

RCP-24

Reciprocal Laboratory Homogenizer



If you have any feedback on our products or services, we would like to hear from you.
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1. About this edition of the instructions

1.1 The current edition of the user instructions applies to the following models:

Model and name	Version
RCP-24, reciprocal laboratory homogenizer	V.1AW

1.2 Edition 1.07 – March of 2023

2. Safety precautions

2.1 Symbols used in these instructions.



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.

2.2 Icons used on the unit and packaging:

	CE marking, manufacturer affirms conformity with European health, safety, and environmental protection standards, see 12.1
	WEEE directive marking, see 12.1
	Rotor protector cap marking: Before starting the operation, screw the cover tightly in a clockwise direction.
	Location of the emergency cover opening, see 5.7 .
	Remove the foam insert from below the rotor before operations.

2.3 General safety



Caution! This device has been developed and tested in accordance with CISPR 11 Class A (EN 61326-1/EN 55011). The device may cause radio interference in domestic environments and is not intended for use in residential areas. The device cannot ensure acceptable protection of radio reception in residential areas and domestic environments. If necessary, take suitable actions to eliminate the interferences.

- The protection provided by the equipment may be impaired if the equipment is used with accessories not provided or recommended by the manufacturer or used in a manner not specified by the manufacturer.
- Save the unit from shocks and falling.
- Store and transport the unit as described in the **Storage and transportation** section.
- 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.

2.4 Electrical safety

- Connect only to the mains with voltage corresponding to that on the serial number label.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- 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.

2.5 During operation

- Do not start the operation without the rotor tightened firmly and less than 2 microtubes loaded and symmetrically positioned in the inner ring of the rotor.
- Do not open the lid of the unit during operations.
- 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 lean on the unit during operation.
- Do not operate the unit if it is faulty or was installed incorrectly.
- Always fix the rotor securely. Stop the operation immediately with the Stop key if any unusual noise occurs during acceleration, which can be due to improper rotor fixation.

2.6 Biological safety

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

3. General information

Reciprocal Homogenizer **RCP-24**, a bench-top mechanical device designed for mixing, grinding, homogenizing and emulsifying biological objects in microtubes by vigorously mixing by reciprocal motion with various beads for the purpose of sample preparation for subsequent academic, pharmaceutical, biotechnological or biomedical studies.

Homogenizer facilitates the formation of a supernatant containing nucleic acids and proteins suitable for subsequent purification, extraction or analysis. The device is optimized for extracting proteins, DNA, RNA or tRNA from various tissue sources, but it can also be used for other applications. **RCP-24** performs efficient homogenization of mammalian tissue, plant tissue or other biomaterials.

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.



Caution! Due to the high weight of the unit, its unpacking and installing must be carried out by two persons.

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

4.2.1 Standard set:

- **RCP-24**, Reciprocal Laboratory Homogenizer 1 pce.
- Power cable 1 pce.
- Rotor stand..... 1 pce.
- Emergency lid opening tool (located at the rear of the unit) 1 pce.
- User instructions, declaration of conformity 1 copy

4.2.2 Optional accessories, on request:

- Ceramic 1.4 mm pre-filled bead mill tubes, sterile, set of 50 pcs. 1 pce.
- Ceramic 2.8 mm pre-filled bead mill tubes, sterile, set of 50 pcs. 1 pce.
- Glass 0.1 mm pre-filled bead mill tubes, sterile, set of 50 pcs. 1 pce.
- Glass 0.5 mm pre-filled bead mill tubes, sterile, set of 50 pcs. 1 pce.
- Stainless steel 2.4 mm pre-filled bead mill tubes, sterile, set of 50 pcs. 1 pce.



1. Rotor stand



2. Rotor
Figure 1.



3. Rotor lid

4.3 **Setup.**

- Place the unit on a stable, horizontal and even working surface, and clear 20 cm around the unit on all sides for ventilation and safety of operation.
- Connect the power cable to the socket on the rear side of the unit, position it with an easy access to the power switch and plug.
- Remove the protective foam insert from below the rotor. To open the lid, power the unit (see 5.1 and 5.2.2) or use emergency opening sequence (see 5.7).

5. Operation

5.1 Startup.

5.1.1 Attach the power cable to the mains. Switch the **Power** switch on the rear of the unit into position **I** (on).

5.1.2 The display lights up with the following indications:

- Set time (min:sec, fig. 2/1), parameter selection indicator < or > (fig. 2/2) and set speed (fig. 2/6) in the top row.
- Indication **STOP** (fig. 2/3) and current speed (fig. 2/7) in the bottom row.

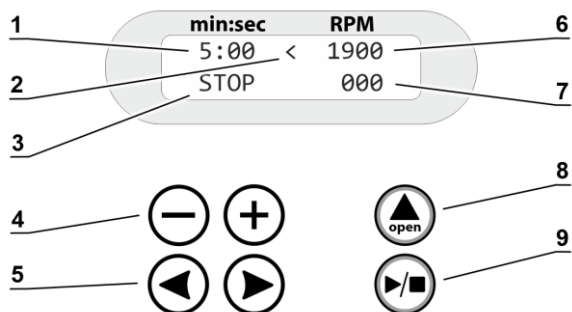


Figure 2. Control panel

5.2 Inserting the samples.

5.2.1 Add the samples to the microtubes with beads, add lysis buffer solution (if required) according to your method or Biosan's recommended homogenization parameters (see section 6).

5.2.2 Open the protective lid of the unit by pressing the ▲ **open** (fig. 2/8). Display shows the **OPEN** indication.

5.2.3 Unscrew the rotor lid (fig. 1/3), remove it, then load the samples into the rotor (fig. 1/2).



Note. If the protective foam insert is in the rotor, remove it.



Caution! Insert the first 2 tubes opposite to each other into the rotor sockets, maintaining balance. If more tubes are loaded, further symmetrical positioning in the rotor sockets is not required.

5.2.4 Tightly screw back the rotor lid.

5.2.5 Close the protective lid of the unit by pushing firmly with two hands on both sides of the lid. If the lid locking is successful, display shows the **STOP** indication.

5.3 Setting parameters.

5.3.1 Using the ◀ and ▶ **SELECT** keys (fig. 2/5), choose between time and homogenization speed. The < or > indicator (fig. 2/2) marks the selected parameter.

5.3.2 Using the + and - keys (fig. 2/4), set the time (fig. 2/1) and speed (fig. 2/6) of the operation. Hold the key pressed to change the values faster.

5.4 **Running the operation.**

- 5.4.1 Press the ►/■ **RUN/STOP** key (fig. 2/9) to start homogenization. Display shows the **RUN** indication (fig. 2/4) and current speed (fig. 2/7). Timer starts the countdown when set RPM is achieved. Speed can be changed during the operation.



Caution! If the unit stops the operation and the display shows the **IMBALANCE** indication, then, either the rotor is not fixed correctly, or the tubes are not loaded correctly, or the rotor is empty. Open the lid by pressing the ▲ **open** key and resolve the issue accordingly.

- 5.4.2 After finishing the program, the unit makes a sound signal, accompanied with a blinking indication **STOP** on the display. Press the ►/■ **RUN/STOP** key to stop the signal and return to standby mode.
- 5.4.3 The operation can be stopped at any moment by pressing the ►/■ **RUN/STOP** key. Timer resets to the starting values.
- 5.5 **Power interruption.** In case of mains/power failure, the unit is not equipped with automatic restart function, which requires the user to reinitiate the platform motion manually.

5.6 **Ending the operation.**

- 5.6.1 Press the ▲ **open** key, unscrew the rotor lid and remove it.
- 5.6.2 Remove the samples.
- 5.6.3 After finishing the operation, move the **Power** switch to position **O** (off). Disconnect the unit from the mains. The rotor and rotor lid can remain in the unit.



Note. Lid can be unlocked by pressing the ▲ **open** key only when the unit is powered. Switch on the unit as described in 5.1 or use the emergency opening method (5.7).

5.7 **Unit lid emergency opening.**

- 5.7.1 Move the **Power** switch to position **O** (off). Disconnect the unit from the mains. Wait for the rotor to stop.
- 5.7.2 Insert the included emergency tool from the holder located on the back of the unit into the emergency opening slot near the lid until a click is heard.

6. Recommended homogenization parameters

6.1 The unit is capable of lysing various samples which can be divided into 3 main groups:

- Soft tissues (plant, animal, human).
- Hard and dry tissues (bones, teeth, nails, seeds, rice, etc.).
- Microorganisms (microbes, fungi, spores, etc.).

6.2 Displayed in the table below are recommended parameters and beads for specific biomaterial homogenization:

Sample name	Bead type (material, size, density)	Setting (RPM)
Microbes (bacteria)	Glass, 0.1 mm, 2.5 g/cm ³	2000
Microbes (yeast)	Glass, 0.5 mm, 2.5 g/cm ³	
Animal soft tissues (muscle, kidney, heart, spleen, etc.)	Ceramic, 2.8 mm, 6 g/cm ³	2000
Leaves, Stems, Roots	Ceramic, 2.8 mm, 6 g/cm ³	2000
Hard and dry tissues (bones, teeth, seeds, nails)	Stainless steel, 2.4 mm, 7.9 g/cm ³	2000
Unengorged ticks	Ceramic, 1.4 mm, 6 g/cm ³	2000
Engorged ticks (fed)	Ceramic, 2.8 mm, 6 g/cm ³	2000

6.3 Common rules to follow when designing the experiment –

- As material density increases, the kinetic energy of the bead increases, thus increasing lysis efficiency.
- Higher density beads usually have a higher cost per experiment and not all samples require the highest kinetic energy for lysis.

7. Specifications

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

7.2 General specifications

Test tube rotor capacity up to 24
 Test tubes 2 ml
 Speed control range 500–2000 RPM (increment 100 RPM)
 Digital time setting 1–15 min (increment 1 min)
 Oscillation amplitude 44 mm, vertical
 Display LCD, 2 x 16 symbols
 Overall dimensions (W×D×H) 285×400×440 mm
 Weight, accurate within ±10% 19.1 kg

7.3 Electrical specifications

Input voltage and frequency 230 V~ ±10%, 50 Hz
 Power consumption 215 W
 Operating current 1.3 A

7.4 Workroom requirements

Workroom description	Cold rooms, incubators and closed laboratory rooms
Temperature range	+4 °C ... +40 °C
Humidity requirements	Maximum of 80% RH at 31 °C, decreasing linearly to 50% RH at 40 °C. Non-condensing atmosphere.
Operating height, maximum	2000 m ASL
Transient overvoltages	Up to the II category
Pollution degree	2

8. Ordering information

8.1 Models and versions available:

Model	Catalogue number
RCP-24, Reciprocal Homogenizer	BS-010701

8.2 To inquire about or order the optional accessories, contact Biosan or your local Biosan representative.

8.2.1 Optional accessories:

Description	Catalogue number
Ceramic 1.4 mm pre-filled bead mill tubes, sterile, set of 50 pcs.	BS-010701-AK
Ceramic 2.8 mm pre-filled bead mill tubes, sterile, set of 50 pcs.	BS-010701-BK
Glass 0.1 mm pre-filled bead mill tubes, sterile, set of 50 pcs.	BS-010701-EK
Glass 0.5 mm pre-filled bead mill tubes, sterile, set of 50 pcs.	BS-010701-FK
Stainless steel 2.4 mm pre-filled bead mill tubes, sterile, set of 50 pcs.	BS-010701-KK

9. Care and maintenance

9.1 Service.

9.1.1 If the unit is disabled (e.g., no rotor movement, no reaction to key presses, etc.) or requires maintenance, consult the troubleshooting table below. If the problem persists or not described, disconnect the unit from the mains and contact Biosan or your local Biosan representative.

9.1.2 All maintenance and repair operations (except listed below) must be performed only by qualified and specially trained personnel.

9.1.3 Operating integrity check. If the unit follows the procedure described in section **Operation**, then no additional checks are required.

9.1.4 Troubleshooting errors

Problem	Cause	Solution
Display not working	No mains/power connection or failure, power cable not fully connected	Check the mains/power connection. Check the fuses. Check the power cable
Lid cannot be open	The unit is still in operation	Wait for the unit to stop
	No mains/power connection or failure	Check the mains/power connection. Check the fuses. Use emergency tool to open the lid
Unit shakes when in operation	There is no rotor inside the unit, or the first two tubes are not loaded symmetrically	Stop the centrifuge and load the first two tubes symmetrically, restart the unit.
Display error - Overheated	The internal temperature of the unit is critical, and the unit must cool down	Allow the unit to cool down (at least 15 min. recommended), repeat the run.
Display error - Temperature error	The internal temperature sensor is not responding	Replace sensor
Display error - Imbalance	There is no rotor inside the unit, or the first two tubes are not loaded symmetrically	Stop the centrifuge and load the first two tubes symmetrically, restart the unit.
Microtube leakage	Too high temperature or pressure inside the microtubes	Lower experiment time

9.2 Cleaning and disinfection.

9.2.1 Use mild soap and water with a soft cloth or sponge for cleaning the exterior. Rinse remaining washing solution with distilled water. Wipe dry the excess water with clean, soft cloth or sponge.

9.2.2 To disinfect the plastic and metal parts, use 75% ethanol or DNA/RNA removing solution (e.g., Biosan PDS-250). After disinfecting, wipe the surfaces dry.

9.2.3 Rotor is autoclavable, at 121°C, for 15 min, the unit itself is not autoclavable.

- 9.3 **Fuse replacement.** Disconnect the unit and the power cable from the mains, then remove the power cable from the socket on the rear panel of the unit. Open the fuse holder (fig. 4/A). Check the fuse and replace if necessary. Fuse parameters - M 4 A (type **M** - time lag: **Medium**), rating 250 V.

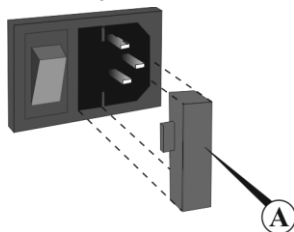


Figure 4. Fuse holder

- 9.4 **Disposal.** Disposal of the appliance requires special precautions and must be carried out at an appropriate disposal site, separate from normal household waste. To prevent pollution of the environment, all waste resulting from the disposal of the product must be collected and disposed of in the country of use, in accordance with the applicable requirements for the handling of electronic waste.

10. Storage and transportation

- 10.1 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%.
- 10.2 After transportation or storage and before connecting it to the electric circuit, keep the unit under room temperature for 2-3 hrs.
- 10.3 To transport the unit, insert the protective foam below the rotor.
- 10.4 For extended storage, no additional measures are required.

11. Warranty

- 11.1 The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.
- 11.2 The warranted service life of the unit from the date of its delivery to the Customer is 24 months. For extended warranty, see **11.5**.
- 11.3 Warranty covers only the units transported in the original package.
- 11.4 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.
- 11.5 Extended warranty. For **RCP-24**, 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.
- 11.6 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

- 11.7 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	Serial number	Date of sale
RCP-24 , Reciprocal Homogenizer		

- 11.8 **Production date.** Production date is placed in the serial number, on the label of the unit. Serial number consists of 14 digits styled XXXXXYYMMZZZZ, where XXXXXX is model code, YY and MM – year and month of production, ZZZZ – unit number.

12. EU Declaration of conformity

12.1 Reciprocal laboratory homogenizer **RCP-24** is in conformity with the following relevant Union legislations:

LVD 2014/35/EU	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.
EMC 2014/30/EU	LVS EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements.
RoHS3 2015/863/EU	Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
WEEE 2012/19/EU	Directive on waste electrical and electronic equipment.

12.2 Declaration of Conformity is available for download on the page for the relevant model on our website by link below:



[RCP-24](#)

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