

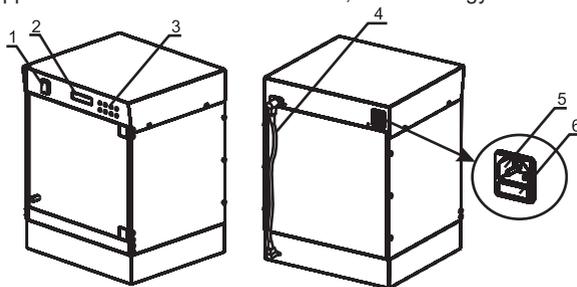


Fig.1

# 3. Getting started

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## 3.1 Unpacking

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

## 3.2 The ES-20 set includes

- Shaker-Incubator ES-20 ..... 1 piece
- Power cord ..... 1 piece
- Control cable ..... 1 piece
- Spare fuse ..... 1 piece
- Platform ..... on order
- Operating Manual; Specifications; Certificate ..... 1 copy
- Assembling scheme ..... 1 copy

## 3.3 Set up

- assemble the unit using as a guide the enclosed assembling scheme;
- connect the shaker control cable (fig.1/4) into the sockets on the rear of thermostatic and shaking blocks (see fig.1);
- plug the power cable into the socket on the rear (fig.1/5).

## 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.

# 4. Operation of ES-20

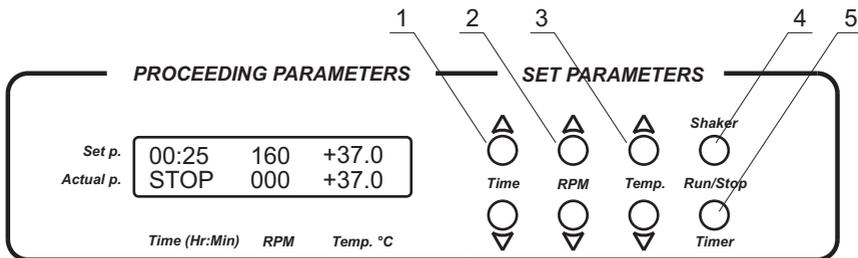


Fig.2 Control panel

- 4.1. Connect the unit to a grounded (earthed) electrical power supply with voltage and frequency within the range specified on the serial number label. Turn On the Power Switch.
- 4.2. The display will turn on with the upper line (set point) showing time, RPM and temperature set earlier and the lower line (actual point) showing current readings of the same parameters (STOP - time, 000 - RPM, thermoblock temperature °C, which automatically starts rising according to the temperature set in the upper line).

*How to set the necessary parameters.*

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

### **Reaction time (TIME)**

- 4.3. With the help of “▲” and “▼” buttons (Fig. 2/1) set the required working time interval in hours and minutes (increment - 1 min). If the button is pressed for longer time the increment becomes bigger.

### **Shaking intensity (RPM)**

- 4.4. With the help of “▲” and “▼” buttons (Fig. 2/2) set the required shaking intensity in revolutions per minute (increment 10 RPM). If the button is pressed for longer time the increment becomes bigger.

### **Reaction temperature (T,°C)**

- 4.5. With the help of “▲” and “▼” buttons (Fig. 2/3) set the necessary temperature (increment

0.1°C). If the button is pressed for longer time the increment becomes bigger.



**Attention** It is possible to turn off heating only by setting the required temperature below 25 °C (the display will show OFF - T,°C - set point).

The set parameters can also be changed during operation.

### **Program execution**

- 4.6. Place laboratory vessels on the platform.
- 4.7. Press the **Shaker-Run/Stop** button (Fig. 2/4). The platform will start rotation and the timer indicator will start counting up the time interval (with 1 min precision).

*Please note:* If the rotation speed is set to zero, pressing **Shaker-Run/Stop** button starts the timer but the platform does not move.

- 4.8. At the end of the program (after the set time elapses) the platform motion stops and the timer shows the flashing reading STOP accompanied by the repetitive sound signal until the **Shaker-Run/Stop** button 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 **Shaker-Run/Stop** button cause the unit to operate continuously until the **Shaker-Run/Stop** button is pressed again.
- 4.10. If required, there is a possibility to restart the timer when it is running. Press the **Timer-Run/Stop** button once (Fig. 2/5) to stop the timer. Press the **Timer-Run/Stop** button again to restart the timer.
- 4.11. The platform motion can be stopped at any time by pressing the **Shaker-Run/Stop** button. In this case the program realisation and the platform motion stops and timer is set back to zero switching into the STOP mode. Press the **Shaker-Run/Stop** button to repeat the operation with the same time and speed.



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 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 Power Switch. Unplug the cable from the power outlet.

# 5. Specifications

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The unit is designed for operation in closed laboratory rooms at ambient temperature from +5°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 regulation range .....+25°C ... +42 °C  
The unit provides stable thermoregulation when the set temperature is at least 5°C higher than the ambient temperature
- Temperature setting resolution .....0.1°C
- Speed range .....50 -250 RPM (increment 10 RPM)
- Continuous operating time, not more .....720 hrs
- Maximum loading .....2,5 kg
- Orbit ..... 10 mm
- Timer with sound signal .....1 min - 96 hrs (increment 1 min)
- Display .....2x16 signs, LCD
- Voltage .....230V, 50/60Hz or 115 V, 50/60 Hz
- Power .....200 W
- Dimensions .....340x340x435 mm
- Weight (with UP-12 platform), not more .....15.0 kg
- Interchangeable platforms:
  - **UP-12** Universal platform with adjustable bars for different types of flasks, bottles and beakers (w/d 270x195 mm)
  - **PP-4** Flat platform with non-slip rubber mat for Petri dishes, culture flasks, agglutinin cards (w/d 220x220 mm)
  - **P-12/100** Platform with clamps for flasks, 100-150 ml (12 places) (w/d 250x190 mm)
  - **P-6/250** Platform with clamps for flasks, 250 - 300 ml (6 places) (w/d 250x190 mm)

To improve the design manufacturer reserves the right to make changes in specification without prior 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.* Plexiglas is an organic material, which is very sensitive to different disinfecting solutions and organic solvents. Table below shows the interaction of plexiglass with ethyl alcohol which we recommend as a cleaning liquid and hydrogen peroxide which we recommend as a disinfecting liquid:

<i>Liquid</i>	<i>Interaction with plexiglass</i>
Ethyl alcohol 10 %	No reaction.
Ethyl alcohol 30 %	Limited reaction.
Ethyl alcohol Pure	Full reaction. Do not use!
H <sub>2</sub> O <sub>2</sub> 6%	No reaction.



Cleaning with ethyl alcohol higher than 30% can cause damage of plexiglass.

The control box should only be cleaned with a cloth dampened with the recommended cleaning liquid - do not wetten or allow moisture to enter the control box.

*Replacement of fuses.* Disconnect the device from the mains power supply. 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 (230V, 50/60Hz, T1A(250Vac), 115V, 50/60Hz, T2A (250Vac)).

## 6.3 Routine safety tests

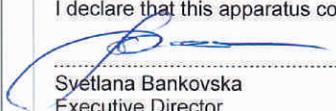
If routine tests are to be made, we recommend a test of the integrity of the protective earth conductor and an insulation test at 500 Vdc. Routine flash tests are not recommended for any electrical equipment, because repeated high voltage tests degrade insulation materials.

# 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:	<u>EN 61326-1:</u> Electrical equipment for measurement, control and laboratory use EMC requirements 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. <u>EN 61010-2-051</u> 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 06.04.2014

# Grant-bio

**Grant Instruments  
(Cambridge) Ltd**  
Shepreth,  
Cambridgeshire  
SG8 6GB

Tel: +44 (0)1763 260811  
[www.grant.co.uk](http://www.grant.co.uk)  
[sales@grant.co.uk](mailto:sales@grant.co.uk)  
Fax: +44 (0)1763 262410