

MPS-1 Multi Plate Shaker



**Operating Instructions
Certificate**

For version
V.2A01

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1. Safety precautions

The following symbols mean:



Caution: Make sure you have fully read and understood the present 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.
- Save the unit from falls and damage.
- Store and transport the unit in a horizontal position (see package label) at ambient temperatures between -20°C and $+60^{\circ}\text{C}$ and maximum relative humidity of 80%.
- After transport or storage in humid conditions and before connecting to the mains, keep the unit under room temperature for 2-3 hrs.
- 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 external power supply with voltage corresponding to that on the serial number label.
- Ensure that the external power supply 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 the mains before moving.
- If liquid penetrates into the unit, disconnect it from the mains 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 apply excessive pressure on platform sides to avoid damage to the unit.
- 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 use outside the laboratory rooms.
- Do not operate the unit if it is faulty or has been repaired incorrectly.
- Do not place a load exceeding the maximum load value mentioned in the Specifications section of this instructions.

BIOLOGICAL SAFETY

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

2. General information

MPS-1 Multi Plate Shaker for small volumes provides adjustable mixing of reagents in microplates, PCR plates, deepwell plates and test tubes from 0.2 to 2 ml. MPS-1 also features a vortex function – vortex head is integrated into the platform holder. Vortex function is available for single test tube from 0.2 to 50 ml.

The Shaker is compact, user-friendly and ideal for personal use. MPS-1 can be used in a wide range of applications, including DNA/RNA isolation and further sample preparation, pellet resuspension, ELISA.

MPS-1 High-Speed Multi Plate Shaker has 5 preprogrammed mixing modes:

- **SOFT** 1000 RPM
- **MEDIUM** 1800 RPM
- **HARD** 2600 RPM
- **TUBE VORTEX** 3200 RPM
- **CUSTOM** 300-3200 RPM (increment 100 RPM)

Please see our recommendations, how to choose the right mode for mixing of different types of plates, microtubes and strips in section 6.

Pulse mode is activated by a separate key on the front panel and features a cycle of 3 second pulses: each increasing linearly in RPM until the set speed is reached, mixes for 3 seconds, then comes to a full stop. Cycles are repeated until the timer stops. This mode provides a constant state of resuspension of particles, due to the constantly changing acceleration.

Universal platform holder accommodates microplates, skirted PCR plates and deepwell plates. Four easily interchangeable additional platforms are available for semi- or unskirted PCR plates, 0.2 ml, 0.5 ml, 1.5 ml, 2 ml test tubes and 8x0.2 ml strips.

Digital timer can be set from 15 seconds to 60 minutes. Unit stops automatically after set time has elapsed.

Multi-functional MPS-1 combines shaking and single tube vortexing function!

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. Warranty covers only the units transported in the original package.

3.2. Complete set. Package contents:

Standard set

- MPS-1, multi plate shaker with universal platform and plate holder ❶ 1 pce
- External power supply 1 pce
- Operating Instructions; Certificate 1 copy

Optional accessories

- Platform P-2/24 for 24x1.5-2 ml tubes ❷on request
- Platform P-05/32 for 32x0.5 ml tubes ❸on request
- Platform P-02/05 for 24x0.5 ml and 48x0.2 ml tubes ❹on request
- Platform P-02-96 for 96x0.2 ml tubes
or a PCR plate, semiskirted or unskirted ❺on request



❶



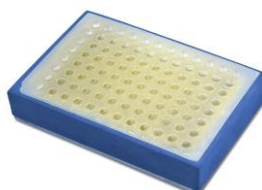
❷



❸



❹



❺

3.3. Setup:

- Place the unit upon even horizontal non-flammable surface 30 cm away from any flammable materials;
- Remove protective film from the display;
- Plug the external power supply into the socket at the rear side of the unit;

3.4. Platform or plate installation:

Install the platform or plate by inserting it in the universal platform/plate holder. Push the rear end of platform/plate into spring clamps (fig. 1/①) and finish installation by pushing from the top (fig. 1/②).

3.5. Platform or plate removal:

Remove the platform or plate by pushing the rear end of platform/plate into spring clamps (fig. 2/①) and lift the front edge up (fig. 2/②).

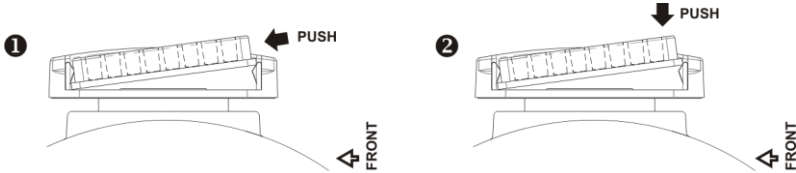


Fig. 1. Platform or plate installation

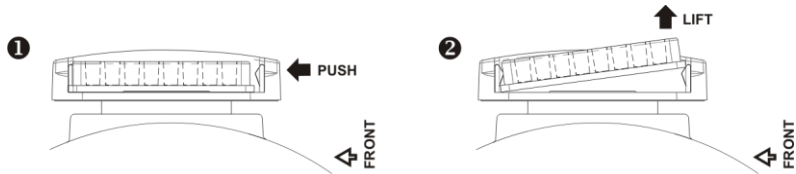


Fig. 2. Platform or plate removal

4. Operation

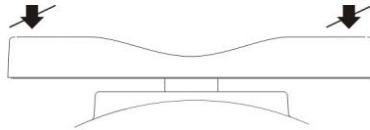
Recommendations during operation



Caution!

Please check the tubes/plates before using, be sure that they are properly sealed. Unsealed tubes or plates may spill the contents during operation causing potential health risks when working with infected material.

- It is recommended to fill the test tubes/plate wells up to 75% of the maximum fill volume for efficient mixing.
- To avoid damage to the unit, do not apply excessive pressure on platform sides.



- 4.1. Connect the external power supply to mains and turn on the power switch located on the rear panel of the unit (position I).
- 4.2. Place the plate or optional platform on the universal platform/plate holder (see 3.4.) Insert the tubes into the sockets of the optional platform.
- 4.3. **Setting the working mode.** Use the **Mode** key (fig. 3/3) to set the required working mode: CUSTOM, SOFT, MEDIUM, HARD, TUBE VORTEX. Operation in SOFT, MEDIUM, HARD and TUBE VORTEX modes differ from CUSTOM mode with a fixed, non-adjustable speed value (see paragraph 5.2).



Caution!

Please check advised mixing modes for your chosen plate or platform in section 6. **How to choose the right mode of mixing.**

We recommend to use CUSTOM mode (adjustable speed) before mixing in order to determine the optimum efficiency. Do not use HARD and TUBE VORTEX modes for microtube platforms and deepwell plates.

- 4.4. **Setting the parameters.** Press and hold the key for more than 3 s to increase the value changing rate. Set parameters are shown at the top of the display.
 - 4.4.1. Set the required working time interval in minutes and seconds (increment 15 s) using the **Time** ▲ and ▼ keys (fig. 3/2).
 - 4.4.2. When using the CUSTOM working mode, set the required speed (increment 100 RPM) using the **RPM** ▲ and ▼ keys (fig. 3/5).
- 4.5. **Operation in CUSTOM, SOFT, MEDIUM, HARD, TUBE VORTEX modes.**
 - 4.5.1. Set the working mode and time interval. When using the CUSTOM mode, set the necessary speed.
 - 4.5.2. Press the **Start Stop** key (fig. 3/4). The platform starts motion, and display shows countdown of the timer, in the upper line of the display.



Note.

Shaking speed may be adjusted in CUSTOM mode during platform rotation using the **RPM** ▲ and ▼ keys.

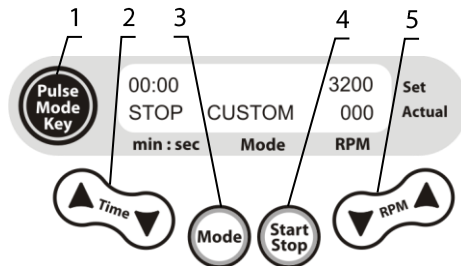


Fig. 3. Control panel

4.6. Operation in PULSE mode.

- 4.6.1. Set the required operation parameters, time and mixing mode.
- 4.6.2. Press the **Pulse Mode Key** (fig. 3/1). The platform starts the following cycle: acceleration – short mixing (duration 3 s) – slowdown. Display shows the ▲▲▲▲ indication and the timer countdown.
- 4.7. After finishing the program (after the set time elapses) the platform motion stops and display shows the flashing indication STOP, accompanied by one short sound signal (if the set time was less than 1 min) or repetitive sound signal (if the set time was greater than 1 min). Press the **Start Stop** key to turn off the signal.
- 4.8. The unit can be stopped before the set time elapses if necessary by pressing the **Start Stop** key. The program resets and the platform stops, the display shows the flashing indication STOP and set time interval. Depending on the operation mode, press either the **Start Stop** key or the **Pulse Mode Key** to repeat the operation with the same working time and speed.
- 4.9. If the working time is set to zero and the display shows 00:00, pressing either the **Start Stop** key or **Pulse Mode Key** starts continuous operation of the unit until the **Start Stop** key is pressed.
- 4.10. After finishing the operation, turn the unit off using the power switch at the rear panel (position **O**) and disconnect the external power supply from the mains.

5. Specifications

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

- 5.1. Speed control range
 CUSTOM.....300-3200 RPM (increment 100 RPM)
- 5.2. Preset shaking mode speed (fixed)
 TUBE VORTEX3200 RPM
 HARD2600 RPM
 MEDIUM.....1800 RPM
 SOFT.....1000 RPM
- 5.3. Pulse Mode acceleration-mixing-stopping cycle
- 5.4. Vortexing tube volume range 0.2 to 50 ml
- 5.5. Maximum shaking volume 30 ml
- 5.6. Maximum load 0.3 kg
- 5.7. Orbit3 mm
- 5.8. Acceleration time to maximum speed 5 s
- 5.9. Digital timer 0-60 min. (increment 15 s) / non-stop
- 5.10. Noise level, not more 65 dBA
- 5.11. Maximum continuous operation time 8 h
- 5.12. Dimensions 225x215x150 mm
- 5.13. Input current / power consumption 12 V, 800 mA / 10 W
- 5.14. External power supply in AC 100-240 V, 50/60 Hz, out DC 12 V
- 5.15. Weight* 5.1 kg

Optional platforms	Description	Catalogue number
P-2/24	Platform for 24 microtubes of 1.5-2 ml	BS-010216-AK
P-05/32	Platform for 32 microtubes of 0.5 ml	BS-010216-BK
P-02/96	Platform for 96 microtubes of 0.2 ml or PCR plate with semiskirt or unskirted	BS-010216-CK
P-02/05	Platform for 24 microtubes of 0.5 ml and 48 microtubes of 0.2 ml	BS-010216-DK

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 $\pm 10\%$

6. How to choose the right mode of mixing

- 6.1. Before mixing, we recommend to use CUSTOM mode with adjustable speed in order to determine the optimum efficiency.



Caution! Do not use HARD and TUBE VORTEX modes for tube platforms or deep well plates.

- 6.2. The available standard mixing modes for different platform/plate combinations are given in the table below.



– Efficient mixing



– Not recommended (increased sound level)



– Forbidden

Platforms	Modes		
	SOFT 1000 RPM	MEDIUM 1800 RPM	HARD 2600 RPM
Deep well plate (full), height 44 mm, volume 2000 μ l	●		
Deep well plate (full), height 29 mm, volume 500 μ l	●	●	
Immunoplate (full), height 15 mm, volume 300 μ l	●	●	●
Skirted PCR plate (full), height 15 mm, volume 200 μ l	●	●	●
Platform P-2/24 (1,5 ml tubes), 24 x 1.5 or 2 ml	●	●	
Platform P-05/32 (full), 32 x 0.5 ml	●	●	○
Platform P-02/05 (full), 24 x 0.5 ml and 48 x 0.2 ml	●	●	○
Platform P-02/96 (full), 96 x 0.2 ml or PCR plate	●	●	○

Tubes*, ml	TUBE VORTEX 3200 RPM
0.5	●
1.5	●
2.0	●
15	●
50	●

* Recommended tube fill level – 75% of maximum volume

7. Maintenance

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

Optional platforms listed in the table on page 10 in the **Specifications** section are made from ethylene-vinyl acetate (EVA) foam. To clean them, use mild soap and water with a soft cloth or sponge. Wipe excess water with an absorbent soft cloth or sponge.

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

8. Warranty and Claims. Registration

- 8.1. The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.
- 8.2. 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 10). For extended warranty, see p. 8.5.
- 8.3. Warranty covers only the units transported in the original package.
- 8.4. 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.
- 8.5. Extended warranty. For **MPS-1**, 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.
- 8.6. 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

Warranty registration



biosan.lv/register-en

Product class description



biosan.lv/classes-en

- 8.7. 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	MPS-1, Multi Plate Shaker
Serial number	
Date of sale	

9. EU Declaration of Conformity

EU Declaration of Conformity

Unit type	Rockers, shakers, rotators, vortexes
Models	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
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/EU LVD Directive 2014/35/EU RoHS2 2011/65/EU 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 61010-2-051: 2015</u> Particular requirements for laboratory equipment for mixing and stirring.

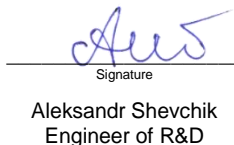
We declare that this product conforms to the requirements of the above Directives



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
10³ ... 10² ml

Erlenmeyer flasks and
Cultivation flasks



Sample volume
10¹ ml

Petri dishes, vacutainers
and tubes up to 50 ml



Sample volume
10⁰ ... 10⁻³ ml

PCR plates, microtest plates
and Eppendorf type tubes



PSU-20i, Orbital Shaker

ES-20/60, Orbital
Shaker-Incubator



Applications:
Microbiology
Extraction
Cell cultivation

PSU-10i,
Orbital Shaker



ES-20, Orbital
Shaker-Incubator



MR-12,
Rocker-Shaker

Applications:
Agglutination
Gel staining/
destaining



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

Applications:
Agglutination
Extraction
Blot hybridisation
Gel staining/
destaining



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



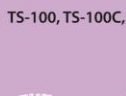
PST-60HL,
Thermo-Shaker



MPS-1,
Multi Plate Shaker



CVP-2, Centrifuge
vortex for PCR
plates



V-32, Multi-Vortex



PST-100HL,
Thermo-Shaker

TS-DW, Thermo-
Shaker for deep
well plates



NEW

Applications:
ELISA Analysis
Genomic Analysis
Hybridization
Immunology



PSU-2T,
Mini-Shaker



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

