

INSTRUCTION MANUAL



Advanced Orbital Shaker



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PACKAGE CONTENTS

Orbital or Reciprocating Shaker, Non-skid rubber mat,
92" (234cm) detachable power cord, Instruction manual, Warranty card

WARRANTY

Manufacturer warrants this product to be free from defects in material and workmanship when used under normal conditions for five (5) years. Please complete and return the enclosed warranty card. For your reference, make a note of the serial number and date of purchase here.

Serial Number: _____

Date of Purchase: _____

INSTALLATION

Upon receiving the SiliCycle Orbital Shaker, check to ensure that no damage has occurred during shipment. It is important that any damage that occurred in transport is detected at the time of unpacking. If you do find such damage the carrier must be notified immediately.

After unpacking, place the shaker on a level bench or table, away from explosive vapors. Ensure that the surface on which the unit is placed will withstand typical heat produced by the unit and place the unit a minimum of six (6) inches from vertical surfaces. Always place the unit on a sturdy work surface.

The Orbital Shaker is supplied with a power cord that is inserted into the IEC connector on the back of the unit first, then it can be plugged into a properly grounded outlet. The 120V unit plugs into a 120 volt, 50/60 Hz source. The 230V unit plugs into a 230 volt, 50/60 Hz source.

MAINTENANCE & SERVICING

The Orbital Shaker is built for long, trouble-free, dependable service. No lubrication or other technical user maintenance is required. It needs no user maintenance beyond keeping the surfaces clean. However at least every three (3) months you should:

- Unplug the unit.
- Remove any accumulated dirt from the base and tray.
- Check all accessible items to make sure they are properly tightened.

The unit should be given the care normally required for any electrical appliance. Avoid wetting or unnecessary exposure to fumes. **DO NOT** use a cleaning agent or solvent on the front panel which is abrasive or harmful to plastics, nor one which is flammable. Always ensure the power is disconnected from the unit prior to any cleaning. If the unit ever requires service, contact your SiliCycle representative.

INTENDED USE

These Shakers are intended for general laboratory use.

ENVIRONMENTAL CONDITIONS

Operating Conditions: Indoor use only.

*For use in CO₂ environments, incubators, or cold rooms.

Temperature:	-10 to 60°C (14 to 140°F)
Humidity:	maximum 80% relative humidity, non-condensing
Altitude:	0 to 6,562 ft (2000 M) above sea level
Mains supply voltage:	Fluctuations are not to exceed 10 percent of the nominal supply voltage.

Non-Operating Storage:

Temperature:	-20 to 65°C (-4 to 149°F)
Humidity:	maximum 80% relative humidity, non-condensing

Installation Category II and Pollution Degree 2 in accordance with IEC 664.

***Avoid cold starts:** Unit is not designed to start after being in a cold room environment. Bring unit into cold room from a room temperature environment, operate and remove unit from cold room as soon as operation is complete.

EQUIPMENT DISPOSAL

This equipment must not be disposed of with unsorted waste. It is your responsibility to correctly dispose of the equipment at life-cycle-end by handing it over to an authorized facility for separate collection and recycling. It is also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect the persons involved in the disposal and recycling of the equipment from health hazards.



For more information about where you can drop off your waste of equipment, please contact SiliCycle. By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

SAFETY INSTRUCTIONS

Please read the entire instruction manual before operating the Orbital Shaker.



WARNING! DO NOT use the Orbital Shaker in a hazardous atmosphere or with hazardous materials for which the unit was not designed. Also, the user should be aware that the protection provided by the equipment may be impaired if used with accessories not provided or recommended by the manufacturer, or used in a manner not specified by the manufacturer.

Always operate unit on a level surface for best performance and maximum safety.

DO NOT lift the unit by the tray.



CAUTION! To avoid electrical shock, completely cut off power to the unit by disconnecting the power cord from the unit or unplug from the wall outlet. Disconnect unit from the power supply prior to maintenance and servicing.

Spills should be removed promptly. **DO NOT** immerse the unit for cleaning.

DO NOT operate the unit if it shows signs of electrical or mechanical damage.

SAFETY INSTRUCTIONS CONT'D



Earth Ground - Protective Conductor Terminal



Alternating Current



Pinch Point - Keep fingers clear during operation.

STANDARDS & REGULATIONS

SiliCycle hereby declares under its sole responsibility that the construction of this product conforms in accordance with the following standards:

Safety standards:

EN 61010

EN 61010-2-051

CAN/CSA C22.2 No. 61010-1-04

UL 61010-1

EMC standards:

CISPR 11 IEC 61000-4-3

IEC 61326 IEC 61000-4-4

IEC 6100-3-2 IEC 61000-4-5

IEC 6100-3-3 IEC 61000-4-6

IEC 61000-4-2 IEC 61000-4-11

Associated EU guidelines:

EMC directive 2004/108/EC

LVD directive 2006/95/EC

ROHS directive 2011/65/EU

CONSIGNES DE SÉCURITÉ

S'il vous plaît lire l'intégralité du manuel d'instructions avant de faire fonctionner l'agitateur orbital.



AVERTISSEMENT! N'UTILISEZ PAS l'agitateur orbital dans un milieu dangereux ou en présence de matières dangereuses non conformes à la conception de l'appareil. L'utilisateur doit également être conscient que la protection assurée par l'équipement peut être amoindrie en cas d'utilisation avec tout accessoire autre que ceux fournis ou recommandés par le fabricant ou en cas d'utilisation contraire aux spécifications du fabricant.

Toujours utiliser l'appareil sur une surface nivelée pour assurer une performance optimale et un maximum de sécurité.

NE PAS soulever l'appareil en le tenant par le plateau.



MISE EN GARDE! Pour éviter les électrocutions, couper complètement l'alimentation électrique de l'appareil en débranchant le cordon d'alimentation de l'appareil ou de la prise murale. Déconnecter l'appareil de la source d'alimentation électrique avant de procéder à tout entretien ou réparation.

Essayer immédiatement tout liquide renversé par accident.

NE PAS immerger l'appareil en vue de son nettoyage.

NE PAS utiliser l'appareil en présence de tout signe de dommage électrique ou mécanique.



Mise à la terre - Borne du conducteur de protection



Courant alternatif



Point de pincement – garder les doigts à l'écart de l'appareil pendant l'utilisation.

NORMES ET RÉGLEMENTATIONS

SiliCycle déclare par la présente sous sa seule responsabilité que la conception de ce produit répond aux exigences des normes suivantes :

Normes de sécurité :

EN 61010

EN 61010-2-051

CAN/CSA C22.2 No. 61010-1-04

UL 61010-1

Normes CEM :

CISPR 11 IEC 61000-4-3

IEC 61326 IEC 61000-4-4

IEC 6100-3-2 IEC 61000-4-5

IEC 6100-3-3 IEC 61000-4-6

IEC 61000-4-2 IEC 61000-4-11

Directives européennes :

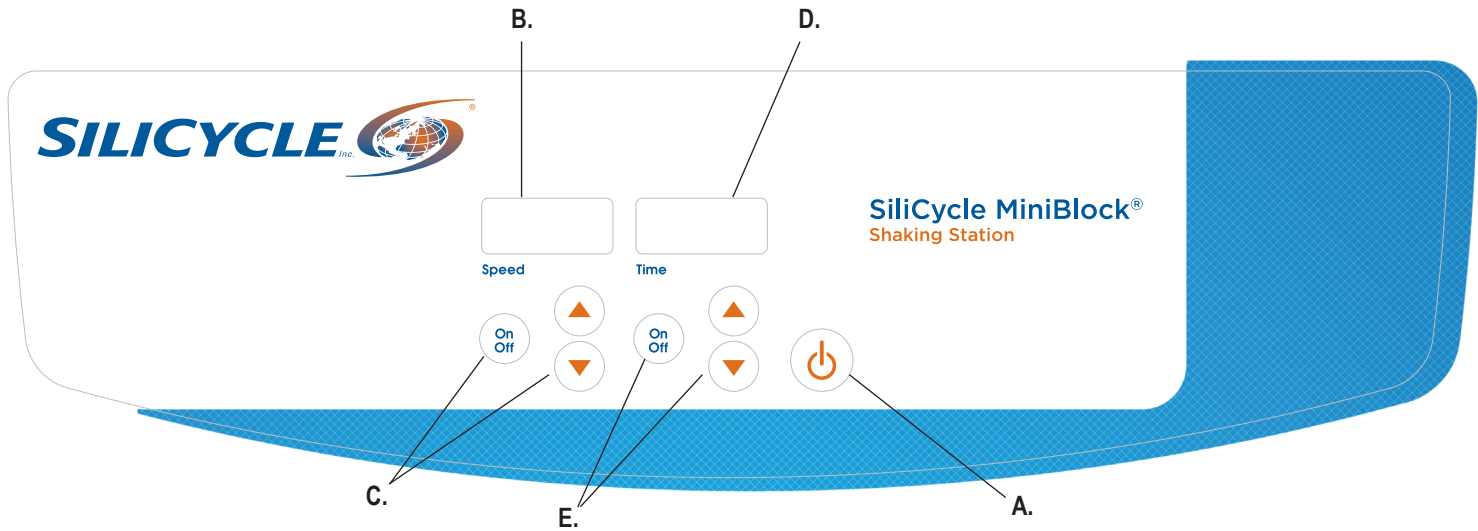
Directive EMC 2004/108/EC

Directive LVD 2006/95/EC

Directive ROHS 2011/65/EU

SPECIFICATIONS

Overall dimensions LxWxH	16.25 x 14 x 5.75 " (41.3 x 35.6 x 14.6 cm)
Tray dimensions LxW	13 x 11" (33 x 22.2cm)
Electrical	120 volts: 5 amps, 75 watts
	230 volts: 2.5 amps, 75 watts
Fuses	5mm x 20mm, 5 amp quick acting
Speed Range	15 to 500 rpm
Speed Accuracy	
Above 100rpm	±1% of set speed
Below 100rpm	±1rpm
Orbit	0.75" (19mm)
Capacity	~35 lbs (16kg) @ 75 rpm
	~5 lbs (2.3kg) @ 500 rpm
Timer	1 second to 160 hours
Controls	See next page
Ship Weight	49 lbs (22.2 kg)



CONTROL PANEL

The front panel of the Orbital Shaker contains all the controls and displays needed to operate the unit.

A. Standby button/standby indicator light: The standby indicator light will illuminate when the unit is plugged in. The unit will be in standby mode. Press the standby button to start the speed and time functions. The standby indicator light will shut off. Press the standby button again and the unit will once again be in standby mode.

B. Speed display: Displays the speed of the shaker.

C. Up/down arrows: For set-point control. On/off button starts/stops shaking function.

D. Time display: Displays accumulated time (continuous mode) or how much time is remaining (timed mode). The display range is from 0 to 9,999 minutes in one (1) second increments. The display will indicate minutes and seconds until the timer reaches 99 minutes and 59 seconds (99:59), then the display will automatically display minutes up to 9,999.

E. Up/down arrows for setpoint control. On/off button starts/stops the timer function.

OPERATING INSTRUCTIONS

The Orbital Shaker has been designed for the speed and time functions to work independently of one another. The speed can be re-set without re-setting the timer and the timer can be stopped and started without interrupting the shaking function.

1. Getting ready:

- a. Plug the cord into a properly grounded outlet. The standby indicator light will illuminate, verifying power to the shaker.
- b. Press the standby button to move the unit from standby mode. The standby indicator light will turn off and the speed and time displays will illuminate, displaying the previously used settings.

2. Setting speed:

- a. Press the up/down arrow below the speed display until you reach the desired speed. When you release the button, the display will blink off and then on indicating the new set speed has been accepted.
- b. Press the on/off button to start the shaking function. The indicator light below the speed display will illuminate and blink until the setpoint is reached. Once the set-point is reached the light will stop blinking and remain lit until shaking has ceased. The microprocessor controlled ramping feature slowly increases speed until the set-point is reached which helps to avoid splashing, and provides excellent low end control.
- c. Speed adjustments can be made without interrupting shaking by using the up/down arrows below the speed display. After the change has been made and you release the button, the display will blink off and then on indicating the new set speed has been accepted.
- d. To stop the shaking function press the on/off button below the speed display. The speed indicator light will turn off.

3. Setting time to zero (0:00) and continuous mode: Accumulated time.

- a. Press and hold the on/off button below the time display. After three (3) seconds, the display will indicate the previous set time.
- b. Simultaneously press both the up and the down arrows, the display will indicate

zero (0:00). The unit time is now set to zero (0:00) minutes. Alternately, you can use the up/down arrows to get to zero (0:00).

- c. Press the on/off button below the time display. The display will indicate accumulated time. The up/down arrows will become inactive. To stop timer, press the on/off button again. **IMPORTANT:** This will **NOT** interrupt the shaking function. Press the on/off button below the speed display to interrupt the shaking function.
- d. To reset, press and hold the on/off button below the time display. After three (3) seconds the display will indicate the previous set time, which was zero (0:00).

4. Setting timed mode: Programmed time.

- a. Press the up/down arrows below the time display until you reach the desired time.
- b. Start this function by pressing the on/off button below the time display. The unit will run for the selected time, the up/down arrows will become inactive while the timer is running. The unit will stop shaking when time display reaches zero (0:00). Four (4) audible beeps will indicate the count down function is complete. The time display will default back to the set time. To repeat for the same time, simply depress the on/off button again.
- c. To interrupt an automatic timing cycle before it is completed, press the on/off button below the time display. The display will flash off and on to indicate the time function is on "hold". **IMPORTANT:** This will **NOT** interrupt the shaking function. Press the on/off button below the speed display to interrupt the shaking function. Restart the timer by pressing the on/off button below the time display. Unit will continue counting down to zero (0:00). When the display reaches zero (0:00), you will hear the four (4) audible beeps that indicate the count down function is complete and the shaking function will cease.

5. Turning unit off:

OPERATING INSTRUCTIONS CONT'D

- a. To turn the unit off, press the standby button. The speed and time displays will be blank, the standby indicator light will illuminate. The Orbital Shaker should be kept in standby mode when not in use. To completely cut off power to the unit, disconnect the power cord from the unit or unplug from the wall outlet.

OPERATING TIPS

Centering your sample and even weight distribution on the tray helps with balance and stability. As a safety feature, a built-in program will shut power off to the motor if the tray is prevented from rotating, or the unit is overloaded beyond its recommended weight capacity. The shaker will automatically restart after a power interruption. Built-in memory maintains the last used speed and time settings during a power interruption.

LOAD SENSING FUNCTION

The Orbital Shaker is equipped with a load sensing function that can be activated by the user. This function provides protection against improper positioning of load and maximum load being exceeded. When activated, the unit will automatically sense improper load conditions and slow to a safe running speed, then display that speed followed by E04 on the speed display. The unit will also beep three (3) times every 60 seconds until the error is reset by pressing the speed on/off button. To activate the load sensing function use the following steps:

1. Place the unit in standby mode.
2. Press and hold the speed on/off button and press the standby button. The unit will beep two (2) times, confirming the function is enabled.
3. To restore normal operation, remove AC power to the unit for ten (10) seconds and then restore. If the E04 error occurs be sure the load is within the maximum specification and properly balanced (centered on tray) and/or reduce sample size/speed before restarting the unit. If the E04 occurs due to acceptable sample vibration or another vibration source, the vibration sensing function can be disabled as described above.

BEEPER PREFERENCE

To silence beeper operation (except for error codes), with the unit in standby mode, press and hold the time on/off button and press the standby button. To restore normal beeper operation, remove AC power to unit for ten (10) seconds and then restore.

CALIBRATION PROCEDURE

This procedure is used to self calibrate the Orbital Shaker. The tray should be free of any samples, vessels, and accessories prior to calibrating.

1. Turn unit on. Speed and time displays will be illuminated.
2. Press and hold the standby button and momentarily press the speed on/off button. The speed display should read "CAL".
3. The unit will run for approximately one (1) minute and automatically calibrate.

RS-232 SERIAL PORT

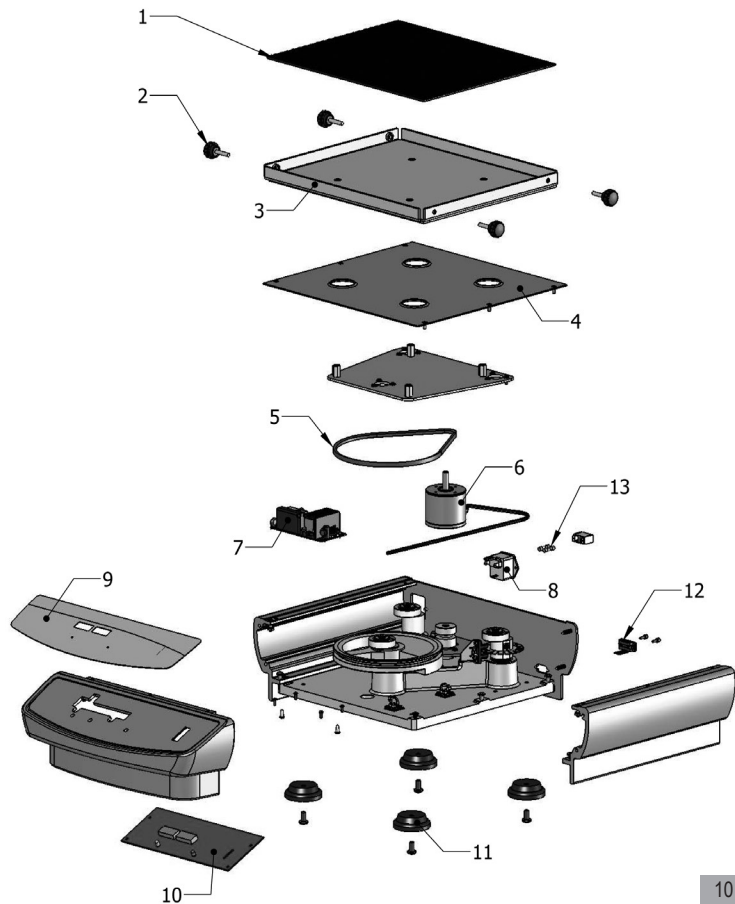
RS-232 serial port provides two-way communications for data logging and unit control. If you need additional details, please contact **SiliCycle** for technical support at: miniblock@silicycle.com.

TROUBLESHOOTING

Problem	Cause	Solution
Unit will not run	Mechanical obstruction Motor obstruction	Add or replace fuse as necessary. If problem persists, please contact your SiliCycle representative for repair.
Unit is excessively noisy	Sensor fan misaligned Motor misaligned	Ensure that tray is secured tightly. If problem persists, please contact your SiliCycle representative for repair.
Unit not shaking at proper speed	-	Perform speed calibration test on page 8. If problem persists, please contact your SiliCycle representative for repair.
E3	Mechanical obstruction Drive system failure Ceased bearing Drive belt broken	Remove mechanical obstruction. If problem persists, the reason may be the drive system and should not be addressed by the end user. Contact your SiliCycle representative for repair.
E4	Improper positioning of load Maximum load exceeded	Ensure the load is evenly distributed and does not exceed the maximum load capacity for the unit. See "Load Sensing Function" on page 8. If problem persists, please contact your SiliCycle representative for repair.
E8	Electronics error	This error cannot be fixed by the end user. Please contact your SiliCycle representative for repair.

REPLACEMENT PARTS

DESCRIPTION	PART NUMBER
1. Rubber mat	MB-480004-00
2. Thumbscrew	MB-580001-00
3. Tray	MB-280700-00
4. Top plate	MB-280703-00
5. V-belt	MB-580000-00
6. Motor	MB-280633-00
7. Power supply	MB-380623-00
8. IEC power inlet, 120V	MB-380506-00
IEC power inlet, 230V	MB-380237-00
9. Front panel	MB-380809-00
10. Display circuit board	MB-380806-00
11. Feet	MB-580002-00
12. Cable, RS 232, 25"	MB-345154-00
13. Fuse	MB-380238-00
Detachable 92" (234cm) power cord:	
120V	MB-330100-00
Euro plug	MB-330101-00
UK	MB-330102-00
SWISS	MB-330103-00



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