Lab Companion™

OPERATION MAUNAL

Multi-Channel Magnetic Stirrer

Model: MS-51M, MS-52M, MS-53M
MS-23M, MS-32M, MS-33M

Manual No.: 00MTS0000018 Version: 0.0

JEIO TECH

Lab Companion™

⚠WARNING

Before using this product, read this entire Operator's Manual carefully. Users should follow all of the Operational Guidelines contained in this Manual and take all necessary safety precautions while using this product. Failure to follow these guidelines could result in potentially irreparable bodily harm and/or property damage.

Thank you for purchasing Jeio Tech's products.

Table of contents

1.0 Safety

1.1 How to use the Manual

This operation manual describes the important subjects to maintain the product's functions and to use it safely. Especially, be sure to read <Safety Precaution> carefully before you use this equipment.
Please keep this manual close to the equipment to use it after reading through it once.
Please place it where the new user can find it easily for the safety use when you hand over or lend the equipment to others.

1.2 Symbols used in this manual.

1. The alert marks are for safety operation and protect user and instrument from Damage.
2. Signal word panels are a method for calling attention to a safety messages or property damage messages and designate a degree or level of hazard seriousness.
3. Pay attention enough to the contents of alert marks.

Signal words	Purpose
⚠WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a property damage message.

1.3 Exemption for responsibility

1. The claim which is out of the quality guaranteed by the manufacturer is out of manufacturer's responsibility.
2. The damage which is from unexpected fault or damage of user by Acts of God is out of Manufacturer's responsibility.

1.4 Warning statement.

⚠WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Please check and connect properly -the voltage, phase and capacity of power supply on the ID plate before installation.

Power supply must be properly grounded.
Abnormal grounded connection causes serious damage. Grounded connection must not be on the water pipe and gas pipe.

Please use correct and provided power code
Power cord: Wall outlet with grounded terminal power cord 250V 7A.

Do not install the product in the place that the gas could leak out. Does not use in the place that has the industrial oil smoke and the metallic dust. It causes fire or electric shock.
Do not use the machine near to places where explosion can be happened due to organic evaporating gases.
Explosive materials: Acid, Esther, Nitro compound
Inflammable materials: salt peroxides, inorganic peroxide, salt acids.

Stirrer explosive and flammable chemicals (Alcohol, Benzene, and etc), you must use with sufficient safety countermeasure.
The flammable organic solvents, dust, and corrosive gas may explode during stirrer sample.
In Accordance with experiment, you should have equipment of explosion-proof and air exhauster in your laboratory. And you should find suitable stirrer RPM defense on your sample.

Please check equipment Permissible environmental condition when you use inside of Temp. & Humid. Chamber or Incubator.
It can be cause fire or trouble by stirrer electricity, electronic, and damage of motor.
Stirrer Permissible environmental condition
Temperature 5℃ to 40℃, Maximum relative humidity 80%.

Unplug, when there is strange sound, smell and smoke from the product.
Please stop operating and request the service.

Keep out of the direct sunlight.
It may influence that product life and operation properly.

Do not use the machine at places where moisture is high and flooding can be happened.

Do not assemble, repair, modify on your own.
The product may not work well and electric shock in the efficiency of the product. Also you cannot get after service by warranty regulation

1.5 Caution statement

⚠ CAUTION
Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

Do not put heavy things on the power line. Do not put the machine on the line.
It may take off the wire coating and causes the electric shock or fire.

Do not touch it with wet hands and put the main plug correctly.
It may cause the electric shock or injuries.

Installation power outlet near instrument and may be convenient.

Do not install the stirrer neat machinery generating high frequency noise.
Please avoid installed from high frequency- welding machine, sewing machine, and mass SCR controller

Do not inject any liquid and inflammable things inside of product.

Do not pure water or put liquid on the top of the product when cleaning.
Please intercept the main power immediately and request the service when water may be in the product.

Do not let the product take any strong shock or vibration.
It causes abnormal operation or trouble. It may deteriorate the ability of the product and not obtain correct results.

Do not sprinkle insecticide or flammable spray on the product. Use smooth cloths.
Cleaning with solvent can cause fire and deformity.

Please power off while product cleaning.
It may cause the electric shock or fire.

Put off the power plug if some sounds and burning smell, smokes are happened. And request the service

Do not let the product take shock and fall down product.
It will be caused by wrong operating and malfunction

2.0 Functional Description

2.1 Introduction

The magnetic multi-stirrer operates range is 30rpm ~ 2,000 rpm by exact speed and powerful performance provides stirring of high viscosity solution. Also it is controlled independently operation; Row, Colum, and Simultaneous motion modes

2.2 Feature

This magnetic stirrer is aimed by user safety in laboratory, convenience and follow feature.

1. User's friendly operating mode allows user to select one of them; Row, Colum, and Simultaneous motion. Also, individual operating can be control each different speed.

2. RPM (Revolution Per Minute) adjust Real-time stirring with quick operation.

3. Non-spark BLDC (Brushless Direct Current) motor stirring to make safety offer and high quality durability in laboratory.

4. The controller display adopts VFD (Vacuum Fluorescent Display). It is easy to indicate stirrer set up and operating condition.

5. The timer mode function can reserve stirrer stop time. (Available to reserve Row, Colum, individual, and Simultaneous motion- separately). Also user can check operating time immediately by time button.

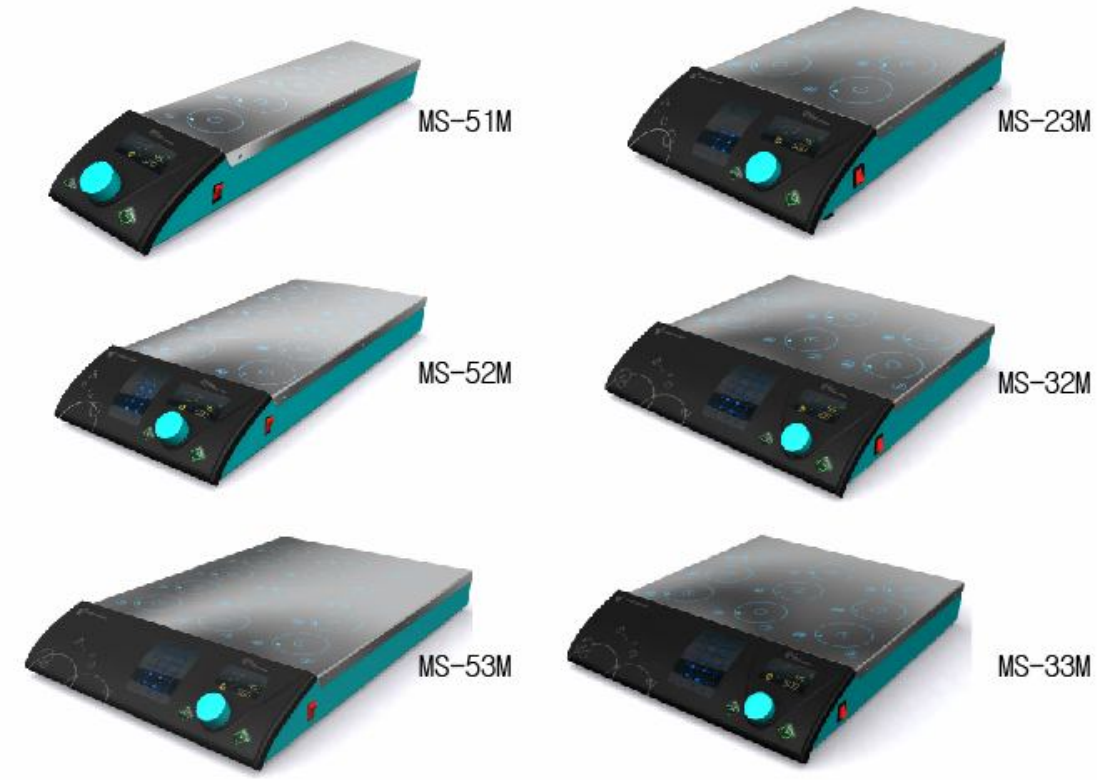
6. The stirrers are offer stabilized rotations rate environment even fewer than 30 rpm. It can provide optimize environmental condition with minimize of physical damage.

7. The use of capacitive touch sensor button and the dial button would be user conveniently control and set the stirrer.

8. The PID controller provide the self-adjust setting speed from impact of outside

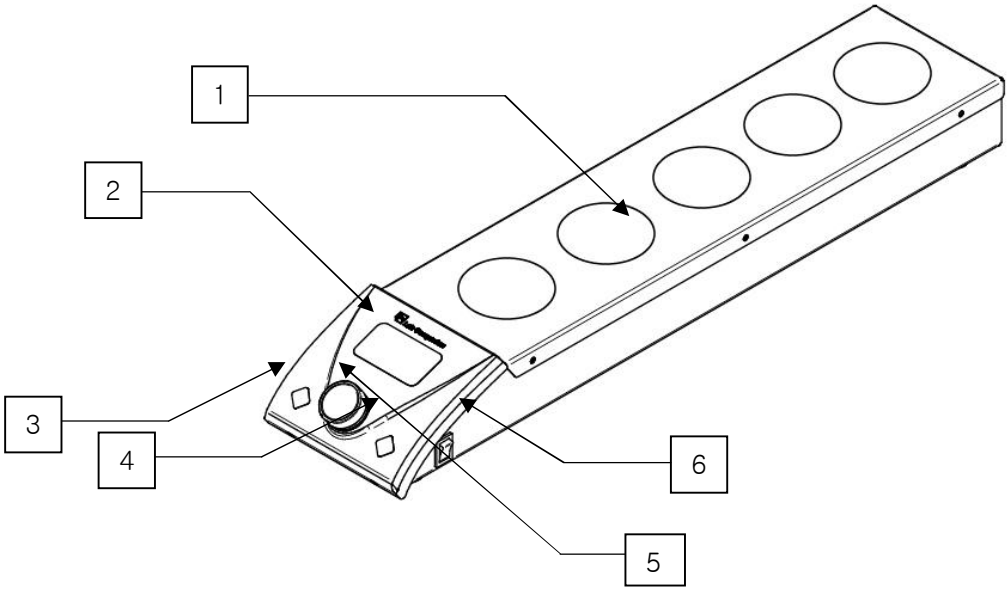
9. Offered different multi-stirrer models depend on lengths and widths, also the operator can choose conveniently their purpose.

2.3 Construction



2.4 Name of each part

2.4.1 MS-51M



(1) **Top-plate :** Protecting stirrer inside and preventing liquid inflow

(2) **VFD panel & Controller:**
The panel indicates product setting and control condition.

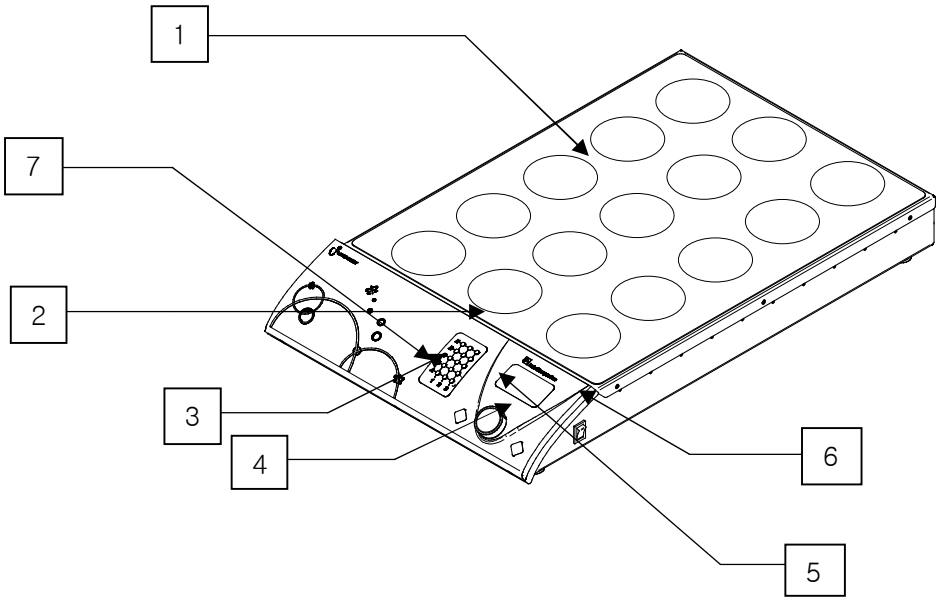
(3) **ESC Button:** The button adjust controller function mode.

(4) **Time Button**: The button adjusts instrument operating time and timer setting..

(5) **Dial type button (Knob):** The dial set up controller function.
- Dial left turn/right turn: Operating rate setting
- Dial push: Operation rate saving, Start / Stop

(6) **Power switch:** It is the main ON/OFF switch and supplying power of the product.

2.4.2 MS-32M, MS-52M, MS-23M, MS-33M, MS-53M



(1)
(2)
(3) **Top-plate :** Protecting stirrer inside and preventing liquid inflow.

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(8) **Power switch:** It is the main ON/OFF switch and supplying power of the product.

(9) **Point Indicator:** Showed present operating point.

2.4.3 Name of back part

(10) **Socket:** Connect the power cable on the socket.

(11) **Foot:** Non-marking foot allow for easy movement.

(12) **Fan:** the heat caused by Motor rotation emitted to the outside.

(13) **Fan Cover:** it protect Fan from exterior substance

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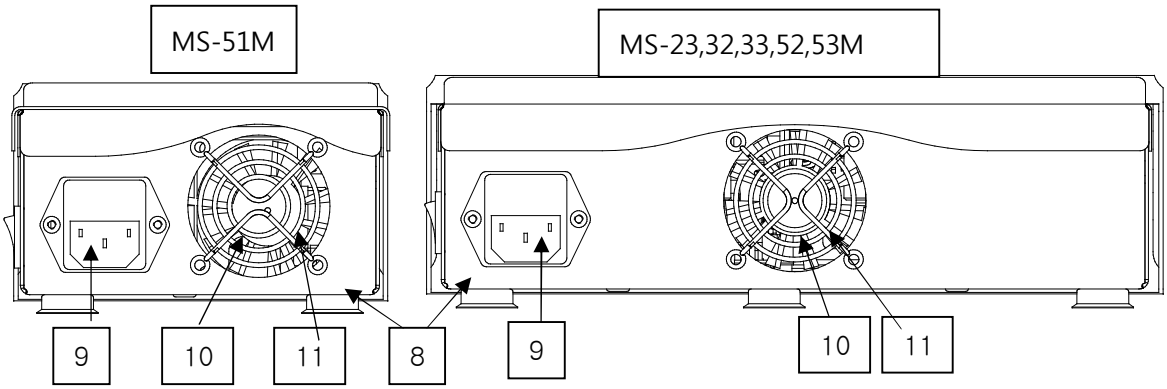


Note) each model is different distance between socket and fan.

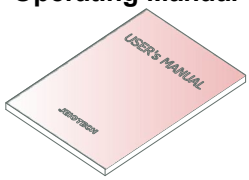
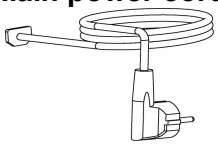
3.0 Installation and Caution

3.1 Unpacking the package and Inspecting damage during transportations.

(1) Check to see that the unit is not damaged before unpacking.
(2) Unpack the unit carefully.
(3) Inspect to see that the unit is not damaged during transportations.

3.2 Checking the unit components

(1) Please check the unit components supplied packaged in the package after unpacking.
(2) If noticeable damage or an omission is found, immediately notify the shipper and contact your local Jeio Tech dealer's Service Department.

COMPONENT/MODEL	QUANTITY	RECEIVED
Operating Manual 	1	OK
Main power cord  Free voltage and frequency (AC 100 ~ 240V, 50/60Hz)	1	OK
Fuse  Fuse is provided with unite	1	OK

3.3 Installation

3.3.1 Environmental conditions

- Temperature: 5℃ ~ 40℃
- Relative Humidity: RH 10% ~ 80%
- Maximum attitude: up to 2,000m

⚠WARNING

The unit should be located away from naked flame sources, direct sunlight. It can come with the malfunction or lower the function.

3.3.2 Location conditions

Place the unit on the wrench, or table when in use, and observe minimum distances in 30cm between the other devices.

⚠CAUTION

Do not place the unit nearby the other laboratory equipments which can be readily influenced, even by weak motor vibration, and also by magnetic force because the unit causes the magnetic field.

The unit can cause the magnetic field. Do not place especially the electric devices on set-up plate due to inducing the strong magnetic field.

⚠WARNING

Do not use the plastic beaker when operating the unit in explosive atmospheres.

The plastic beaker can cause the magnetic field, resulting in igniting to explosive substances.

3.3.3 Arrangement of the unit

- **STEP 1:** Place the unit to be fixed tight to non-slip foot on the table
- **STEP 2:** Ensure that the unit will be paralleled to the table.

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3.4 Connecting to the mains power supply

Connect the electric power to the unit according to the following process.

STEP 1: Switch off the main switch before connecting power cable.

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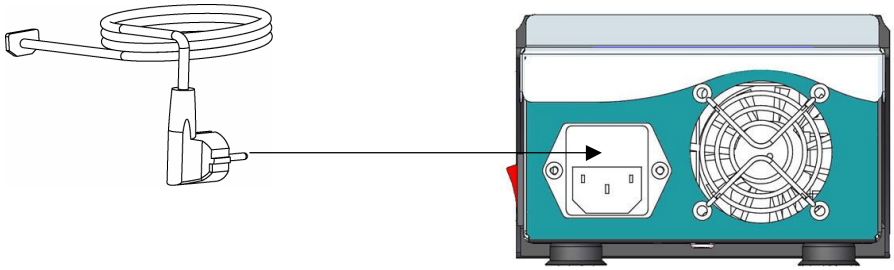
STEP 2: Connect the power cable on the socket located on the back side of the unit.



⚠WARNING
Ensure that the unit should be connected to a power supply that is an appropriate voltage, phase capacity. Failure to connect to a proper connection of a power will cause the risk of fire, electric shock and personal injury

⚠WARNING
Never use a forked socket, or a double-tapped socket. Failure to obey a safety warning will cause a drop in a line voltage, resulting in a loss of power and causing risk of fire by turning the cable. Use the power cord only supplied with the unit.

3.5 Stirring operation

STEP 1: Pour the liquids to be mixed into the flask, or the beaker.

STEP 2: Place the stirring bar at the center of the container.

STEP 3: Place a beaker or glass container on top of set-up plate.

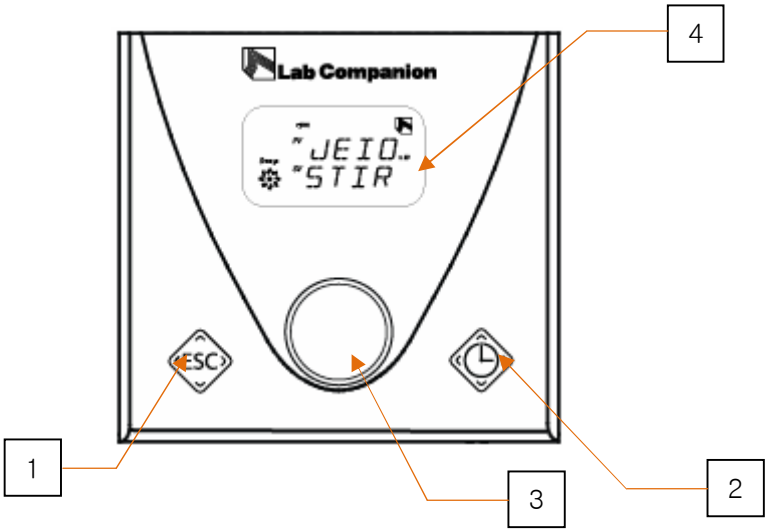
⚠WARNING

Maximum load to be placed on top of top plate cannot exceed in the total 30Kg

4.0 Operation

4.1 Controller – Name and function

4.1.1 Controller for MS-51M – Name and function



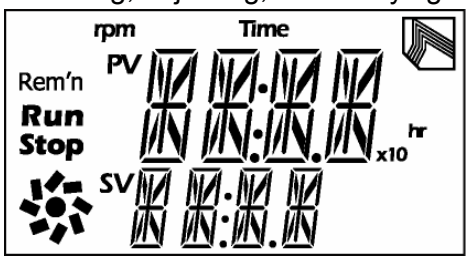
(1) ESC Button: escapes from the present status, or cancel the operation.
It can be activated by the light touch (auto detecting the electric capacity).

(2) Time Button: indicates operation time, or set the timer.

(3)Dial knob: enters/stores the set value, and to start/stop the operation.

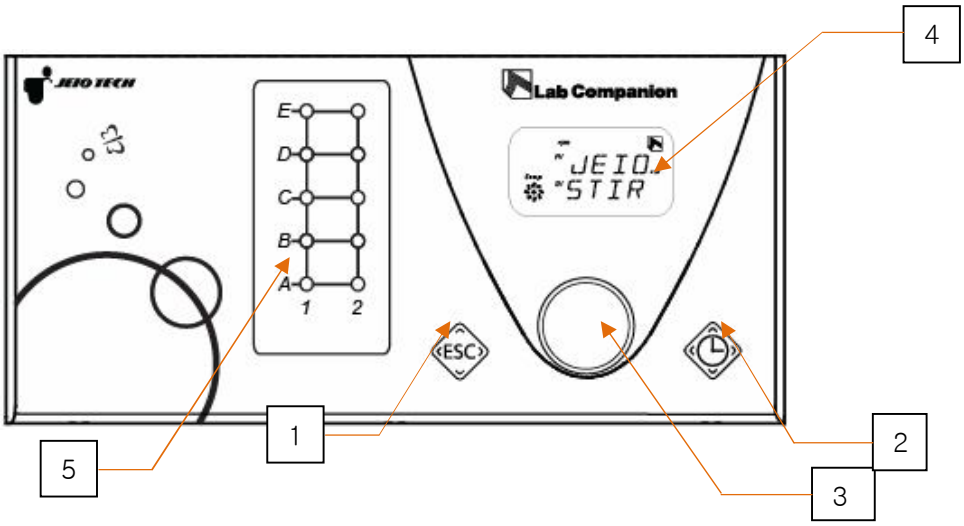
(4) Controller with VFD type display

It helps monitoring, adjusting, and verifying set value and control status.



A. **Rem'n:** Remaining time
B. **Run:** Unit is operating.
C. **Stop:** indicates that unit is stop status.
D. **Rpm:** indicates stirring speed status.
E. **Time:** displays Timer status.
F. **PV:** indicates the present (current) stirring speed.
G. **SV:** indicates the set (desired) stirring speed.
H. x **10:** Conversion stirring value of current PRM

4.1.2 Controller for MS-32M, MS-52M, MS-23M, MS-33M, MS-53M- Name and function



(1) ESC Button: escapes from the present status, or cancel the operation. It can be activated by the light touch (auto detecting the electric capacity).

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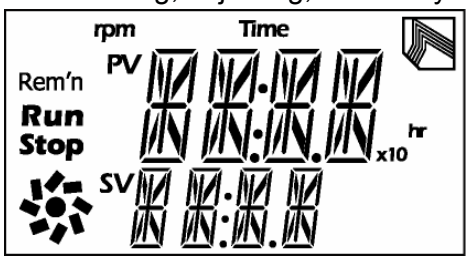


I. Rem'n: Remaining time
J. Run: Unit is operating
K. Stop: It indicates unit is stop status.
L. rpm: It indicates stirring speed status
M. Time: It displays Timer status
N. PV: It indicates the present (current) stirring speed.
O. SV: It indicates the set (desired) stirring speed.
P. x 10: Conversion stirring value of current RPM

(5) Point Indicator: Indicates the present Point, or Row, or Column in operation.

4.2 Functional description and name of controller

4.2.1 Functional description of controller

(1) ALL MODE: Setting the same speed to all points.

(2) POINT MODE: Setting time and speed respectively to each point.

(3) COLUMN MODE: Setting time and speed respectively to each column. (MS-23M, MS-32M, MS-33M, MS-52M, MS-53M only applicable)

(4) ROW MODE: Setting time and speed respectively to each row. (MS-23M, MS-32M, MS-33M, MS-52M, MS-53M only applicable)

4.2.2 Name of controller

(1) **RPM:** Stirring speed

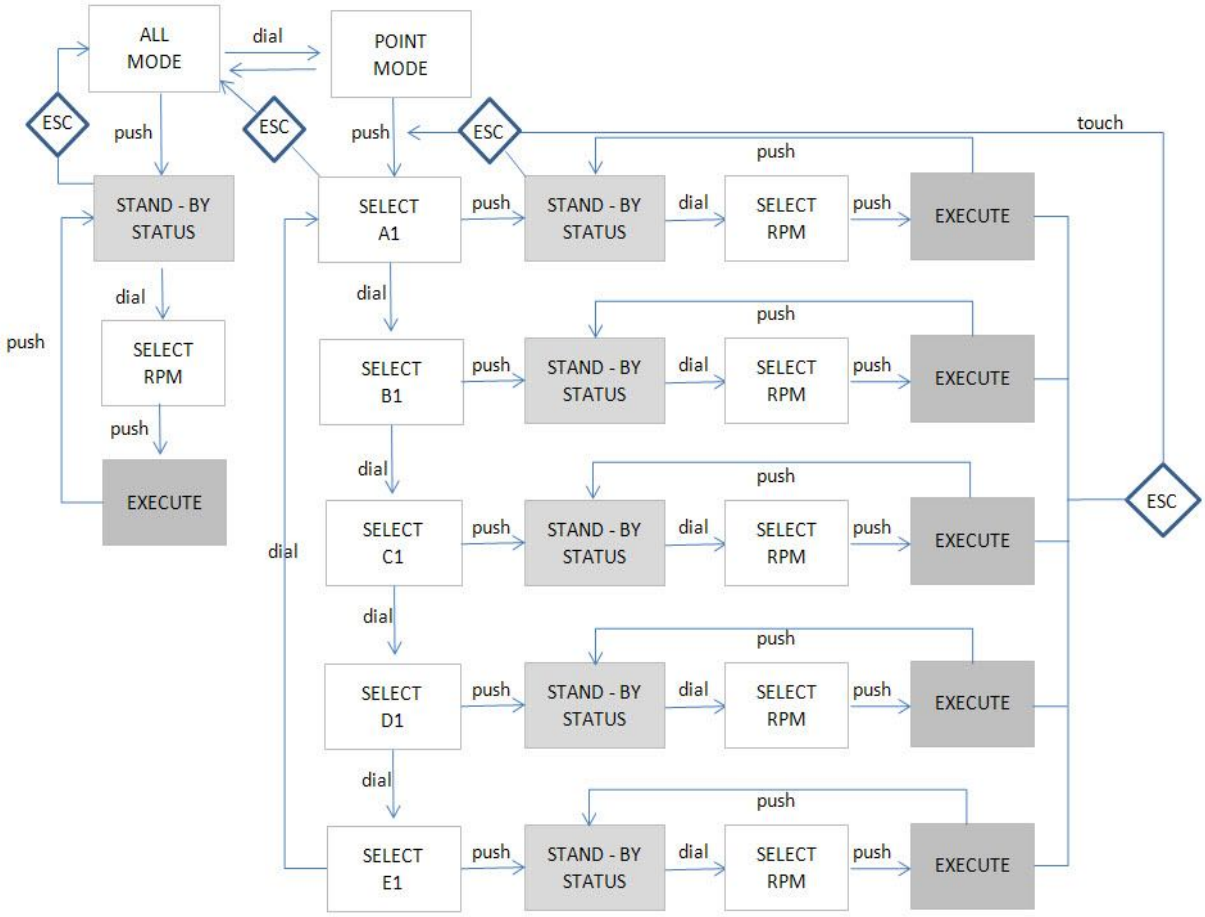
(2) **TIME:** Operation Hour/Minute

(3) **TIMER:** Timer setting

4.3 Flow chart of controller setting

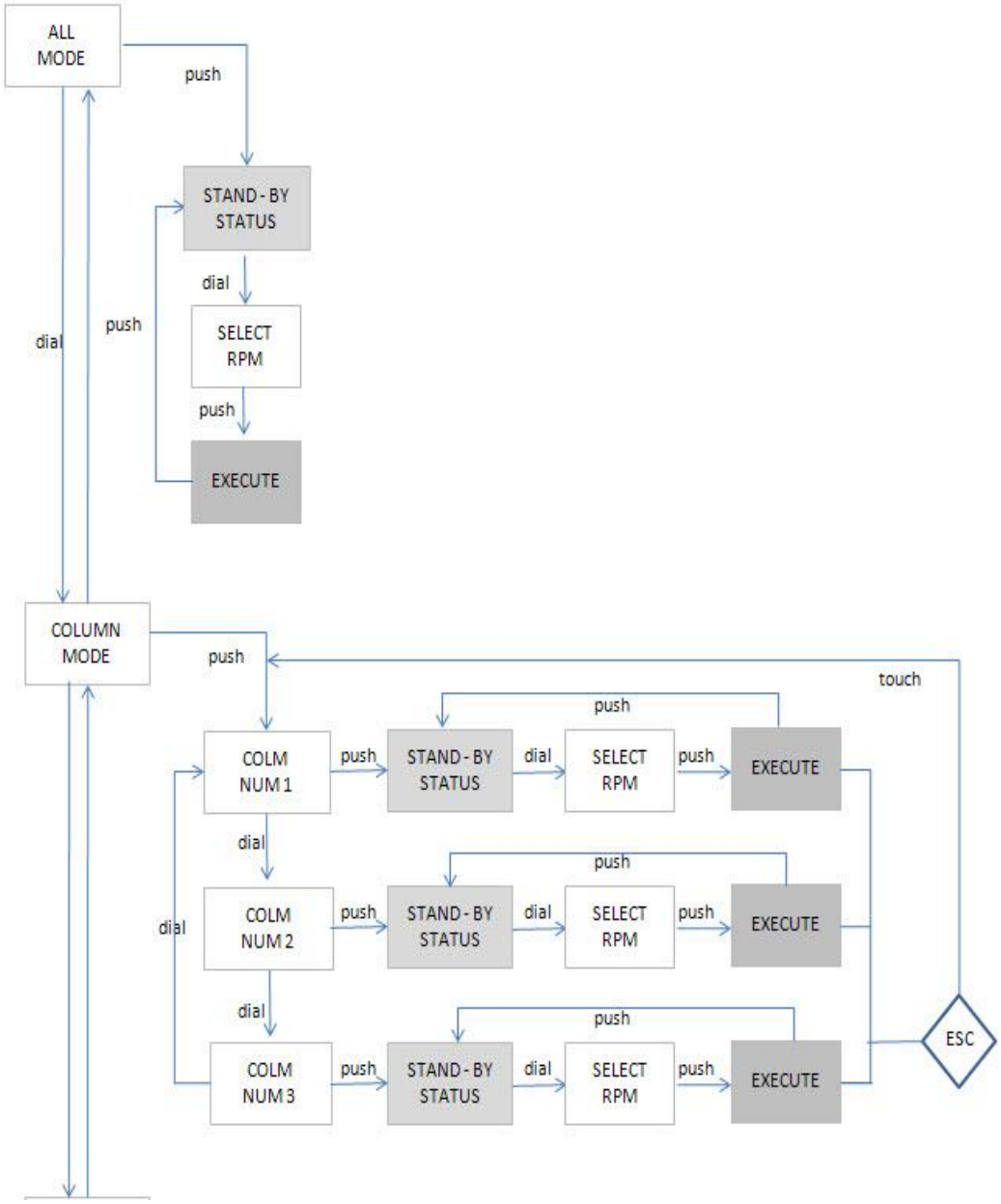
4.3.1 Flow chart of controller setting in MS-51M

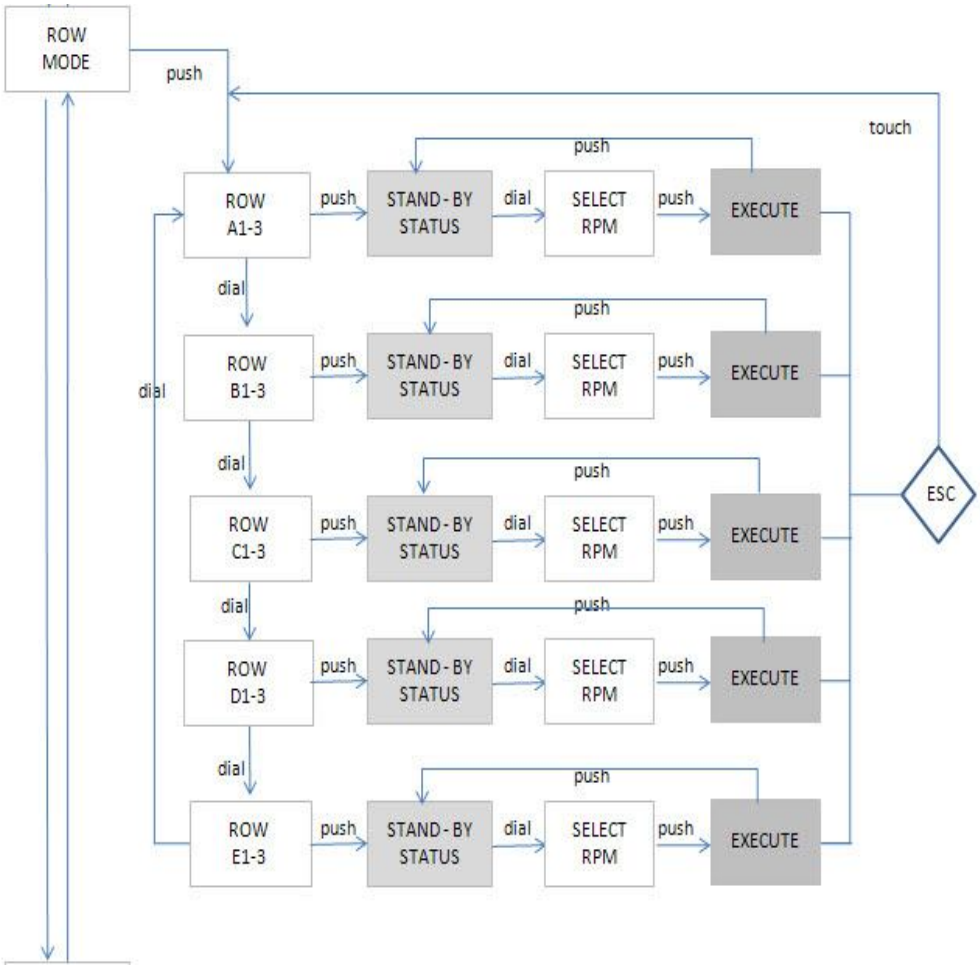
There are 2 operation modes in MS-51M.
By using the adjustable dial, they can be moved an chosen from ALL Mode, POINT Mode respectively to operate the unit.

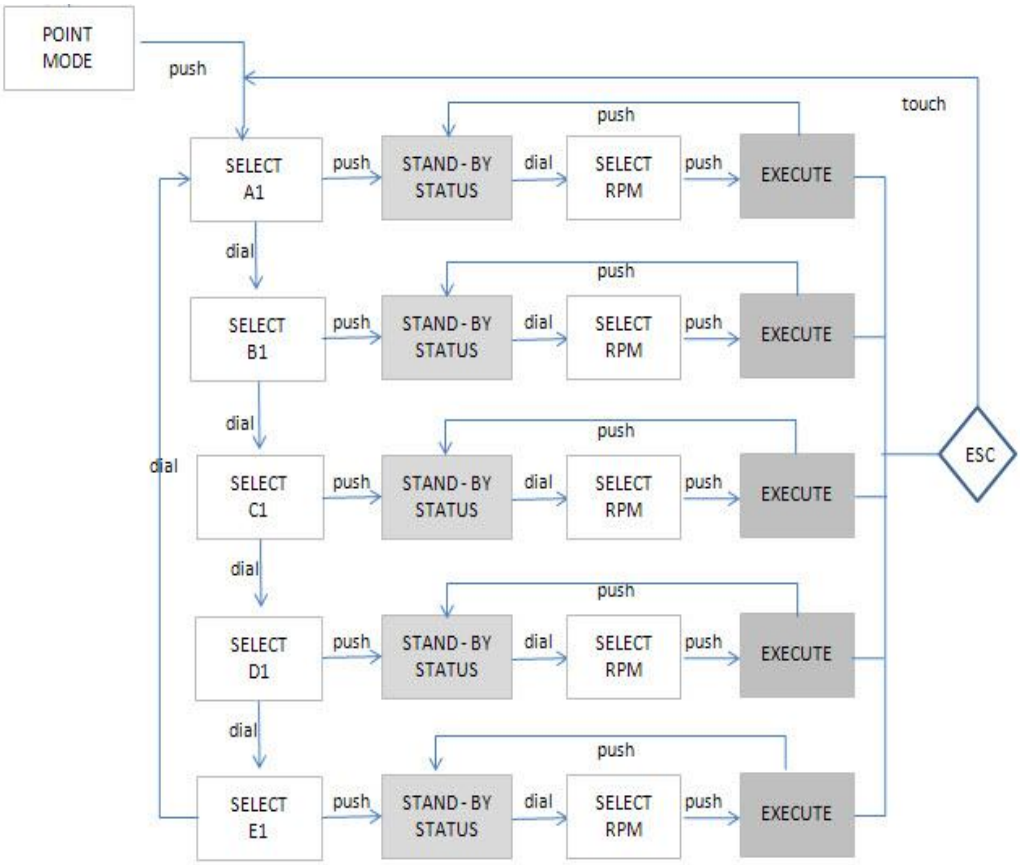


4.3.2 **Flow chart of controller setting** in **MS-32M, MS-52M, MS-23M, MS-33M, MS-53M**

There are 4 operation modes in MS-32M, MS-52M, MS-23M, MS-33M, MS-53M. By using the adjustable dial, they can be moved and chosen from ALL Mode, COLUMN Moe, ROW Mode and POINT Mode respectively to operate the unit.




ROW MODE
push
touch
ROW A1-3
push
STAND-BY STATUS
dial
SELECT RPM
push
EXECUTE
dial
ROW B1-3
dial
ROW C1-3
dial
ROW D1-3
dial
ROW E1-3
ESC


POINT MODE
push
touch
SELECT A1
push
STAND - BY STATUS
dial
SELECT RPM
push
EXECUTE
dial
SELECT B1
dial
SELECT C1
dial
SELECT D1
dial
SELECT E1
dial
ESC

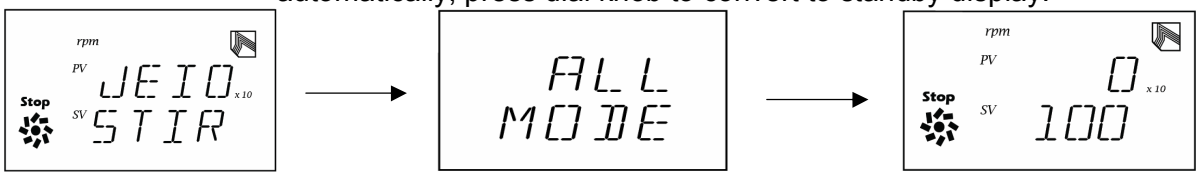
4.4 Operation for each mode

4.4.1 ALL MODES

Set the same RPM for all point.

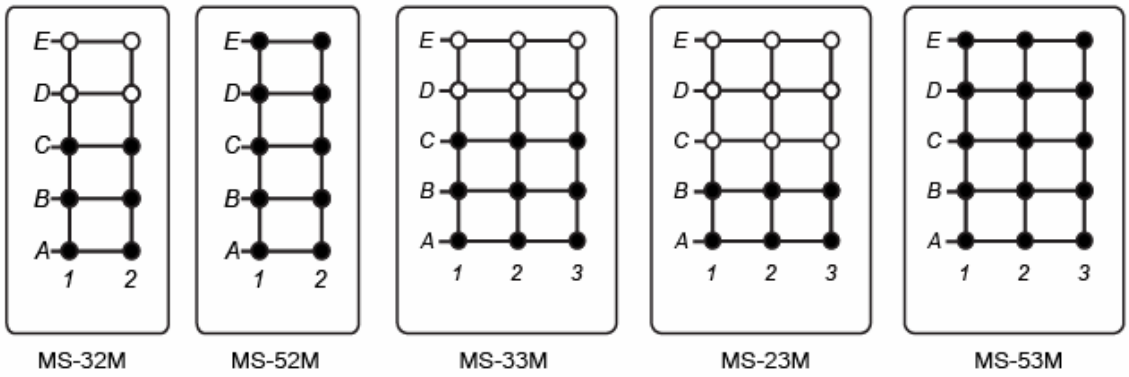
4.4.1.1 Operation

STEP 1: Press power switch to turn on. After appearing ALL MODE display automatically, press dial knob to convert to standby display.



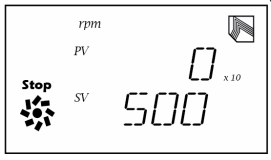
[Booting display] [Initial display] [Standby display]

In case of MS-32M, MS-52M, MS-23M, MS-33M, MS-53M.LED of all point running is lighted.



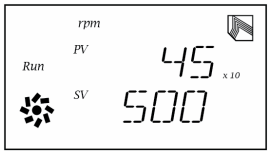
MS-32M MS-52M MS-33M MS-23M MS-53M

STEP 2: Turn dial Knob left/right side to change RPM.



[RPM selected display]

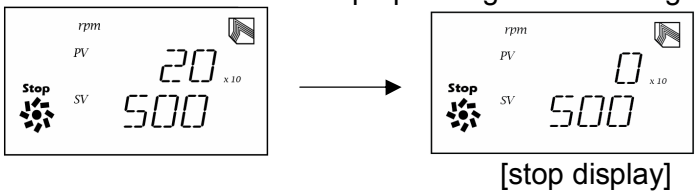
STEP 3: Press dial knob once to operate the stirrer.



[operating display]

STEP 4: Check it to reach up to user set RPM.

STEP 5: Press dial Knob once to stop operating after finishing stirring.



[stop display]

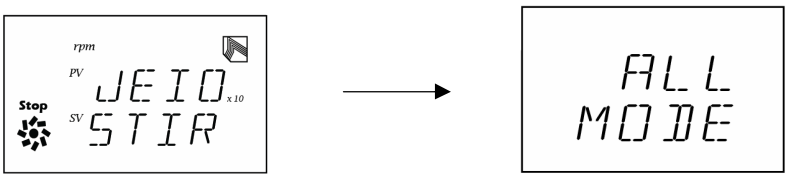
It stops by decreasing PV value.

4.4.2 Point Mode

It is the function that each other RPM and stirrer time can be set for every point.

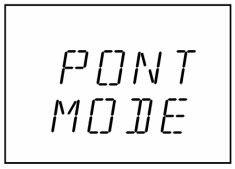
4.4.2.1 Operation

STEP 1: Automatically ALL MODE display appears when you press switch to turn on.



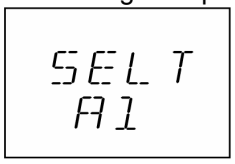
[Initial display] [Standby display]

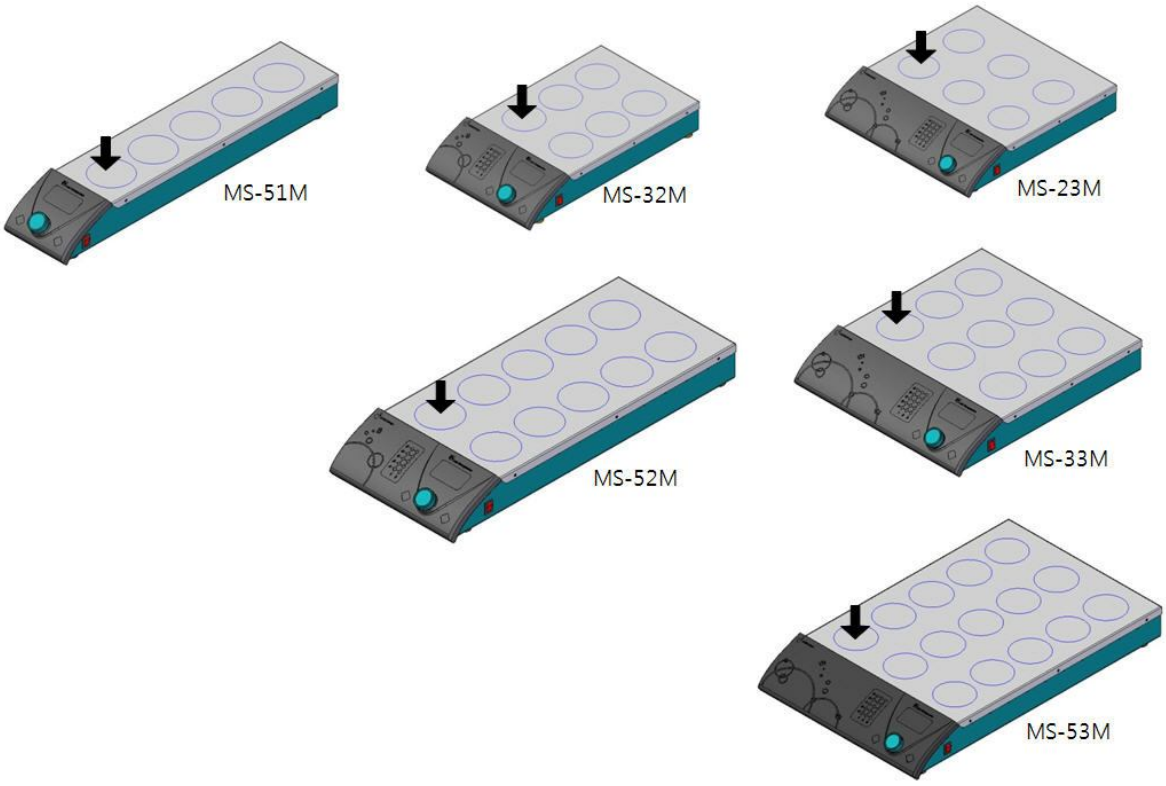
STEP 2: Turn the dial knob right side once in case of MS-51M, in case of MS-23M, MS-32M, MS-33M, MS-52M, MS-53M, Turn 3times.This display appears with BEEP sound.



STEP 3: Press once dial knob. Turn dial knob right/left side to select point you want and then press once dial knob.

예시) On selecting A1 point

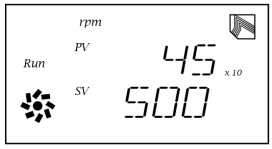




STEP 4: it is step to set RPM at the point you want.
Select wanting RPM by turning dial knob after standby display appears.

[Standby display] [Select RPM display]

STEP 5: Press dial knob once to operate the stirrer.



[Operating display]

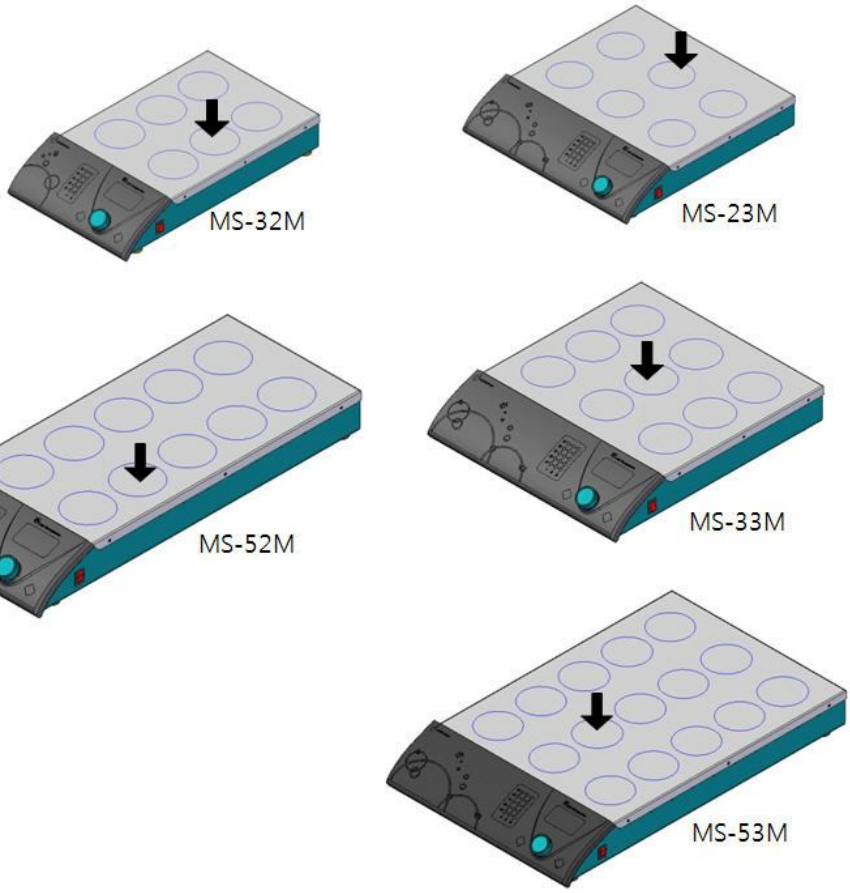
PV value is going up gradually as picture.

STEP 6: Check if it reaches up to user set RPM.

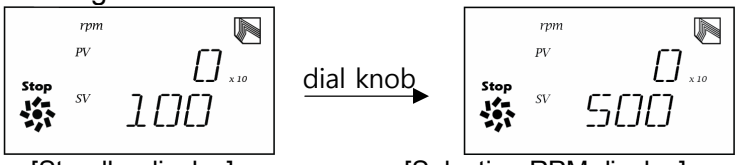
4.4.2.2 Adding point

STEP 1. It returns to point selecting display(STEP3) if you press ESC while it is running. Select wanting point by turning dial.

e.g.) this process is example to stir at AI point and B2 point at the same time with different RPM speed.



STEP 2: Standby display appears if you press dial knob. Set wanting RPM by turning dial.



[Standby display] [Selecting RPM display]

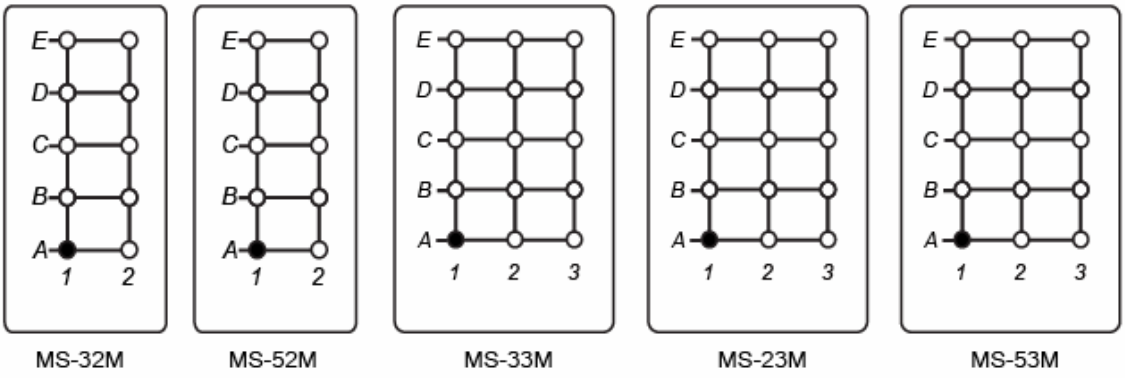
STEP 3: press dial knob once to operate the stirrer.

STEP 4: Check if it reaches up to user set RPM. At this time point A1 keeps

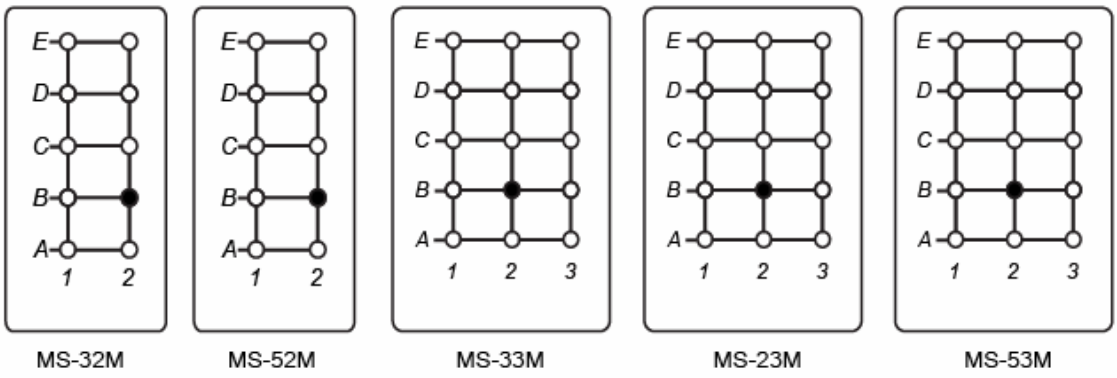
stirring with set value.

● Like this way, you can stir at all points with different speed.

POINT -A1



POINT -B2



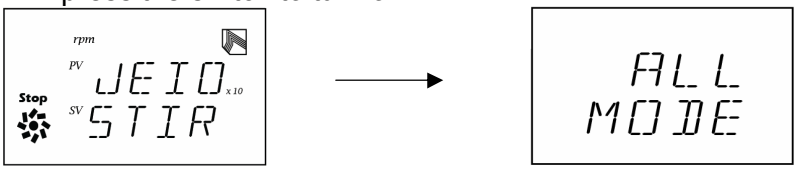
4.4.3 Column Mode

Only for these items (MS-32M, MS-52M, MS-23M, MS-33M, MS-53M)

It is the function to stir with different RPM and stirring time for each row.

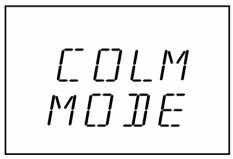
4.4.3.1 Operation

STEP 1: press the switch to turn on.



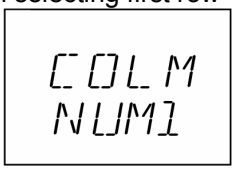
[Booting display] [Initial display]

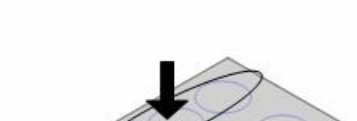
STEP 2: Turn dial knob right once. COLM MODE appears with following BEEP sound.

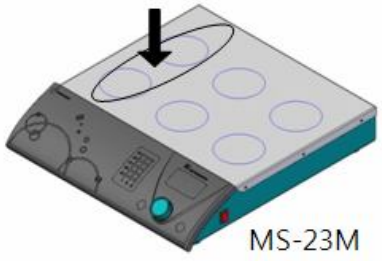


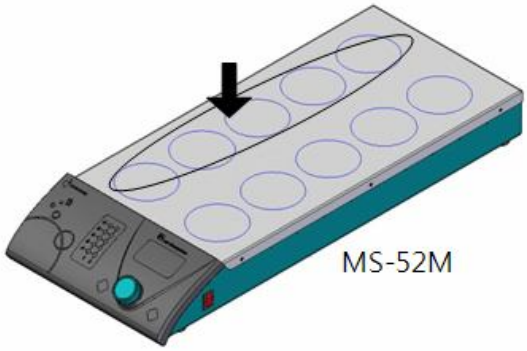
STEP 3: Press once dial knob. Turn dial knob right/left side to select point you want and then press once dial knob.

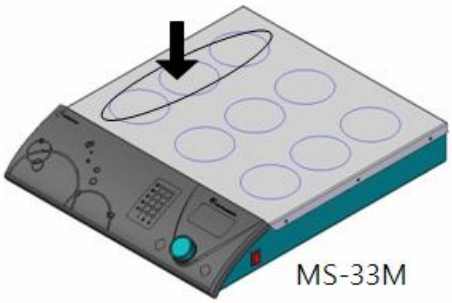
e.g.) on selecting first row

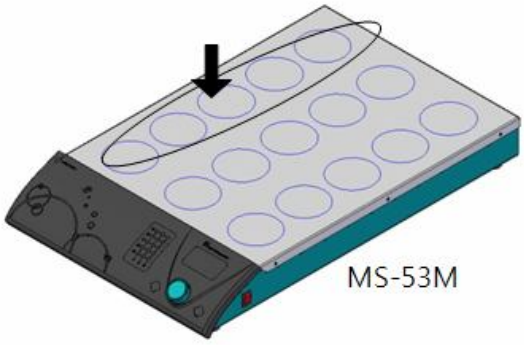




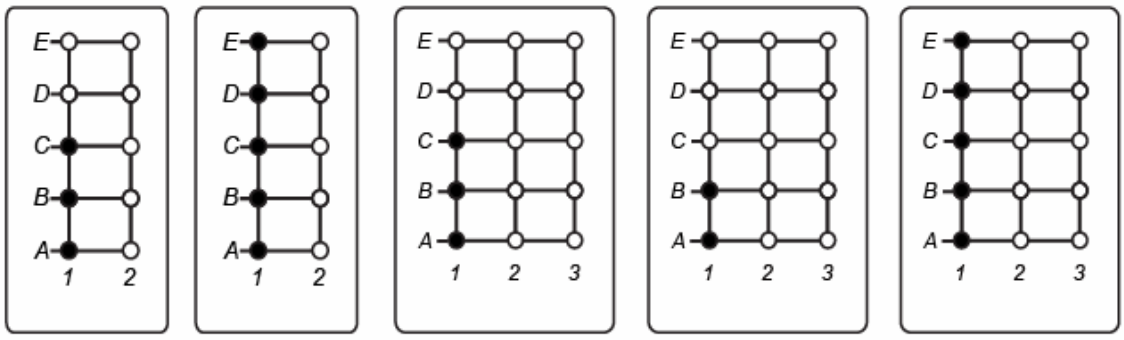




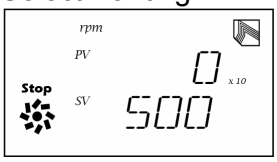




COLUMN -1

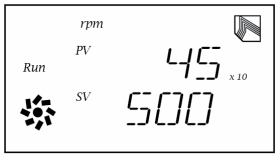


STEP 4: It is step to input RPM at the wanting row.
Select wanting RPM by turning knob at the standby display.



[RPM display]

STEP 5: press dial knob once to turn it on.



[Operating display]

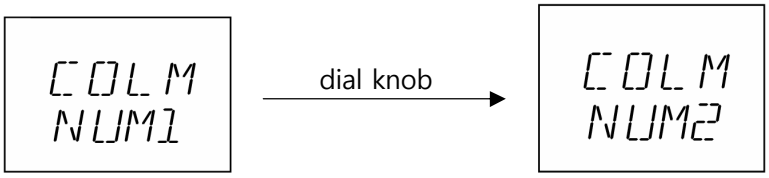
PV is increasing gradually.

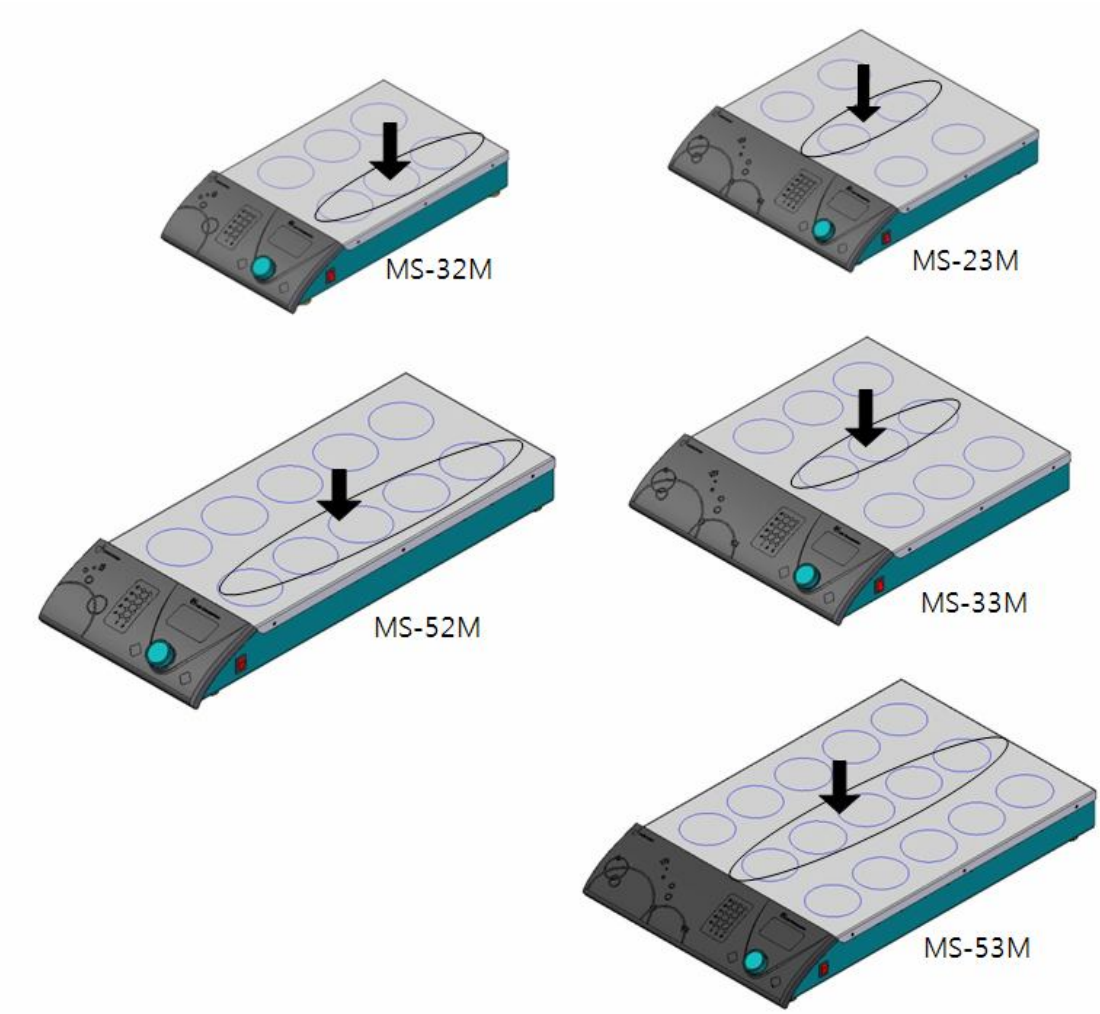
STEP 6: Check if it reaches up to user set RPM.

4.4.3.2 COLM Addition

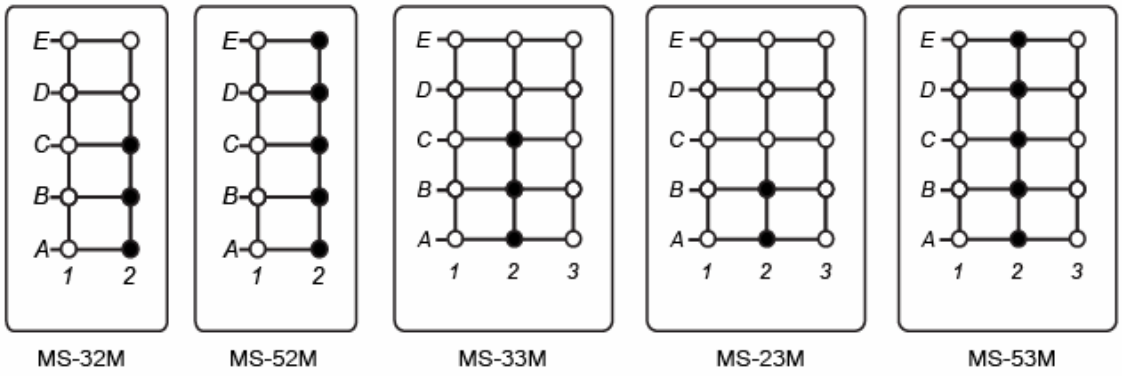
STEP 1: if you press ESC button during operation, COLM that is already set returns to COLM selecting display. Turn dial and select row you want.

It is example to show process that first row and second row stir at the same time with different RPM.

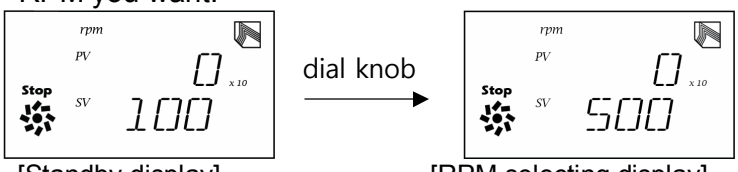




COLUMN -2



STEP 2: On pressing dial knob, standby display appears. Turn dial and set RPM you want.



[Standby display] [RPM selecting display]

STEP 3: press dial knob once to operate the stirrer.
STEP 4: Check if it reaches up to user set RPM. At this time COLM NUM1 keeps stirring with set value.

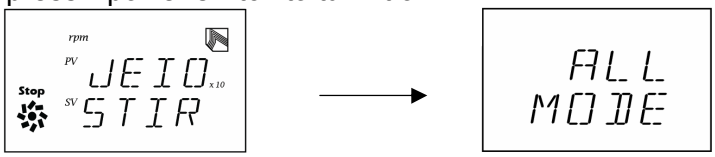
- Like this way, you can stir at all points with different speed.

4.4.4 Row Mode– Only for these items (MS-32M, MS-52M, MS-23M, MS-33M, MS-53M)

It is the function to stir each line with different RPM.

4.4.4.1 Operation

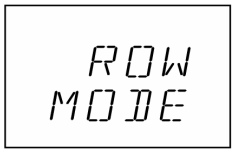
STEP 1: press power switch to turn it on.



[Booting display] [Initial display]

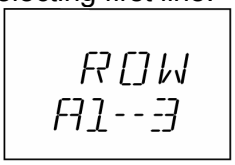
STEP 2: Turn dial knob right once. ROW MODE appears with following BEEP sound.

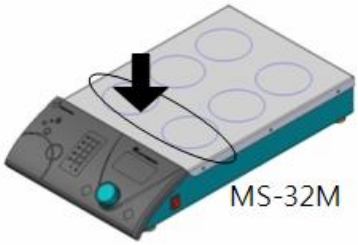
.

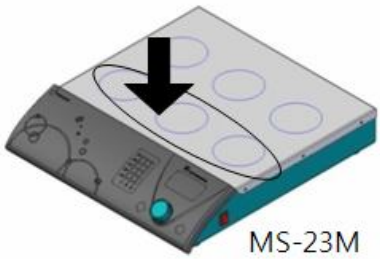


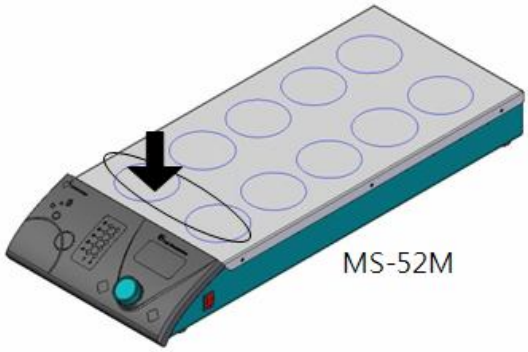
STEP 3: Press once dial knob. Turn dial knob right/left side to select point you want and then press once dial knob.

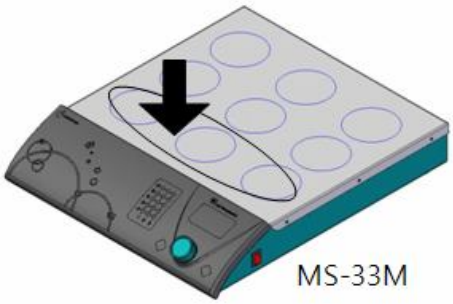
e.g) On selecting first line.

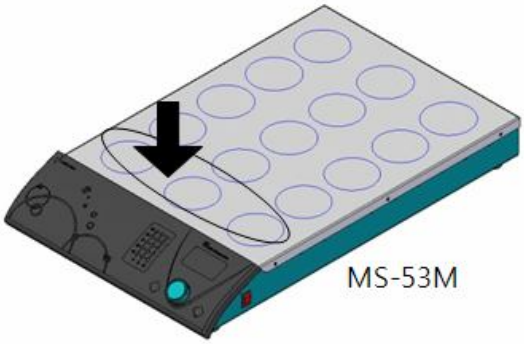



MS-32M

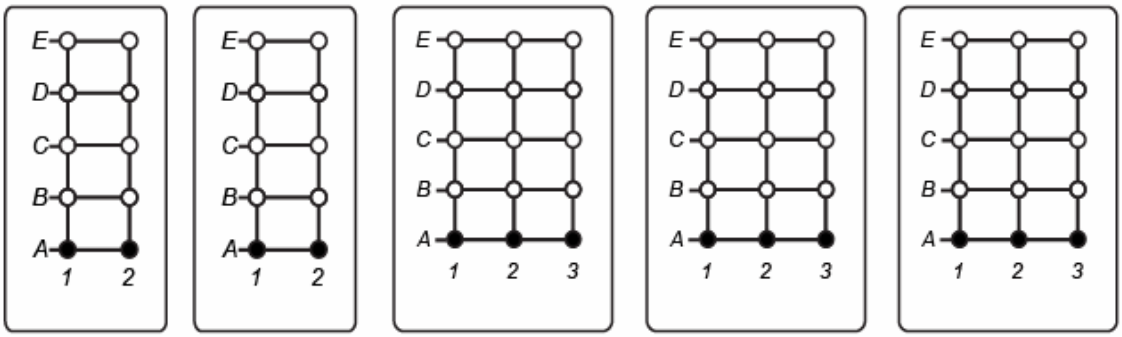

MS-23M


MS-52M

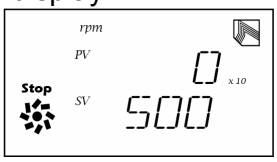

MS-33M


MS-53M

ROW -A

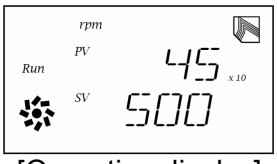

E
D
C
B
A
1 2
MS-32M
E
D
C
B
A
1 2
MS-52M
E
D
C
B
A
1 2 3
MS-33M
E
D
C
B
A
1 2 3
MS-23M
E
D
C
B
A
1 2 3
MS-53M

STEP 4: it is step to input RPM at the wanting line.
Select wanting RPM by turning dial knob when appearing standby display.



[RPM select display]

STEP 5: Press dial knob once to turn it on.



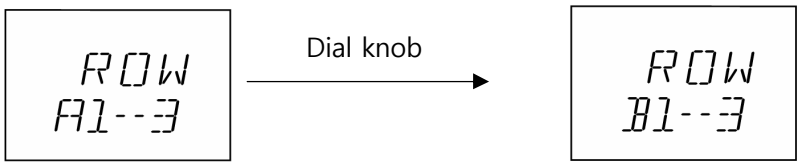
[Operating display]
RPM is increasing gradually .

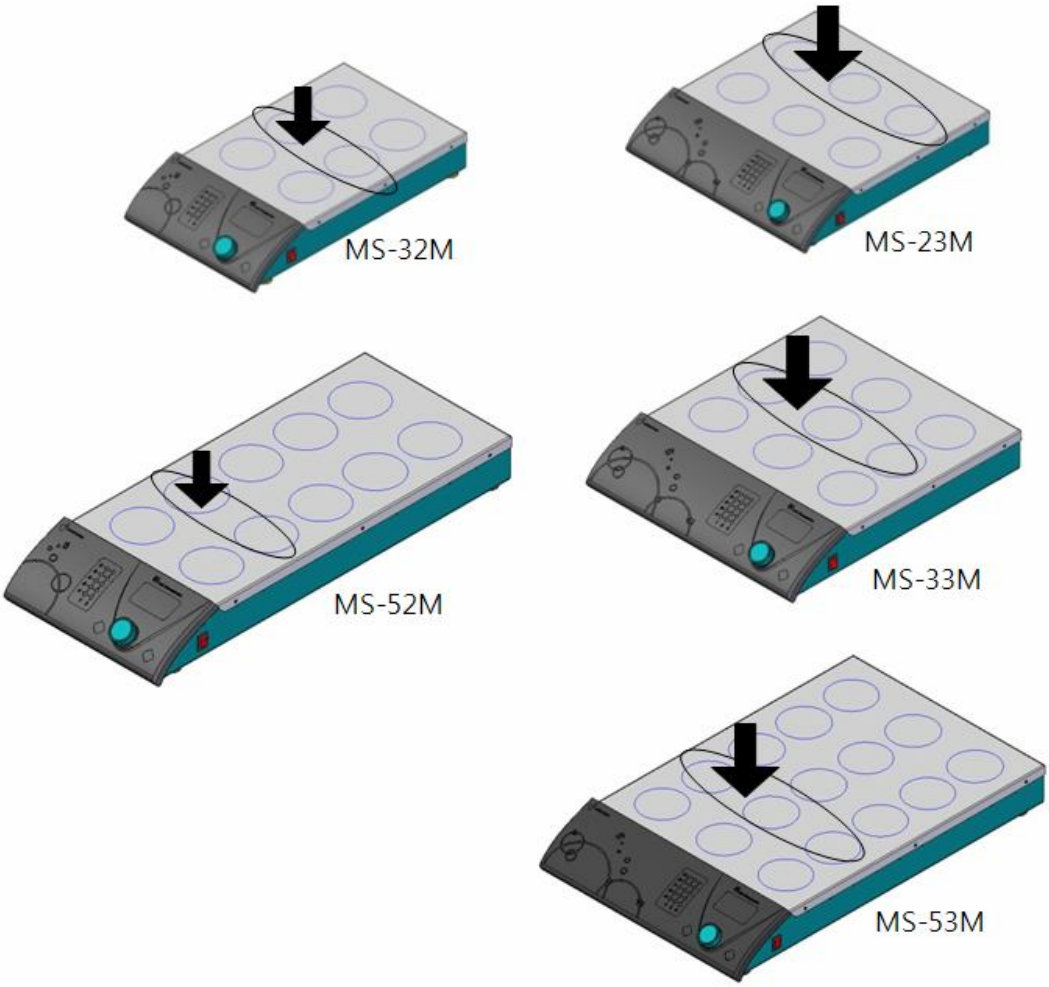
STEP 6: Check if it reaches up to user set RPM.

4.4.4.2 Line Addition

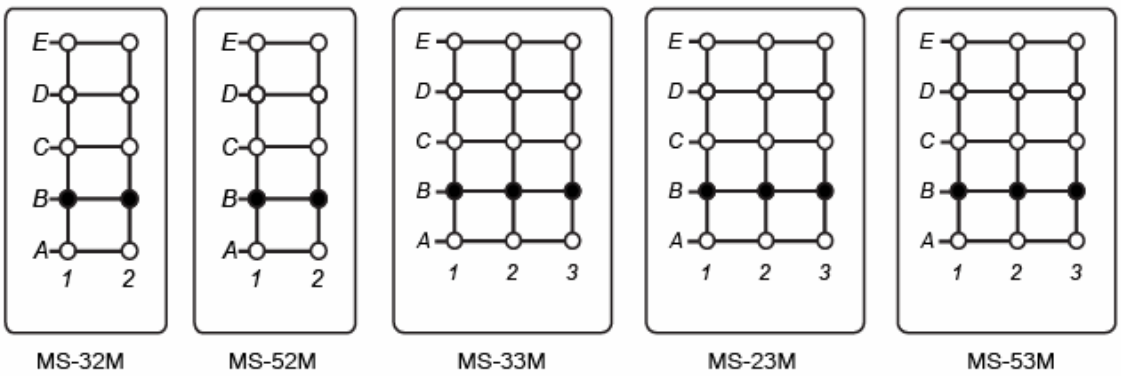
STEP 1: if you press ESC button during operation, COLM that is already set returns to COLM selecting display. Turn dial and select row you want.

It is example for process to stir A line & B line at the same time with different RPM.

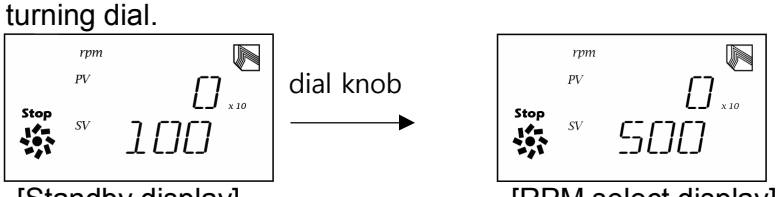




ROW -B



STEP 2: if you press dial knob, standby display appears. Set wanting RPM by turning dial.



[Standby display] [RPM select display]

STEP 3: press dial knob once to operate the stirrer.
STEP 4: Check if it reaches up to user set RPM. At this time A line keeps stirring with set value.

● Like this way, you can stir at all lines with different speed.

4.5 Operating other functions during stirring

4.5.1 Changing RPM during stirring

STEP 1: change RPM value by turning dial knob left/right side.
(It is not required to press dial knob, just turn it.)

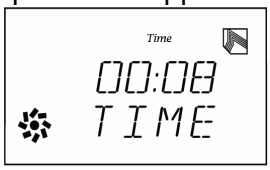
NOTICE

In case of Point Mode, Culm Mode, Row Mode, you can change RPM value by pressing dial knob if you press ESC button once and turn dial knob.

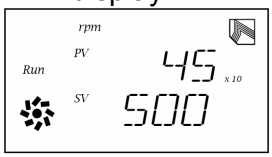
STEP 2: Check if it reaches up to user set RPM

4.5.2 Checking operating time

STEP 1: touch Time button once during stirring.
* Elapsed time appears



STEP 2: touch ESC button once
. It returns to RPM display.



[RPM display]

NOTICE

At this time, in case of Point Mode, Culm Mode, Row Mode, you can check operation time in each position if you touch Time button once after selecting & pressing dial knob.

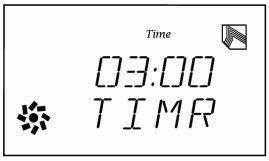
4.6 How to set Timer function

Both stirring time and stirring speed(RPM) can be set.

Step 1. There are 3 options to enter Timer setting.

(1) Touch TIME button 1 time at standby status.
(2) Touch TIME button 1 time after done RPM setting.
(3) Touch TIME button 2 times during stirring.

Step 2. Time blinks which means time can be inputted. – ESC button : Green color, TIME button : Red color



[TIME input status]

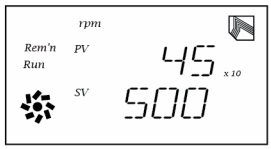
Step 3. Dial the knob to set HOUR.

Step 4. Press the knob to set Hour and to input Minutes.

Step 5. Dial the knob to set Minutes.

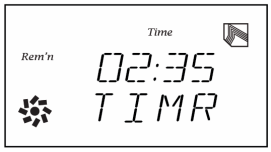
Step 6. Press the knob to start stirring.

Note : Press ESC button to cancel the value of time.



[Display when Timer is set]

Note) Press TIME button if you want to see remaining time during stirring.



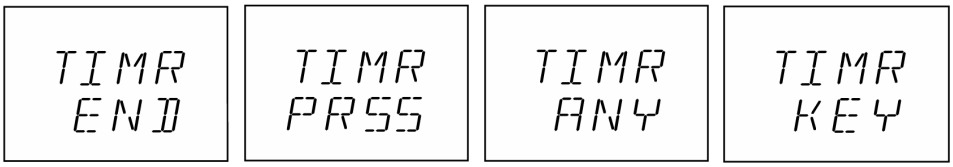
[Display of verifying remaining time]

NOTICE
– How to verify remaining time of Point mode, Column mode, Row mode: 1. Press ESC button. 2. Location displays. 3. Dial the knob and set the desired location. 4. Press the knob to choose the location. 5. Press TIME button. 6. TIMER can be set and remaining time can be verified.

Step 7. Stirring stops when timer is finished.

Step 8. END PRESS ANY KEY blinks with alarming.

Step 9. Press any key to return standby status.



4.7 How to stop stirring

4.7.1 ALL MODE

There are 2 options to stop stirring.

(1) By pressing the knob : Press the knob .
(2) By pressing ESC button

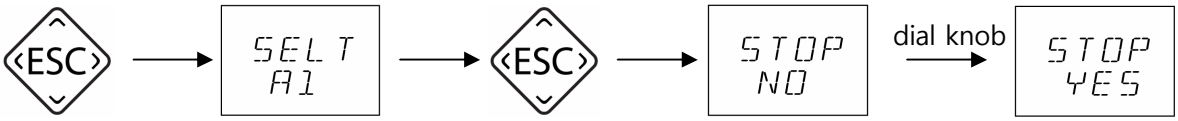
Step 1. Press ESC button.
Step 2. 'STOP NO' displays.
Step 3. Dial the knob and select 'STOP YES'.
Step 4. Press the knob.

4.7.2 POINT MODE

There are 2 options to stop stirring.

(1) By pressing the knob(stop part of stirring)
- Confirm the desired point through indication.
- Press the knob to stop the corresponding stirring.
- If you want to stop other part of stirring, move to the point and press the knob.

(2) By pressing ESC button (All stirring point stops)



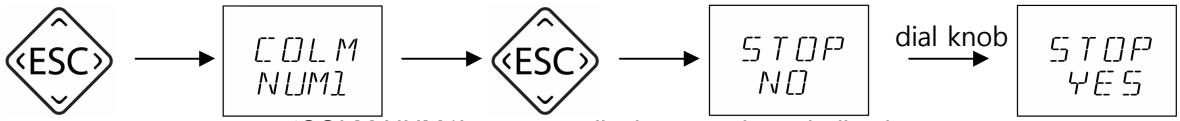
'SELT A1' message displays on point indication.

4.7.3 COLUMN MODE

There are 2 options to stop stirring.

(1) By pressing the knob(stop part of stirring)
- Confirm the desired column through indication.
- Press the knob to stop the corresponding stirring.
- If you want to stop other column of stirring, move to the column and press the knob.

(2) By pressing ESC button (All stirring point stops)

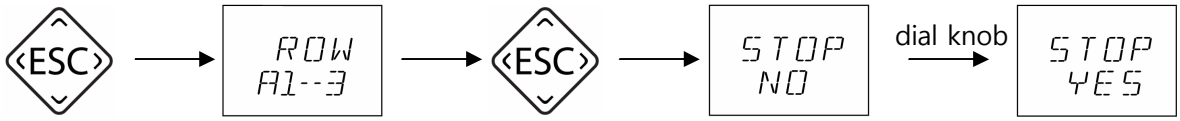


'COLM NUM1' message display on column indication.

4.7.4 ROW MODE

(1) By pressing the knob (stop part of stirring)
- Confirm the desired Row through indication.
- Press the knob to stop the corresponding stirring.
- If you want to stop other row of stirring, move to the row and press the knob.

(2) By pressing ESC button (All stirring point stops)



'ROW A1--3' message display on column indication.

5.0 Maintenance

5.1 Inspection cycle

Classification	Inspection cycle frame	
	Daily	Weekly
General		
Power cord		
- Inspect power cord connection at unit and receptacle.	●	
- Inspect power cord for wear, cracks or cuts.	●	
Top plate and plate cover cleaning		●
Magnetic stirrer		
Controller display checking	●	
Controller function		●
Motor on/off checking	●	
Motor speed checking	●	

5.2 Cleaning of top plate

(1) Remove a contaminant by cleaning the unit with a wet soft cloth.
(2) Keep the unit clean always by cleaning the unit with a dry soft cloth.

⚠WARNING

Do not soak the product in the water to clean.

5.3 In case of not using long time

(1) Unplug the unit from the main power.
(2) Clean the unit with a soft cloth neatly.
(3) Store in a dry place after packing.

6.0 Trouble shooting

Trouble	Causes	Solution
The unit does not turn on	Incorrect electric power	Compare power source and voltage on the ID plate and make sure they are the same. ID plate is found on the back of unit.
	Power failure or circuit breaker shuts down	Find out the causes of power failure and recovery.
	Main plug not seated properly.	Check the electrical cord connection at the unit to ensure it is fully seated.
	Socket / plug / main power line might be cut	If the socket / plug / main power line are cut, request service.
	PCB has demaged by reagent	Request service.
	Fuse shorts inside product.	Request service.
Room circuit breaker trips often when the unit is turned on or running	Too many plugs connect at the same time	1. Check the circuit breaker size along with the voltage and current supplied to it. 2. Check that several similar units are inserted together, if so you should not use overly.
With the POWER switch ON, the main display does not illuminate.	Power interruption	Check for power interruption.
	Main plug does not insert correctly	Make sure electrical cord connections at the outlet and the unit are firmly in place.
VFD display cracks	VFD segment Fault	Request service.

Trouble	Causes	Solution
No LED on Point indication	LED problem	Request service
Dial button doesn't operate well	Button problem.	Request service.
Dial button doesn't work out	Controller problem	Request service.
	Button demaged.	Request service.
Magnetic bar is out of position	Too much soultion(solvent) in flask.	Reduce volume of solution(solvent) or increase RPM slowly.
	High density of solution(solvent) in flask..	From low speed it raises a rotation speed slowly at high speed and find a proper speed.
	The magnetic force of magnet bar becoming weak.	Replace the magnetic bar
Makes bumping noise when operating	Magnetic bar inside the machine troubles	Request service.
Dial button doesn't operate well or doesn't work out	restart error of electrostatic capacity sensor	Turn off switch and intercepts power after supply power and controller will restart.
In case where the rotation speed will not be controlled normally	Using a program function.	Check the functional set and a normal operation presence. Set the controller function according to use objective.
	BLDC motors and circuit troubles.	Request service.
In case where magnet agitation stirring bar does not rotate	The low-speed rotation speed set which does not hold in control scope	use small size of stirring bar or raise rotation speed a little bit and fine proper rotation speed.

7.0 Accessories

7. 1 Description and Order Number

7.1.1 Magnetic stirring bar

Cat. No.	Description
MTT0008	Octagon type (Φ8 x 12.7, mm)
MTT0009	Octagon type (Φ8 x 16.0, mm)
MTT0010	Octagon type (Φ8 x 22.0, mm)
MTT0011	Octagon type (Φ8 x 25.4, mm)
MTT0012	Octagon type (Φ8 x 28.6, mm)
MTT0013	Octagon type (Φ8 x 38.0 mm)
MTT0014	Octagon type (Φ9.5 x 50.8, mm)
MTT0015	Polygon type (Φ5 x 15 mm)
MTT0016	Polygon type (Φ5 x 20 mm)
MTT0017	Polygon type (Φ5 x 25 mm)
MTT0018	Polygon type (Φ5 x 30 mm)
MTT0019	Polygon type (Φ5 x 40 mm)
MTT0020	Polygon type (Φ5 x 50 mm)
Cat. No.	**Description**
MTT0021	Egg type (16.0 mm)
MTT0022	Egg type (19.0 mm)
MTT0023	Egg type (25.4 mm)
MTT0024	Egg type (31.8 mm)
MTT0025	Egg type (41.28 mm)

7.1.2 Silicon Cover

Cat. No.	Description
MTS0015	355 x 475 x 1 mm (MS-23M,33M)
MTS0016	235 x 475 x 1 mm (MS-32M)
MTS0017	115 x 475 x 1 mm (MS-51M)
MTS0041	355 x 310 x 1 mm (MS-52M)
MTS0042	235 x 310 x 1 mm (MS-53M)

8.0 Annex

8.1 Technical Specifications

MODEL			MS-51M	MS-32M	MS-23M	MS-33M	MS-52M	MS-53M
Technical data	Stirring capacity (ml, H_2O)		250					
	Speed range (rpm)		30 ~ 2,000					
	Speed Stability (%)		±3 (300 rpm이상)					
	Timer		1 min. to 99 hours 59 min.					
	Operating mode		2 mode	4 mode				
	Speed display		VFD(Vacuum Fluorescent Display)					
	Motor rating input / output (W)		2.9/1.6					
	Magnetic bar (Ø x mm), Max.		Polygon type Ø 8×30mm					
	Load, Max (kg)		30					
General data	Set-up plate	Material	Stainless Steel					
		Dimension (W x L, mm)	124 x 485	242 x 318	362 x 318	362 x 318	246 x485	367 x485
	Body	Material	Powder coated steel					
		Color	Persian Blue					
		Dimension (W x D x H, mm)	130 x 591 x 75	250 x 433 x 75	375 x 433 x 75	375 x 433 x 75	251 x 591 x 75	378 x 591 x 75
	VFD Panel	Material	SPET					
		Color	Black					
	Weight (kg)		4	5	6	7	8	11
	Permissible am.temperature (℃)		+5 ~ 40					
	Permissible relative humidity (%)		up to 80%					
	Electrical requirements		AC 100~240V , 50/60Hz					
	Power consumption (W)		45	45	45	54	85	135
	Motor		Long life BLDC(Brushless Direct Current)					
	Control type		Digital PID Control					
	Adjustment tool		Touch key , Adjustment knob					
	Safety Device		Thermal Shutdown, Current limit protection					

※ Specifications can be changed without prior notice for quality upgrade.

※ Speed range(rpm): RPM can be set from 50 rpm. 30RPM can be done depending on Magnetic bar and volume of liquid.

※ **Test standard**

(1) Stirring capacity: Volume(mL) of water(H2O). Possible volume(ml) of water(H2O) at the highest speed.

(2) Speed range: Range with maximum capacity of stirring with maximum magnetic bar.

(3) Magnetic bar: Maximum magnetic bar not to escape at the highest speed and the maximum stirring capacity.

(4) Load Max. : Total weight of a container on plate and maximum weight of water(H2O) which the stirrer can stand.

8.2 Maximum stirring quantity and maximum stirring speed of stirring capacity of each model

Model	Capacityu	250 ml	500 ml	1 L	2 L
MS-51M	Possible quantity of stirring(location)	5	4	3	3
	Maximum stirring speed(rpm)	2,000	1,600	1,400	1,000
MS-52M	Possible quantity of stirring(location)	10	8	6	4
	Maximum stirring speed(rpm)	2,000	1,600	1,400	1,000
MS-53M	Possible quantity of stirring(location)	15	12	9	5
	Maximum stirring speed(rpm)	2,000	1,600	1,400	1,000
MS-23M	Possible quantity of stirring(location)	6	6	2	2
	Maximum stirring speed(rpm)	2,000	1,600	1,400	1,000
MS-32M	Possible quantity of stirring(location)	6	4	2	2
	Maximum stirring speed(rpm)	2,000	1,600	1,400	1,000
MS-33M	Possible quantity of stirring(location)	9	6	3	2
	Maximum stirring speed(rpm)	2,000	1,600	1,400	1,000

※ Magnetic stirring bar : Polygon type, Ø8X30mm

8.3 Warranty

8.3.1 General

(1) The warranty period of two year, covering for defects in workmanship and material when used under recommended conditions, as set forth in the operating manuals for such equipment.

(2) Jeio Tech needs to know for better and quick service when service needs.

- Purchasing date
- Serial number on Identification plate.
- Defect and trouble
- Application and using condition.

8.3.2 Warranty exception

This warranty does not cover any unit even under warranty period.

- Abuse, - Misuse, neglect, and accident
- Improper application, repair or attempt repair not authorized by Jeio Tech
- Fire, water, power outage, power surge, lighting, or other acts of nature.
- Damage as the result of not being complied by manual.

8.4 Service & Technical assistance

Jeiotech provides best service based on perfect customer system which we always think at customer side.

Korea (International Headquarters – Overseas Department)

#1005, Byucksan Digital Valley 6-cha,
481-4 Gasan-Dong, Geumcheon-Gu,
Seoul, Republic of Korea (153-803)
TEL: +82 (0)2 - 2627 - 3816
FAX: +82 (0)2 - 3143 - 1824
http://www.jeiotech.com
E-mail: overseas@jeiotech.com

U.S.A.

Jech Tech, Inc.
1-A Gill Street
Woburn, MA 01801 USA
TEL: +1 781-376-0700
FAX: +1 781-376-0704
E-mail: info@jeiotech.com

China

RM107, No. 68 Line, 569 Xin Hua Road, Shanghai, China
Postcode: 200052
TEL: +86 21-62940608
FAX: +86 21-62940602
E-mail: wslee@jeiotech.com

South East Asia

No.7A, Jalan Kemboja 1 B/2, 48300 Bandar Bukit
Beruntung, Selangor Darul Ehsan, Malaysia
TEL: +60 (0)3 60285833, +60 (0)3 60285825
FAX: +60 (0)3 60285822
E-mail: labcomp@streamyx.com

England (UK)

Unit 33, Monument Business Park Warpsgrove Lane
Chalgrove, Oxfordshire OX44 7RW, UK
TEL: +44 1865-400321
FAX: +44 1865-400736
E-mail: labcompanion@medlinescientific.com

The contents of the operation manual could be changed without notice for product improvement and accurate information.