

**Grant bio**

# **Centrifuge/Vortex for PCR plates CVP-2**

*Operating instructions*

*For version V.1GW*



# Contents

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1. Safety Precautions.....	3
2. General Information .....	5
3. Getting started .....	6
4. Operation.....	8
5. Specifications .....	12
6. How to choose a proper adapter .....	13
7. Guarantee and service .....	14
8. Declaration of conformity .....	15

# 1. Safety Precautions

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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

- ☞ This unit is a state-of-the-art piece of equipment, which is extremely safe to operate. Nevertheless, it may lead to danger for users or others nearby if used by untrained staff, in an inappropriate way or for purposes other than those it was designed for.
- ☞ 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 2-3hrs before connecting to electric circuit.
- ☞ 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 external power supply is easily accessible during use.
- ☞ Do not plug the unit into an ungrounded mains outlet, and do not use an ungrounded extension lead.
- ☞ Disconnect the unit from the electric circuit before moving.
- ☞ Disconnect the external power supply from mains outlet 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 use rotors with visible signs of corrosion, wear or mechanical damage.
- ☞ Do not use the unit without the rotor safety cover.
- ☞ 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.
- ☞ Observe the safety area of 300 mm around the unit. Persons and hazardous materials must not be located in the safety area whilst the unit is operating.
- ☞ Do not centrifuge flammable or chemically active substances.
- ☞ Do not use outside laboratory rooms.
- ☞ Do not operate the unit if it is faulty or was installed incorrectly.
- ☞ Always fix 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.
- ☞ Use only original accessories (rotors, adapters, etc.) provided by the manufacturer and ordered specifically for this model

## BIOLOGICAL SAFETY

- ☞ According to EN 61010-2-020 a centrifuge without biological safety system is not considered a biologically safe and therefore cannot be used for centrifuging hazardous materials contaminated with toxic, radioactive or pathogenic microorganisms.
- ☞ Take additional measures if a contact of bare skin with hazardous substances is possible. Take care not to cut, puncture, or tear the gloves. Not one glove material is impervious to all substances. Disposable surgical or PVC gloves provide substantial but not complete protection. PVC gloves are probably more protective than surgical gloves, but they are stiffer and less tactile. Discard gloves after each use.
- ☞ It is the user's responsibility to carry out appropriate decontamination if hazardous material spills on or penetrates into the equipment.
- ☞ Some inner components are susceptible to contamination. Only qualified specialists, who are experienced in deactivations procedures, must perform cleaning these components for their future use.
- ☞ The user is responsible for decontaminate the unit before its decommissioning and utilization.

## 2. General Information

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After many years of Combined Centrifuge/Vortex concept success, we are proud to introduce the long awaited Centrifuge/Vortex for PCR plates, CVP-2, to the sample preparation market. The application range of CVP-2 is PCR plates: with skirts, semi-skirts or without them.

The Spin-mix-spin technology is intended to spin-down micro volumes of reagents on the well's bottom (first centrifugation spin), following mixing (mix) and spin-down the reagents again (second spin). We named this repetitive algorithm **sms**, spin-mix-spin. It aims at reducing the mistakes during sample preparation for PCR analysis. The algorithm was published for the first time and patented by Biol. Dr. V. Bankovskis (V. Bankovskis et al., Riga, Latvia, Pat. No. P94-74).

CVP-2 is a fully automatic device for reproducing **sms** for 2 PCR plates at the same time, thus saving time considerably. A must-have instrument for PCR and DNA analyses laboratory.

CVP-2 is 4 devices combined in 1:

1. Centrifuge –Maximum RCF:  $245 \times g$  (1500 rpm)
2. Vortex (regulation timer 0 – 60 s)
3. Centrifuge/Vortex
4. SMS for realization of the **sms** algorithm



# 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.

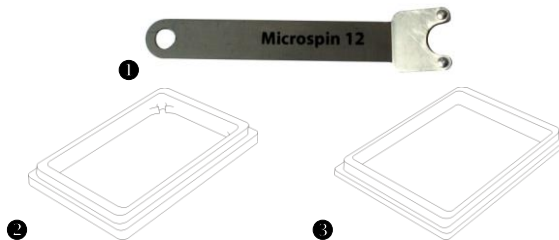
## 3.2. Standart set. Package contents:

### Standard set

- **CVP-2** Centrifuge/Vortex..... 1 pce
- **R-2MP** rotor for PCR plates with fixation nut for fastening and safety cover..... 1 pce
- **AP-96**  adapter for semi-skirted and non-skirted PCR plates, 96 wells ..... 2 pcs
- wrench for rotor removing  ..... 1 pce
- key for cover unblocking (fixed into rear panel of the unit) ..... 1 pce
- external power supply ..... 1 pce
- power cable..... 1 pce
- Operating instructions, Certificate..... 1 copy

### Optional accessories

- **AP-384**  adapter 384-well PCR plates (Eppendorf) ..... on request



### 3.3. Setup.

- place the unit on the even, stable, horizontal and clean surface;
- remove protective film from the display;
- plug the power cord into the external power supply;
- plug the external supply into the power socket on the rear of the unit and position the unit so that there is easy access to the power switch and mains outlet;
- according to EN 61010-2-20 people and hazardous materials must not be within a 300 mm area around the device during the centrifuge operation;

### 3.4. Rotor installation.

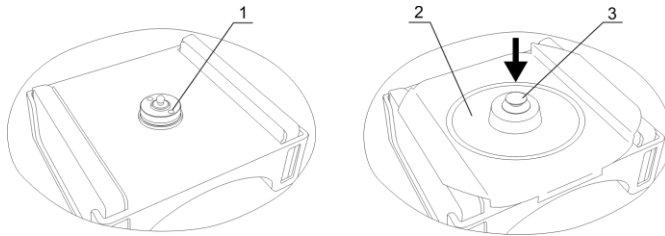
- connect the power cord to a properly grounded mains outlet. Switch on the power switch (I position) on the rear;
- press the **Open** key and open the lid by lifting it upwards by hand;
- unscrew the fixation nut (Fig. 1/1) counterclockwise using the wrench included in standard set and remove the nut.
- place the rotor and secure it tightly with the fixation nut, placing the nut with the key holes up (Fig.1/1) and turning it clockwise by the included wrench.
- place the safety cover (Fig. 1/2) on the rotor by pressing the cover clip (Fig. 1/3) down;
- close the centrifuge lid.



#### **Note!**

To close the lid, press down the middle part of the edge of the lid until the clicking sound is heard. Otherwise, the lid will not be secured properly, which will cause operation malfunction.

- turn off the centrifuge with switch on the rear (position O).

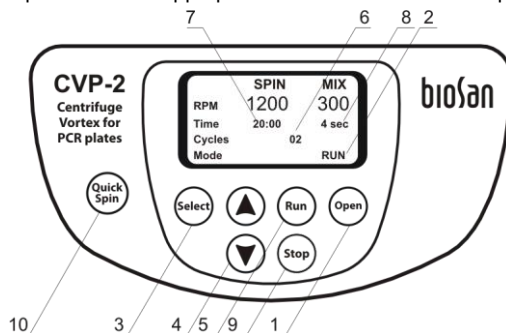


**Fig. 1. Rotor replacement**

# 4. Operation

## Recommendations during operation

- Do not use rotors with visible signs of corrosion, wear or mechanical damage. Check the rotor, buckets for any signs of wear or corrosion, and replace if necessary.
- When using semi-skirted or non-skirted PCR plates, put the plate into an appropriate adapter. Insert the plate into the rotor with the adapter. Refer to section 6. How to choose a proper adapter.
- Load both PCR plates to balance the unit during operation.
- Before operation check PCR plates and ensure that they are closed properly. Content can be spilled from open PCR plates, endangering personnel working with hazardous materials.
- For proper mixing, it is recommended to fill PCR plates not more than 75% of their nominal volume.
- Seal the microplates with an appropriate adhesive film to avoid spilling the sample.



**Fig. 2. Front panel**

- 4.1. Connect the external power supply to a properly grounded power socket. Turn on the power switch (I position) on the rear side of the unit. Lid unlocks automatically.



- 4.2. Press the **Open** key (fig. 2/1) and open the lid by lifting it upwards by hand (indication "OPEN" will appear in the Mode bottom line, fig. 2/2). Lid will open only with rotor stopped.
- 4.3. Remove the safety cover by lifting the safety cover clip.
- 4.4. Insert TWO microtest plates in rotor one opposite another.
- 4.5. Place the safety cover on the rotor and secure it by pressing the safety cover clip down tightly. Close the outer lid carefully and smoothly until the clicking sound is heard (indication "STOP" will appear in the Mode bottom line).



**Note!**

To close the lid, press down the middle part of the edge of the lid until the clicking sound is heard. Otherwise, the lid will not be secured properly, which will cause operation malfunction.

4.6. **Quick centrifugation.**

Press the **QS** (fig. 2/10) button for quick mixing / sedimentation and hold it pressed for the desired time. The unit will automatically when the **QS** button is released.

4.7. **Setting parameters.**

- 4.7.1. By pressing **Select** key (fig. 2/3) choose a parameter to change. Each pressing of the **Select** key consecutively activates parameters in operation cycle, currently active parameter is indicated by blinking.
- 4.7.2. Use ▼ and ▲ keys (fig. 2/4) for setting the corresponding values (pressing a key for longer than 2 seconds will increase change rate).
- 4.7.3. Speed (**RPM**) and spinning / mixing time (**Time**) can be changed during operation — when a new operation cycle starts, microprocessor automatically accept changes as current operation mode. Cycle count (**Cycle**) and operating mode (**Mode**) cannot be changed during operation.
- 4.7.4. **Mode** (fig. 3/1) parameter can be one of the following:
  - S.M.S.** sms-algorithm mode.
  - M.S.** alternating centrifugation and vortexing.
  - SPIN** centrifugation only.
  - MIX** vortexing only.

#### 4.8. Sms-algorithm

- 4.8.1. Select the sms-algorithm (indication **S.M.S.** of **Mode** parameter, fig. 3/1).
- 4.8.2. Set the required centrifugation speed, from 300 to 1500 rpm (increment 100 rpm, fig. 3/2).
- 4.8.3. Set the required centrifugation time, from 1 s to 30 min (increment 1 s, after 1 min - 1 min, fig. 3/3).
- 4.8.3. Set the required vortexing speed, from 300 to 1200 rpm (increment 100 rpm, fig. 3/4).
- 4.8.4. Set the required vortexing time, from 1 to 60 s (increment 1 s, fig. 3/5).
- 4.8.5. Set the required sms-algorithm cycle count, from 1 to 999 (fig. 3/6).

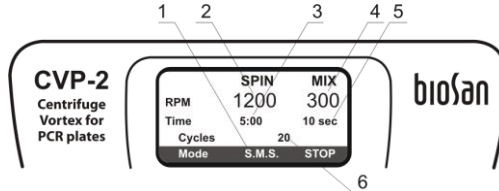


Fig. 3. Sms-algorithm

#### 4.9. Centrifugation + vortexing

- 4.9.1. Select the alternating centrifugation and vortexing algorithm (indication **M.S.** of **Mode** parameter, fig. 4/1).
- 4.9.2. Set the required centrifugation speed, from 300 to 1500 rpm (increment 100 rpm, fig. 4/2)
- 4.9.3. Set the required centrifugation time, from 1 s to 30 min (increment 1 s, after 1 min - 1 min, fig. 4/3).
- 4.9.3. Set the required vortexing speed, from 300 to 1200 rpm (increment 100 rpm, fig. 4/4).
- 4.9.4. Set the required vortexing time, from 1 to 60 s (increment 1 s, fig. 4/5).
- 4.9.5. Set the required sms-algorithm cycle count, from 1 to 999 (fig. 3/6).

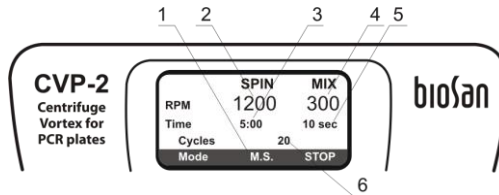


Fig. 4. Centrifugation + vortexing

#### 4.10. Centrifugation

- 4.10.1. Select the centrifugation mode (indication **SPIN** of **Mode** parameter, fig. 5/1).
- 4.10.2. Set the required centrifugation speed, from 300 to 1500 rpm (increment 100 rpm, fig. 5/2)
- 4.10.3. Set the required centrifugation time, from 1 s to 30 min (increment 1 s, after 1 min - 1 min, fig. 5/3).

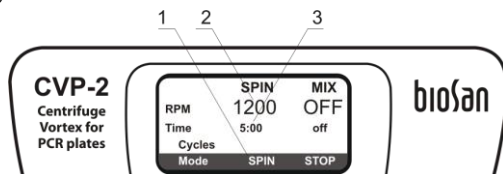


Fig. 5. Centrifugation

#### 4.11. Vortexing

- 4.11.1. Select the vortexing mode (indication **MIX** of **Mode** parameter, fig. 6/1).
- 4.11.2. Set the required vortexing speed, from 300 to 1200 rpm (increment 100 rpm, fig. 6/2).
- 4.11.3. Set the required vortexing time, from 1 to 60 s (increment 1 s, fig. 6/3).

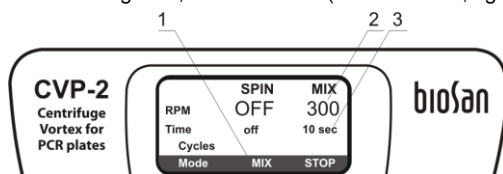


Fig. 6. Vortexing

- 4.12. Press **Run** key (fig. 2/5) to start operation.
- 4.13. Rotor will begin rotating and on the display, indication **RUN** (fig. 2/2), cycle countdown (fig. 2/6) and changing parameters of the current mode (fig. 2/7 and fig. 2/8).
- 4.14. Operation can be stopped before the set number of cycles elapses if necessary by pressing the **Stop** key (fig. 2/9).
- 4.15. Unit stops automatically after executing set number of cycles (blinking indication **STOP** (fig. 2/2) on the display) and the lid unlocks automatically. A sound signal is emitted after full stop of the rotor. Press **Stop** key (fig. 2/9) to stop the signal.
- 4.16. At the end of operation set the power switch in position **O** (OFF) on the rear. Disconnect the external power supply from electric circuit.



**Note:** The electrical lid lock allows opening the lid only when the unit is connected to the mains and is turned on.

#### 4.17. Lid emergency opening

Disconnect the power cord from external power supply unit.

Wait until the rotor stops completely.

Insert the provided lid unblocking key (found on the rear panel of the unit) into opening on the right side of the unit and press to unlock the lid.

# 5. 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.

Speed setting range	
Centrifugation .....	300 — 1500 rpm
Vortexing .....	300 — 1200 rpm
Speed setting increment .....	100 rpm
Relative centrifugal force.....	up to 245 x g
Centrifugation mode time range .....	1 s - 30 min
Centrifugation mode time increment.....	1 s; after 1 min - 1 min
Vortex mode time range .....	0 - 60 s
Vortex mode time increment.....	1 s
Number of programmable cycles.....	1 - 999 cycles
Maximum plate height .....	17 mm
Display .....	LCD, 64x128 px
Safety measures .....	Lid with a lock
Dimensions .....	285x350x190 mm
Weight* .....	6,15 kg
Operating voltage/power consumption .....	24 V, 750 mA / 18 W
External power supply input .....	in AC 100-240V 50/60 Hz, out DC 24 V

Optional accessories	Description
R-2MP	Rotor for PCR plates, with a fixator lid
AP-96	Set of 2 adapters for semiskirted and unskirted 96-well PCR plates
AP-384	Set of 2 adapters for 384-well PCR plates (Eppendorf)

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

\* Accurate within  $\pm 10\%$ .

## 6. How to choose a proper adapter

6.1. Displayed in the table below are PCR plate types in relation to available adapters.



Effective mixing  
Do not use

Plate type	No adapter	AP-96 adapter	AP-384 adapter
96-well skirted PCR plate	●		
Piko PCR plates, in frame, 4 pcs/frame	●		
96-well semi-skirted PCR plate		●	
96-well non-skirted PCR plate		●	
384-well PCR plate (Eppendorf)			●



### Warning!

PCR plate height inside an adapter should not be higher than 17 mm.

# 7. Guarantee and service

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- 7.1. When used in laboratory conditions and according to these working instructions, this product is guaranteed for TWO YEARS against faulty materials or workmanship. For full details of the Grant Bio Warranty policy please contact Grant Instruments.
- 7.2. Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and disinfection of the unit.

Follow these steps for cleaning the rotor:

- to open a powered unit, press **Open** key (fig. 3/1) and open the outer lid lifting it upwards by hand;
- to open an unpowered unit, insert the provided lid unblocking key (screwed in the rear panel of the unit) into opening on the right side of the unit and press;
- open the rotor safety cover by lifting the cover clip by hand (fig.1/3);
- holding the rotor with one hand, unscrew rotor fixation nut, turning it counterclockwise using included wrench;
- retrieve the rotor and perform necessary cleaning. The rotor is autoclavable (120°C, 20 min);
- after cleaning, place the rotor and secure it tightly with the fixation nut, placing the nut with the key holes up and turning it clockwise by securing wrench;
- place the rotor safety cover on the rotor pressing the cover clip down tightly.

# Declaration of Conformity

<b>Equipment name:</b>	<b>CVP-2</b>
<b>Type of equipment:</b>	Centrifuge/Vortex for PCR plates
<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>EN 61326-1:</b> Electrical equipment for measurement, control and laboratory use EMC requirements. General requirements. <b>EN 61010-1:</b> Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements. <b>EN 61010-2-20:</b> Particular requirements for laboratory centrifuges.

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

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

  
\_\_\_\_\_  
Signature  
Aleksandr Shevchik  
Engineer of R&D

28.01.2015  
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Date

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

# Grant bio

**Grant Instruments  
(Cambridge) Ltd**

Shepreth

Cambridgeshire

SG8 6GB

UK

Tel: +44 (0) 1763 260811

Fax: +44 (0) 1763 262410

Email: [scientificsales@grantinstruments.com](mailto:scientificsales@grantinstruments.com)

**[www.grantinstruments.com](http://www.grantinstruments.com)**

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