

**Grant bio**

# High-Speed Multi Plate Shaker MPS-1

*Operating instructions*

*For version V.1GW*



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# 1. Safety







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The following symbol means:










**Caution!** Make sure you have fully read and understood the operating instructions before using the equipment. Please pay special attention to sections marked by this symbol.






## GENERAL SAFETY

-  Use only as specified in the operating instructions provided.
-  The unit should not be used if dropped or damaged.
-  The unit must be stored and transported in a horizontal position (see package label).
-  After transportation or storage keep the unit at room temperature for 2–3 hrs before connecting it to the electric circuit.
-  Use only cleaning and decontamination methods recommended by the manufacturer.
-  Do not make any modifications to the design of the unit.

## ELECTRICAL SAFETY

-  Connect only to a power supply with voltage corresponding to that on the serial number label.
-  Use only the external power supply unit provided with this product.
-  Ensure that the power switch and external power supply connector are easily accessible during use.
-  Disconnect the unit from the electric circuit before moving.
-  Turn off the unit by disconnecting the external power supply from the power socket.
-  If liquid penetrates into the unit, disconnect it from the external power supply unit 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 impede the platform motion.
-  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 exceed the maximum load value mentioned in the Specifications section.

## BIOLOGICAL SAFETY

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

## 2. General Information

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The MPS-1 High-Speed Multi Plate Shaker mixes small volumes of reagents in microplates, PCR plates, deepwell plates and microtubes. A vortex function is integrated into the platform holder, also allowing vortexing for a single test tube from 0.5 to 50ml in size.

The MPS-1 is compact, user friendly and ideal for personal use. It can be used in a wide range of applications including DNA/RNA isolation, pellet resuspension and ELISA.

MPS-1 High-Speed Multi Plate Shaker has **5 preprogrammed mixing modes**:

1. **SOFT** 1000 rpm
2. **MEDIUM** 1800 rpm
3. **HARD** 2600 rpm
4. **TUBE VORTEX** 3200 rpm
5. **CUSTOM** adjustable from 300 to 3200 rpm (increment of 100 rpm)

Please see our recommendations - How to choose the right mode of mixing for different types of plates, microtubes and strips in paragraph 6.

MPS-1 High-Speed Multi Plate Shaker provides:

- Pulse mode - featuring a series of 3 second pulses, each increasing linearly in rpm until the set speed is reached. Activated by a separate key on the front panel, this motion is repeated until the timer stops. This mode provides a constant state of resuspension of particles, as the acceleration is constantly changing.
- Universal platform holder - accommodating microplates, PCR plates (skirted) and deepwell plates. Four easily interchangeable additional platforms are also available for semi-/unskirted PCR plates, 0.2ml test tubes and trips and 0.5ml/2ml test tubes.
- Digital timer - can be set from 15 seconds to 60 minutes, unit will stop automatically after set time has elapsed.
- Multi-function - combines shaking and vortexing function all in one unit!

# 3. Getting started

## 3.1. Unpacking

Remove packaging 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.

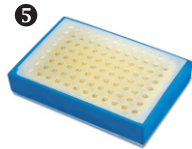
## 3.2. Package contents

### Standard set

- MPS-1 high-speed multi plate shaker with universal platform/plate holder ❶ .....1 piece
- external power supply unit .....1 piece
- Operating Instructions; Certificate .....1 copy

### Optional accessories

- platform P-2-24 for 24 tubes 1.5–2 ml ❷ .....on request
- platform P-05-32 for 32 tubes 0.5 ml ❸ .....on request
- platform P-02-05 for 24 tubes 0.5 ml and 48 tubes 0.2 ml ❹ .....on request
- platform P-02-96 for 96 tubes 0.2 ml or semi-/unskirted PCR plate ❺ ..on request

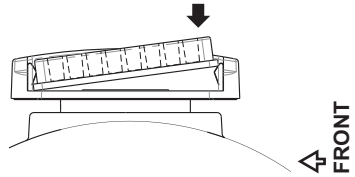


### 3.3. Set up

- 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.

### 3.4. Platform or plate installation

Install the platform or plate by inserting it in the universal platform/plate holder (fig.1).



**Fig.1 Platform or plate installation**

# 4. Operation

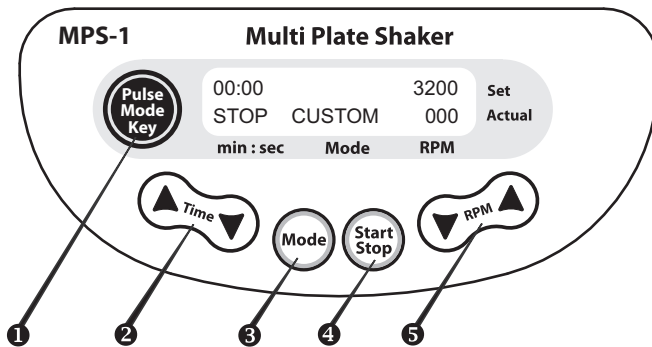


Fig. 2 Control panel

## Recommendations during operation



**Caution!** Please check the tubes/plates before using, be sure that they are properly sealed. Unsealed tubes or plates may spill the contents during operation causing potential health risks when working with infected material.

It is recommended to fill the test tubes/plate wells up to 75% of the maximum fill volume for efficient mixing.

- 4.1. Connect the external power supply unit to electric circuit and turn ON the power switch located on the rear panel of the unit (position I).
- 4.2. Place the plate or optional platform on the universal platform/plate holder and push it inside firmly (fig. 1). Insert the tubes into the sockets of the optional platform.



**Caution!** Before mixing it is recommended to use CUSTOM mode (adjustable speed) in order to determine the optimum efficiency. Do not use HARD and TUBE VORTEX modes for tube platforms/deepwell plates.

- 4.3. Using the **Mode** key (fig. 2/②) set the required working mode (CUSTOM, SOFT, MEDIUM, HARD, TUBE VORTEX). Operation in SOFT, MEDIUM, HARD, TUBE VORTEX modes differ from CUSTOM mode with a fixed, non-adjustable speed value (see specifications).

#### Operation in CUSTOM, SOFT, MEDIUM, HARD, TUBE VORTEX modes

- 4.4. Set the required working time interval in minutes and seconds (the increment is 15 sec) using the **▲** and **▼ Time** keys (fig. 2/③). Pressing the key for more than 3 sec will make the values change faster. The set time is displayed in the upper line of the display.
- 4.5. Set the required speed (the increment is 100 rpm) in CUSTOM mode using the **▲** and **▼ RPM** keys (fig. 2/④). Pressing the key for more than 3 sec will make the values change faster. The set speed is displayed in the upper line of the display.

**Note:** Shaking speed may be adjusted in CUSTOM mode during platform rotation using the **▲** and **▼ RPM** keys.

- 4.6. Press the **Start Stop** key (fig. 2/⑤). The platform will start motion (indication "RUN") and the timer indicator will start counting down the time interval in the upper line of the display.
- 4.7. After finishing the program (after the set time elapses) the platform motion will stop and the flashing indication "STOP" will appear in the lower line of the display, accompanied by one short (set time less than 1 min) or repetitive sound signal (set time greater than 1 min). Press the **Start Stop** key to turn off the signal.
- 4.8. The unit can be stopped before the set time elapses if necessary by pressing the **Start Stop** key. The Time indicator will show the set time interval. Press the **Start Stop** key to repeat the operation with the same working time and speed.
- 4.9. If the working time is set to zero and the display shows "00:00", pressing the **Start Stop** key will start continuous operation of the unit until the **Start Stop** key is pressed.

#### Operation in PULSE mode

- 4.10. Set the required operation parameters, time and mixing mode.
- 4.11. Press the **Pulse Mode Key** (fig. 2/⑥). The platform will start the following cycle: acceleration – short mixing (duration 3 sec) – slowdown, (" " indication ) and the timer indicator will start counting down the time interval in the upper line of the display.
- 4.12. The unit can be stopped before the set time elapses if necessary by pressing the **Start Stop** key, the platform motion will stop and the reading will flash "STOP" in the lower line of the display, accompanied by the one short (set time less than 1 min) or repetitive sound signal (set time greater than 1 min). Press the **Start Stop** key to turn off the signal.
- 4.13. If the working time is set to zero and the display shows "00:00", pressing the **Pulse Mode Key** will start continuous pulsating operation of the unit until the **Pulse Mode Key** or **Start Stop** key is pressed.
- 4.14. After finishing the operation, turn the unit off using the power switch at the rear panel (position O) and disconnect the external power supply unit from electric circuit.



# 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 control range (CUSTOM) .....300–3200 rpm (increment of 100 rpm)
- Types of shaking preset modes (fixed speed)
  - TUBE VORTEX .....3200 rpm
  - HARD .....2600 rpm
  - MEDIUM .....1800 rpm
  - SOFT .....1000 rpm
- Pulse mode provides a series of pulses with linear increase of rpm to the set speed, holds it for 3 seconds and then stops for a moment. This motion is repeated until the timer stops. This method provides a constant state of resuspension of particles inside a tube, as the acceleration is always changing.
- Tube volume for vortexing .....from 0.5 to 50 ml
- Maximum mixing tube volume .....30 ml
- Maximum load .....0.3 kg
- Orbit .....3 mm
- Acceleration time until max. speed .....5 sec
- Digital time setting .....0–60 min (increment of 15 sec) or non-stop
- Noise level, max .....65 dBA
- Maximum continuous operation time .....8 hrs
- Dimensions .....225x215x150 mm
- Input current/power consumption .....12 V, 800 mA / 10 W
- External power supply unit .....input AC 100-240 V 50/60 Hz output DC 12 V
- Weight\* .....5.1 kg
  - \* Accurate within ±10%.

<b>Platform</b>	<b>Description</b>
Universal platform holder	Vortex head with 1.5 mm eccentric, holder for microtest plate (U, V or flat-bottomed), PCR plate (96-wells, 384-wells, fully-skirted) or Deep well plate (250, 500, 1000, 2000 µl)

<b>Optional platforms</b>	<b>Description</b>
P-2-24	platform for 24 tubes 1.5–2 ml
P-05-32	platform for 32 tubes 0.5 ml
P-02-96	platform for 96 tubes 0.2 ml or semi-/unskirted PCR plate
P-02-05	platform for 24 tubes 0.5 ml and 48 tubes 0.2 ml

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




## 6. How to choose the right mode of mixing

6.1. Before mixing it is recommended to use CUSTOM mode (adjustable speed) in order to determine the optimum efficiency.



**Caution!** Do not use HARD and TUBE VORTEX modes for tube platforms/deepwell plates.

6.2. The available standard mixing modes for different platform/plate combinations are given in the table below.

	– Efficient mixing
	– Not recommend (increased sound level)
	– N/A

Platforms / Preset mode	SOFT (1000 rpm)	MEDIUM (1800 rpm)	HARD (2600 rpm)
<b>Deep well plate</b> (full) Height 44 mm, 2000 µl	●		
<b>Deep well plate</b> (full) Height 29 mm, 500 µl	●	●	
<b>Immunoplates</b> (full) Height 15 mm, 300 µl	●	●	●
<b>PCR plate skirted</b> (full) Height 15 mm, 200 µl	●	●	●
<b>Platform P-2-24</b> 24 x 2 ml (1.5 ml)	●	●	
<b>Platform P-05-32</b> 32 x 0.5 ml (full)	●	●	○
<b>Platform P-02-05</b> 24 x 0.5 and 48 x 0.2 ml (full)	●	●	○
<b>Platform P-02-96+strips</b> / <b>PCR plate</b> 96 x 0.2 ml (full)	●	●	○

Tubes*, ml / Preset mode	TUBE VORTEX (3200 rpm)
0.5	●
1.5	●
2.0	●
15	●
50	●

\*It is recommended that test tubes are filled up to 75% of the maximum volume for optimum mixing.

# 7. Maintenance

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Where applicable all Grant laboratory products are designed to comply with IEC61010-1 and can be flash tested. Some are fitted with radio frequency interference suppressers. Therefore it is recommended that only a D.C. test be performed.

No other routine service is required.

## 7.1 Cleaning

The unit case can be cleaned with a damp cloth after disconnection. Do not use solvents.

Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and decontamination of the unit.

Before using any other cleaning/decontamination method other than that recommended, check with our service department (or distributor if outside of the UK), that the proposed method will not damage the equipment.

# 8. Guarantee and Service

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## 8.1 **Guarantee**

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

## 8.2 **Service**

For service, return for repair to our Service Department in the UK or, in other countries, to our distributor.

# Declaration of Conformity

Manufacturer:	BIOSAN SIA Ratsupites 7, build. 2, Riga, LV-1067, Latvia
Equipment name/type number:	<b>MPS-1</b>
Description of Equipment:	High-Speed Multi Plate Shaker
Directives	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC RoHS 2011/65/EC WEEE 2002/96/EC & 2012/19/EU

Applied Standards	<b>EN 61326-1:</b> Electrical equipment for measurement, control and laboratory use EMC requirements. General requirements
Harmonized Standards:	<b>EN 61010-1:</b> Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements
	<b>EN 61010-2-051:</b> Particular requirements for laboratory equipment for mixing and stirring.

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



Signature

Svetlana Bankovska  
Managing director

02.12.2013

Date



Signature

Aleksandr Shevchik  
Engineer of R&D

02.12.2013

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)