



Medical–Biological  
Research & Technologies

# Multi RS-60

## Programmable rotator



**Operating Manual**  
**Certificate**

for version  
V.3AY

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# 1. 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

- Save the unit from shocks or falling.
- Store and transport the unit in a horizontal position (see package label).
- After transportation or storage, keep the unit under room temperature for 2-3 h 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 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.

## 2. General Information

Multi RS-60 programmable rotator provides: 1) orbital rotational motion, 2) reciprocal motion, 3) vibro motion of the platform in different planes according to the microprocessor protocol. The protocol enables making not only programs that include mixing motion of one particular type, but also programs that alternate mixing motions of different types cyclically. There are options for setting:



**Orbital Rotational motion.** Ordinary orbital rotational motion ( $360^\circ$ ) of the platform for a duration of 0-250 s or non-stop, with speed of 1-100 rpm.



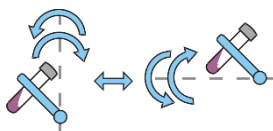
**Reciprocal motion.** Segment of reciprocal motion when the direction orbital rotational motion of the platform from the vertical plane is changing in turns within the limits of the set segment (turning angle  $1-90^\circ$  for a duration 0-250 s, or non-stop) at set speed of the Orbital rotational motion.



**Vibro motion.** Segment and duration of the Vibro motion of the platform run inside the borders of reciprocal motion segment. Turning angle  $0-5^\circ$ , duration 1-5 s. It is available only when the reciprocal motion is on.



**Pause.** Duration of the Pause runs inside the borders of reciprocal motion segment, when Vibro motion turning angle is set to  $0^\circ$ , and pause duration is 1-5 s. It is available only when the reciprocal motion is on.



**Working period** from 1 min to 24 hours or nonstop.

Reciprocal motion can be started in two modes, tube position – either **horizontal** or **vertical**.

Apart from the unique operation modes, the Multi RS-60 rotator possesses attractive miniature and elegant BioForm design and offers user-friendly interface, which provides options not only for changing the program during the operation, but also for simultaneous control over different steps of mixing protocol realization.

Multi RS-60 programmable rotator will undoubtedly provide increased methodical means to researchers working in the field of modern molecular and cell biology and the developing biodiagnostics technology based on the use of magnetic particles, for which unexpected and disturbing hydrodynamic shifts of the reactants are essential.

Multi RS-60 programmable rotator is designed for mixing biological solutions, cell suspensions, magnetic particles conjugated with specific antibodies as well as incubation and cultivation of biological liquids according to the operator set program.

The unit is applicable in all areas of laboratory research in biotechnology, microbiology, chemistry, and medicine.

### 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:

##### Standart set

- Multi RS-60 programmable rotator ..... 1 piece
- PRS-48 platform ❶ ..... 1 piece
- External power supply unit..... 1 piece
- Operating Manual; Certificate ..... 1 copy

##### Optional accessories

- PRS-8/22 platform ❷ ..... on request
- PRS-14 platform ❸ ..... on request



#### 3.3. Set up:

- place the unit on the horizontal even working 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 replacement.

- unscrew two fixing screws on the platform;
- replace the platform and install the new platform securing it with the screws;
- fix the screw tightly.

## 4. Operation

### Recommendation during operation

- Arrange the tubes symmetrically in relation to the rotation axis when loading.
- 4.1. Connect the external power supply unit to the electric circuit.
  - 4.2. Place samples on the platform: microtubes - to the end; vacutainers and tubes with caps - half way.
  - 4.3. Set the appropriate program and operation time (see the **Program Setting Section** of this Manual) according to the methodical prescriptions.
  - 4.4. Press the **Run Stop** key (Fig.1/6) to start the program.
  - 4.5. The platform motion will begin and the corresponding indication, ► (Fig.1/4), and the changing time values will be shown on the display.
  - 4.6. If the operation time is not set and the timer indicator (Fig.1/3) shows 0:00, pressing the **Run Stop** key will cause continuous operation of the rotator until the **Run Stop** key is pressed again.
  - 4.7. If the operation time is set, the platform movement stops after expiring (flashing indication ■ will be shown on the display) and sounds the end of operation (press the **Run Stop** key to stop the signal).
  - 4.8. Press the **Run Stop** key to repeat the set program.
  - 4.9. The rotator can be stopped at any time during operation before set time expires if necessary by pressing the **Run Stop** key. In this case the platform motion stops when the platform achieves starting position. Pressing the **Run Stop** key again starts the program from the beginning (countdown timer restarts).



#### Note:

A step motor is used in this model. Stopping the platform with hand briefly is allowed and will not damage the mechanical parts of the device. If the platform is stopped with hand during operation, the program does not stop and the platform motion is automatically resumed after the platform is released.

- 4.10. Disconnect the external power supply unit from electric circuit to turn off the unit.

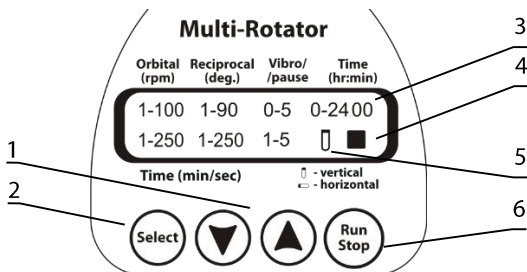


Fig. 1. Control panel

# 5. Program setting

- 5.1. The program cycle consists of several parameters that follow each other and their durations. When the last parameter is finished, the cycle starts again. Press the **Select** key (Fig. 1/2) to choose the parameter to change. The active parameter is flashing.
- 5.2. Use the **▼** and **▲** keys (Fig. 1/1) to set the necessary value. Pressing the key down for longer time will increase the increment.
- 5.3. Saving the program doesn't require additional operations: the microprocessor saves the last parameter changes as the working program automatically.
- 5.4. The countdown timer is used to control the operation time. The timer can be set for the period from 1 min to 24 hours. Timer set to 0:00 causes continual operation.

- 5.5. Press and hold the **Select** key for 4 seconds to change the reciprocal motion mode (tube position – either vertical or horizontal).

When the tube icon (Fig. 1/5) is in vertical position, reciprocal rotation starts from tubes in vertical position (platform in horizontal position).



When the tube icon is in horizontal position, reciprocal rotation starts from tubes in horizontal position (platform in vertical position).



- 5.6. The examples below show separate motion types and their available combinations in cycles. The data to the right show the possible parameter values for each type.

- 5.6.1. **Orbital rotation.** Set the speed (1-100 rpm) and time of Orbital rotation (1-250 s) and time for Reciprocal motion to zero (OFF).

Orbital (rpm)	Reciprocal (deg.)	Vibro / pause
1-100	1-90°	0-5°
1-250	OFF	OFF

- 5.6.2. **Orbital + Reciprocal.** Set the speed (1-100 rpm) and time of Orbital rotation (1-250 s). Set the turning angle (1-90° from starting position) and time (1-250 s) for Reciprocal motion. Switch off the Vibro motion by setting the time of Vibro motion to 0 (OFF).

Orbital (rpm)	Time (sec.) Reciprocal (deg.)	Vibro / pause
1-100	1-90°	1-5°
1-250	1-250	OFF

- 5.6.3. **Orbital + Reciprocal + Vibro.** Set the speed (1-100 rpm) and time (1-250 s) of Orbital rotation. Set the angle (1-90° from starting position) and time (1-250 s) for Reciprocal motion. Set the turning angle (0-5°) and time (1-5 s) for Vibro motion.

Orbital (rpm)	Time (sec.) Reciprocal (deg.)	Vibro / pause
1-100	1-90°	1-5°
1-250	1-250	1-5

Time (sec.)



**Caution!**

To avoid the platform drift while performing Vibro motion, do not load the platform over the weight that is specified in the Table 1 of the Specifications section.

Note that if the set time of Reciprocal motion is shorter or equal to the set time of Vibro motion then the Reciprocal motion will be omitted (Orbital + Vibro).

- 5.6.4. **Orbital + Reciprocal + Pause.** Set the speed (1-100 rpm) and time (1-250 s) of Orbital rotation. Set the turning angle (1-90° from starting position) and time (1-250 s) for Reciprocal motion. Set the angle of Vibro type motion to zero. Set the time for Vibro/ pause mode (1-5 s) - this is pause duration.

Orbital (rpm)	Reciprocal (deg.)	Vibro / pause
1-100	1-90°	0°
1-250	1-250	1-5

Time (sec.)

Note that if the set time of Reciprocal motion is shorter or equal to the set time of Vibro/pause mode, the Reciprocal motion will be omitted (Orbital + Pause).

- 5.6.5. **Reciprocal rotation.** Set the speed (1-100 rpm) for Orbital rotation. Set time for Orbital rotation to zero (OFF). Set the turning angle (1-90° from starting position) and time (1-250 s) of Reciprocal motion. Set the time for Vibro motion to zero (OFF).

Orbital (rpm)	Reciprocal (deg.)	Vibro / pause
1-100	1-90°	0-5°
OFF	1-250	OFF

Time (sec.)

- 5.6.6. **Reciprocal + Pause.** Set the speed (1-100 rpm) of Orbital rotation. Set time of Orbital rotation to zero (OFF). Set the angle (1-90° from starting position) and time (1 - 250 s) of Reciprocal motion. Set the time for Vibro motion type (1-5 s) - this is pause duration. Set the angle of Vibro type motion to zero.

Orbital (rpm)	Reciprocal (deg.)	Vibro / pause
1-100	1-90°	0°
OFF	1-250	1-5

Time (sec.)

- 5.6.7. **Vibro + Reciprocal.** Set the speed (1-100 rpm) of Orbital rotation. Set the time of Orbital rotation to zero (OFF). Set the angle (1-90°) and time (1-250 s) of Reciprocal motion. Set the angle (1-5°) and time (1-5 s) of Vibro type motion.

Orbital (rpm)	Reciprocal (deg.)	Vibro / pause
1-100	1-90°	0-5°
OFF	1-250	1-5

Time (sec.)

- 5.6.8. **Hard Vibro.** Set the speed (1-100 rpm) of Orbital rotation. Set the time of Orbital rotation and Vibro motion to zero (OFF). Set the angle of Reciprocal motion to 1°. Set the starting position of the tubes to horizontal (see p. 5.5.).

Orbital (rpm)	Reciprocal (deg.)	Vibro / pause
1-100	1°	1-5°
OFF	1-250	OFF

Time (sec.)



**Caution!**

To avoid the platform drift while performing Vibro or Hard Vibro motions, do not load the platform over the weight that is specified in the Table 1 of the Specifications section.



## 6. Specifications

The unit is designed for operation in cold rooms, 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.

- 6.1. Orbital rotational motion mode
  - Speed control range ..... 1-100 rpm
  - Vertical rotation movement..... overhead, 360°
  - Time setting range ..... 0-250 s
- 6.2. Reciprocal motion mode
  - Tilt angle range ..... 1°-90° (increment 1°)
  - Time setting range ..... 0-250 s
- 6.3. Vibro/pause mode
  - Tilt angle range ..... 0°-5°(increment 1°)
  - Time setting range ..... 0-5 s
- 6.4. Digital time setting ..... 1 min - 24 hours, or non-stop
- 6.5. Maximum load ..... 0.8 kg
- 6.6. Dimensions ..... 430x230x230 mm
- 6.7. Input current/power consumption ..... 24 V, 750 mA / 18 W
- 6.8. External power supply unit ... input AC 100-240V 50/60 Hz, output DC 24 V
- 6.9. Weight\* ..... 3.8 kg

**Table 1. Recommendation of maximum allowed platform load depending on motion types**

Motion type		Weight
Orbital and Reciprocal rotation		Up to 800 g
Vibro	1-2°	
	3°	Up to 400 g
	4-5°	Up to 250 g
Hard Vibro		Microtubes only

Optional accessories	Capacity	Tube volume	Tube diameter	Catalogue number
PRS-8/22 platform	8/22	max. 50 ml / 2-15 ml	20-30 / 10-16 mm	BS-010118-AK
PRS-14 platform	14	50 ml	20-30 mm	BS-010118-BK

Replacement parts	Capacity	Tube volume	Tube diameter	Catalogue number
PRS-48 platform	48	2-15 ml	10-16 mm	BS-010118-CK

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%.

## 7. Maintenance

- 7.1. If the unit requires maintenance, disconnect the unit from the mains 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.

## 8. Warranty and Claims

- 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. Contact your local distributor to check availability of extended warranty.
- 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. Please visit [www.biosan.lv](http://www.biosan.lv), Technical support section to obtain the claim form.
- 8.5. 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	Multi RS-60, Programmable rotator
Serial number	
Date of sale	

## 9. Declaration of Conformity

# Declaration of Conformity

<b>Equipment name:</b>	<b>Multi RS-60</b>
<b>Type of equipment:</b>	Programmable Rotator
<b>Directive:</b>	EMC Directive 2014/30/EC Low Voltage Directive 2014/35/EC RoHS 2011/65/EC WEEE 2002/96/EC & 2012/19/EU
<b>Manufacturer:</b>	SIA BIOSAN Ratsupites 7, build.2, Riga, LV-1067, Latvia
<b>Applied Standards:</b>	<b><u>EN 61326-1:</u></b> Electrical equipment for measurement, control and laboratory use EMC requirements. General requirements. <b><u>EN 61010-1:</u></b> Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements. <b><u>EN 61010-2-051:</u></b> Particular requirements for laboratory equipment for mixing and stirring.

We declare that this product conforms to the requirements of the above Directive(s)

  
\_\_\_\_\_  
Signature  
Svetlana Bankovska  
Managing director

28.01.2015  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Signature

Aleksandr Shevchik  
Engineer of R&D

28.01.2015  
\_\_\_\_\_  
Date

# How to Choose a Proper Shaker, Rocker, Vortex

**ES-20/60 (with heating)** **PSU-20i**

**Applications:**

- Microbiology
- Extraction
- Cell growing

**ES-20 (with heating)**

**PSU-10i**

**ES-20 (with heating)**

**MR-12**

**Applications:**

- Agglutination
- Extraction
- Gel staining/destaining

**Multi Bio RS-24**

**Multi RS-60**

**Bio RS-24**

**Applications:**

- Microbiology
- Extraction
- Cell growing

**NEW** **RTS-1C**

**MR-1**

**Applications:**

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

**Multi Bio 3D**

**Applications:**

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

**V-1**

**MSV-3500**

**Applications:**

- DNA-analysis
- Genome sequence

**V-32**

**Multi Bio RS-24**

**PST-60HL-4 (with heating)**

**PST-100HL (with heating)**

**NEW** **TS-DW**

**PST-60HL (with heating)**

**Applications:**

- ELISA analysis
- Hybridization

**PSU-2T**

**NEW** **MPS-1**

**NEW** **CVP-2**

**TS-100 (with heating)**

**TS-100C (with heating and cooling)**

## Level of liquid

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

*Erlenmeyer flasks and Cultivation flasks*

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

*Petri dishes, vacutainers and tubes up to 50 ml*

**10<sup>0</sup> ... 10<sup>-3</sup> ml**

*PCR plates, microtest plates and Eppendorf type tubes*

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