Centrifuge / vortex
ExiSpin™

Operating Manual
Specifications
Certificate

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1. Safety precautions

The following symbols mean:

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

Use only as specified by the operating instructions or the intrinsic protection may be impaired.

After transport or storage in humid conditions, the unit should be dry out before connecting it to the supply voltage during 2~3 hrs. During drying out the intrinsic protection may be impaired.

Connect only to a power supply with a voltage corresponding to that on the serial number label.

Ensure that the main switch and isolating device (power supply connector) are easily accessible during use.

Do not use other power supply units than supplied with the unit.

Before moving, disconnect at the power supply socket.

Do not operate the unit outside the laboratory premises.

Do not operate the unit premises with aggressive or explosive chemical mixtures.

Do not place a load exceeding 0.2kg.

The unit should be saved from shocks and falling.

If liquid is split inside the unit, disconnect it from the power supply and have it checked by a competent person.

Before using any cleaning or decontamination method except those recommended by manufacturer, user should check with the manufacturer that the proposed method will not damage the equipment.

Always load the unit evenly. To keep the vortex balanced insert EVEN number of equally filled tubes in the opposite sockets on the rotor.

2. General Information

2.1. Centrifuge/vortex *ExiSpin*TM is a next step of evolution of the centrifuge/vortex Combi-Spin.

2.2. *ExiSpin*TM (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).

2.3. *ExiSpin*TM allows considerable time saving compared to Combi-Spin by automatically performing cycling program of micro sample **mixing** and **spins** according to the set Spin->Mix->Spin cycle for 12 pcs of micro tubes simultaneously (see table 1).

Specification	**CombiSpin FVL-2400**	***ExiSpinTM***
G-forces	550 g	800 g
Tube vortexing	1 tube individual	12 tubes Simultaneously
Time of Spin-Mix-Spin cycle of 2 tube	1 min	25 sec
Time of Spin-Mix-Spin cycle of 12 tubes	5-6 min	1 min 30 sec
Time of Spin-Mix-Spin cycle of 100 tubes	60 min	15 min
Price	1x	1.7x

Table 1.

2.4. **Spin->Mix->Spin** cycle (which we call **"sms algorithm"**) is needed for collecting micro quantity of sample distributed on a cover and walls of micro tubes after mixing which give reproducibility in micro sampling(total volume of samples smaller than 100 mkl).

2.5. *ExiSpin*TM is four devices combined in one (depending on operating mode) :

1) Multitube centrifuge (speed and time setting);
2) Multitube vortex (3 modes – low, medium, high; time setting);
3) Multitube centrifuge/vortex;
4) Centrifuge/vortex/centrifuge cycler for realization of the sms algorithm.

2.6. 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

2.7. The current version of ExiSpin offers fixed preset program and advanced mode with above options available.

2.8 The external power supply unit 220V / 24V 1.25A ensures the electrical safety of the *ExiSpin*TM.

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 *ExiSpin*™ …..…… 1 pce.
- External power supply unit…… 1 pce.
- Specification; Operating Manual; Certificate…….. 1 copy

Optional accessories…… on request

3.3. Place the unit on the horizontal even working surface.

It is necessary to observe the safety area of 300 mm around the centrifuge in accordance with EN-61010-2-2. Persons and hazardous materials must not be located in the safety area whilst the centrifuge in operation

3.4. Plug the external power supply unit into the socket at the rear side of the *ExiSpin*™.

3.5. Rotor replacement:

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

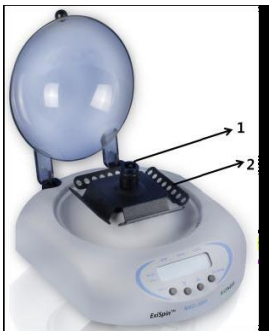

Fig. 1

4. Operation in standard (preset) mode

4.1. Connect the external power supply unit to the mains outlet.

4.2. The centrifuge turns on and the display shows the following readouts (see fig.3):

- Three groups of three squares indicate three same cycles, that proceed one after another.

Each cycle consists of:

- Centrifugation at 2500 RPM for 10 seconds (First Square (Fig.3/1))
- Hard vortexing for 150 seconds (Second Square (Fig.3/2))
- Centrifugation at 2500RPM for 10 seconds (Third Square (Fig.3/1))

- Operation status indication (Fig.3/3) (STOP- when rotor is stopped, OPEN – if the centrifuge lid is open, RUN – unit in operation, rotor spinning).

Note! If the display readouts are as shown on Fig. 5, it is necessary to switch the unit to standard mode

. Hold the **P1/Select** key (Fig. 4/2) for 8 seconds. To switch the unit back to advanced mode press again **P1/Select** key and hold it 8 seconds.

4.3. Open the centrifuge and insert the tubes/strips into the rotor sockets.

4.4. Check the rotor and buckets for any signs of wear or corrosion and replace if necessary. Insert EVEN number of tubes in rotor facing one another. The loading in the opposite tubes must be equal.

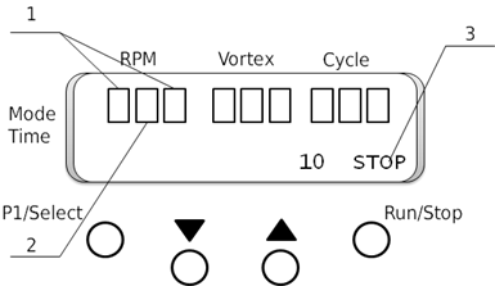

Fig.3 Control panel in STOP mode

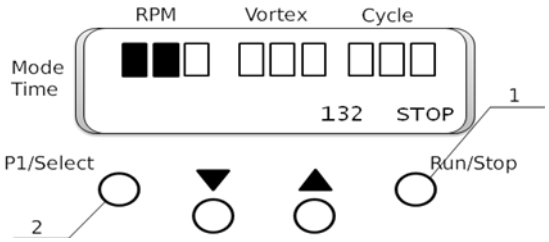

Fig.4 Control panel in RUN mode

4.5. Close the lid.

4.6 Press **Run/Stop** (Fig. 4/1) key to start the first cycle.
Blinking square indicates current step. Dark squares indicate completed steps.

Note! If the rotor imbalance occurs causing vibration the centrifuge stops automatically (Indication IMBALANCE). After the rotor is stopped open the lid and remedy the cause of imbalance.

4.7. After first cycle is complete (first three squares become dark) ExiSpin stops.

4.8. Open the lid, make necessary operation and close the lid.

4.9. Repeat the steps 4.6-4.8 for second cycle.

4.10. Repeat the steps 4.6.-4.7 for third cycle.

Note! If **Run/Stop** key is pressed during the operation, program stops at the current cycle end.

4.11. After third cycle elapsed the preset program switches the unit into sleep mode for 2 hours. The sleep mode is necessary for cooling down and keeping the unit in working order for long period. During the sleep mode the unit will not respond to key pressing. Do not disconnect from power supply during sleep mode.

4.12. Open the lid to take tubes out. It is recommended to leave the lid open during the sleep mode. After 2hours the unit automatically returns to operation in STOP mode (Fig.3) allowing to continue operation as described above.

4.13. At the end of operation unplug the external power supply unit for the mains during operation mode (it is also acceptable to turn off the unit at the end of day during the countdown). In this case on connecting to the power the following message will be displayed ERROR! PROCESS IS NOT COMPLETE. Press **Run/Stop** (Fig. 4/1) key to return the unit into operation in STOP mode.

5. Operation in advanced mode

5.1. Connect the external power supply unit to the mains outlet.

5.2. To switch the unit to advances mode hold the P1/Select key (Fig. 4/2) for 8 seconds. To switch the unit back to standard mode press again P1/Select key and hold it for 8 seconds.

5.3. SMS-algorithm

5.3.1. Open the lid and place EVEN number of tubes in rotor sockets facing one another. Close the lid.

5.3.2. Parameter setting: Press **P1/Select** key (Fig. 5/3) to choose the parameter to change (the active parameter is blinking). Use “▲” and “▼” keys (Fig. 5/6) to set the necessary value (note: if the key is pressed for more that 4 sec the numerical changes quickly).

5.3.3. 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.
5.3.4. Set the necessary speed of spin (from 1000 till 3500 RPM, step 100 RPM) (Fig.5/1)
5.3.5. Set the time of spin (from 1 sec till 30 min, time less than 1min – with 1sec step, more than 1min – with 1 min step)(Fig. 5/2)
5.3.6. Set the mixing strength (select for soft, medium and hard) (Fig. 5/4)
5.3.7. Set the time of mixing (from 1 till 20 sec, step 1sec) (fig. 5/5)
5.3.8. Set how many times the set sms – algorithm shall be repeated (from 1 till 999 times) (Fig. 5/7)
5.3.9. Press **Run/Stop** key (Fig.5/9) to start the program.
Note: If the rotor imbalance occurs causing vibration the centrifuge stops automatically (Indication IMBALANCE). After the rotor is stopped open the lid and remedy the cause of imbalance.
5.3.10. The rotor motion begins and the corresponding indication **(RUN. Fig. 5/8)**, cycle countdown (Fig. 5/7) and the changing time values **(Fig. 2/2 or Fig. 2/5))** are shown on the display.
5.3.11. ExiSpin automatically stops after the set number of cycles is performed (blinking indication STOP on the display) and gives a sound signal about the end of operation (press **Run/Stop** key to stop the signal).
5.3.12. For the repeated operation according to the set program press **Run/Stop** key.
5.3.13. If necessary ExiSpin 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).

5.4. Multitube centrifugation

5.4.1. Open the lid and place EVEN number or tubes in rotor sockets facing one another. Close the lid.
5.4.2. Set the necessary speed of spin (from 1000 till 3500 RPM, step 100 RPM) (Fig. 5/1).
5.4.3. Set the time of spin (from 1 sec till 99 min, time less than 1min – with 1 sec step, more than 1 min – with 1 min step) (Fig. 5/2)
5.4.4. Turn off the Vortex type motion by setting the time of Vortex type motion to zero (OFF) (Fig. 5/5). Note that the cycle counter turns off.
5.4.5. Press **Run/Stop** key (Fig. 5/9) to start centrifugation.
5.4.6. The rotor motion begins and the corresponding indication (Run (Fig. 5/8), and time countdown (Fig. 5/2) is shown on the display.
5.4.7. ExiSpin automatically stops after the set time of centrifugation has elapsed (blinking indication STOP on the display) and gives a sound signal about the end of operation (press **Run/Stop** key to stop the signal).

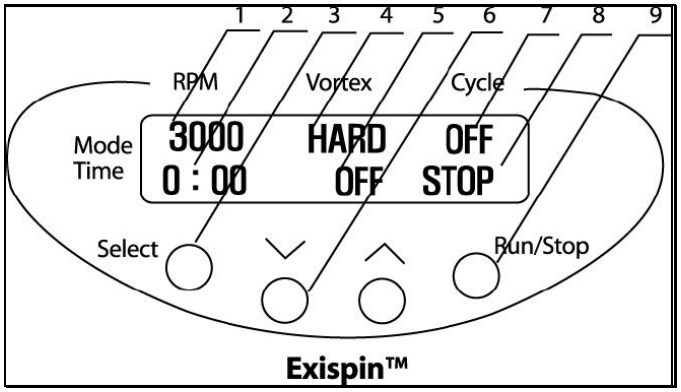

Fig. 5 Control panel in advanced mode

5.4.8. for the repeated operation according to the set program press **Run/Stop** key.
5.4.9. If necessary ExiSpin can be stopped at any time during operation before set time of centrifugation has elapsed by pressing **Run/Stop** key. Pressing **Run/Stop** key again will start the program from the beginning (time countdown will be restarted).

5.5. Multitube centrifugation

5.5.1. Open the lid and place EVEN number or tubes in rotor sockets facing one another. Close the lid.
5.5.2. Turn off the Spin motion by setting the time of Spin motion to zero (OFF) (Fig. 5/2).
Note that the cycle counter turns off.
5.5.3. Set the mixing strength (select from soft, medium and hard) (Fig. 5/4).
5.5.4. Set the time of mixing (from 1 till 20 sec, step 1 sec) (Fig. 5/5).
5.5.5. Press **Run/Stop** key (Fig. 5/9) to stat vortexing.
5.5.6. The rotor motion begins and the corresponding indication (RUN [Fig. 5/8], and time countdown [Fig. 5/5]) is shown on the display.
5.5.7. *ExiSpin*TM automatically stops after the set time of vortexing has elapsed (blinking indication STOP on the display) and gives a sound signal about the end of operation (press **Run/Stop** key to stop the signal).
5.5.8. For the repeated operation according to the set program press **Run/Stop** key.
5.5.9. If necessary *ExiSpin*TM can be stopped at any time during operation before set time of vortexing has elapsed by pressing **Run/Stop** key. Pressing **Run/Stop** key again will start the program from the beginning (time countdown will be restarted).
5.5. At the end of operation unplug the external power supply unit from the mains.

6. Specifications

6.1. Standard mode(Preset) specifications

Three Spin-mix-Spin cycles consisting each of :

- First Centrifugation
  - Speed …… 2500 rpm centrifugation
  - Timer …… 10 sec
- Hard vortexing
  - Timer …… 150 sec
- Second Centrifugation
  - Speed …… 2500 rpm centrifugation
  - Timer …… 10 sec

Sleep mode timer …… 2 hours

6.2. Advanced mode specification

• Spin speed ……..……1000 – 3500 r.p.m.(increment 100 r.p.m.)
• Spin timer……1 sec ~ 30 min
• Mixing strength……..soft, medium, hard
• Mixing time……..….0-20 sec (step 1 sec)
• Cycle regulation……1-999 cycles

6.3. General specifications

- External power supply unit……AC 24V, 1250 mA
- Dimensions……..…190 X 235 X 125 mm
- Weight (with power supply), not more…….2.7 kg
- Optional rotors:

rotor R-1.5	for 12 X 1.5ml microtest tubes
rotor R-0.5/0.2	for 12 X 0.5 + 12 X 0.2ml microtest tubes
rotor R-2/0.5	for 8 X 2.0 ml + 8 X 0.5ml microtest tubes
rotor R-2/0.5/0.2	for 6 X 2.0ml + 6 X 0.5ml + 6 X 0.2ml microtest tubes
rotor SR-16	for strips 2 X 8 sockets 0.2ml microtubes
rotor SR-32	for strips 4 X 8 sockets 0.2ml mictrotubes tubes

- The unit is designed for operation in closed laboratory rooms at ambient temperature from +0.5℃ to +40℃ and maximum relative humidity 80% for temperatures up to 31℃ decreasing linearly to 50% relative humidity at 40℃.

7. Technical Maintenance

7.1. It is allowed to perform the maintenance and all types of repair operations only to the persons who have done a special training.

7.2. Cleaning. Standard ethanol (75%) or any other cleaning liquids can be used for cleaning and disinfecting of the device, if it does not contain any strong organic solvents (such as acetone, toluene or benzene).

8. Warranty. Reclamation information

The Manufacturer warrants the compliance of *ExiSpin*™ with the requirements of Specifications, provided the consumer follows the operation, storage and transportation requirements.

The warranted service life of *ExiSpin*™ from the date of delivery to the Customer is 24 months. If any manufacturing defects are discovered by the customer, an unsatisfactory – equipment report shall be compiled, certified and sent to the local distributor address.

9. CE Marking

The marking affixed to the equipment indicates that the equipment meets the requirements of the following Directive(s):

EMC Directive 2004/108/EC
"ELECTROMAGNETIC COMPATIBILITY"
Applied standards:
EN 61326 Electrical equipment for measurement, control and laboratory use EMC requirements
Part 1 - General requirements

Low Voltage Directive 2006/95/EC
"ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS"
Applied standards:
EN 61010 Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1 - General requirements
Part 2-20– Particular requirements for laboratory centrifuges