Medical–Biological
Research & Technologies

MM-1000

Overhead stirrer
Multi Mixer

Operating Manual
Certificate

for version
V.2AW

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1. Safety Precautions

The following symbol means:

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

- Use only as specified in the Operating Manual provided.
- The unit should be saved from shocks or falling.
- After transportation or storage keep the unit under room temperature for 2-3hrs before connecting to electric circuit.
- Use only cleaning and decontamination methods recommended by the manufacturer.
- Do not make modifications to the design of the unit.

ELECTRICAL SAFETY

- Connect only to an external power supply unit with voltage corresponding to that on the serial number label.
- Use only the external power supply unit provided with this product.
- Ensure that the switch and external power supply unit are easily accessible during use.
- Disconnect the external power supply unit from electric circuit before moving the unit.
- If liquid penetrates into the unit, disconnect it from the external power supply unit and have it checked by a repair and maintenance technician.

DURING OPERATION

- Avoid contact of any parts of clothing or body with the moving parts of the unit. Avoid contact the stirrer with the flask surfaces.
- Stop operation if strong vibration of the unit occurs. In this case it is necessary to reduce the speed or remedy the reason of imbalance.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.

- Do not leave the operating unit unattended.

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

MM-1000 Overhead stirrer Multi Mixer is designed for mixing solutions of different viscosity.

Multi Mixer MM-1000 provides three types of motion: 1) rotational motion, 2) reciprocal motion, 3) vibro motion, 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.

Rotational motion

Simple even rotation with an option of shifting direction (clockwise/counterclockwise) after set time.
The speed adjustment range is from 40 to 1000 rpm with 10 rpm increment. The motion time can be set in 0 to 250 sec range or non-stop.

Reciprocal motion

Reciprocal motion direction changing, limited by the turning angle.
The turning angle adjustment range is from 0° to 360° with 30° increment. The speed is the same as set for rotational motion. The motion time can be set in 0 to 250 sec range or non-stop.

Vibro motion

Intensive mixing at high speed with small adjustable turning angle.
The turning angle adjustment range is from 0° to 5° with 1° increment. The motion time can be set in 0 to 5 sec range or non-stop.

Reciprocating and Vibro motion types can be replaced by a pause.
These 3 motions are combined in a cycle and can be used:

- separately (only 1; 2; or 3);
- in combinations by two (1 ⇢ 2 ; 2 ⇢ 3 ; 3 ⇢ 1);
- all three in one cycle (1 → 2 → 3) (Fig. 1).

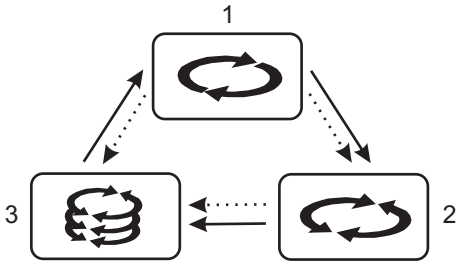


Fig.1. Innovative mixing cycle

A timer with the working range from 1 min to 96 hr is used to control the time of operation.

By combining the provided motion types a researcher gets unlimited options for choosing the mixing parameters.

Apart from the unique operation modes MM-1000 Multi Mixer possesses attractive 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 realisation.

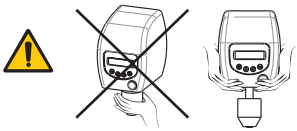
The external power supply unit ensures the electrical safety of the device.

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.



Do not apply excessive force on the clamping chuck. At moving hold the unit at the housing, not at the clamping chuck.

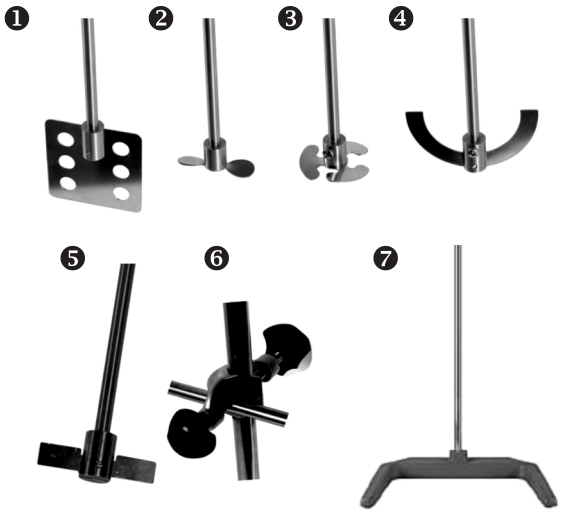
3.2 Complete set. Package contents:

Standard set

- MM-1000 Overhead Stirrer Multi Mixer .....1 pce.
- external power supply unit .....1 pce.
- rod for fixing on the support stand.....1 pce.
- Operating manual, Certificate .....1 copy

Optional accessories

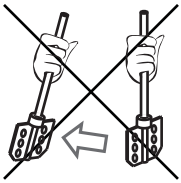
- MP-1 stirring element ❶ .....on request
- MP-2 stirring element ❷ .....on request
- MP-3 stirring element ❸ .....on request
- MA-1 stirring element ❹ .....on request



- MC-1 stirring element ❺ .....on request
- double clamp ❻.....on request
- support stand ❼ .....on request

3.3 Set up (fig.2):

- screw the nut (fig.2/2) on the support stand (fig.2/1);
- screw in the support stand (fig.2/1) in the opening (fig.2/4) on the rear side of the Multi Mixer. Tighten the nut (fig.2/2) turning it clockwise to fasten the fixing rod;
- fasten the unit on the stand using the double clamp;
- fasten the stirring element axle (fig.2/6) in the clamping chuck (fig.2/5) without applying excessive force sideways;
- connect the external power supply unit to the socket (fig.2/3);
- remove protective film from the display.



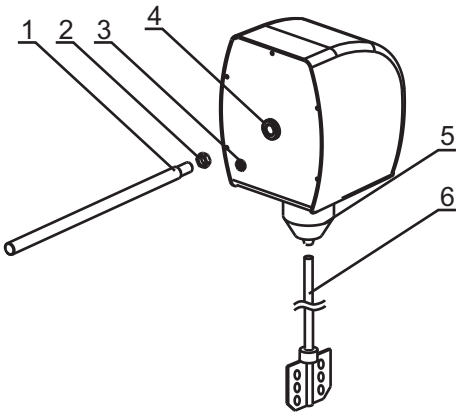


Fig.2 Set up

4. Operation

4.1. Connect the external power supply unit to electric circuit.

4.2. Dip the stirrer inside the vessel with the liquid being mixed. The stirring element should be completely dipped into the liquid.

4.3. Turn **ON** the power switch on the front panel.

4.4. Set the required program and operation time (see Section 5. Program Setting).

4.5. Press the **Run/Stop** key (fig.3/5) to start the program.

4.6. The stirrer motion will begin and the corresponding indication (RUN, fig.3/3 and the changing time values, fig.3/2) will be shown on the display.

4.7. If the operation time is not set and the **Time** indicator (fig.3/2) shows 0:00, pressing the **Run\Stop** key will start continuous operation of the unit until the **Run\Stop** key is pressed again.

4.8. If the operation time is set then the unit will stop after the set time interval elapses (flashing indication STOP (fig.3/3) will be shown on the display) and give a repetitive sound signal about the end of operation (press the **Run\Stop** key to stop the signal).

4.9. Press the **Run/Stop** key to repeat the preset program.

4.10. The unit can be stopped at any time during operation before the set time elapses if necessary by pressing the **Run\Stop** key. Pressing the **Run\Stop** key again will start the program from the beginning (timer will be restarted).

4.11. After finishing the operation turn **OFF** the power switch.

4.12. Unplug the external power supply unit from electric circuit.

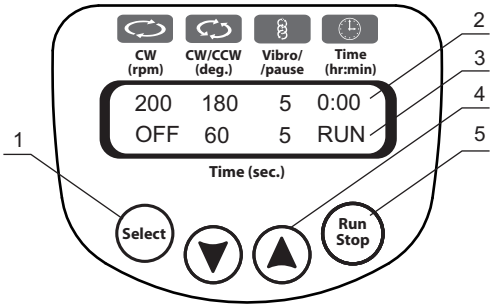


Fig. 3 Control panel

5. Program setting

The program consists of cycles. Each cycle includes three different types motions (Rotational, Reciprocating and Vibro) set one after another with the duration from 0 to 250 seconds for Rotational and Reciprocal motion types and from 0 to 5 seconds for Vibro motion.

5.1. Press the **Select** key (Fig.3/1) to choose the parameter to change (each pressing of the **Select** key consecutively activates the parameters in the cycle; the active parameter is flashing).

Use the ▲ and ▼ keys (Fig.3/4) to set the necessary value. Pressing the key for more than 2 sec will increase the increment.

5.2. The program can also be changed during the operation - microprocessor automatically enters the last changes into the memory as the working program (excluding overall operation time).

5.3. Set the following parameters: speed, turning angle, time for each motion type and overall operation time.

5.4. If the time for a motion is set to zero (indication *OFF*), this type of motion will be skipped in the cycle.

5.5. A pause can be set instead of Reciprocal (0-250 sec) or Vibro (0-5 sec) motion. Set the turning angle of Reciprocal or Vibro motion to zero to set the pause. The time, set for this motion type, will be the pause duration. The stirrer will not move in this mode during the operation, but the time will be counted down.

5.6. The overall timer (fig.3/2) is used to control the operation time. The timer can be set for the period from 1 min to 96 hours (timer increment is 1 min).

5.7. Table 1 shows possible motion combinations in the cycle.

	Rotational motion	**Reciprocal motion**	**Vibro motion**
1	On	On	On
2	On	OFF	On
3	On	Pause	On
4	On	OFF	OFF
5	On	Pause	OFF
6	On	OFF	Pause
7	On	Pause	Pause
8	On	On	OFF
9	On	On	Pause
10	OFF	On	On
11	OFF	Pause	On
12	OFF	On	Pause
13	OFF	OFF	On
14	OFF	On	OFF

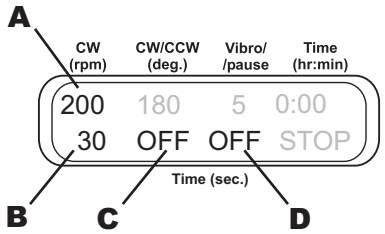
Table 1. Motion combinations

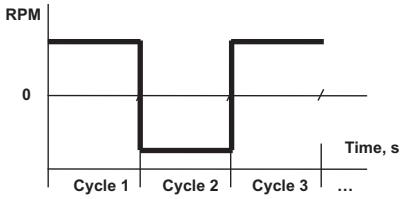
5.8. Further examples illustrate program setting for both separate motions and their combinations in the cycle.

5.8.1. Rotational motion

Set the speed (**A**) (40 - 1000 rpm) and time (**B**) (1 - 250 sec) of Rotational motion. Turn off Reciprocal motion by setting time (**C**) of Reciprocal motion to zero (*OFF*). Turn off Vibro motion by setting time (**D**) of Vibro motion to zero (*OFF*).

Note that Multi Mixer is programmed to change the rotation direction each time when the motion timer is started, i.e. if the rotational motion time is set to 30 sec then the direction of rotation will be changed every 30 sec.

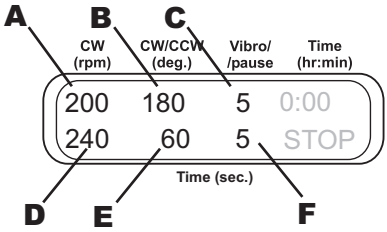


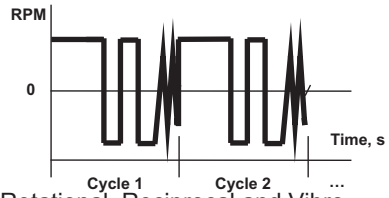


Orbital motion run in cycles

5.8.2. Rotational + Reciprocal + Vibro motions

Set the speed (**A**) (40 - 1000 rpm) and time (**D**) (1 - 250 sec) of Rotational motion.
Set the angle (**B**) (30 - 360º) and time (**E**) (1 - 250 sec) of Reciprocal motion. It is performed at the same speed as the rotational motion.
Set the turning angle (**C**) (1-5º) and time (**F**) (1 - 5 sec) for Vibro motion.

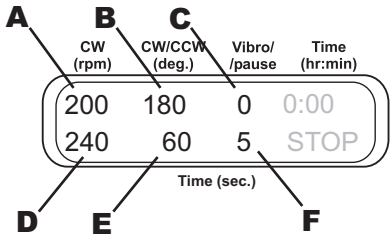


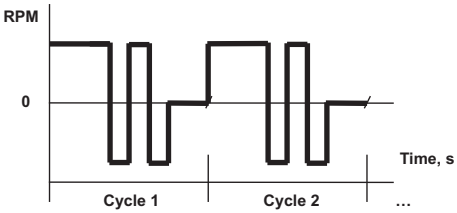


Rotational, Reciprocal and Vibro motions run one after another in cycles

5.8.3. Rotational + Reciprocal motions + Pause

Set the speed (**A**) (40 - 1000 rpm) and time (**D**) (1 - 250 sec) of Rotational motion. Set the turning angle (**B**) (30 - 360º) and time (**E**) (1 - 250 sec) of Reciprocal motion. (It is performed at the same speed as the rotational motion.)
Set the turning angle (**C**) of Vibro motion to zero. Set the time (**F**) of Vibro motion (1 - 5 sec) - this is the time of pause duration.

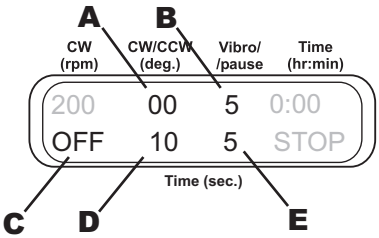


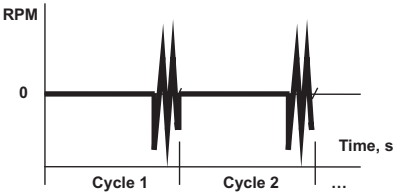


Rotational motion, Reciprocal motion and pause run one after another in cycles.

5.8.4. Vibro motion + Pause

Turn off Rotational motion by setting time (**C**) of Rotational motion to zero (*OFF*).
Set the turning angle (**A**) of Reciprocal motion to zero. Set the time (**D**) for Reciprocal motion (1 - 250 sec) - this is the time of pause duration.
Set the turning angle (**B**) (1-5º) and time (**E**) (1 - 5 sec) for Vibro motion.





Vibro motion and pause run one after another in cycles.

6. Specification

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.

6.1. **Rotational motion**

Speed range .....40 - 1000 rpm (increment 10 rpm)

Timer .....0 - 250 sec

6.2. **Reciprocal motion**

Turning angle .....0º - 360° (increment 30º)

Timer .....0 - 250 sec

6.3. **Vibrating motion**

Turning angle .....0º - 5° (increment 1º)

Timer .....0 - 5 sec

6.4. General timer of operation .....1 min - 96 hrs (increment 1 min) /non-stop

6.5. Maximal stirring volume (water) .....20 l

6.6. Maximal stirring liquid viscosity.....1000 mPa.s

6.7. Dimensions (w/out rod) .....140 x 135 x 250 mm

6.8. Rod for fixing on the support stand, diam. x lenght .....Ø 12 mm x 260 mm

6.9. Stirrer shaft .....Ø 8 mm

6.10. Input current/power consumption .....12 V, 700 mA / 8,4 W

6.11. External power supply..... input AC 100-240 V 50/60 Hz, output DC 12 V

6.12. Weight*.....2.4 kg

*Accurate within ±10%.

Optional accessories	Description	Catalogue number
MP-1	Paddle stirring element, 378x(70x70)x8 mm	BS-010306-AK
MP-2	Propeller stirring element, 2 folding blades 326x55x8 mm	BS-010306-BK
MP-3	Propeller stirring element 3 folding blades 325x50x8 mm	BS-010306-CK
MA-1	Anchor stirring element, 332x90x8 mm	BS-010306-DK
MC-1	Centrifugal stir.elem., 358x60(110)x8 mm	BS-010306-EK
Double clamp	for unit fixing	VELA00001300
Support stand	for unit fixing, 40x30x87 cm	VEL A00001301

Biosan is committed to a continuous programe of improvementand reserves the right to alter design and specifications of the equipment without additional notice.

7. Maintenance

7.1. If the unit requires maintenance, disconnect the unit from electric circuit 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 unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.

8.2. The warranted service life of unit from date of delivery to the Customer is 24 months. Contact your local distributor to check availability of extended warranty.

8.3. 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, Technical support section to obtain the claim form.

8.4. 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	MM-1000 Overhead Stirrer Multi Mixer
Serial number	
Date of sale	

9. Declaration of Conformity

DECLARATION OF CONFORMITY

Manufacturer:	**BioSan Ltd.**
Address:	**Ratsupites Str.7, build.2, Riga, LV-1067, Latvia**
Product name:	**Overhead stirrer Multi Mixer**
Type:	**MM-1000**

We, BioSan Ltd., certify that the above mentioned product has been manufactured according to the regulations of the following European directives proven through complete compliance with the following standards:

№	*Directive*
Low Voltage Directive 2006/95/EC	*ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS*
EMC Directive 2004/108/EC	*ELECTROMAGNETIC COMPATIBILITY*

№	*Standard*
EN 61010	*Safety requirements for electrical equipment for measurement, control and laboratory use* *Part 1 - General requirements*
EN 61326	*Electrical equipment for measurement, control and laboratory use – EMC requirements* *Part 1 - General requirements*

The testing for compliance with the requirements of the above standards has been performed at Grant Instruments (Cambridge) Ltd, Shepreth, Cambridgeshire, SG8 6GB, Great Britain.

Vasily K. Bankovsky
President,
Head of R&D Department
Biosan Ltd.

Riga 15.06.2009

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