



**Orbital and Linear Shaker
MS-OS500/MS-OS800
MS-LS3502.5/MS-LS3507.5
User Manual**



MARSHALL

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1. Safety Instructions

1.1 Safety Instructions

	<p>Warning!</p> <ul style="list-style-type: none"> • Read the operating instructions carefully before use. • Ensure that only trained staff works with the instrument.
	<p>Protective ground contact!</p> <ul style="list-style-type: none"> • Make sure that the electrical socket is grounded (protective ground contact) before use.

- (1) Wear the personal protective equipment in accordance with the hazard category of the media to be processed.
 - Splashing of liquids.
 - Vibration force led to broken glass container.
 - The body, hair, clothes, jewelry are inhaled.
- (2) Use the instrument following the safety instructions and profession safety rules to avoid any accident.
- (3) Users are not allowed to touch moving parts of the instrument to avoid any accidents. Pay attention to protect hands or fingers from rolling when moving the instrument.
- (4) Set up the instrument in a spacious area on an stable, clean, non-slip, dry and fireproof surface. Do not operate the instrument in explosive atmospheres, with hazardous substances or under water.
- (5) Observe the vessel on the shaking table for medium splashing out of liquid when setting the motor speed. Reduce the motor speed if the instrument is not running smoothly.
- (6) Accessories must be securely attached to the instrument so that it cannot come off by itself, and vessels must be firmly placed on the shaking table to avoid any injury.
- (7) Working with combustible media or flammable materials may result in additional hazards. Only process media that will not react dangerously to the extra energy produced through processing should be used on the instrument.
- (8) Always disconnect the plug before fitting accessories. Check the instrument and accessories beforehand for damage each time you use them. Do not use damaged components.
- (9) The instrument may only be opened by trained technicians. And always disconnect the plug beforehand.
- (10) The operating voltage required as stated on the instrument and voltage in the supply network must match.
- (11) Do not cover the instrument. Protect the instrument and accessories from bumps and impacts.
- (12) Keep away from high magnetic field.

1.2 Proper Use

The instrument is designed for mixing or shaking liquids in schools, laboratories or factories. This instrument is suitable for usage in various attachments for mixing liquids in bottles, flasks, test tubes for a maximum supported weight of 7.5 kg (330) and 2.5Kg (180). This instrument is not suitable for use in residential areas or other areas that may cause danger to the user or instrument as mentioned in

1.1.

1.3 Inspection

1.3.1 Receiving Inspection

Unpack the instrument carefully and check for any damages which may have arisen during transport. If it happens, please contact supplier for technical support.



Note: If there is any apparent damage to the unit, please do not plug it into the power line.

1.3.2 Listing of Items

The package includes the following items:

Item	Quantity
Main unit	1
Power cable	1
User manual	1

2. User Instructions

2.1 Trial running

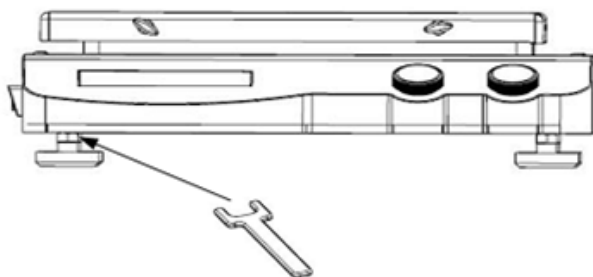
Do trial operation as follows:

- (1) Make sure the required operating voltage and power supply voltage match.
- (2) Ensure the socket is securely earthed.
- (3) Plug in the power cable, Power ON the instrument.
- (4) LCD displays the safe rotary speed limit and operating mode.
- (5) Turn the speed knob to set the rated rotary speed.
- (6) Press the speed knob. And the shaking function is switched ON.
- (7) Press the motor regulation knob again, and the shaking function is switched OFF.

If these operations above are normal, the instrument is ready to operate.

If these operations are not normal, the instrument may be in security protection state or be damaged.

If the mounting surface is not flat, you can improve the stability of the instrument with the adjustable feet. To do this, turn the appropriate foot downward with the wrench until the instrument is standing securely on the surface. (Refer to Picture 1)



Picture 1

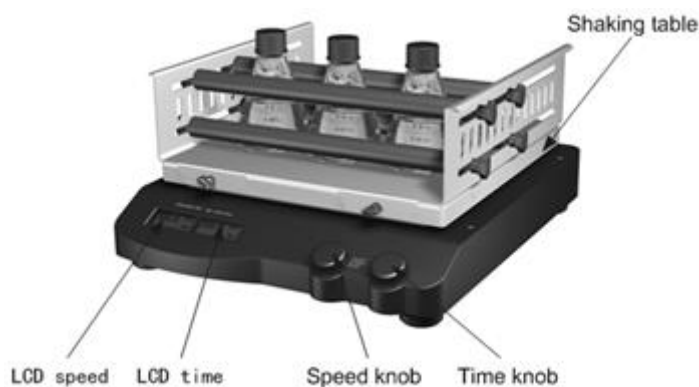
2.2 Control and Set

2.2.1 Technical Parameters

Model	MS-OS500 MS-LS3507.5	MS-OS800 MS-LS3502.5
Shaking Motion	Orbital /Linear	
Orbital Diameter	10mm	4mm
Max. Shaking Weight (with attachment)	7.5kg	2.5kg
Motor Type	Brushless DC motor	
Motor Input	28W	
Motor Output	15W	

Speed Range (rpm)	100-500 (Orbital)	100-800 (Orbital)
	100-350 (Linear)	100-350 (Linear)
Speed Display	LCD	
Time Range	1-1199min	
Operation Mode	Continuous/timed operation	
Ambient Temp.	5-40°C	
Protection Type	IP21	
Connection Interface	RS232	
Power Consumption	30W	
Power supply	AC110/220V±10%, 50/60Hz	
Standard Accessory	1pc SK330.1 universal attachment	1pc SK180.1 universal attachment
External Size (W*D*H)	370*420*100mm	300*340*100mm
Package Size (W*D*H)	500*600*230mm (Shaker)	450*450*200mm (Shaker)
	380*480*200mm (Accessory)	380*480*200mm (Accessory)
Gross Weight	15kg (Shaker), 2kg (Accessory)	10kg, 2kg (Accessory)

2.2.2 Control



Picture 2

Items	Descriptions
Speed knob	Set the rated rotary speed. “rotation” is switched ON or OFF via pressing the knob
Time knob	Set working time.

LCD	Display the status of instrument and any set
Main switch	Switch ON or OFF.

- Put the instrument on stable and safe place and plug in the mains power.
- Turn ON the mains switch on the left panel.
- The instrument starts self-test.
- The instrument shows rated speed and time after initialization.
- Turn the speed knob on the left side to set the rated speed.
- Press the speed knob and characters on the left LCD do not flash any more, and the shaking function is switched ON.
- Press the speed knob again and characters on the left LCD begin to flash, and the shaking function is switched OFF.
- Turn the time knob on the left side to set the rated time
- Press the time knob and characters on the LCD do not flash any more, and the timing function is switched ON.
- Press the time knob again and characters on the right LCD begin to flash, and the timing function is switched OFF.

2.2.3 Set

(1) Set time

The rated shaking time can be set by turning the time knob on the right. A distinction is made for the shaking time setting between timed mode and continuous operation. If continuous mode is selected, the shake can continue its shaking function for any amount of time with the previously set speed. If timed mode is selected, the shaker can run in the set time. After the instrument is powered OFF and restarted, the set time is erased to zero blanking and it switches into offline operating mode.

If a target time (max. 19h59min) and speed are set, users can activate the instrument with pressing the time knob, and the time begin to read, If:

A, Press the time knob, the speed and the time will stop. Press the time knob again, restart the shaking function, the time will use the pre-set time.

B, Press the speed knob, the speed and the time will stop. Press the time knob again, restart the shaking function, the time is not (There are flashing on the right of the LCD), press the time knob again restart the time function. The time will use the pre-set time.



Note: The current set time can be varied at any time.

(2) Set speed

The rated speed and upper speed limit can be set by turning the speed knob (As the Picture 6). The continuous mode can be switched ON with pressing the left knob without the time setting and switched OFF with pressing the knob again.

Adjust the motor speed knob slowly in order to keep the instrument running smoothly.



Note: The current set speed can be varied at any time.

2.3 Operating modes

2.3.1 Mode A

Operating mode A is the default mode set in factory. After turning ON the instrument with the mains switch, the shaking and timing functions are turned OFF. The LCD displays the set time and speed values. They are adopted or varied when the corresponding functions are turned ON.

After turning ON the instrument, the following process will be shown on the display.

(1) The left LCD displays “SAF” and the right displays the upper speed limit (rpm) which can be set by pressing the speed knob and turning at the same time.



Picture 3

(2) The LCD displays run modes “StA”, “A” or “B” for about 2 seconds.



Picture 4

(3) The set or stored speed value is shown in the left display, and the set or stored time value is shown in the right display. Turn the speed knob and time knob can set the speed and time.



Picture 5

(4) After pressing the speed knob or time knob, the instrument begins to run at the set speed. The actual speed and time remaining are shown in the LCD. If the remaining has reached zero, the shaker stops its motion. Press the speed knob alone, the instrument will work at continuous mode (The time function is OFF).



Picture 6



Note: The set values can be varied during shaking. Shaking can be stopped by pressing the left or right knob.

2.3.2 Mode B

When the instrument is turned ON and values for speed and time are erased to zero, users can set. The upper speed limit that has been set is taken over from operating mode A and cannot be modified. After the power has been turned OFF, the instrument will no longer automatically start up in operating Mode B by itself.

After turning ON the instrument and selected run mode, the following process will be shown on the display.

(1) The left LCD displays “SAF” and the right displays the upper speed limit(rpm) which cannot be changed.



Picture 7

(2) The LCD displays run modes “StA” for about 2 seconds.



Picture 8

(3) The set speed value is shown in the left display, and the set time value is shown in the right display. Then set the motor rotary speed and time.



Picture 9



Picture 10

(4) After pressing the speed knob or time knob, the instrument begins to run at the set speed. The actual speed and time remaining are shown in the LCD. If the remaining has reached zero, the shaker stops its motion.



Picture 11



Note: The set values can be varied during shaking. Shaking can be stopped by pressing the left or right knob.

2.3.3 Switching the mode

Switch the operating mode as follows:

- Turn OFF the instrument with the mains switch.
- Hold down both knobs and turn ON the instrument with the mains switch. After about 5 second, you can let go of the knobs.
- Switch between operating Modes A and B in order.

2.4 Supported load

In order to ensure safe, the shaker must only be operated within the supported weight (7.5kg for 330 and 2.5Kg for 180).

Make sure the holding surface of the shaker is always clean and level. Ensure the individual shaking vessels must be placed evenly and fastened securely in the middle of the shaking table no matter one or multiple shaking vessels are placed.

3. Trouble shooting and Maintenance

3.1 Faults

- (1) When switched ON, the instrument doesn't work
 - Check whether the power cable fitted well
 - Check whether the fuse is broken
- (2) The speed cannot reach set value
 - Check whether it is overloaded
- (3) The motor does not start via pressing the speed knob and time knob
 - Check whether the time is set to zero

3.2 Interface

Orbital and Linear Digital Shaker, special adapter and cable are used to link to external device. And the Standard 9-pin interface to connect with the PC.

- The cable between the shaker and the computer used EIA Standard RS232C communication line, corresponding to the DIN 66020 interface.
- Transmission method: Asynchronous signal transmission.
- Mode of transmission: Fully Duplex.
- 1 start bit; 8 character bits; 1 stop bit.
- Transmission speed: 9600 bit/s.



Note: Forbid to plug in and plug off the power cable when the instrument working.

3.3 Maintenance and Cleaning

Use and maintain the instrument in right way to keep it in good operating state in order to lengthen its life time and avoid the damage to the instrument. Only use the cleaning agents which have been approved by manufacturer to clean the instrument.

Only use cleanser that we advised as below. Do not use a spray cleanser on the instrument when cleaning.

Dyes	Isopropyl alcohol
Construction materials	Water containing tenside / Isopropyl alcohol
Cosmetics	Water containing tenside / Isopropyl alcohol
Foodstuffs	Water containing tenside
Fuels	Water containing tenside

For materials which are not listed, please request information from manufacturer or your supplier. Before using another than the recommended method for cleaning or decontamination, the user must ascertain that this method does not destroy the instrument. Wear the proper protective gloves during cleaning of the instrument.



Note:

- a. Electrical instrument may not be placed in the cleansing agent for the purpose of cleaning.**
- b. The instrument must be cleaned and put it into the initial packaging carton before sending to service for repair, avoiding the contamination of hazardous.**
- c. Switch OFF the instrument and put it in the dry, clean, stable place at room temperature in long-term disuse.**

4. Warranty

- 1) Warranty is 12 months from EX-factory date (excluding consumable accessories).
- 2) We will take no responsibility for risks caused by improper operation and man-made damages.
- 3) After the expiration of warranty, our company is also responsible for repairs, but the corresponding maintenance cost should be charged.
- 4) We can provide equipment drawings and necessary technical data for maintenance companies or personnel trained by our company.

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