

# MSV-3500

## Multi Speed Vortex





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## 1. About this edition of user instructions

The current edition of the user instructions applies to the following version of Multi Speed Vortex:

- **MSV-3500** ..... version V.3AW

## 2. Safety precautions



**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

- The protection provided can be ineffective if the operation of the appliance does not comply with the manufacturer's requirements.
- Save the unit from shocks and 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 and before connecting it to the electric circuit, keep the unit under room temperature for 2-3 hrs.
- According to EN 61010-2-20, a centrifuge without a lid gasket is not considered a biologically safe system and therefore cannot be used for centrifuging hazardous materials contaminated with toxic, radioactive or pathogenic microorganisms.
- Use only original parts and accessories, provided by manufacturer for this product.
- 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 the mains with voltage corresponding to that on the serial number label.
- Use only the external power supply provided with this product.
- Ensure that the power plug is easily accessible during use.
- 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 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 maximum load value mentioned in the Specifications section of this Manual.

### BIOLOGICAL SAFETY

- The user is responsible to carry out appropriate decontamination if hazardous material spills on or penetrates into the equipment.

### 3. General information

**MSV-3500 Multi Speed Vortex** is designed for soft or intensive mixing of reagents in different size and type plastic tubes. It is designed for operation in life-science laboratories working in the fields of biochemistry, cell and molecular biology.

Unit has four types of interchangeable platforms: for Eppendorf type microtest tubes, 10/15/50 ml tubes (diameter 12/16/30 mm). Platforms can be ordered separately or as one set with **MSV-3500**.

Speed and time are under microprocessor control. LCD display indicates two lines of values: the set and actual values of speed and time. Unit provides high maximum speed of platform rotation efficiently mixing microvolumes (less than 5 ml) of samples.

### 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.



**Note.** Automatic balancing system (ABS) produces a soft metal-like noise when moving the unit during unpacking or during acceleration and deceleration of the platform. It is a normal occurrence and does not indicate a fault or a loose part.

4.2. **Complete set.** Package contents:

4.2.1. Standard set:

- **MSV-3500**, Multi Speed Vortex ..... 1 pce.
- External power supply ..... 1 pce.
- Spare gasket ..... 2 pcs.
- Operating manual, declaration of conformity ..... 1 copy

4.2.2. Optional accessories:

- SV-16/8 platform .....on request
- SV-10/10 platform .....on request
- SV-8/15 platform .....on request
- SV-4/30 platform .....on request



SV-16/8



SV-10/10



SV-8/15



SV-4/30

#### 4.3. Setup.

- Place the unit on horizontal even working surface.



**Caution!** Regularly clean support suction feet for improvement of their adhesion with desk surface.

- Remove the protective film from the display.
- Connect the power cable to the external power supply.
- Connect the power cable to the socket on the rear side of the unit, and position it with easy access to the power switch and plug.

#### 4.4. Platform installation or replacement.

- Release the screw on the top of the tube mixing platform by turning it counter-clockwise.
- Lift and replace the tube mixing platform.
- Fix the screw tightly by turning it with the hand clockwise as far as it will go.



**Caution!** Improper fixation may cause platform rotation and noise from trembling at fixation point.

## 5. Operation

### Recommendations during operation

- It is recommended to fill tubes up to 75% of the rated volume for efficient mixing.

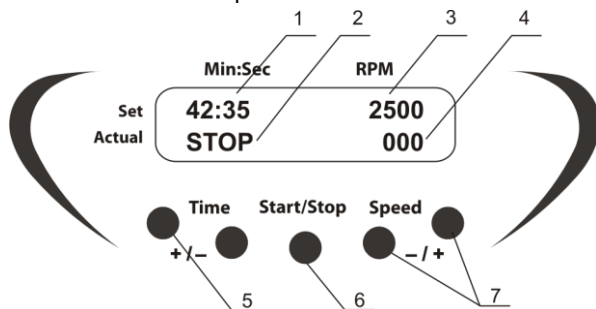


Figure 1. Control panel

- 5.1. Connect external power supply to a power socket and switch ON (I position) the power switch located on the rear panel of the unit.
- 5.2. The unit will turn on and the following readouts will be shown on the display:
  - previously set time and speed in the upper line (**Set**);
  - timer mode (STOP/RUN) and current speed in the lower line (**Actual**).
- 5.3. Place **EVEN** number of tubes filled up equally in the opposite sockets on the platform.
- 5.4. Use the **+** and **- Speed** keys (fig. 1/7) to set the required speed (increment - 100 rpm). Holding down the key for longer than 2 s increases value change speed. The set value is displayed in the upper line of the display (fig. 1/3).
- 5.5. Use the **+** and **- Time** keys (fig. 1/5) to set the required working time interval in min & sec (increment - 1 min). Holding down the key for longer than 2 s increases value change speed. The set value is displayed in the upper line of the display (fig. 1/1).

- 5.6. Press the **Start/Stop** key (fig. 1/6). The platform will start vortexing and the timer indicator will start counting the time interval in the lower line of the display - **Actual** (fig. 1/2).
- 5.7. If the working time is not set (or is reset) and the display shows 00:00, pressing the **Start/Stop** key will cause the unit to operate continuously until the **Start/Stop** key is pressed. Actual value of the platform speed is displayed in the lower line of the display (fig. 1/4)
- 5.8. After finishing of the program (after the set time elapses) the platform motion will stop and flashing reading "STOP" will appear in the lower line of the display accompanied by the repetitive sound signal until the **Start/Stop** (fig. 1/7) key is pressed.
- 5.9. The platform motion can be stopped at any time by pressing the **Start/Stop** key.
- 5.10. After finishing the operation turn the unit OFF by switching the power switch at the rear panel to O position and disconnect the external power supply from electric circuit.

## 6. Specifications

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

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

6.1.	Speed control range <sup>1</sup> .....	300–3500 rpm (increment 100 rpm)
6.2.	Speed increment .....	100 rpm
6.3.	Acceleration .....	15 s
6.4.	Orbit .....	4 mm
6.5.	Digital time setting.....	0–60 min / non-stop
6.6.	Maximum continuous operation time.....	8 hrs
6.7.	Display .....	LCD, 2 x 16 characters
6.8.	Maximum load.....	0.2 kg
6.9.	Dimensions .....	180x170x145 mm
6.10.	Input current/power consumption .....	12 V, 1 A / 12 W
6.11.	External power supply .....	input AC 100—240 V 50/60 Hz, output DC 12 V
6.12.	Weight <sup>2</sup> .....	2.6 kg

<sup>1</sup> Maximum speed depends on load, see Table 1

<sup>2</sup> Accurate within 10%

**Table 1. Maximum speed depending on load, rpm**

Platform		Tube loading volume		
		25%	50%	75%
SV-16/8	loaded 0.2 and 0.5 ml tubes	3500		
	loaded 1.5 ml tubes			
	loaded 2.0 ml tubes	3500		3400 <sup>1</sup>
	all tubes loaded			3300
SV-10/10		3500	3300	3000
SV-8/15		3500	2900	2700
SV-4/30		2500	2200	do not use

## 7. Ordering information

7.1. Models and versions available:

Model	Version	Catalogue number
MSV-3500	V.3AW	BS-010210-AAH
MSV-3500 with all platforms	V.3AW	BS-010210-TAH

7.2. To inquire about or order the optional accessories or the replacement parts, contact Biosan or your local Biosan representative.

7.3. Optional accessories:

Optional platform	Capacity	Rated tube volume, ml	Tube diameter, mm	Catalogue number
SV-4/30	4	50	30	BS-010210-AK
SV-10/10	10	10	12	BS-010210-BK
SV-16/8	16/8/8	1.5/0.5/0.2	11/8/6	BS-010210-CK
SV-8/15	8	15	16	BS-010210-DK

7.4. Replacement parts:

Replacement part	Catalogue number
Rubber gasket, see 8.4	BS010210-S10

<sup>1</sup> Immerse the tubes (2 ml, 75% volume) into the platform SV-16/8 to the level they are filled



## 8. Care and 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.
- 8.3.1. Regularly clean support suction feet for improvement of their adhesion with desk surface. To clean the support suction feet and desk surface use mild soap and water with a soft cloth or sponge. Wipe excess water from support suction feet and desk surface with an absorbent soft cloth or sponge.
- 8.4. **Gasket replacement.**
  - Disconnect the unit from the external power supply.
  - Hold the platform with one hand and turn the fixing screw counter clockwise to set platform free.
  - Remove the platform.
  - Unscrew the two screws (fig. 2/1) on the rotor.
  - Remove the platform adapter (fig. 2/2).
  - Remove the rubber gasket.
  - Install a new gasket, matching the inside of the gasket edge to the rotor groove (fig. 2/4).
  - Pull the outer side of the gasket groove (fig. 2/3) on the plastic body edge.
  - Reassemble the unit.

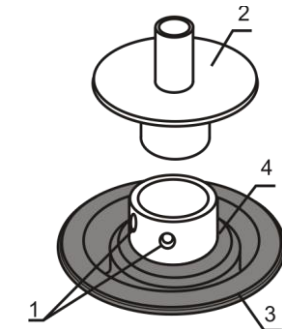


Figure 2. Gasket replacement

## 9. Warranty

- 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 **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 report shall be compiled, certified and sent to the local distributor address. To obtain the claim form, visit **Technical support** page on our website at link below.
- 9.5. Extended warranty. For **MSV-3500**, the *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)

### 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	<b>MSV-3500, Multi Speed Vortex</b>
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

**Sample volume**  
**10<sup>3</sup> ... 10<sup>2</sup> ml**

Erlenmeyer flasks and  
Cultivation flasks



**Sample volume**  
**10<sup>1</sup> ml**

Petri dishes, vacutainers  
and tubes up to 50 ml



**Sample volume**  
**10<sup>0</sup> ... 10<sup>-3</sup> 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

Applications:  
Agglutination  
Gel staining/  
destaining

Applications:  
Agglutination  
Extraction  
Blot hybridisation  
Gel staining/destaining



PST-60HL-4,  
Thermo-Shaker

PST-60HL,  
Thermo-Shaker



PST-100HL,  
Thermo-Shaker

TS-DW, Thermo-  
Shaker for deep  
well plates



**NEW**

Applications:  
ELISA Analysis  
Genomic Analysis  
Hybridization  
Immunology

MPS-1,  
Multi Plate Shaker



PSU-2T,  
Mini-Shaker

**NEW**



CVP-2, Centrifuge  
vortex for PCR  
plates

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



V-32, Multi-Vortex