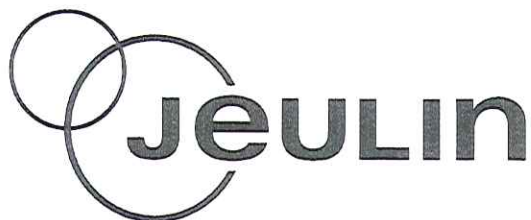


# INSTRUCTION MANUAL

## HEATING MANTLE

MODEL : MS-ES series , MS-E series

ver 1.0



MISUNG SCIENTIFIC CO.,LTD

HEAD OFFICE & FACTORY	#691-4, Duckye-Dong, Yangju-Si, Kyounggi-Do, 482-852 Republic of Korea TEL : ++82-31-866-3808 FAX : ++82-31-866-3810
SEOUL OFFICE	#89, Kwansu-dong, Chongro-ku, Seoul, 110-420 Republic of Korea TEL : ++82-2-2277-3811 FAX : ++82-2-2277-3813

We appreciate you for purchasing MISUNG SCIENTIFIC CO.,Ltd product.




Before using the product you have purchased, check to make sure that it is exactly what you ordered.




Then, please use it following the instructions below.




1. Safety information	-----	2
2. Safety information (Setting up)	-----	2
3. Features and areas of use	-----	2
4. Explanation of each part	-----	2
5. Safety Precaution (in use)	-----	2
6. Operation and control	-----	3
7. Cleaning and store	-----	3
8. Trouble shooting	-----	3
9. Specifications	-----	3

## 1. Safety information

Before you use, read safety precautions carefully, and use this product properly. The precautions described in this manual contain important contents related with safety; therefore, please follow the instructions accordingly. The precautions are composed of DANGER, WARNING and CAUTION.

	<b>DANGER</b> indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.
	<b>WARNING</b> is used to alert operators to an operating procedure, practice or condition that, if not strictly observed, can result in severe injury or loss of life.
	<b>CAUTION</b> indicates a potentially hazardous situation that may result in minor or moderate injury.

	 <b>WARNING</b>  <b>CAUTION</b>
<b>Hot Surface</b>	Touching the reactor block surfaces and vials while hot can cause serious burns.

	 <b>WARNING</b>  <b>CAUTION</b>
<b>Protective Earth Ground</b>	This product requires a protective earth connection. If not provided with a plug on a cord, connect positive earth to this terminal.

## 2. Safety information ( Setting up )

Used to alert operators to a specific operating procedure that should be emphasized for operating safety.

Read and follow instructions carefully before performing the required procedure.

	<b>DANGER</b>		<b>WARNING</b>		<b>CAUTION</b>
---	---------------	---	----------------	---	----------------

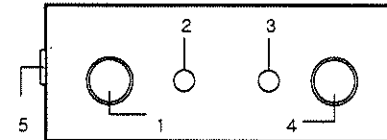
- 1) Do not use this product at any place with possible thermal accumulation due to direct sunlight or heat radiatic
- 2) Do not use this product at any place with direct vibration or impact.
- 3) To prevent defecion of this product, apply a proper power voltage in accordance with the rating.
- 4) Do not use outdoors : Shock harzard may result and life can be shortened.
- 5) If there is a concern about a serious accidrnt caused by a malfunction or abnormality of this product, please install an external protection circuit and devise a scheme for preventing an accident.
- 6) Do not use this product at any place with a large inductive difficulty or occurring static electricly or magnetic noise.
- 7) If there is excessive noise from the power supply, using insulating transformer and noise filter is recommended. The noise filter must be attached to a panel which is already conncted to a ground and the wire between the filter output side and power supply
- 8) Do not use this product at any place with liquid, oil, medical substances, dust, salt or iron contents. (Use at Pollution level 1 or 2)
- 9) Do not use in the presence if flammable or combustibile materials: fire or explosion may result.
- 10) Do not use this product at any place with occurring corrosive (especially noxious gas or ammonia) or flammable gas.
- 11) Since this product is not designed with explosion-protective structure, do not use it any place with flammabl or explosive gas.
- 12) Use this product within the range of the operating ambient temperature, 0~40°C and ambient humidity, 35~85%RH (No condensation).

## 3. Features and areas of use

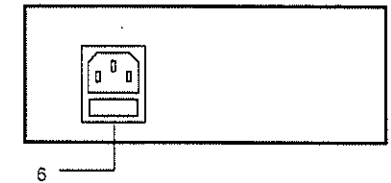
Your Misung heating mantle or stirring mantle is a general purpose heating and/or stirring mantle designed for laboratory procedures requiring precise control of temperature and/or stirring speed. Your heating mantle or stirring mantle may be

## 4. Explanation of each part

Front side



Rear side



Model	STIRRING MANTLE	HEATING MANTLE
	MS-ES	MS-E
NO		
1	Heater volume	
2	Heater lamp	X
3	Motor lamp	Heater lamp
4	Motor volume	X
5	Main power switch	
6	Single fuse holder	
7		
8		

\* 6. Fuse holder : It breaks or stops the current if the flow of electricity is too strong, thereby fuse prevents damage to the unit.

Main power cord : AC 200~230V 50/60Hz

## 5. Safety Precaution (in use)

	<b>Danger</b>		<b>Warning</b>		<b>Note</b>	Unsuitable use causes danger !
---	---------------	---	----------------	---	-------------	--------------------------------

- 1) Use a properly grounded electrical outlet of correct voltage and current handling capacity. This unit operates only by AC200~230V 50/60Hz without danger. Check supplied voltage and current of AC200~230V, 50/60HZ before use.
- 2) Do not cover top plate with aluminum foil to prevent overheating, or fatal damage may result.
- 3) Keep the controller out of fluid.
- 4) Keep the unit out of particle and fluid. Inflow of particle and fluid into the unit can be a cause of fire. If inflow of particle or liquid, remove them after turn your power switch off and disconnect the plug
- 5) Do not put a strain on unit, it can be damaged.
- 6) Hot surface on operation. Avoid contact!
- 7) Do not drop objects onto your unit and do not drop your unit.
- 8) Turn your power switch OFF and disconnect the plug whenever you leave the unit.
- 9) Power cable should not be contacted hot plate.

ETC.

	<b>Warning</b>		<b>Note</b>	Unsuitable use causes danger !
--	----------------	--	-------------	--------------------------------

- 1) If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- 2) When the product gets wet, the inspection is essential because there is danger of an electric leakage or fire.
- 3) Some parts of this product have limited life span, and others are changed by their usage.
- 4) Confirm carefully the plug connected correctly. Wrong connection of the plug may cause fire.
- 5) Do not leave the unit whenever the unit is on running. Turn your power switch OFF whenever the item is not used, or before disconnecting the plug.
- 6) Do not use the unit on other purpose.
- 7) Hot surface. Avoid contact. The hot plate will remain hot without any visual indication on power as well after power has been removed for sometime.

**6. Operation and control**

- 1) Turn volume switch OFF and check the voltage (AC200-230V 50/60Hz) before plugging in. And connect the power cord to power supply (AC200-230V 50/60Hz).
  - 2) Place your container or heating bath with the magnetic stirrer bar. Stirrer bar should be placed in center of mantle.
  - 3) Turn main power S/W ON.
  - 4) Heating : Use heater control to adjust mantle temperature.  
(Heater lamp confirms heating current ON.)
- The below chart shows the surface temperature chart of mantle on the position of volume scale.
- 5) Stirring: Use motor control volume to adjust motor speed rpm.  
(Analog Type: Turn the speed control ON. Motor lamp confirms the current ON. Set speed to meet your needs by rotation of the speed control volume on the front panel.)
  - 6) Do not place anything on top plate when use finishes.
  - 7) Turn the main power S/W OFF.
  - 8) Turn your power switch OFF and disconnect the plug whenever the unit is not in use.

Keep the unit clean.

Note:

- 1) Range of speed control : 100-1500 rpm  
(Every 10rpm increases by rotation the knob right-handed and every 10rpm decreases by rotation the knob left-handed)
- 2) Speed control knob in extreme left (CCW) position stops operating.
- 3) Set the speed (rpm) with the dial, it arrives at the set value shortly and maintained constant speed by arithmetic logic unit. (Smooth start function)
- 4) If motor does not run on starting, make it run in 3 second by a increasing or output until 10rpm or more.

**7. Cleaning and store**

	<b>Caution</b>	Disconnect the plug before cleaning !!
--	----------------	--

- 1) Do not polish this product with substances such as alcohol or benzene. (Use neutral detergent.)
- 2) Do not decompose, modify, revise or repair this product. This may be a cause of malfunction, electric or fire.
- 3) Cleaning: wipe housing surfaces clean with a damp cloth (add some sort of mild liquid soap).
- 4) Wipe again with dry cloth
- 5) We recommend to store the item and its components in its original box, or a similar container that offers adequate protection against damage in transit. Tape the box securely.

**8. Trouble shooting**

- 1) Cause of trouble
  - Corrosion caused by inflow of fluid into the unit inside.
  - Damages occurred by overheat when user covers the top plate with aluminium foil.
  - Heavy load
- 2) Power switch dim:
  - Check power supply and power cord.
  - Check power switch "ON"
  - Check fuse.

In case of a malfunction as described above, contact your authorized Misung Dealer.

**9. SPECIFICATIONS**

MODEL		MS-ES	MS-E
Type		STIRRING MANTLE	HEATING MANTLE
H E A T E R	Temperature range	Up to 450°C	
	Control	Proportion control	
M O T O R	Speed	100 ~ 1500rpm	---
	Capacity		---
	Control	Feed back control	---
<b>Power</b>		AC 230/220V 50/60Hz	
<b>Fuse</b>			

MODEL NO.	Capacity	Watts	Dimensions (WxDxH)	Internal (height : mm)	MODEL NO.	Capacity	Watts	Dimensions (WxDxH)	Internal (height : mm)
E05	50ml	60W		45	E106	3000ml	600W	274x358x205	125
E101	100ml	80W	162x256x134	45	E107	5000ml	800W	316x400x199	145
E102	250ml	150W	162x256x147	60	E108	10000ml	1300W	Ø395xH265	
E103	500ml	260W	192x276x162	75	E109	20000ml	2000W	Ø460xH290	
E104	1000ml	380W	214x298x172	85	EH108	10000ml	1300W	Ø395xH265	
E105	2000ml	500W	248x332x199	115	EH109	20000ml	2000W	Ø460xH290	

Note. EH Model = Bottom hole . E108, E109, EH108, EH109 = Order made.

MODEL NO.	Capacity	Watts	Dimensions (WxDxH)	Internal (height : mm)	MODEL NO.	Capacity	Watts	Dimensions (WxDxH)	Internal (height : mm)
ES302	250ml	150W	162x256x162	65	ES306	3000ml	600W	274x358x220	125
ES303	500ml	260W	192x276x177	75	ES307	5000ml	800W	316x400x244	145
ES304	1000ml	380W	214x298x187	85	ES308	10000ml	1300W	214x298x187	
ES305	2000ml	500W	248x332x214	115	ES309	20000ml	2000W	248x332x214	

Note. ES308, ES309 = Order made.