



**Digital Overhead Stirrer**  
**MS-OT20LC/MS-OT40LC**  
**MS-OT20LE/MS-OT40LE**  
**User Manual**

**MARSHALL**



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## **Preface**

Welcome to the “Digital Overhead Stirrer User Manual”. Users should read this manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

## **Service**

When help needed, you can always contact the service department of manufacturer for technical support .

Please provide the customer care representative with the following information:



- Serial number (on the rear panel)
- Certification
- Description of problem (i.e., hardware or software)
- Methods and procedures adopted to resolve the problems
- Your contact information

## **Warranty**

This instrument is warranted to be free from defects in materials and workmanship under normal use and service, for a period of 12 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident or abnormal conditions of operation.

For claims under the warranty please contact your local supplier. You may also send the instrument directly to manufacturer, enclosing the invoice copy and by giving reasons for the claim.

## 1. Safety Instructions

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

- When working wear personal safety guards to avoid the risk of:
  - Splashing liquids
  - Broken glass containers
- Follow the safety instructions, guidelines and accident prevention regulations.
- Do not touch the running parts, moving instrument care not rolling your fingers.
- Set up the instrument in a spacious area on a stable, clean, non-slip, dry and fireproof surface. Do not operate the instrument in explosive atmospheres, with hazardous substances or under water.
- Please note the vessel when set up the speed, to avoid splashing the sample. If the instrument does not run smoothly, please decrease the motor speed.
- Firmly secure the accessories and vessels in place to avoid damage or risk.
- Preparation of samples may lead to dangerous flammable. Only process samples that will not react dangerous.
- Use the standard accessories listed in the “accessories” section, and follow the instructions to use accessories to ensure safety. Please switch off the power before assembly of accessories, confirm the instrument and accessories are intact before switch on each time.
- The instrument only be opened by expert, please switch off before use.
- The voltage stated on the nameplate must correspond to the mains voltage.
- Do not cover the instrument during running. Prevent the collision and extrusion to instrument and accessories.
- Keep away from high magnetic field.

## 2. Proper Use


The instrument is designed for mixing sticky substance in schools, laboratories or factories. It can be installed on a variety of impeller, for different viscosity of the medium. This instrument is not suitable for using in residential areas or other constraints mentioned in Chapter 1.

Do not use the accessories recommended by the manufacturer, or failure to use the instructions, may be caused unsafe situation.

## 3. Inspection

### 3.1 Receiving Inspection

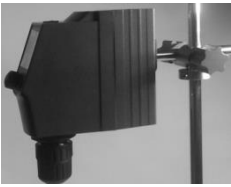


Unpack the instrument carefully and check for any damages which may have arisen during transport. If it happens, please contact manufacturer/supplier for technical support.

	<p><b>Note:</b></p> <p>If there is any apparent damage to the system, please do not connect to the power line.</p>
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### 3.2 Listing of Items


Item	Qty
Main unit	1
Power cable	1
User manual	1

## 4. System Assembly

<p><b>a. Install stand</b></p> <p>The stand must be assembled according to the following instructions. Adjust the height of the main unit, and the distance from main unit to the support holder by rotating the locking device. Anti-drop protector can be adjusted up or down, ensure the locking position is suitable for fixing the main unit, and then attach the main unit to the stand.</p>	 <p>Figure 1</p>
<p><b>b. Install stirring impeller</b></p> <p>Plug the stirring impeller into the drill chuck, and adjust the depth of stirring impeller into vessel. Rotate the drill chuck with your fingers to fix the stirring impeller.</p>	 <p>Figure 2</p>
	<p><b>Note:</b></p> <ol style="list-style-type: none"> <li>Overhead stirrer is a high-speed running device. The system are required to lock securely the corresponding components in each step of the assembly to avoid any movement of the main unit or stirring impeller which would be caused harm or damage to peripheral instrument and personnel.</li> <li>The stand is a support device for overhead stirrer. The corresponding components are required to be locked securely to avoid any movement which would be caused harm or damage.</li> <li>When install main unit and anti-drop protector, take care of your fingers to avoid harm.</li> </ol>

## 5. Trial Running

Follow the instructions below to trial operate:

LCD Digital (Enhanced) Overhead Stirrer	LED Digital (Enhanced) Overhead Stirrer
<ul style="list-style-type: none"> <li>•Ensure the required operating voltage and power supply voltage matched.               <ul style="list-style-type: none"> <li>•Ensure the socket must be earthed reliably.</li> </ul> </li> <li>•Connect the power cable, ensure the power on and begin self-checking.</li> <li>•Rotate the stirring button and set stirring speed.               <ul style="list-style-type: none"> <li>•Press stirring button and start stirring.</li> </ul> </li> <li>•Press again the stirring button and stop stirring.</li> </ul>	<ul style="list-style-type: none"> <li>•Ensure the required operating voltage and power supply voltage matched.               <ul style="list-style-type: none"> <li>•Ensure the socket must be earthed reliably.</li> </ul> </li> <li>•Counter-clockwise rotate the speed control button to the end before switch on instrument.</li> <li>•Connect the power cable, ensure the power on and begin self-checking.</li> <li>•Clockwise rotate the speed control button to the target speed value, and start stirring function.               <ul style="list-style-type: none"> <li>•Counter-clockwise rotate the speed control button to stop stirring function.</li> </ul> </li> </ul>
<p>If these operations above are normal, the instrument is ready to operate. If not, the instrument may be damaged during transportation, please contact technical support of manufacturer/supplier.</p>	
	<p><b>Note:</b> Do not touch components of high-speed running instrument during operation to avoid damage and harm.</p>

## 6. Function

### 6.1 Control



Figure 4 LCD Digital (Enhanced) Overhead Stirrer





Figure 5 LED Digital Enhanced Overhead Stirrer

	Items	Default settings
LCD Digital (Enhanced) Overhead Stirrer	Speed control button <b>Speed</b>	Set stirring speed, press the button to start/stop stirring function.
	Mode switch knob <b>Mode</b>	Shift speed and torque display. LCD displays the current speed value at initial running. LCD displays the current torque value when press the mode knob.
	LCD display	LCD displays the real working state and all setting values.
	Speed/torque light <b>RPM/Torque</b>	Yellow/Green LED display light. Different color of LED lights show the value for speed or torque that LCD screen currently displays. Yellow LED light shows that LCD screen currently displays speed. Green LED light shows that LCD screen currently displays torque.
	Power switch /Overload protection light <b>Power/Overload</b>	Green/Red LED display light. LED light shows green when switch on, LED light shows red when starts overload protection. When the torque reaches limited value, overload protection function will be started. At the same time overload protection light flashes, while the system stops running.
	Drill chuck	Can be held stirring impellers.
	Push-through agitator shaft	If needed, shaft can push-through agitator.
	Power switch <b>I/O</b>	Switch ON or OFF the instrument.
LED Digital (Enhanced) Overhead Stirrer	Speed control button <b>Speed</b>	Set stirring speed, press the button to start/stop stirring function.
	LED display	LED displays speed value and warning code.
	Overload protection light	LED display light.



	Items	Default settings
	<b>Overload</b>	LED light shows red when starts overload protection. When the torque reaches limited value, overload protection function will be started. At the same time overload protection light flashes, while the system stops running.
	Power switch light <b>Power</b>	LED display light. LED light shows green when switch on.
	Drill chuck	Can be held stirring impellers.
	Push-through agitator shaft	If needed, shaft can push-through agitator.
	Power switch <b>I/O</b>	Switch ON or OFF the instrument.

## 6.2 Display

LCD Digital (Enhanced) Overhead Stirrer		LED Digital (Enhanced) Overhead Stirrer	
			
<b>Set</b>	Display when set target speed value.	Display area	LED displays speed value under normal conditions. LED displays warning code under abnormal conditions.
<b>PC</b>	Display when using external probe.		
<b>Err</b>	Display in case of error happening.		
Value set/display area	When <b>Set</b> display, this area shows setting value; When <b>Set</b> disappears, this area shows running value.		
<ul style="list-style-type: none"> <li>Place the overhead stirrer in safe and stable surface and connect power cable. <ul style="list-style-type: none"> <li>Switch ON instrument. <ul style="list-style-type: none"> <li>The instrument begins self-checking.</li> </ul> </li> </ul> </li> <li>When initialization is over, displays “set”, at the same time the area of value setting/display flashes that indicate can be set speed value. <ul style="list-style-type: none"> <li>Rotate speed control button to set stirring speed.</li> <li>LCD display no longer flashes when press speed button, “set” disappear, the stirring function start.</li> <li>Press speed button again, LCD display flashes, “set” display, the stirring function close.</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Place the overhead stirrer in safe and stable surface and connect power cable. <ul style="list-style-type: none"> <li>Switch ON instrument.</li> </ul> </li> <li>Clockwise rotate the speed control button to the target speed value, and start stirring function. <ul style="list-style-type: none"> <li>Counter-clockwise rotate the speed control button to stop stirring function.</li> </ul> </li> </ul>	

## 7. Overload Protection

Overhead Stirrer works continuous, the motor current is electronically limited to achieve security stall and overload protection. When the torque reaches limited value, overload protection function will be started. At the same time overload protection light flashes.


- Starts overload protection
- When the setting speed value does not match the current medium viscosity, starts overload protection.
- When the motor output shaft is stuck, motor protection starts.
- Refer to Chapter 9 for the solutions of overload protection and motor protection.

## 8. Interface and Output ( LCD digital )

LED Digital (Enhanced) Overhead Stirrer makes use of special accessories and cables to connect external devices. Standard 9-pin interface is used to be connected to the PC.

- The cable between Overhead stirrer and PC are selected from the specified communication line of the EIA-standard RS232C, corresponding with DIN66020.
- Transmission method: Asynchronous signal transmission in start-stop-operation.
- Mode of transmission: Fully Duplex. 1 starts bit; 7 character bits; 1 stop bit.
- Transmission speed: 9600 bit/s

Data communication from laboratory instrument to computer is only possible on demand of the computer.

	<p><b>Note:</b> Do not insert or remove the RS232C communication line when switch on!</p>
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LCD Digital (Enhanced) Overhead Stirrer	LED Digital (Enhanced) Overhead Stirrer
<ul style="list-style-type: none"> <li>• Instrument cannot be powered ON when start stirring function.</li> <li>■ Check whether the power cable is connected.               <ul style="list-style-type: none"> <li>• Speed cannot reach set point.</li> </ul> </li> <li>■ The setting speed value does not match the current medium viscosity, please reduce speed then re-start.               <ul style="list-style-type: none"> <li>• Stirring function suddenly stop</li> </ul> </li> <li>■ Overload protection light changed to red, display area shows “Er 03”, indicate the current failure is “overload protection”. When the setting speed value does not match medium viscosity that caused overload protection, should be first pressing speed control button to stop stirring function. Restart stirring after lowered setting speed value. If overhead protection continues starting, then repeat the process and gradually reduce the speed.</li> </ul>	<ul style="list-style-type: none"> <li>• Instrument cannot be powered ON when start stirring function.</li> <li>■ Check whether the power cable is connected.               <ul style="list-style-type: none"> <li>• Stirring function suddenly stop</li> </ul> </li> <li>■ Overload protection light changed to red, display area shows “Er 03”, indicate the current failure is “overload protection”. When the setting speed value does not match medium viscosity that caused overload protection, should be first switching OFF the instrument. Switch ON the instrument after lowered setting speed value. If overhead protection continues starting, then repeat the process and gradually reduce the speed.</li> </ul>
<ul style="list-style-type: none"> <li>■ Overload protection light changed to red, display area shows “Er 04”, indicate the current failure is “motor protection”. When the motor output shaft is stuck that caused motor protection, should be first pressing speed control button to stop stirring function, remove the block material, and then re-set original setting speed value to start stirring function.</li> </ul>	<ul style="list-style-type: none"> <li>■ Overload protection light changed to red, display area shows “Er 04”, indicate the current failure is “motor protection”. When the motor output shaft is stuck caused motor protection, should be first switching OFF the instrument, remove the block material, and then switch ON the instrument to start stirring function.</li> </ul>

## 9. Faults


If these faults are not resolved, please contact manufacturer/supplier.

## 10. Maintenance and Cleaning

- Proper maintenance can keep instrument working properly and lengthen its lifetime.
- Do not spray cleanser into the instrument when cleaning.
- Do not remove the power line when cleaning. Only use recommended cleansers:

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

Before using other method for cleaning or decontamination, the user must ascertain with the manufacturer that this method will not damage the instrument. Wear the proper protective gloves during cleaning of the instrument.

	<p style="text-align: center;"><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Electronic device can not clean with cleanser.</li> <li>• If you require maintenance service, must be cleaned the instrument in advance to avoid pollution of hazardous substances, and to send back into original packing.</li> <li>• If the instrument will not use for a long time, please switch off and place in a dry, clean, room temperature and stable location.</li> </ul>
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## 11. Associated standards and regulations

Construction in accordance with the following safety standards:

EN 61010-1

UL 3101-1

CAN/CSA C22.2(1010-1)

EN 61010-2-10

Construction in accordance with the following EMC standards:

EN 61326-1

## 12. Specifications

Items	Specifications			
	LCD Digital Enhanced Overhead Stirrer	LCD Digital Overhead Stirrer	LED Digital Enhanced Overhead Stirrer	LED Digital Overhead Stirrer
Max. stirring quantity (H <sub>2</sub> O) [L]	40	20	40	20
Motor rating input [W]	120	60	120	60
Motor rating output [W]	100	50	100	50
Voltage [VAC]	100-240	100-240	100-240	100-240
Frequency [Hz]	50/60	50/60	50/60	50/60
Power [W]	130	70	130	70
Speed range [rpm]	50-2200	50-2200	50-2200	50-2200
Speed display accuracy [rpm]	±3	±3	—	—
Speed display	LCD	LCD	LED	LED
Speed display accuracy [rpm]	±1	±1	±1	±1
Max. torque [Ncm]	60	40	60	40
Max. viscosity [mPas]	50000	10000	50000	10000
Overload protection	LED light flash, auto stop	LED light flash, auto stop	LED light flash, auto stop	LED light flash, auto stop
Motor protect	LED light flash, auto stop	LED light flash, auto stop	LED light flash, auto stop	LED light flash, auto stop
Chuck range diameter [mm]	0.5-10	0.5-10	0.5-10	0.5-10
Dimension[W x H x D] [mm]	83 x 220 x 186	83 x 220 x 186	83 x 220 x 186	83 x 220 x 186
Weight [kg]	2.8	2.6	2.8	2.6
Protection class acc. to DIN/EN 60529	IP21	IP21	IP21	IP21
Temperature [°C]	5-40	5-40	5-40	5-40
Permission relative humidity [%]	80	80	80	80
RS232 interface	Yes	Yes	No	No

Marshall Scientific  
102 Tide Mill Road, Units 1-5  
Hampton, NH 03842 USA  
(603) 601-8511  
[new.marshallscientific.com](http://new.marshallscientific.com)