

# 3D / Multi Bio 3D 3D mini-shakers





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## 1. About this edition of the operating manual

The manual applies to following models and versions of 3D mini-shakers:

- 3D                      version V.4AW
- Multi Bio 3D        version V.2AW

## 2. 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 the unit only according to this Manual.
- Save the unit from shocks or falling.
- Store and transport the unit in a horizontal position (see package label) at ambient temperatures between -20°C and +60°C and maximum relative humidity of 80%.
- After transportation or storage, keep the unit under room temperature for 2-3 hrs before connecting it to the mains.
- 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 in design of the unit.

### ELECTRICAL SAFETY

- Connect only to external power supply with voltage corresponding to that on the serial number label.
- Use only the external power supply provided with this product.
- Ensure that the external power supply is easily accessible during use.
- Disconnect the unit from the mains before moving.
- Turn off the unit by disconnecting the external power supply from the power socket.
- If liquid penetrates into the unit, disconnect it from the external power supply 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 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.
- Do not place a load exceeding the maximum load value mentioned in the Specifications section of this Manual.

### BIOLOGICAL SAFETY

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

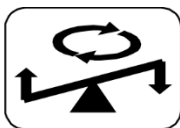
### 3. General Information

3D mini-shaker series are designed for a variety of applications: hybridization reactions, cell growth, gel staining and destaining, mixing blood samples, soft extraction and homogenization of biological components in solutions. Use of direct drive and brushless motor allows continuous mixing during up to 7 days (model 3D) and guarantees reliable operation for more than 2 years. They are compact devices with low energy consumption.

A versatile dimpled PDM mat for different size tubes can be placed on the platform, for additional stability and fixation.

Mini-Shaker provides adjustable three-dimensional smooth rotation of the platform (model 3D), whereas Multi Bio 3D provides three types of motion:

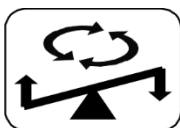
#### 3D Orbital Shaking



Combination of:

- 3D shaking;
- orbital shaking with adjustable speed from 1 to 100 rpm, with 7° pitch.

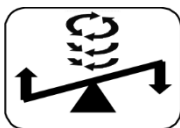
#### 3D Reciprocating Shaking



Combination of:

- 3D shaking;
- reciprocating shaking with adjustable turning angle from 0 to 360° (increment 30°), with 7° pitch, with adjustable speed from 1 to 100 rpm.

#### 3D Vibro Shaking



Intensive mixing. Combination of:

- 3D shaking;
- vibro shaking with adjustable turning angle from 0 to 5° (increment 1°), with 7° pitch.

These 3 motions are consecutively combined into a cycle and can be used:

- separately;
- in combinations by two;
- all three in one cycle (Fig. 1).

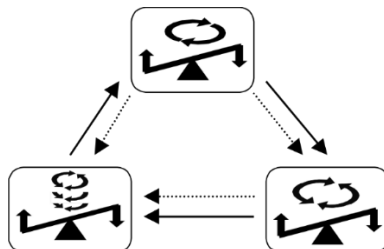


Fig.1. Innovative mixing cycle

3D Reciprocating and 3D Vibro motion types can be replaced with a pause. Each cycle can be repeated up to 125 times or run continuously.

## 4. Getting started

### 4.1. 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.

Warranty covers only the units transported in the original package.

### 4.2. Complete set. Package contents:

#### Standard set

- Mini-Shaker ..... 1 pce
- Bio PP-4S platform ❶ ..... 1 pce
- External power supply ..... 1 pce
- Operating Manual; Certificate ..... 1 copy

#### Optional accessories

- PDM optional dimpled mat ❷ ..... on request



❶ Heat resistant non-slip silicone mat on Bio PP-4S platform



❷ Dimpled mat for tubes PDM on Bio PP-4S platform

### 4.3. Setup

- place the unit on the horizontal even working surface;
- remove protective film from the display (for model Multi Bio 3D);
- plug the external power supply into the 12 V socket at the rear side of the unit.

### 4.4. Platform installation

Install the platform to the movable base by inserting the pins on the underside of the platform into the holes on the supporting platform on the movable base.

## 5. Operation

- 5.1. Working with model **3D**.
  - 5.1.1. Connect the external power supply to the electric circuit.
  - 5.1.2. Place samples on the unit platform.
  - 5.1.3. Switch on the **Power** switch (fig. 2/1).
  - 5.1.4. Use the speed control knob (fig. 2/2) to adjust the shaking speed to the required setting.
  - 5.1.5. After finishing the operation, set the shaking speed to a minimum by turning the regulator knob counter clockwise to the limit.
  - 5.1.6. Switch off the **Power** switch.
  - 5.1.7. Disconnect the external power supply from electric circuit.

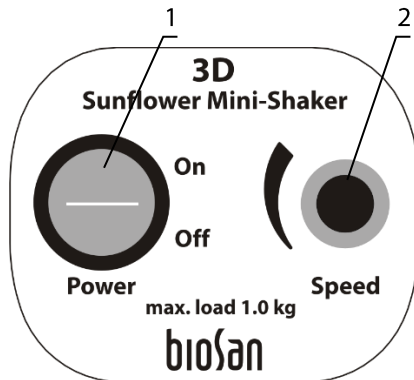


Fig. 2. Control panel of a model 3D

- 5.2. Working with model **Multi Bio 3D**.
- 5.2.1. Connect the external power supply to the mains.
- 5.2.2. Place samples on the unit platform.
- 5.2.3. Set the required program and number of cycle repetitions (see section **6. Program setting**).
- 5.2.4. Press the **Run/Stop** key (fig. 3/11) to start the program.
- 5.2.5. The platform motion begins and the corresponding indications are shown on the display: operation mode - RUN (fig. 3/10), cycle countdown (fig. 3/9) and the time countdown of current cycle (fig. 3/2, 3/5 or 3/7).
- 5.2.6. The unit stops after performing the set number of cycles (flashing indication STOP on the display) and give a sound signal about the end of operation. Press the **Run/Stop** key to stop the signal.
- 5.2.7. Press the **Run/Stop** key again to repeat the preset program.
- 5.2.8. The unit can be stopped at any time during operation before the set number of cycles is performed if necessary by pressing the **Run/Stop** key. Pressing the **Run/Stop** key again will start the program from the beginning and cycle countdown will be restarted.
- 5.2.9. If the number of cycles is not set (i.e. cycle number indicator, fig. 3/9 shows zero), pressing the **Run/Stop** key starts continuous operation of the unit until the **Run/Stop** key is pressed again.
- 5.2.10. Unplug the external power supply from the mains to turn off the unit.

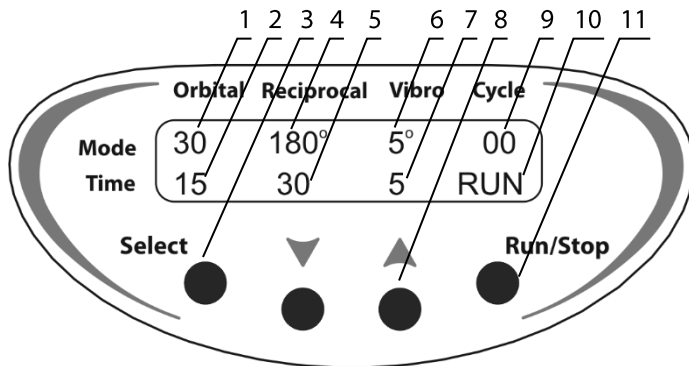


Fig. 3. Control panel of a model Multi Bio 3D



## 6. Program setting



**Note.** This section is applicable to the model **Multi Bio 3D**.

- 6.1. The program of the unit consists of cycles. Each cycle includes three different types of platform motion (3D orbital, 3D reciprocating and 3D vibro), set one after another with the duration from 0 to 250 seconds for 3D orbital and 3D reciprocal motion types and from 0 to 5 seconds for 3D vibro motion. The set cycle can be repeated from 1 to 125 times or non-stop.

	<b>Orbital</b>	<b>Reciprocal</b>	<b>Vibro</b>
1	On	On	On
2	On	Off	On
3	On	Pause	On
4	On	Off	Off
5	On	Pause	Off
6	On	Off	Pause
7	On	Pause	Pause
8	On	On	Off
9	On	On	Pause
10	Off	On	On
11	Off	Pause	On
12	Off	On	Pause
13	Off	Off	On
14	Off	On	Off

**Table 1. Possible combinations**

- 6.2. Press the **Select** key (fig. 3/3) to choose the parameter to change (the active parameter is blinking).
- 6.3. Use the ▼ and ▲ keys (fig. 3/8) to set the necessary value. Pressing the key down for more than 2 s will make the values change quickly.
- 6.4. The program can also be changed during operation: microprocessor automatically will enter the last changes into the working memory as the working program when the new cycle begins.
- 6.5. Set the speed (fig. 3/1), turning angle (fig. 3/4, fig. 3/6), time for each motion type (fig. 3/2, 3/5 and 3/7) and number of cycle repetitions (fig. 3/9).
- 6.6. If the time for a motion is set to zero, this type of motion will be skipped in the cycle.
- 6.7. You can set a pause instead of 3D reciprocal (0-250 s) or 3D vibro (0-5 s) motion. To set a pause, set the turning angle of 3D reciprocal or 3D vibro motion to zero and set the time for this motion, which will be the time of pause duration. During the operation, the platform will not move in this mode but the time will be counted down.
- 6.8. Table 1 shows different possible cycle options.

6.9. Further examples illustrate program setting for four different cycles.

6.9.1. **3D orbital** (fig. 4). Most popular kind of motion.

Set the speed (**A**, 1 - 100 rpm) and time (**B**, 1 - 250 s) of 3D orbital motion. Turn off 3D reciprocal motion by setting time of 3D reciprocal motion to zero (**C**, OFF). Turn off 3D-Vibro type motion by setting time of 3D vibro motion to zero (**D**, OFF).

Fig. 5 shows 3D orbital motion run in cycles.

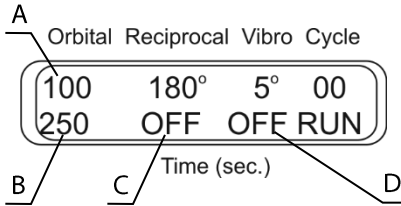


Fig. 4

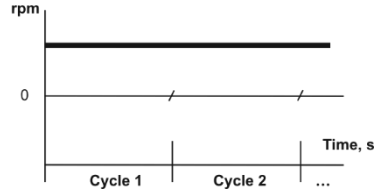


Fig. 5

6.9.2. **3D orbital + 3D reciprocal + 3D vibro** (fig. 6). Set the speed (**A**, 1 - 100 rpm) and time (**B**, 1 - 250 s) of 3D orbital motion. Set the angle (**C**, 0 - 360°) and time (**D**, 1 - 250 s) for 3D reciprocal motion. It is performed at the same speed as the orbital motion. Set the turning angle (**E**, 0-5°) and time (**F**, 1 - 5 s) for 3D vibro type motion.

Fig. 7 shows 3D orbital, 3D reciprocal and 3D vibro motions run one after another in cycles.

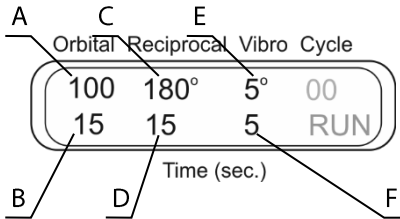


Fig. 6

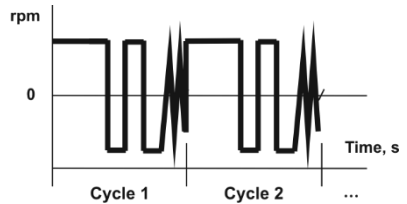


Fig. 7

6.9.3. **3D orbital + 3D reciprocal + pause** (fig. 8). Set the speed (**A**, 1 - 100 rpm) and time (**B**, 1 - 250 s) of 3D orbital motion. Set the turning angle (**C**, 0 - 360°) and time (**D**, 1 - 250 s) for 3D reciprocal motion. Set the angle of (**E**) 3D vibro type motion to zero. Set the time for 3D vibro motion (**F**, 1 - 5 s) - this is the time of pause duration.

Fig. 9 shows 3D orbital and 3D reciprocal motions and pause run one after another in cycles.

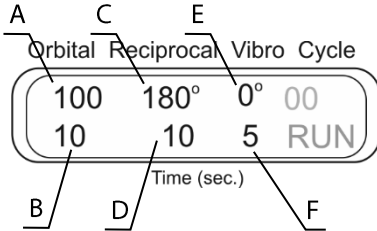


Fig. 8

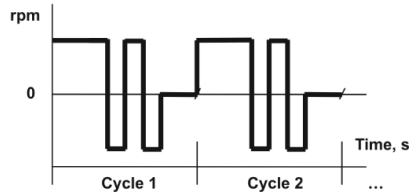


Fig. 9

6.9.4. **3D vibro + pause** (fig. 10). Turn off 3D orbital motion by setting time of 3D orbital motion to zero (**A**, OFF). Set the angle of 3D reciprocal type motion to zero (**B**). Set the time for 3D reciprocal motion (**C**, 1 - 250 s) - this is the time of pause duration. Set the turning angle (**D**, 0 - 5°) and time (**E**, 1 - 5 s) for 3D vibro type motion.

Fig. 11 shows 3D vibro motion and pause run one after another in cycles.

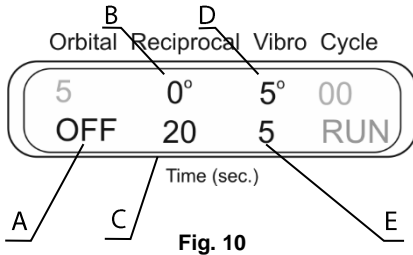


Fig. 10

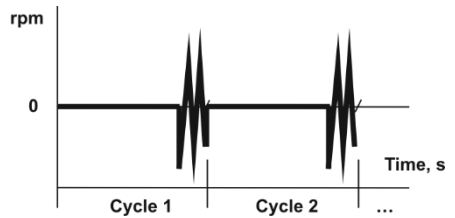


Fig. 11

## 7. Specifications

The unit is designed for operation in cold rooms, incubators (excluding CO<sub>2</sub> 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.

		<b>3D</b>	<b>Multi Bio 3D</b>
Speed control range	Orbital motion	5-60 rpm	1-100 rpm
	Reciprocating motion	-	1-100 rpm
Turning angle	Reciprocating motion	-	0°-360°
	Vibro motion	-	0°-5°
Increment	Reciprocating motion	-	30°
	Vibro motion	-	1°
Single cycle time setting	Orbital and reciprocating motion	-	0-250 s
	Vibro motion	-	0-5 s
Number of cycles		-	0-125 times
Maximum continuous operation time		168 hours	
Fixed tilt angle		7°	
Orbit		-	22 mm
Maximum load		1 kg	
Platform working area		200x200 mm	
Dimensions (w/out platform)		235x235x120 mm	235x235x140 mm
Weight*		1.2 kg	1.8 kg
Input current		12 V, 260 mA	12 V, 380 mA
Power consumption		3.1 W	4.6 W
External power supply		input AC 100-240 V 50/60 Hz, output DC 12 V	

<b>Optional accessories</b>	<b>Description</b>	<b>Catalogue number</b>
PDM	Dimpled mat for different size test tube fixation	PDM

<b>Replacement parts</b>	<b>Description</b>	<b>Catalogue number</b>
Bio PP-4S	Detachable platform with silicone mat	
Silicone mat	Non-slip heat resistant silicone mat	BS-010125-S14

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

\* Accurate within ±10%.

## **8. Maintenance**

- 8.1. If the unit requires maintenance, disconnect the unit from the mains and contact Biosan or your local Biosan representative.
- 8.2. All maintenance and repair operations must be performed only by qualified and specially trained personnel.
- 8.3. Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and decontamination of the unit.

## 9. Warranty and Claims. Registration

- 9.1. The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.
- 9.2. The warranted service life of the unit from the date of its delivery to the Customer is 24 months. For extended warranty, see p. 9.5.
- 9.3. Warranty covers only the units transported in the original package.
- 9.4. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim must 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.
- 9.5. Extended warranty.
- For **Multi Bio 3D**, a *Premium* class model, one year of extended warranty is available free of charge after registration, during 6 months from the date of sale. Online registration form can be found in section **Warranty registration** on our website at the link below.
  - For **3D**, 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.
- 9.6. 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](https://biosan.lv/en/support)

### Warranty registration



[biosan.lv/register-en](https://biosan.lv/register-en)

### Product class description



[biosan.lv/classes-en](https://biosan.lv/classes-en)

- 9.7. 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	3D / Multi Bio 3D Mini-Shaker
Serial number	
Date of sale	

## 10. EU Declaration of Conformity

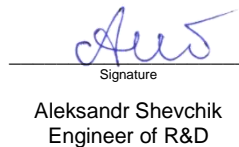
# EU Declaration of Conformity

<b>Unit type</b>	Rockers, shakers, rotators, vortexes
<b>Models</b>	<b>MR-1, MR-12; 3D, Multi Bio 3D, PSU-10i, PSU-20i, MPS-1, PSU-2T; Bio RS-24, Multi Bio RS-24, Multi RS-60; V-1 plus, V-32, MSV-3500</b>
<b>Serial number</b>	14 digits styled XXXXXYYMMZZZZ, where XXXXXX is model code, YY and MM – year and month of production, ZZZZ – unit number.
<b>Manufacturer</b>	SIA BIOSAN Latvia, LV-1067, Riga, Ratsupites str. 7/2
<b>Applicable Directives</b>	EMC Directive 2014/30/EU LVD Directive 2014/35/EU RoHS2 2011/65/EU WEEE 2012/19/EU
<b>Applicable Standards</b>	<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 61010-2-051: 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

19.07.2016  
\_\_\_\_\_  
Date

# HOW TO CHOOSE

## A PROPER SHAKER, ROCKER, VORTEX

**biosan**

Medical-Biological  
Research & Technologies

**Sample volume**  
 $10^3 \dots 10^2$  ml

Erlenmeyer flasks and  
Cultivation flasks



**Sample volume**  
 $10^1$  ml

Petri dishes, vacutainers  
and tubes up to 50 ml



**Sample volume**  
 $10^0 \dots 10^{-3}$  ml

PCR plates, microtest plates  
and Eppendorf type tubes



PSU-20i, Orbital Shaker

ES-20/60, Orbital  
Shaker-Incubator



PSU-10i,  
Orbital Shaker



ES-20, Orbital  
Shaker-Incubator



MR-12,  
Rocker-Shaker



Multi RS-60,  
Programmable rotator

Bio RS-24,  
Mini-Rotator



**NEW**

RTS-1 and RTS-1C,  
Personal bioreactors



MR-1,  
Mini Rocker-Shaker



Multi Bio 3D, Mini Shaker



Multi Bio RS-24,  
Programmable  
rotator

Applications:  
Microbiology  
Extraction  
Cell cultivation  
Hematology



V-1 plus,  
Vortex



MSV-3500,  
Multi Speed Vortex

Applications:  
Nucleic acid Analysis  
Molecular Analysis  
Protein Analysis  
Genomic Analysis



PST-60HL-4,  
Thermo-Shaker



PST-60HL,  
Thermo-Shaker



MPS-1,  
Multi Plate Shaker



PSU-2T,  
Mini-Shaker



CVP-2, Centrifuge  
vortex for PCR  
plates



V-32, Multi-Vortex



TS-100, TS-100C, Thermo-Shakers



PST-100HL,  
Thermo-Shaker

TS-DW, Thermo-  
Shaker for deep  
well plates

Applications:  
Microbiology  
Extraction  
Cell cultivation

Applications:  
ELISA Analysis  
Genomic Analysis  
Hybridization  
Immunology

Applications:  
Agglutination  
Gel staining/  
destaining

Applications:  
Agglutination  
Extraction  
Blot hybridisation  
Gel staining/destaining

**NEW**

**NEW**