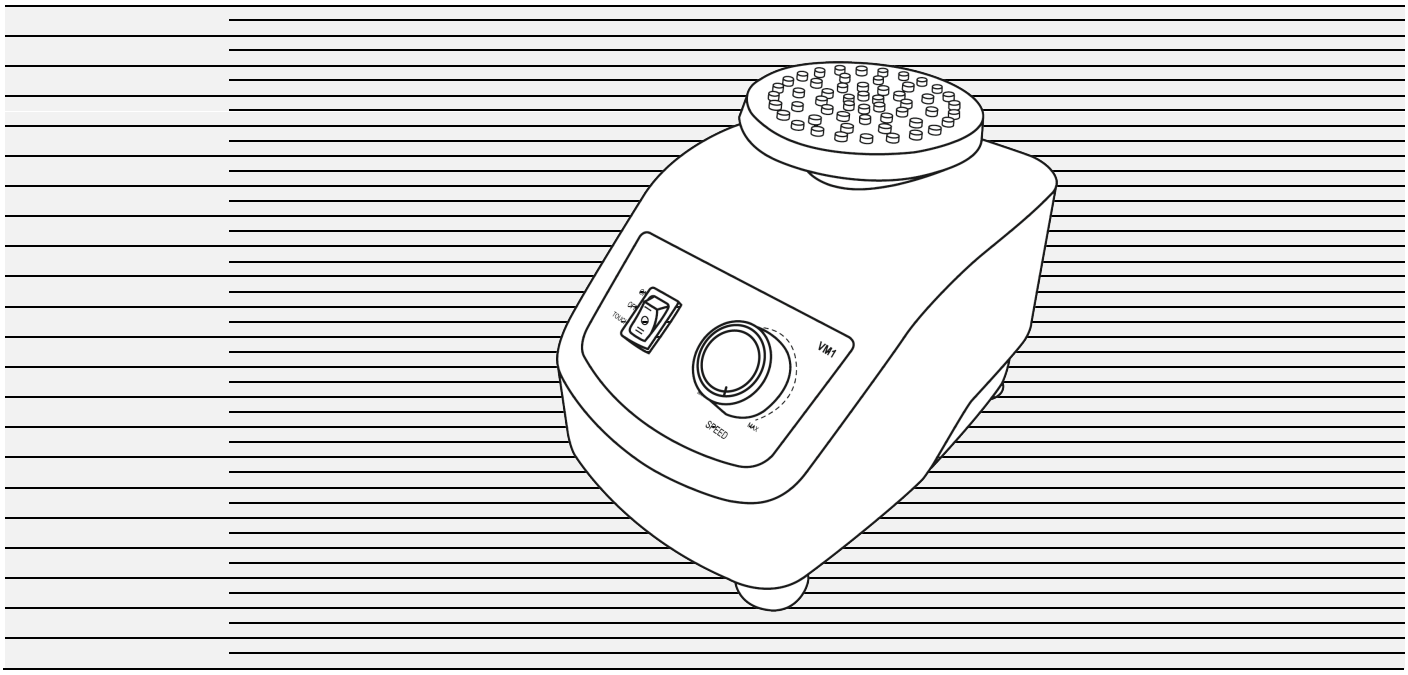
DAIHAN
Scientific International

Laboratory Vortex Mixer
VM1

OPERATING MANUAL



- We greatly appreciate your purchase of the VM1 Vortex Mixer.
- To be sure you take maximum advantage of all the features the VM1 has to offer, read these instructions carefully and use the set properly. Be sure to keep this manual for future reference, should any questions or problems arise.

SERIAL NO. _____

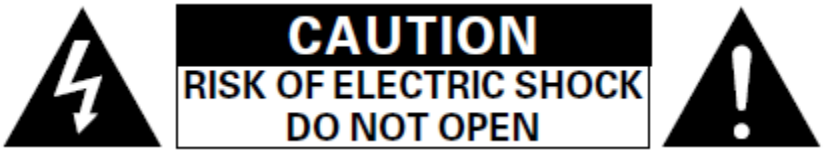
PLEASE RECORD UNIT SERIAL NUMBER ATTACHED TO THE REAR OF THE UNIT FOR FUTURE REFERENCE.

■ SAFETY PRECAUTIONS

◆ Safety symbol used in the manual

Danger The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the appliance.	**Dangerous voltage** The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage"
Explosion hazard If volatile and explosive chemical materials are used, the explosion may occur.	**High temperature** Be careful not to use at high temperature.
Notice If the user arbitrarily dismantles or transforms the product, the fatal damage of the product may be induced.	**Approach prohibition** Prohibit the user from approaching to this area.
warning If the product is mishandled while ignoring this symbol, the danger by which human beings are dead or severely injured may occur.	**Contact prohibition** Prohibit the contact at the moment that leads to the accident.
Caution If the product is mishandled while ignoring this symbol, the possibility in which human beings are injured or property damage occurs exists.	Observe the safety rules.
	Earth
Be careful to maintain the horizontality of the product and not to fall to the ground.	OFF position of power switch
	ON position of power switch
Keep the product out of the direct rays of the sun.	Connection point of the neutral wire of installation
	AC voltage

WARNING :
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.



CAUTION : TO RECUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

● Precautions at transportation and installation

- Please never tilt or lay the product doing during transportation.
- Be careful not to drop when transporting the product.
- This product was manufactured to move normally at the rated voltage. Confirm the voltage state before the installation of product.

- Install the product in a place where the floor is hard and flat.
- Keep the set free from moisture, water and dust. It may cause overheating or short circuit. (Pollution Degree 2)
- Do not install the product in a location at an altitude of over 2,000 meters. (6,562 feet).

- Avoid high temperatures : Install the product out of the direct rays of the sun.
- When the product is moved, separate the power plug from a wall outlet, and then move not to damage the product. The cord damage becomes the root cause for an electric shock or an ignition.

- If the product was moved or stored in high humidity state, identify the packaging state of the product before use.
  In case that the carton box or wooden box is soaked in water, consult with an engineer about the matter. Do not operate the equipment before the safety is confirmed. This wetting state may be the cause of an electric shock or a fire.
- When installing and using the product, please certainly use the power cord provided with the products.

- **Precaution in use**

- Please be familiar with the user manual before using this product, and operation should be performed only by qualified personnel.
- This product must be used within the permitted standard load resistance.
- This product should be operated in a room with temperature maintain between 5°C and 40°C. Long-term use in an environment that exceeds the allowable range may cause a malfunction.

- Do not cut or process the power cord or do not bend it by force or pull or tie up it. In addition, if heavy things are placed on the power cord, it may cause damage and it may become the root cause of a fire or an electric shock.

- Please do not touch or manipulate the electrical parts such as the power plug with wet hands electric shock.
- Please do not operate the product by manipulation of the plug to avoid electric shock or short circuits.

- Do not operate the product in the outdoors. It is not allowed to use it at the place that is exposed to the sun or at the place that is gotten in the rain. This leads the product to overheating or electric malfunction.

- Do not use the product on a high place or at high temperature. Do not use the product near the heater or the wind of air conditioner.
  The accident by the overheating of the equipment can occur.

- Do not operate the equipment at the place of an inflammable danger or a fire danger. This triggers the severe accident such as an explosion or a fire.

- Please do not use the flammable spray such as lacquers and paint, or volatile, flammable chemicals and its similar product, in the proximity of the product. They may cause the ignition due to the spark of switch.
- If you detect any noise, which is unlike any other time, or it exhibits wrong movement symptom, immediately turn off the power of the product and separate the power cable from the body.
- Please regularly check whether dust or dirt are on the power plug and completely connect the plug. If the plug is covered with dust, or the connection is not complete, it will cause an electrical shock or fire.
- Please separate the power plug from the outlet for safety when the product is unused for long periods of time to avoid overheating or ignition due to dust.
- Please handle the power cord carefully. Hold the plug when unplugging the cord
- The fluctuation of main power voltage should be lower than +/-10% of the nominal voltage.
- The maximum relative humidity is 80% at 31°C and 50% at 40°C.
- Please maintain the clean condition of this product by removing the foreign matter while gently wiping with the neutral detergent and a dry cloth after checking whether the foreign matter present or not, before and after using this product.

■ INTRODUCTION

Thank you for purchasing Vortex Mixer of **DHIHAN Scientific International Inc.**
We, DHIHAN Scientific International Inc., started to manufacture and supply highly reproducible and reliable products
in the basic equipment for basic science research such as biotechnology, medicine, environment, and chemistry. Especially, in various experimental equipment for various purposes, the accumulated know-how of DHIHAN Scientific International Inc. has achieved high convenience and reliability by achieving commonization and systematization of the methods of use.

This product is manufactured as subminiature size for the effective use in customer's laboratory, and it guarantees low noise and low vibration to maintain the comfortable environment of laboratory. In addition, it was designed by adopting electrical and instrumental safety devices to realize the use safety. We, DHIHAN Scientific International Inc. pursues customer satisfaction as the best value, We will do our best to implement steadily. Thank you.

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① BEFORE USING

Pay attention to the following before using this unit:

- **Moving the set**
  To prevent short circuits or damaged wires in the connection cords, always unplug the power cord safely.
- **Before turning the power switch on**
  Check once again that all connections are proper and that there are not problems with the connection cords.
- **About operating manual**
  Read and understand all the instructions in the user manual before using the products.
  In any case, we don't bear responsibility for the damage of product which occurs by no observance for the requirements of user manual. The contents of user manual may be changed or improved. Use only for the intended purpose which is described in the user manual. After reading, store this manual along with the warranty in a safe place.
- **Note that illustrations in this manual may differ from the actual set for explanation purposes.**

② FEATURES

The vortex mixer, which is produced by **DHIHAN Scientific International Inc**., is used for mixing the specimens after placing them into a test tube or dissolving the solids that exist in the test tube. It can be used in the laboratories of various fields such as life science, biochemistry, medical devices and so on, and its characteristic is as follows.

- **Various Sample Application**

  Various Shapes, Sizes and Materials of the Head allows for mixing.

- **Multifunction Switch**

  3-position Power Switch Operates with Continuous Action or "Touch On" Control.

- **Variable Speed Control**

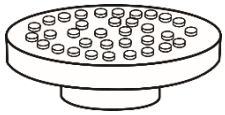
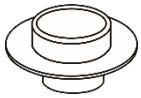
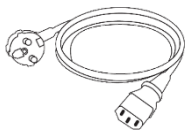
  Variable Speed Control Allows Slow Speed Shaking Action up to High Speed Vortex, up to 3,300 rpm.

- **Stable Platform**

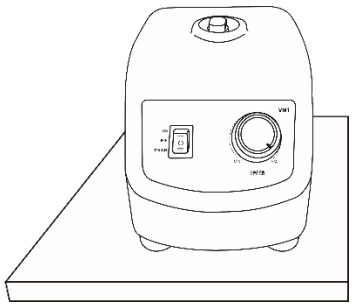
  The strong motor realizes the stable movement and Tough Metal Housing Provides a Stable Platform for all types of Mixing.

③ PRODUCT INSTALLATION

Composition identification

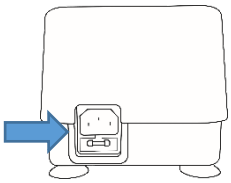
	Basic Components		Qty
1		Vortex Mixer Unit	1
2		Platform head with Rubber Platform	1
3		Pop-off Cup head	1
4		Remove Applicator	1
5		Power Cable	1
6		Operating Manual	1

How to install

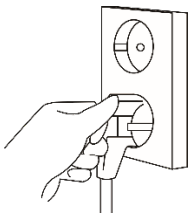


1. Remove the packaging of the product at the place in which the floor of the interior is flat and the horizontality is maintained and place it on the designated place.

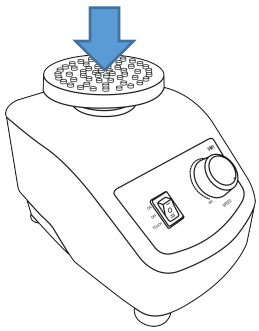
2. Recommend that the product keeps a certain distance with other products. As the heat is generated by operating the product for long time, do not arrange the wall or other products near the product.



3. Confirm whether or not the power cable which is supplied together with the product is damaged, and connect it with the product.



4. Insert the socket in the other side into the wall plug. In case of using a power strip, be careful not to exceed the electrical energy of maximum sum.



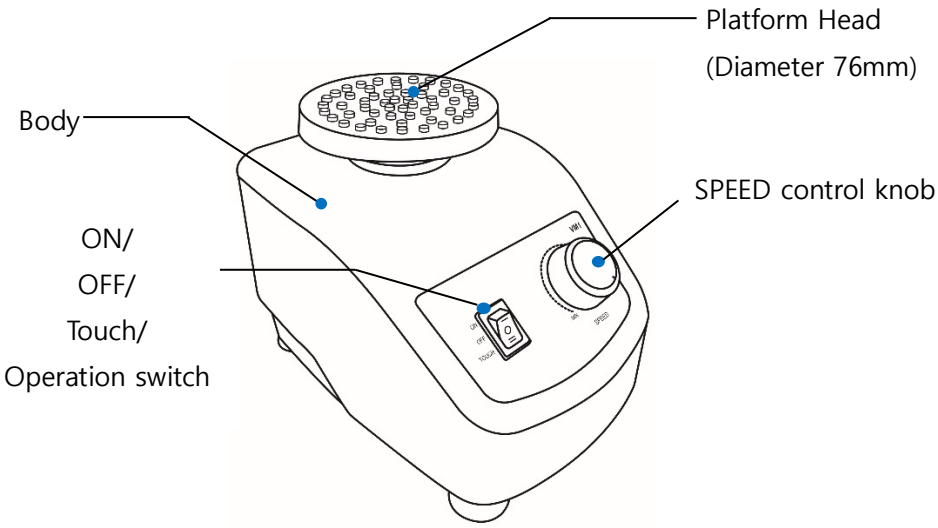
5. Select one of the heads which are supplied together with the product and assemble it into the upper part of the body. In case of pop-off cup head, install the head in the mount of the body by pushing with a hand to the arrow direction like the figure. At this time, the installation can be confirmed with the connection sound such as "tug". (Other installation method of the head refers to the "Check before operation")

Product specification

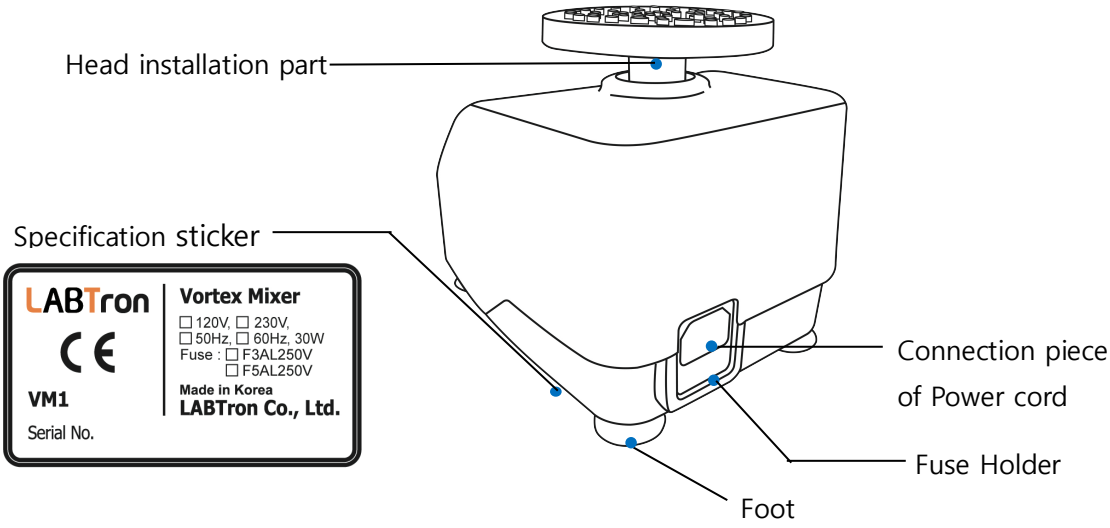
Model	VM1
Type of movement	Orbital
Speed Range	0 to 3,300rpm
Operating Modes	Touch or continuous
Orbit diameter	Circular Orbit, 4.0mm Dia.
Speed Control	Stepless
Application Container / Number	Hand holding: any micro tube or conical tube Fixed holding (Micro tube Platform Head) : 0.5/1.5/2.0ml micro tube x 12 each
Construction Material	Powder Coated Aluminum
Driving Motor	Brushless Shade motor
Permissible Temp. & Humidity	5℃~40℃, <80%
Max. Load & Power	0.5Kg, 30W
Dimensions (w x d x h) & Net Weight	131 x 185 x 125mm, 2.64Kg
Packing Size (w x d x h) & Gross Weight	190 x 250 x 215mm, 2.94Kg
Power Supply	AC 120V, 60Hz or AC 230V, 50/60Hz

④ Check before operation

Product structure

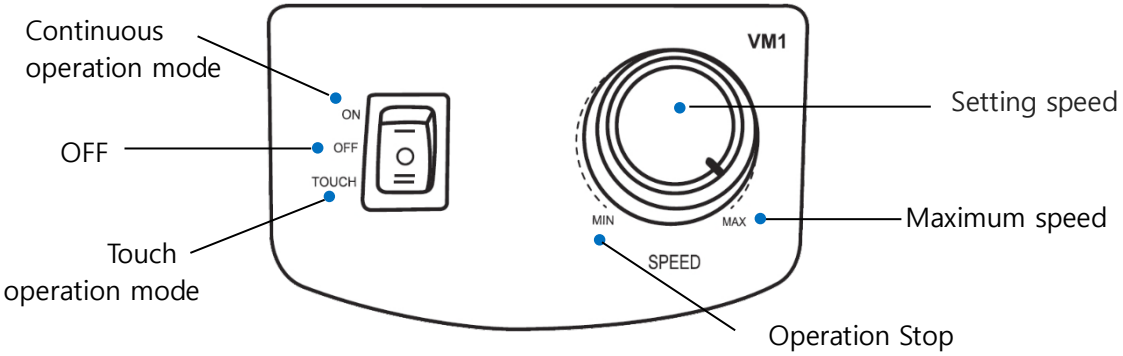


- ON/OFF/Touch/ Operation Switch : Select the operating mode of the product.
- SPEED control knob : Regulating of mixing speed.
- Platform Head (Ø76mm) : Applied to mix the samples by putting them on the platform directly.
- Pop-off Cup Head. (Included)



- Head installation part : Installation after selecting adequate head in accordance with the shape and size of tube.
- Fuse holder : Fixing the fuse and protection not to expose.
- Foot : Supporting the body not to slip when operation.
- Specification sticker : Recording the specification and serial number of product.

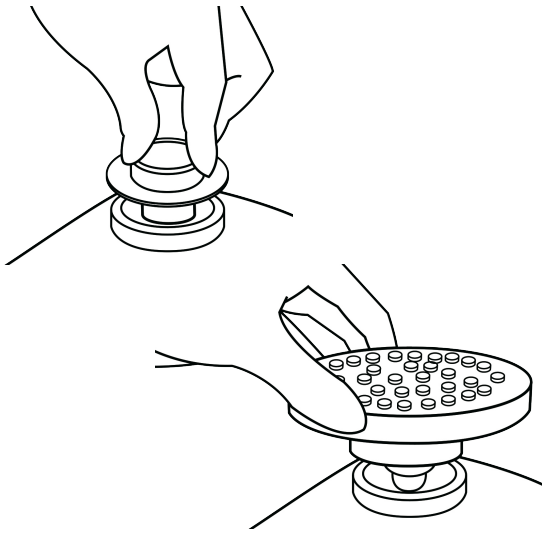
Control panel



- Continuous operation mode : Continuous movement at the set speed.
- OFF : Stop of the movement.
- Touch operation mode : Movement only whenever the head is pressed.
- Operation stop : "0rpm"
- Maximum speed : " 3,300rpm"
- Setting speed : Movement at the speed within the range in which projecting part is placed.
  Acceleration if it is regulated to clockwise.
  Deceleration if it is regulated to anticlockwise.

Head installation and replacement

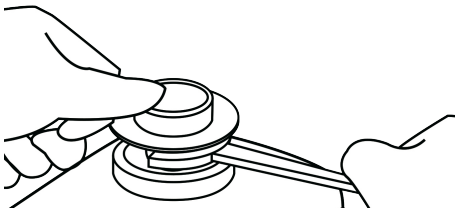
: Installation and dismantlement of Pop-off Cup Head and Platform Head

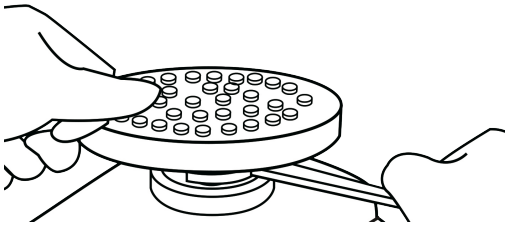


How to install

- Identify the mount of the body like the figure, place pop-off cup head or platform head on the mount and install it in the mount using both figures to the arrow direction.
- The completion of installation can be confirmed through the connection sound like “tug”.

←-Remove Applicator





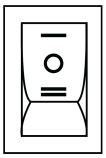
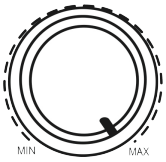
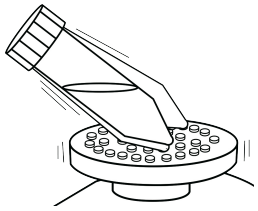
How to dismantle

- Insert the “Remove Applicator” to both sides in the bottom of head in order that the round shape is positioned to down direction.
- Lean the remove applicator against the body, and raise the head up while pulling down the handle powerfully.
- Separate the head from the mount.

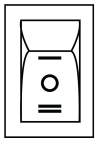
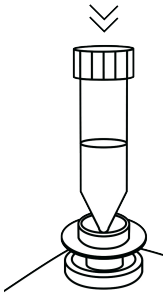
⑤ OPERATION

- Confirm whether the power cable is normally connected or not.
- Confirm whether or not the head is normally assembled before the operation of the product.
- As the shaking of the product may occur when it is immediately operated at the state in which the speed regulating knob is set as the maximum, initiate it at the lower speed and then regulate it to speed up.

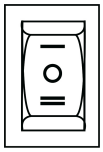
Continuous operation mode (ON)

Controller	How to operate
 Front Side	1) Set the movement mode switch of the regulator to "ON". The product is operated right after "ON' is set.
 Point of movement speed	2) Adjust the knob to be placed at the appropriate position using the RPM control knob of the controller.
	3) Place the test tube on the head, and mix.

Touch operation mode (TOUCH)

Controller	How to operate
 Front Side	1) Set the movement mode switch of the regulator to "TOUCH".
Point of movement speed	2) Adjust the knob to be placed at the appropriate position using the RPM control knob of the controller.
	3) If you press down the test tube on the head powerfully, the device operates to the established speed.

Stop operation (OFF)

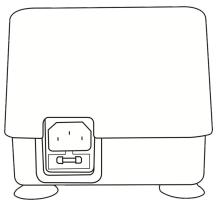
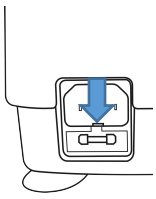
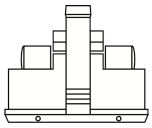
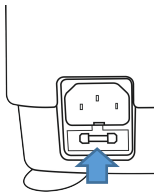
Controller	How to operate
 Front Side	If you set the movement mode switch of the regulator to "OFF", the operation is stopped.

⑥ Product management

Regular inspection

Classifications	A period of checking time		
	Day	Week	Month
Connection state of the source of electric power	√		
Damage of power cable	√		
Cleaning state of power cable	√		
Assembly state of accessories	√		
Cleaning state of regulator	√		
Shape preservation of regulating foot		√	
Extent of noise		√	
Normal control of movement mode		√	
Normal control of regulating knob		√	
Damage state of fuse			√

How to replace the fuse

			
Separate the power cable in the back side of the product, and identify the fuse holder.	Separate the holder from the body using "—" driver.	Identify the fuse and replace it. 120V: F5AL 250V 230V: F3AL 250V	Re-install the fuse holder to the body while pushing the holder with hands.

Cleaning and storage

● Cleaning of the product

Maintain the cleaning state of the product by regular cleaning. The regular maintenance of the product extends the use period of the product and minimizes the contamination of specimen.

1. Confirm whether or not any foreign matters exist, and if yes, immediately wipe off them.
2. Do not use abrasive or detergent based on solvent.
3. If a chemical substance stains the product, wear gloves and a mask which are composed of chemical resistance material, and wipe off them with a piece of dry cloth.
4. When cleaning the product, you must separate the power cord from the body.
5. For the part from which the contaminant is not easily erased, wipe off only the part with the towel wetting with the solvent that has low freezing point.

● Disposal of the product

- When the warranty period of the product is terminated, it should be disposed in accordance with the management regulation of wastes of the corresponding territory.

● Storage of the product

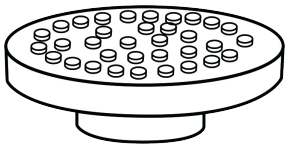
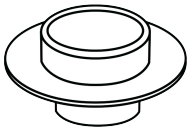
1. If the product is not used for long time, separate the power socket from the body, wrap and store it.
2. Store them in the same place not to lose the components.

⑦ Troubleshooting

Error identification

Problem	Possible Causes	Corrective Action
In case of failing to operate	• Power supply which is not met with the electric power voltage of the product. • Switch-off of the residual-current device at the installation place or occurrence of power failure. • Inaccurate connection between a power plug and a socket. • Damage of socket/plug/power cable. • Short-circuit of fuse. • Stop of movement mode.	1. Confirm whether the movement switch is positioned at "ON" or "TOUCH" not. 2. Confirm whether power failure occurs or not. 3. Connect the power plug to the wall socket accurately. 4. If the short-circuit of fuse occurs, replace it. 5. If the problem is not solved, contact our customer service.
If the acceleration or deceleration can't be controlled.	• Internal control unit malfunction.	• Contact our customer service.

⑧ Accessory

Component	Ordering Number	Information
	LT.VM00010	"VM1RP" 3inch Rubber Platform Head
	LT.VM00020	"VM1PC" Pop-off Cup Head
	LT.VM00030	"VM1RA" Remove Applicator

■ **Free warranty service**

If any malfunction due to the flaw of the product occurs within 2 years from the purchasing date, the product is free repaired or replaced it with the same kind product after inquiring our head office

■ **Onerous service**

- In case after a lapse of warranty service period of 2 years. In case the product is arbitrarily remodeled or repaired.
- In case the malfunction by natural disaster. (fire, damage of sea water, gas disaster, flood damage and so on).
- In case the malfunction occurs by not observing the safety caution and warning described in the user manual.
- In case the malfunction occurs by the handling carelessness of the user.

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