

MS Orbital Shaker

Instruction Manual

Catalog No. MS-NOR-30
MS-NOR-3001



www.majorsci.com
service@majorsci.com

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Packing list

MS-NOR-30

- 1x MS Orbital Shaker with 30 x 30cm Platform
- 1x Power Cord
- 1x MS Orbital Shaker Instruction Manual
- 3x Spare O-ring for orbital motor belt replacement

MS-NOR-3001

- 1x MS Orbital anti-moisture Shaker with 30 x 30cm Platform
- 1x Power Cord
- 1x MS Orbital Shaker Instruction Manual
- 3x Spare O-ring for orbital motor belt replacement

Signed by:

Date:

Major Science is liable for all missing or damaged parts / accessories within 7 days after customer received this instrument package. Please contact Major Science immediately regarding this issue. If no response within such time period from consignee party, that will be consignee party's whole

responsibility.

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Warning

Major Science Orbital Shaker has been tested and found to comply with safety limits for the CE regulation. Also, MS Orbital Shaker is RoHS compliant to deliver confident product which meets the environmental directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. It is strongly recommended for the user to read the following points carefully before this equipment is operated.

1. Read and follow carefully the manual instructions.
2. Do not alter the equipment. Failure to follow these directions could result in personal and/ or laboratory hazards, as well as invalidate equipment warranty.
3. Use a properly grounded electrical outlet with correct voltage and current handling capacity.
4. Disconnect from power supply before maintenance and servicing. Refer servicing to qualified personnel.
5. Never use this instrument series without having the safety cover correctly in position.
6. Do not use the unit if there is any sign of damage to the external case or cover. Replace damaged parts.
7. Do not use in the presence of flammable or combustible material; fire or explosion may result. This device contains components, which may ignite such materials.
8. Refer maintenance and servicing to qualified personnel.
9. Ensure that the system is connected to electrical service according to local and national electrical codes. Failure to make a proper connection may create fire or shock hazard.
10. Use appropriate materials and operate correctly to avoid possible

hazards of explosion, implosion or release of toxic or flammable gases arising from overheated materials.

11. The unit shall be operated only by qualified personnel.

Safety Information

Use high level of precaution against any electrical device. Before connecting the electrical supply, check to see if the supply voltage is within the range stated at the rating label, and see to it that the device be seated firmly. Place the unit in a safe and dry location; it must NOT touch the surrounding. Follow the safety precautions for chemicals / dangerous materials. If needed, please contact qualified service representative or service@majorsci.com

Environmental Conditions

Ensure the instrument is installed and operated strictly in the following conditions:

1. Indoor use only
2. $\leq 95\%$ RH
3. 75 kPa – 106 kPa
4. Altitude must not exceed 2000 meters
5. Ambient to 40°C operating temperature
6. Pollution degree: 2
7. Mains supply voltage fluctuations up to $\pm 10\%$ of the normal voltage

Avoiding Electrical Shock

Follow the guidelines below to ensure safe operation of the unit. MS Orbital Shaker has been designed to use with shielded wires thus minimizing any potential shock hazard to the user. Major Science recommends against the use of unshielded wires.

To avoid electrical shock:

1. In the event of solution accidentally spilling into the instrument, it must

- be dried out for a period of time (at least 2 hours) and restored to NORMAL CONDITION before each operation.
2. Never connect or disconnect wires loading from the power jacks when the red indicator light of power switch is on.
 3. WAIT at least 5 seconds after stopping a run before handling output leads or any connected apparatus.
 4. ALWAYS make sure that your hands, work area, and instruments are **clean** and **dry** before making any connections or operating the power supply.
 5. ONLY connect the power cord to a properly grounded AC outlet.

Avoiding Damage to the Instrument

1. Do not attempt to operate the device if damage is suspected.
2. Protect this unit from physical damage, corrosive agents and extreme temperatures (direct sunlight, etc.).
3. For proper ventilation and safety concerns, keep at least 10 cm of space behind the instrument, and at least 5 cm of space on each side.
4. Use high level of precaution against the damages on the unit.
5. Do not operate the unit out of environmental conditions addressed above.
6. Prior to applying any cleaning or decontamination methods other than manufacturer's recommendation, users should check with the manufacturer's instruction to see if the proposed method will damage the equipment.
7. To avoid condensation after operating the shaker in a cold room, wrap the unit in a plastic bag and allow at least 2 hours for the unit to equilibrate to room temperature before removing the bag and operating the unit.

Equipment Operation

Follow the guidelines below to ensure safe operation of the unit:

1. Check the displayed figures to see if the unit is functioning correctly before using this unit.
2. NEVER access dangerous chemicals or other materials to prevent possible hazard of explosion and damage.

3. Do not operate the unit without lids or covers to prevent possible hazards.
4. A temporary conductivity caused by condensation might occur even though this series is rated Pollution Degree 2 in accordance with IEC 664.

Symbols

The symbols used on MS Orbital Shaker are explained below.



Indicates an area where a potential shock hazard may exist.
Consult the manual to avoid possible personal injury or instrument damage.



Indicates a warning.
MOVING PARTS HANDS OFF



Indicate disposal instruction.
DO NOT throw this unit into a municipal trash bin when this unit has reached the end of its lifetime. To ensure utmost protection of the global environment and minimize pollution, please recycle this unit.

Section 1 Introduction

1.1 Overview

Major Science Orbital Shaker, using its patented mechanism and function achieves unique motion which drives forward and backward, elicits perfect mixing performance. Agitation is driven with exact measurements, while cycle rotation for forward and backward is controlled by the microprocessor controller with timer. This unit provides a 30 cm x 30 cm platform. It is perfect for bench-top and normal incubator operations. Its light weighted for easy mobility, and it also provides quiet, reliable operation for any research. More importantly, MS Orbital Shaker is RoHS compliant and designed to comply with the CE regulation.



MS-NOR-30

1.2 Product Description

The orbital shaker is a microprocessor controlled orbital shaking instrument for many general purpose shaking applications in chemical and life sciences laboratories. Its unique design digitally controls clockwise and/or anti clockwise orbits to achieve outstanding mixing efficiency. The operation may be continuous or timed, with the integral electronic timer ensuring accurate repeatability of time-sensitive incubations. Speed and time setting are straightforward in the LED display. Its load weight is up to 10kg. An audible signal accompanies automatic switch-off to indicate the completion of a set time period. The interchangeable / stacking platforms and accessories enable a wide choice of vessels to be used, including bottles, flasks and beakers, dishes, boxes, and petri-dishes.

For Anti-moisture model

The MS Anti-moisture Shaker series offers the same capabilities as our original MS Shaker series with moisture protection coating. The moisture protection allows you to operate in low temperature environment. An anti-moisture coating is applied on the electrical structure to minimized and prevent the forming of condensation when operating in & out of cold room. Accessary from MS shaker series are applicable to this anti-moisture as well.

Features

- Microprocessor controller with digital display
- Orbital moving in one direction or clockwise / anti-clockwise direction
- Continuous or timed operation with automatic witch-off
- Variable shaking speed up to 200rpm
- Interchangeable / stacking platforms, and accessories for a variety of vessels
- 10kg carry capacity
- 30 x 30cm platform
- Anti-moisture coating allows smooth operation in cold environment or CO2 incubation.

Section 2 Product Specifications

Cat. NO.	MS-NOR-30	MS-NOR-3001
Motion	Orbital	
Moving Feature	Orbital moving in one direction or two directions	
Clockwise and/or Anti-clockwise	0.1 - 10 circle 0.1 circular increment	
Max. Stroke Length	20 mm	
Controller	Digital microprocessor controller	
Speed	0 - 200 rpm 1rpm increment	
Timer	9999 (min) with alarm/ Continuous 1min increment	
Motor	Stepping motor	
Operating Temperature	Ambient to 40°C	
Loading Capacity	10 kg	
Platform Dimension (W x L)	30 x 30cm	
Additional Platform	Yes (<i>*Optional</i>)	
Platform Material	Painted iron metal	
Unit Dimension (W x L x H)	300 x 310 x 130 mm	
Construction	ABS and Painted iron metal	
Weight	Approx. 7.0 kg	
Rated Voltages	110V~ / 220V~ selectable; 50/60 Hz; 0.63A	
Anti-Moisture	N/A	Yes

※ Two directions orbital shaking function shall be only applied below 100rpm

Section 3 Installation Instructions

Major Science Orbital Shaker is actually a pre-installed instrument. As long as it is placed on a sturdy and level surface in a safe, dry place, and sufficient spare space in the neighborhood for shaking movement, it is ready for operation.

Note:

Due to the orbit of this type of shaker, when you operate the shaker along with 2000ml flask, the rotation speed should be under 150rpm.

Installation Instruction of Double Platforms (Optional)

If users purchase the additional platforms, here we offer a simple installation instruction to help users install the second platform.

※ If users have no requirement on double platforms, please skip this section and directly go to *Section 5 for Operation Instructions*.

Tool Required: a crosshead screw driver (Not provided)



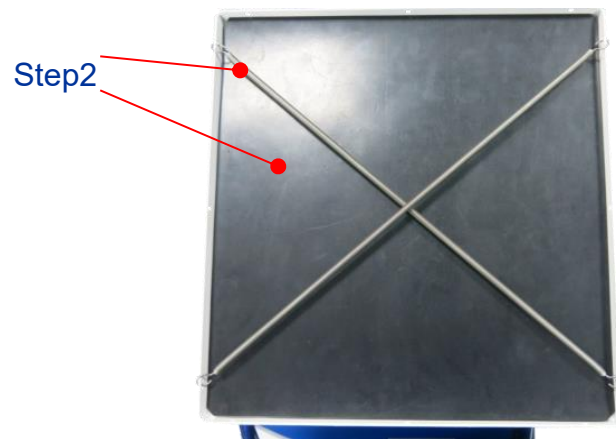
Step1. Get ready the second platform, aluminum pillars and 4 flathead screws, which are included in the purchased package.

Note:

If users require double platforms with “single-layer pillars”, then 4 pillars are needed. And if double platforms with “double-layer pillars” are required, 8 pillars are needed.



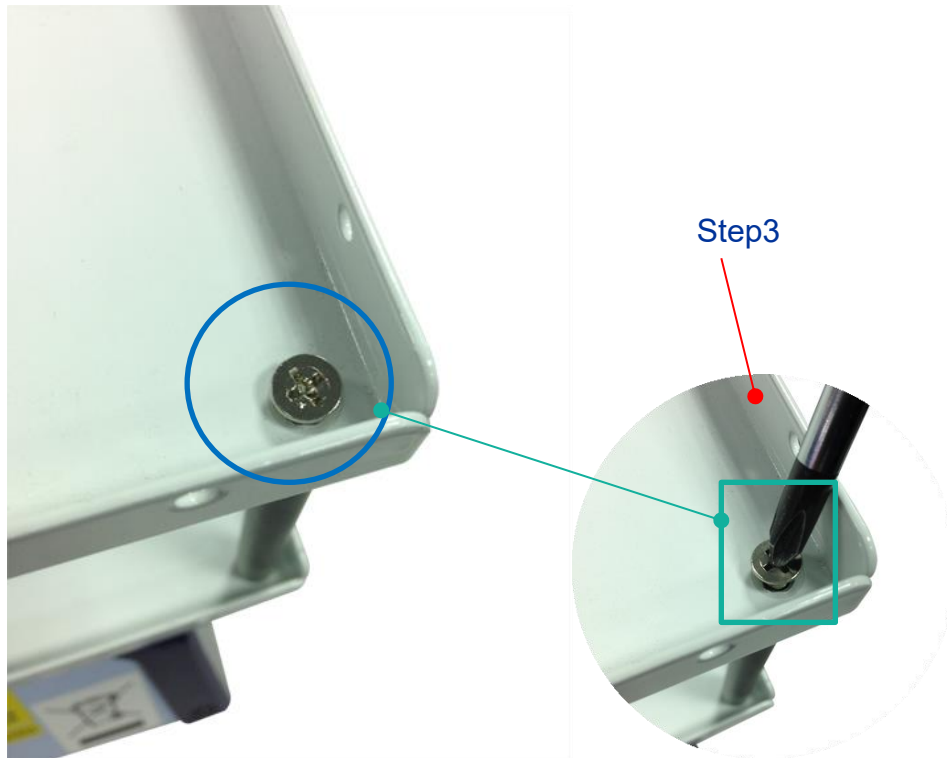
Step2. Release the springs and remove the black rubber pad that are on the platform.



Step3. Insert 4 pillars to the holes at 4 corners. And fasten the pillars tightly.

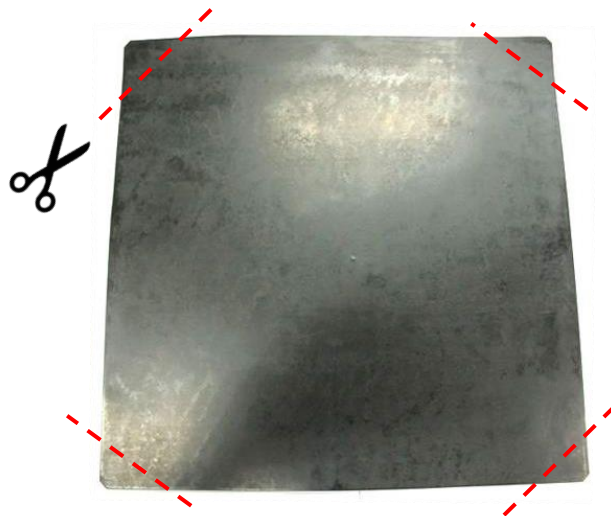


Step3. And fasten the flathead screws to fix the second platform.



Note (1):

After finish the installation of double platforms, remember to put the rubber pads back to the platforms. But note that users might have to cut off small pieces of the rubber pad at 4 corners to avoid blocking the pillars.



Note (2):

If users require the double platform with double-layer pillars, just insert another pillar on the first-layer pillar and fasten it tightly; then screw the flathead screw to fix the second platform on the pillars.

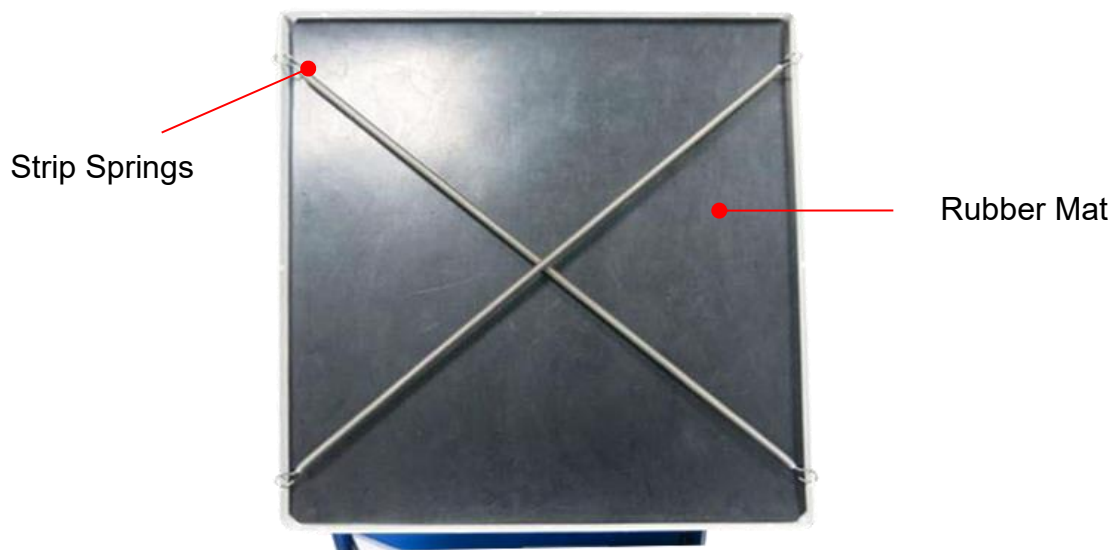


Instruction of Drilling Holes on the Rubber Mat

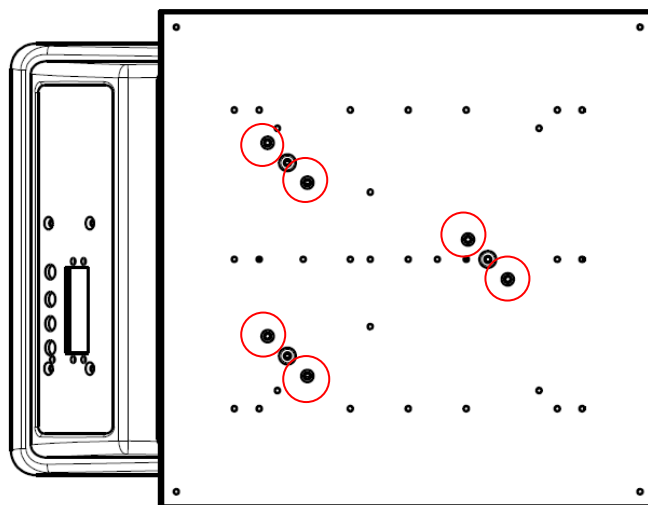
(to install the flask holders with the rubber mat on platform.)

The standard rubber mat that Major Science provides is without any drilled holes. If you would like to fasten the flask holders on the platform along with the rubber mat, here we offer the instruction of drilling procedure.

Step1. Release the strip springs, and remove the rubber mat.



Step2. Reveal the platform, and loosen the screws that fasten on the platform.



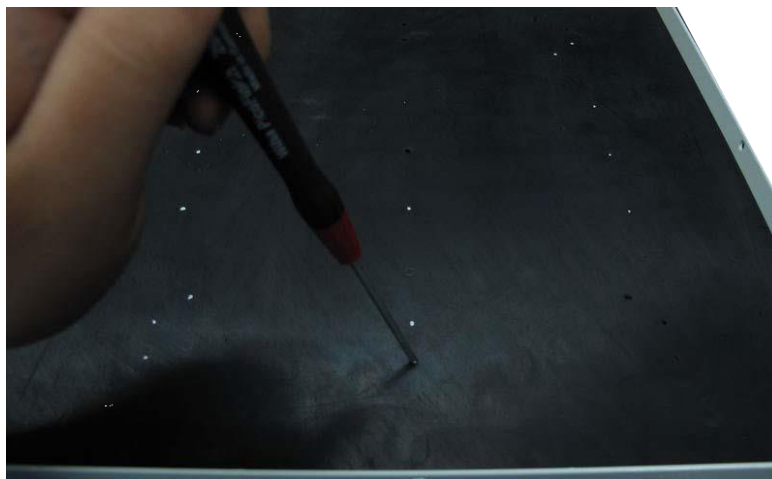
- Step3. Remove the platform from the machine, and put the rubber mat back to the platform, and place a thick cushion (the size should be similar as the size of platform) on the rubber mat and platform.



- Step4. Turn over the platform, and use a white marker to mark the screw holes that fasten the flask holders on the rubber mat.



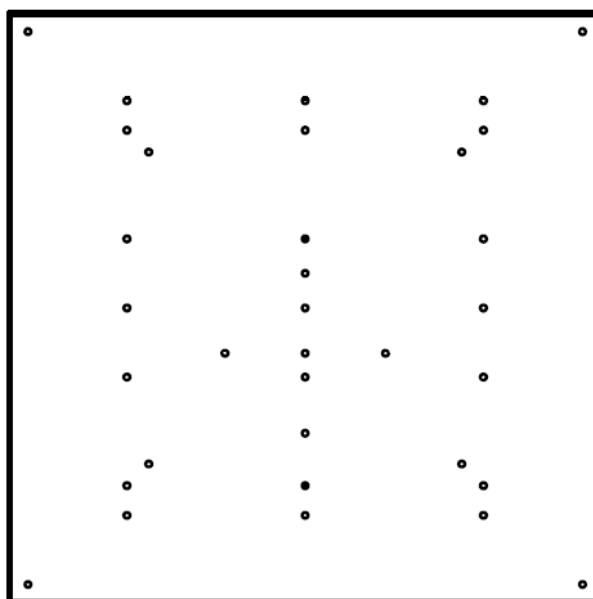
Step5. Use a sharp tool to drill the marked dots on the rubber mat. (The small flathead screwdriver is used for drilling in the picture; it is strongly suggested using the professional drilling tools when drilling the mat.)



Step6. The finished rubber mat should be as the picture below.

Note:

The rubber mat in the illustration below has been drilled for the different sizes of flask holders (from 125 ml to 2000 ml).

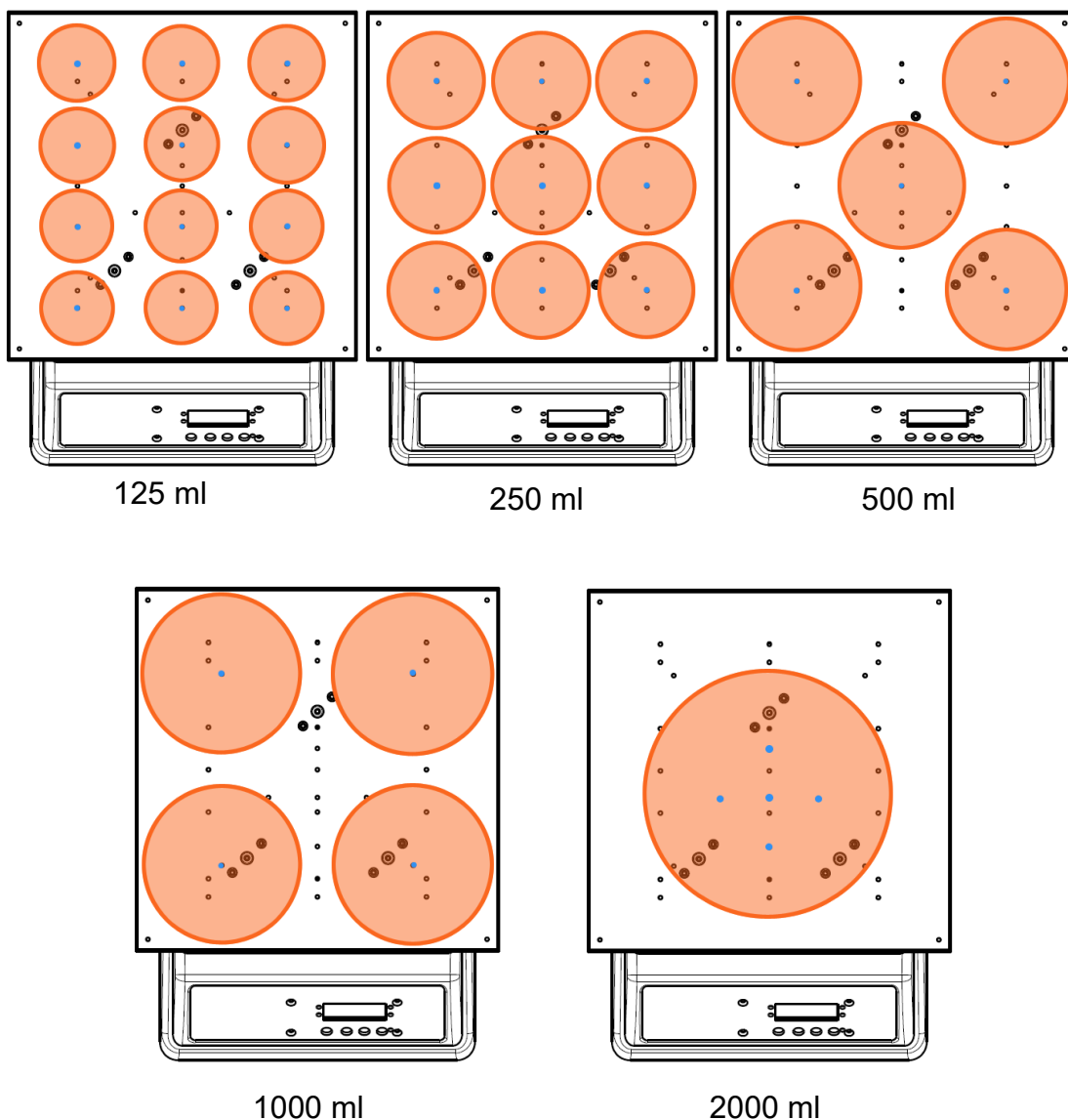


Step7. Assemble the platform back. Then you'll be able to install the flask holders on it.

Note:

Use the correct-sized screws to install the flask holders on the platform along with the rubber mat. We'll provide a set of holder screws attached to your purchase of MS Orbital Shaker (with flask holders).

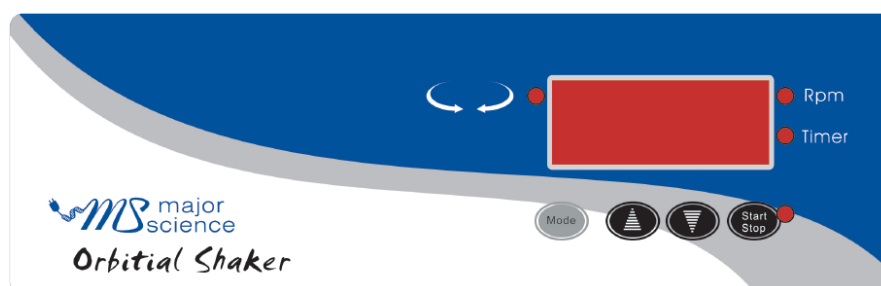
** If the rubber mat is not required when you install the holders, please use M4 × 8 mm screws to fasten them in case of damages on other parts. The arrangement of flask holders is illustrated as below.*



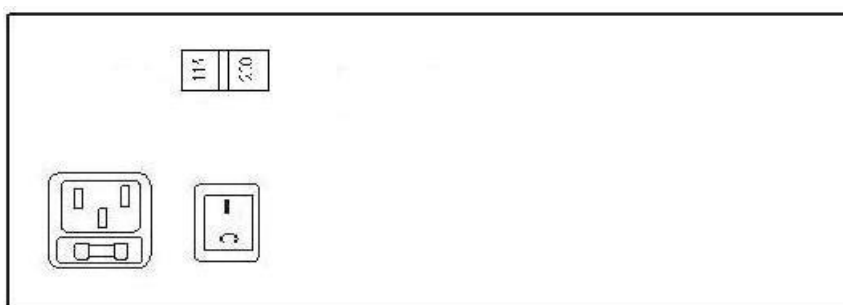
Section 4 Operation Instructions

4.1 Controls and Features





Please refer to the following page for the location of the following controls and features.



Front Control Panel




Rear of Unit

1.  **Key** – to increase either rpm or time value
– to increase shaking cycles rotation for forward and backward
2.  **Key** – to decrease either rpm or time value
– to decrease shaking cycles rotation for forward and backward
3.  **Key** – activate or stop the unit.
4.  **Key** – To set either rpm or timer setting mode

5. **TIMER** – This LED light indicates on Timer setting mode

6. **Rpm** - This LED light indicates on Rpm setting mode.

 - This LED light indicates on two directions rotation cycles setting mode.

8. **AC Power Switch** – to switch the unit power ON/OFF

9. **AC Power Cord and Fuse Holder** – Power Cord Socket and Fuse Holder


10. **Rated Voltage selection switch** – For select suitable rated voltage



4.2 Start the operation



1. Place MS Orbital Shaker on a sturdy and level surface in a safe, dry place, away from laboratory traffic.


2. Ensure that the AC power switch is OFF, then plug the three-pronged power cord into a grounded three-prong AC outlet of the appropriate voltage (selectable 115V or 220V as indicated on the rating sticker near the AC cord on the back of the unit).

3. Turn the AC power ON.

4. Press  Key to select either rpm or timer mode for setting up.

5. Press  Key or  Key to adjust the desired rpm and timer.

6. If two directions orbital shaking is required, press  Key to select two directions rotation circles setting mode for setting up. Press 

Key or  Key to adjust the rotation circles between clockwise and anti-clockwise orbital interchange.

※ Two directions orbital shaking function shall be only applied below 100rpm

7. Press  Key to start shaking.

8. Press  Key again to stop the unit.

4.3 Power Recover function

If MS orbital shaker was switched off during the shaking state due to a power outage, upon resume of power the system will start buzzing and countdown from 10 to 0. After which it will resume back to the shaking state, and the timer will resume back to the original set time.

Section 5 Troubleshooting & Maintenance

Many operating problems may be solved by carefully reading and following the instructions in this manual accordingly. Some suggestions for troubleshooting are given below. Should these suggestions not resolve the problem, contact our SERVICE DEPARTMENT or a distributor in your region for assistance. If troubleshooting service is required, please include a full description of the problem.

Problem	Recommendations
LED does not light up	1. Check the FUSE
	2. Ensure that the AC power switch is ON
	3. Check the three-pronged power cord are properly plugged into a grounded three-prong AC outlet of the appropriate voltage

Replacing the Fuse

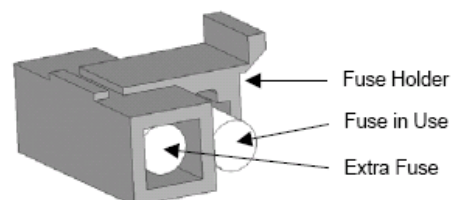
For additional fuses, contact Major Science co. Ltd.

To replace the fuse:

1. Turn off the main power switch on the rear of MS Orbital Shaker and detach the power cord from the rear of MS Orbital Shaker.
2. Open the fuse compartment located inside the Power Entry Module by inserting a small flat blade screwdriver into the slot below the ON/OFF switch. Turn the screwdriver to gently pry open the fuse compartment.

Note: The fuse compartment will not open with the power cord in place.

3. Pull the fuse holder out of the compartment and inspect the fuse. If the fuse is burned or there is a break in the fuse element, replace the fuse with an identical type of fuse (0.63A/250V~) as provided in the fuse holder (see figure below).
4. Place the fuse holder back into the compartment
5. Snap the cover closed.



Maintenance

MS Orbital Shaker may be cleaned with a moist cloth containing a mild soap solution. The belts might need to be replaced after running out its life time, and please contact Major Science or its distributor for this part.

Section 6 Ordering Information

Cat. No.	Product Description
MS-NOR-30	MS Orbital Shaker with 30 x 30cm platform and flat non-slip rubber mat, 110V/220V~
MS-NOR-3001	MS Orbital Anti-moisture Shaker with 30 x 30cm platform and flat non-slip rubber mat, 110V/220V~
ACCESSORIES	
MW-SP	Strip springs (pack of 2), 265mm
MS-P3030	Additional 30 x 30cm platform with attachable 10cm pillars 8 pcs and flat non-slip rubber mat
MS-DIMPLED-30	30 x 30cm dimpled mat
MS-FLAT-30	Non-slip rubber mat 30x30 cm
PPL-04-SI-SI-200-3	Sticky Pad, 20x20 cm
MS-UP-30	Universal adjustable platform, 30x30 cm (Maximum capacity: 2x 2L flasks)
SI-200-08	Flask Holder, 50ml
SI-200-09	Flask Holder, 125ml
SI-200-10	Flask Holder, 250ml
SI-200-11	Flask Holder, 500ml
SI-200-12	Flask Holder, 1000ml
SI-200-13	Flask Holder, 2000ml

Section 7 Warranty

Major Science warrants apparatus of its manufacture against defects in materials and workmanship, under normal service, for **one year from the shipping date to purchaser**. This warranty excludes damages resulting from shipping, misuse, carelessness, or neglect. Consumable parts (O-ring belts, rubber mat and strip spring) are not covered by our warranty. Major Science's liability under the warranty is limited to the receipt of reasonable proof by the customer that the defect is embraced within the terms of the warranty. All claims made under this warranty must be presented to Major Science within one year following the date of delivery of the product to the customer.

Manufacturer:

Major Science Co., Ltd.

Address:

Headquarters:

Major Science Co., Ltd.

Contact Information:

Main Office :

No. 156, Sec. 1, Guoji Rd., Taoyuan Dist.,
Taoyuan City 33061,
Taiwan

T/ +886-3-3762878

F/ +886-3-3761310

E-mail : info@majorsci.com