Medical–Biological
Research & Technologies

MSV-3500
Multi Speed Vortex

Operating Manual for version V.3AW

Contents

1. Safety Precautions

The following symbol means:

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

- 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 to the design of the unit.

ELECTRICAL SAFETY

- Connect only to the 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 power switch and external power supply are easily accessible during use.
- Disconnect the unit from electric circuit before moving.
- Disconnect the external power supply from power socket to turn off the unit.
- 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 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.

2. 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.

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.

Caution! Automatic balancing system in this product produces a light metal-like noise when moving the unit, which is likely to be heard during unpacking and during operation (acceleration/deceleration of the platform). It is a normal occurrence and does not indicate a fault or a loose part.

3.2. **Complete set**. Package contents:

3.2.1. 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

3.2.2. Optional accessories

- SV-16/8 platform ❶ ..... on request
- SV-10/10 platform ❷ ..... on request
- SV-8/15 platform ❸ ..... on request
- SV-4/30 platform ❹ ..... on request

❶ **SV-16/8**

❷ **SV-10/10**

❸ **SV-8/15**

❹ **SV-4/30**

3.3. **Setup**.

- Place the unit on the clean, even, horizontal, working area;

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

- Remove protective film from the display;
- Plug the external power supply into the 12 V socket at the rear side of the unit.

3.4. **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.

4. Operation

Recommendations during operation

Always load the unit evenly. To keep the unit balanced insert EVEN number of tubes in the opposite sockets on the platform. The opposite tubes must be filled up equally.

- For efficient mixing, it is recommended to fill test tubes up to the volume values mentioned in the table in the Specification chapter.

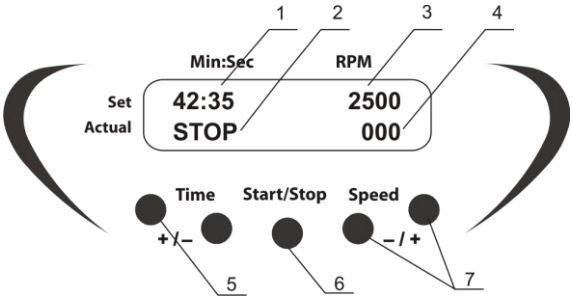

Fig.1. Control panel

4.1. Connect external power supply to a power socket and switch ON (I position) the power switch located on the rear panel of the unit.

4.2. 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**).

4.3. Place EVEN number of tubes filled up equally in the opposite sockets on the platform.

4.4. 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).

4.5. 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).

4.6. Press the **Start/Stop** key (Fig. 1/6). The platform will start vortexing and the timer indicator will start counting up the time interval in the lower line of the display - **Actual** (fig.1/2).

4.7. 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)

4.8. 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.

4.9. The platform motion can be stopped at any time by pressing the **Start/Stop** key.

4.10. 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.

5. Specifications

The unit is designed for operation in cold rooms, incubators (excluding CO_2 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.

5.1. Speed control range ..... 300 - 3500 rpm (increment 100 rpm)
Maximum speed depends on load, see Table 1
5.2. Orbit .....4 mm
5.3. Digital time setting.....0 - 60 min / non-stop
5.4. Maximum continuous operation time.....8 hrs
5.5. Display ..... LCD, 2 x 16 signs
5.6. Maximum load.....0.2 kg
5.7. Dimensions ..... 180x170x145 mm
5.8. Input current/power consumption .....12 V, 1 A / 12 W
5.9. External power supply..... input AC 100—240 V 50/60 Hz, output DC 12 V
5.10. Weight*.....2.6 kg

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

Replacement part	Catalogue number
Gasket	BS-010210-S10

Table 1. Maximum speed depending on load, RPM

Platform	Tube loading volume		
	25%	**50**%	**75**%
SV-16/8	3500		
loaded 0.5 and 0.2 ml tubes			
loaded 1.5 ml tubes			
loaded 2 ml tubes	3500		3400**
all tubes loaded			3300
SV-10/10	3500	3300	3000
SV-8/15	3500	2900	2700
SV-4/30	2500	2200	do not use

* Accurate within ±10%.

** Immerse the tubes (2 ml, 75% volume) into the platform **SV-16/8** to the level they are filled.

6. Maintenance

6.1. If the unit requires maintenance, disconnect the unit from the electric circuit and contact Biosan or your local Biosan representative.

6.2. All maintenance and repair operations must be performed only by qualified and specially trained personnel.

6.3. **Cleaning & disinfection.** Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and disinfection of the unit.

6.3.1. 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.

6.4. 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.

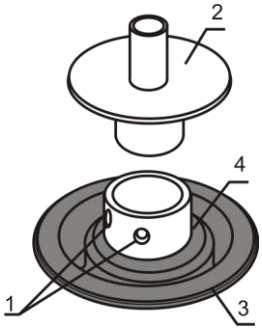

Figure 2. Gasket replacement

7. Warranty and Registration

7.1. The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.

7.2. The warranted service life of the unit from the date of its delivery to the Customer is 24 months (excluding gasket and platforms). For extended warranty, see p. **7.5**.

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

7.4. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim shall be compiled, certified and sent to the local distributor address. Please visit the **Technical support** section on our website at the link below to obtain the claim form.

7.5. Extended warranty. For **MSV-3500**, 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.

7.6. 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

Product class description

biosan.lv/classes-en

7.7. 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	MSV-3500, Multi Speed Vortex
Serial number	
Date of sale	

8. 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 XXXXXXYYMMZZZZ, 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	LVS EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements. LVS EN 61010-1: 2011 Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements. LVS EN 61010-2-051: 2015 Particular requirements for laboratory equipment for mixing and stirring.

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

Signature	Signature
Svetlana Bankovska Managing director	Aleksandr Shevchik Engineer of R&D
19.07.2016. Date	19.07.2016 Date

HOW TO CHOOSE
A PROPER SHAKER, ROCKER, VORTEX

biosan
Medical–Biological Research & Technologies

Sample volume 10^3 ... 10^2 ml
Erlenmeyer flasks and Cultivation flasks

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

Sample volume 10^1 ml
Petri dishes, vacutainers and tubes up to 50 ml

Multi RS-60, Programmable rotator

Multi Bio RS-24, Programmable rotator

Applications:
- Microbiology
- Extraction
- Cell cultivation
- Hematology

Bio RS-24, Mini–Rotator

V-1 plus, Vortex

NEW

RTS-1 and RTS-1C, Personal bioreactors

MSV-3500, Multi Speed Vortex

MR-1, Mini Rocker–Shaker

Multi Bio 3D, Mini Shaker

Applications:
- Agglutination
- Gel staining/ destaining

Applications:
- Agglutination
- Extraction
- Blot hybridisation
- Gel staining/destaining

Sample volume 10^0 ... 10^{-3} ml
PCR plates, microtest plates and Eppendorf type tubes

PST-60HL-4, Thermo–Shaker

PST-100HL, Thermo–Shaker

TS-DW, Thermo–Shaker for deep well plates

PST-60HL, Thermo–Shaker

NEW

Applications:
- ELISA Analysis
- Genomic Analysis
- Hybridization
- Immunology

Applications:
- Nucleic acid Analysis
- Molecular Analysis
- Protein Analysis
- Genomic Analysis

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

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