

Grant-bio

Centrifuge/vortex Multi-Spin PCV-6000

Operating instructions



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1. Safety

The following symbols mean:



Caution! Read these operating instructions fully before use and pay particular attention to sections containing this symbol.

GENERAL SAFETY







- ☞ Operation of the unit must be carried out according to the given operating instructions.
- ☞ The unit should be saved from shocks or drops.
- ☞ The unit must be stored and transported only in a horizontal position (see marking on the package).
- ☞ After transport or storage allow the unit to dry out (2-3 hrs) before connecting to the mains.
- ☞ Before using any cleaning or decontamination method except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- ☞ Use only original accessories (rotors, pins, etc.) provided by the manufacturer and ordered specifically for this model.

ELECTRICAL SAFETY


- ☞ Connect only to the external power supply with a voltage corresponding to that on the serial number label.
- ☞ Use only the external power supply unit provided with this product.
- ☞ Ensure that the external power supply is easily accessible during use.
- ☞ Do not plug the unit into the mains outlet without grounding, and do not use extension lead without grounding.
- ☞ Before moving the unit, disconnect it from the mains outlet.
- ☞ To turn off the unit, disconnect the external power supply from the mains outlet.
- ☞ If liquid is spilt inside the unit, disconnect it from the external power supply and have it checked by a competent person.

DURING OPERATION

- ☞ Do not use rotors with visible signs of corrosion, wear or mechanical damage.

-  Do not fill in the tubes after they are inserted in the rotor.
-  Do not operate the unit in environments with aggressive or explosive chemical mixtures.
-  For indoor use only.
-  Do not use outside laboratory rooms.
-  Do not operate the unit if it is faulty or been incorrectly installed.
-  Do not make modifications to the design of the unit.

BIOLOGICAL SAFETY

-  It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilled on or inside the equipment.

2. General Information

Centrifuge/vortex Multi-Spin is a next step of evolution of the centrifuge/vortex CombiSpin.

Combi-Spin (the previous name Micro-Spin) was invented and for the first time published by Biol. Dr. V.Bankovskis in 1989 and after the successful approbation and finishing patented in 1994 (V.K.Bankovskis et al., Riga, Latvia, Pat. No. P94-74).

Spin-mix-spin technology automates the repeated steps of spinning down of the sample followed by vortex mixing. This cycle of repeats significantly reduces the likelihood of contamination and therefore errors in PCR analysis as well as the overall time taken for sample preparation. This cycle of successive operations aiming at reduction of errors of sample preparation for PCR analysis was called „sms algorithm” (see Table 1).

Specifications	Combispin PCV-2400	Multi-Spin PCV-3000	Multi-Spin PCV -6000
Speed range max.	2800 rpm	3500 rpm	6000 rpm
RCF max.	700 x g	800 x g	2350 x g
Number of tubes vortexing	1 individually	12 simultaneously	
Time for completing “Spin-Mix-Spin” cycle:			
for 2 microtubes	60 sec	25 sec	15 sec
for 12 microtubes	5–6 min	1 min 30 sec	1 min
for 100 microtubes	60 min	15 min	10 min

Table 1. Comparison of PCV-4200, PCV-3000 and PCV-6000

PCR reaction preparation times have traditionally been lengthy, the Multi-Spin reduces this time. Trying to achieve the same sms algorithm manually is around ten times slower (up to 30 min for 100 samples vs 30 min for 1000 samples on the Multi-Spin) and the reproducibility of results may vary due to slight differences in the vortex and centrifugation stages, a normal consequence of manual operations.

Multi-Spin is four devices combined in one:

1. Centrifuge (Maximum RCF up to 2350 × g);
2. Vortex (3 vortexing modes - soft, medium, hard; regulated time; Vortexing regulation)

- timer 1–20 sec);
3. Centrifuge/vortex;
 4. SMS-cycler for realisation of the “sms-algorithm”.

Areas of application:

- Reproducible Multi-tubes Vortexing;
- Centrifugation of samples;
- Reproducible Spin->Mix->Spin cycling;
- PCR samples premixing before thermo cycling;
- Micro sampling before enzymatic reaction;
- Cells permeabilization by chelating or hydrophobic agents for reaction *in situ*;
- Low solubility Drug testing;
- Cells washing from culture media after fermentation;
- Preparing a sample before loading in to a gel for electrophoresis;
- Magnetic beads technology.

Lid lock when centrifuge is running provides safe operation.

The external power supply unit ensures the electrical safety of the Multi-Spin.

3. Getting started

3.1. Unpacking

Remove packing materials carefully, and retain for future shipment or storage of the unit.

3.2. Complete set. The unit set includes:

Standard set:

Centrifuge/Vortex Multi-Spin PCV-6000.....	1 pce.
External power supply.....	1 pce.
Rotor fixation pin.....	1 pce.
rotor 18091 ❶.....	1 pce.
rotor 18092 ❷.....	1 pce.
Operating Instructions; Declaration of Conformity	1 copy

Optional accessories:

rotor PR2-05 ❸.....	on request
rotor PR2-05-02 ❹.....	on request
rotor PSR-16 ❺.....	on request



3.3. Set up:

- place the unit on the horizontal even working surface;
- plug the external power supply unit into the 12 V socket at the rear side of the unit.
- it is necessary to observe the safety area of 300 mm around the unit in accordance with EN-61010-2-20. Persons and hazardous materials must not be located in the safety area whilst the centrifuge is in operation.

3.4. Rotor replacement:

To change a rotor (Fig.1/②): insert the provided pin into the opening in the fixation head (Fig.1/①). Hold the rotor with one hand and turn the fixation head (using the pin as a lever) counter clockwise to set rotor free. Change the rotor and fix it properly putting back the fixation head.

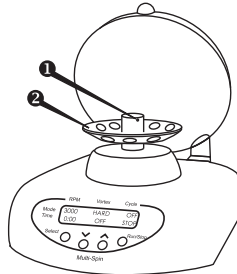


Fig.1 Rotor replacement

4. Operation

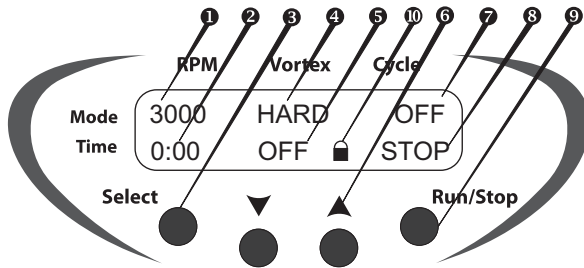
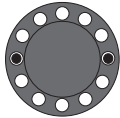


Fig.1 Control panel

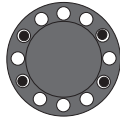
Recommendation during operation



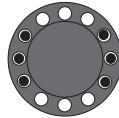
Always load the rotor evenly. To keep the rotor balanced insert **EVEN** number of equal volume tubes in rotor sockets facing one another.



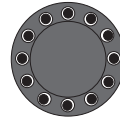
2 TUBE
ARRANGEMENT



4 TUBE
ARRANGEMENT



6 TUBE
ARRANGEMENT



FULL
ARRANGEMENT

- 4.1. Connect the external power supply to the mains.
- 4.2. Open the lid and place **EVEN** number of tubes in rotor sockets facing one another. Close the lid.
- 4.3. Parameter setting: Press **Select** key (Fig.2/⑨) to choose the parameter to change (each press of the **Select** key will sequentially activate the parameters in the cycle, the active parameter is blinking).
- 4.4. Use “▲” and “▼” keys (Fig.2/⑥) to set the necessary value (note: if the key is pressed for more than 2 sec the numerical changes quickly).
- 4.5. The program can also be changed during the operation - microprocessor automatically enters the last changes into the memory as the working program when the new cycle begins.


4.6. SMS - algorithm

- 4.6.4. Set the necessary speed of spin (increment 100 RPM, Fig.2/①).
- 4.6.5. Set the time of spin (time less than 1 min - with 1 sec increment, more than 1 min - with 1 min increment, Fig.2/②).
- 4.6.6. Set the vortexing strength (select from soft, medium and hard, Fig.2/③).
- 4.6.7. Set the time of vortexing, from 1 to 20 sec (increment 1 sec, Fig.2/④).
- 4.6.8. Set how many times the set sms - algorithm shall be repeated (from 1 till 999 times, Fig.2/⑤).

4.7. Multitube centrifugation

- 4.7.1. Set the necessary speed of spin (increment 100 RPM, Fig.2/①).
- 4.7.2. Set the time of spin (time less than 1 min - with 1 sec step, more than 1 min - with 1 min increment, Fig.2/②).
- 4.7.3. Turn off the Vortex type motion by setting the time of Vortex type motion to zero (OFF, Fig. 2/⑤). Note that the cycle counter turns off.

4.8. Multitube vortexing

- 4.8.1. Turn off the Spin motion by setting the time of Spin motion to zero (OFF, Fig. 2/②). Note that the cycle counter turns off.
 - 4.8.3. Set the vortexing strength (select from soft, medium and hard, Fig.2/③).
 - 4.8.4. Set the time of vortexing (from 1 till 20 sec, increment 1 sec, Fig.2/④).
- 4.9. Press **Run/Stop** key (Fig.2/⑥) to start the program.
 - 4.10. The rotor motion begins and the corresponding indication (RUN (Fig.2/⑧), cycle countdown (Fig.2/⑦), the changing time values (Fig.2/② or Fig.2/⑤)) and lid lock symbol  (fig.2/⑩) are shown on the display.
 - 4.11. Multi-Spin automatically stops after the set number of cycles is performed (blinking indication STOP (fig.2/⑨) on the display) and gives a sound signal about the end of operation (press **Run\Stop** key to stop the signal).
 - 4.12. For the repeated operation according to the set program press **Run\Stop** key.
 - 4.13. If necessary Multi-Spin can be stopped at any time during operation before the set number of cycles is performed by pressing **Run\Stop** key. Pressing **Run\Stop** key again will start the program from the beginning (cycle countdown will be restarted).
 - 4.14. At the end of operation unplug the external power supply from the mains.

Note! Electromechanical lid lock allows opening the lid only when the centrifuge is connected to the power supply and is turned on. Do not force the lid to open when the centrifuge is switched off!

4.15. Lid emergency opening

- 4.15.1. Disconnect the external power supply from the mains outlet and allow the centrifuge to stop.
- 4.15.2. Slide the centrifuge to the front of the bench to access the emergency opening slot on the underside of the unit (located under the front side left feet). Avoid tilting the centrifuge as this may cause spilling of the materials from the containers inside the centrifuge.
- 4.15.3. Insert a small screwdriver, or similar tool (with diameter up to 3 mm) into the emergency opening slot at 15 mm depth and move the lever from the left to the right side with one hand and simultaneously with another hand open the lid.

5. Specifications

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- Speed control range 1000 - 6000 RPM
 - Speed setting resolution 100 RPM
 - Max. RCF 2350 x g
 - Spin timer 1 sec - 30 min
 - Vortexing strength Soft, medium, hard
 - Vortexing time 0-20 sec (increment 1 sec)
 - SMS-cycle regulation 1-999 cycles
 - Safety Lid lock
 - Overall dimensions 190 x 235 x 125 mm
 - Weight with ext. power supply, not more 2.5 kg
 - Input current/power consumption DC 24V / 24 W (1 A)
 - External power supply in. AC 100-240V 50/ 60Hz, out. DC 24V
 - Operating conditions

The unit is designed for operation in cold rooms, incubators and closed laboratory rooms at ambient temperature from +4°C to +40°C and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

Optional accessories	Description
rotor PR2-05	for 8 x 2.0 ml + 8 x 0.5 ml microtest tubes
rotor PR2-05-02	for 6x2,0 ml + 6x0.5 ml + 6x0.2 ml microtest tubes
rotor PSR16	for 2 strips 8 x 0,2 ml microtubes

Replacement parts	Description
rotor 18091	for 12 x 1.5 ml microtest tubes
rotor 18092	for 12 x 0.5 + 12 x 0.2 ml microtest tubes

Grant is committed to a continuous programme of improvement, specifications may be changed without notice.

6. Guarantee and service

6.1. **Guarantee**

When used in laboratory conditions and according to these working instructions, this product is guaranteed for TWO YEARS against faulty materials or workmanship.

6.2. **Service & Maintenance**

There are no user-serviceable parts inside the unit. For all maintenance and repairs return to our service department in the UK or in other countries, our distributor.

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.

Declaration of Conformity

Manufacturer:	BIOSAN LTD. Ratsupites 7, build.2, Riga, LV-1067, Latvia
Equipment name/type number:	MSC-6000
Description of Equipment:	Centrifuge/Vortexer Multi-spin
Directive:	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC

Applied Standards	
Harmonized Standards:	EN 61326-1: Electrical equipment for measurement, Control and laboratory use - EMC requirements General requirements EN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements EN 61010-2-020: Particular requirements for laboratory centrifuges.

I declare that this apparatus conforms to the requirements of the above Directive(s)


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Syetlana Bankovska
Executive Director
Biosan Ltd.

Dated 01.08.2012

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