

# Compact Digital MicroPlate Shaker

**Orbital Motion, 100-240V AC, 50/60Hz**

Operation Manual 9240-11-017



**Important** Before using this product, read this entire operation 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. ▲

**Caution** All internal adjustments and maintenance must be performed by qualified service personnel. ▲

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#### MANUAL NUMBER 9240-11-017

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REV	ECR/ECN	DATE	DESCRIPTION	By

This manual contains important safety and operation information. You must carefully read, understand, and follow all the instructions in this manual prior to operating this instrument. Keep this manual in a safe place nearby for reference and make it easily available to all users.

- 1) This manual highlights DANGER/WARNING/CAUTION/NOTICE alerts to prevent injury or property damage and also to achieve optimum performance of your instrument.
- (2) These alerts are classified into four types in this manual depending on the importance and the risk levels as described below:

Symbols	Meaning
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Ignoring this warning could cause serious injury or even death.
	Ignoring this caution could cause injury or property damage.
	Ignoring this notice could cause operational problems.

- 3) The claim which is out of the quality guarantee published by the Manufacturer is out of Manufacturer's responsibility.
- 4) The damage which is from unexpected fault or damage of user by Acts of God is out of Manufacturer's responsibility.

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When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

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# Table of Contents

<b>Section 1</b>	<b>Warnings and Cautions</b> .....	<b>1-1</b>
<b>Section 2</b>	<b>Section 2 Functional Descriptions</b> .....	<b>2-1</b>
	Features .....	2-1
	Construction .....	2-2
<b>Section 3</b>	<b>Installation</b> .....	<b>3-1</b>
	Checking Instrument Components .....	3-1
	Installation Environment .....	3-1
	Connecting to the Mains Power Supply .....	3-2
	Plate Installation .....	3-2
<b>Section 4</b>	<b>Operation</b> .....	<b>4-1</b>
	Start and Stop .....	4-2
	How to Set the Timer .....	4-2
	Stop Timer .....	4-3
	Safety Device for Overload .....	4-4
<b>Section 5</b>	<b>Maintenance</b> .....	<b>5-1</b>
	Cleaning of Tray and Unit Body .....	5-1
	Keeping Product .....	5-1
<b>Section 6</b>	<b>Troubleshooting</b> .....	<b>6-1</b>
<b>Section 7</b>	<b>Accessories</b> .....	<b>7-1</b>
	Tube Support 1.5ml .....	7-1
	Tube Support 15ml .....	7-2
	Tube Support 50ml .....	7-2
<b>Section 8</b>	<b>Technical Specifications</b> .....	<b>8-1</b>
	Disposing of the Product .....	8-2
<b>Section 9</b>	<b>Warranty Information</b> .....	<b>9-1</b>

## Section 1 Warnings and Cautions

### WARNING

Ignoring the following warnings could cause serious injuries or even fatal accidents.

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.

Use correct and provided power cord.

Do not install the product in the place that the gas could leak out. Do not use in a place that has industrial oil smoke and metallic dust. It causes fire or electric shock.

Do not use the machine near places where explosion can occur due to organic evaporating gases.

Explosive materials: Acid, Esther, Nitro compound

Inflammable materials: salt peroxides, inorganic peroxide, salt acids.

Check equipment for permissible environmental conditions when used inside Temp. & Humid. Chamber or Incubator. It can be cause of fire or trouble by shaker electricity, electronic, and damage of motor.  
Shaker Permissible environmental condition; Temperature 2°C to 60°C,  
Maximum relative humidity 80%.

Wear your personal protective equipment in accordance with the hazard category of the medium to be processed. Splashing liquids, projectile parts, body parts, hair, clothing and jeweler getting caught.

Unplug, when there is strange sound, smell and smoke from the product.  
Stop operating and request 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 change the efficiency of the product. Also this will void the warranty.

## Section 1

### Warnings and Cautions

#### 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 cause electric shock or fire.

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

Install power outlet near instrument for convenience.

Do not install the stirrer near machinery generating high frequency noise. Avoid installing near 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.

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.

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

Disconnect the power plug if some sounds and burning smell, smokes occur. And request service.

Do not let the product take shock by falling down. It will cause wrong operation and malfunction.

## Section 2 Functional Descriptions

Compact Digital MicroPlate Shaker can be operating large amount of sample (4 Microplates in same time). And the shaker is designed for conveniences and safety of the experiment.

### Features

#### Performance

- Rotation diameter 3mm, 150 ~ 1,200 rpm rotational speed with stable rotation speed can be selected to user suitable purpose.
- The shaker is designed to operate high temp.(~ 60°C) and suitable to use in Hybridization reaction.
- Low profile design, silicone pads, and rubber feet are minimizing noise and vibration to safety of the experiment. During the high mixing sample, the shaker is not easily slid.

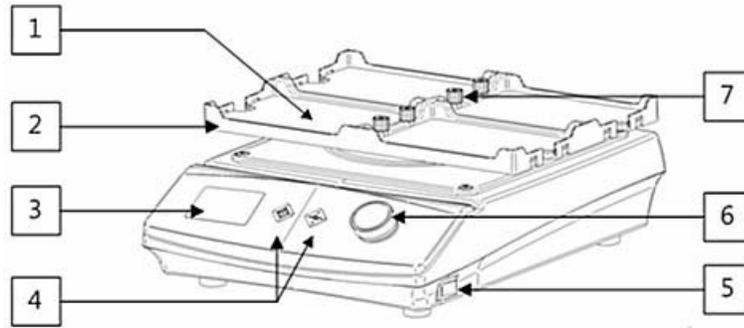
#### Safety

- Smooth starting function to protect the split out of sample.
- The structure can be minimized some liquid passes through into the product. So the shaker can be protecting user from electrical hazards, fire or explosion.
- During overload situation, the built-in safety device can show overload sign, alarm, and stop operating. After power re-play, the product will operating.
- Use of BLDC motor provides low noise and strong durability.

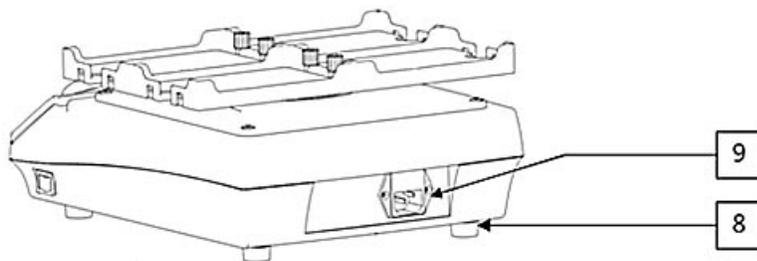
#### Ease of Use

- The controller display adopts VFD (Vacuum Fluorescent Display). It is easy to indicate shaker setup and operating condition.
- User can do Timer setting conveniently (1 min to 99 hour 59 min). Also, the Timer can be used to check remaining time.
- Possible to use 1.5ml Micro-tube, 15ml, 50ml conical tube.

## Construction



- (1) Silicone Pad: to protect sliding of glass flask.
- (2) Plate Tray: to be placed Microplate, Adapter (Acc. Refer: 7-1).
- (3) VFD panel & Controller: The panel indicates product setting and control condition.
- (4) Touch Button: to choose RPM or TIMER individually, operating by orange and green LED lamp.
- (5) Power switch: It is the main ON/OFF switch and supplying power of the product.
- (6) Dial knob : to set a shaking speed / Timer and start / stop.
- (7) Fixing Rubber: to be placed Microplate on the plate.



- (8) Foot: to prevent from slippery and support main body
- (9) Socket: Connect the power cable on the socket.

## Section 3 Installation

Check to see if there is any damage in the instrument packaging before unpacking. Then unpack the instrument carefully. Inspect to see that the instrument was not damaged during transportation.

### Checking Instrument Components

Check the instrument components supplied in the package after unpacking. If a noticeable issue or an omission is found, immediately notify your local Thermo Scientific dealer's Service Department.

BASIC COMPONENT	QUANTITY/ RECEIVED	DESCRIPTION
Operating Manual	1/OK	-
Body	1/OK	-
Power cord	1/OK	-

### Installation Environment

- Temperature: 2°C ~ 60°C
- Relative Humidity: RH 10% ~ 80%
- Maximum Altitude: Up to 2000m

#### WARNING

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

#### CAUTION

- Do not place the unit near other laboratory equipment which can be readily influenced, even by weak motor vibration.

## 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 AC power cable.

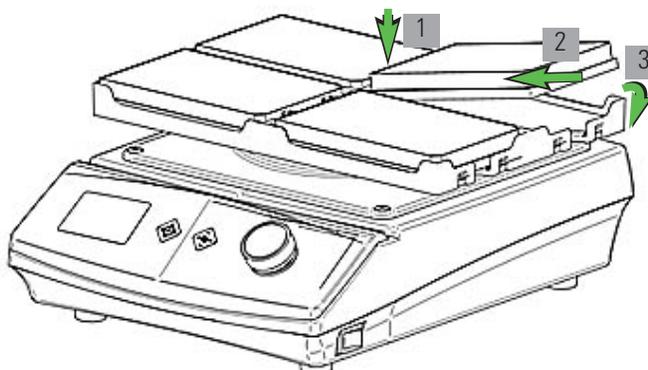
STEP 2: Connect the power cable to the socket located on the unit back.

### ⚠ WARNING

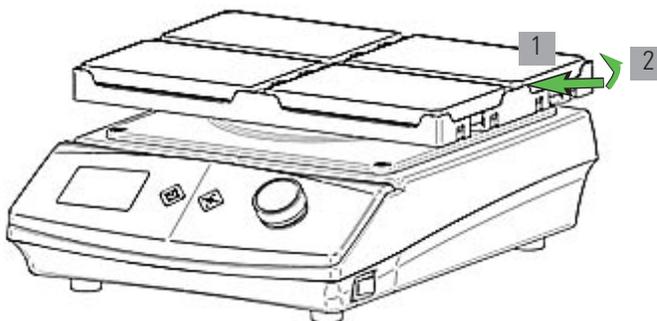
- Check voltage, phase, volume of power and connect properly.
- Power source must be grounded.
- Cable could be damaged by overcurrent and may cause fire. So do not use a branch socket or double taps.

## Plate Installation

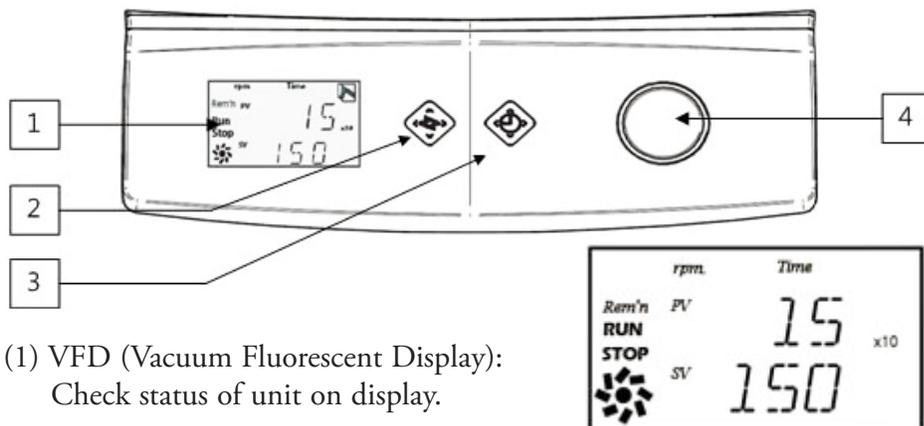
Slide and insert Microplate to the direction of the fixing rubber as below. Operate after inserting four Microplates for balancing. If you insert two Microplates, install them diagonally.



Likewise, when you remove the plate, push the outside home of the plate tray to the direction of the fixing rubber. Lift and remove it.



## Section 4 Operation



- (1) VFD (Vacuum Fluorescent Display):  
Check status of unit on display.

rpm : Indicator below PV and SV shows RPM.

Time: Run time or Indicating Timer mode.

PV: Current RPM

SV: Setting RPM

Run: It indicates the unit works.

Stop: It indicates the unit stops.

Rem'n: It shows remaining time during Timer mode operation

-  (2) RPM button: It indicates that the unit works. RPM can be verified during Timer mode operation.

It is Touch Sensitive Capacitive Button. So, when you just touch the button with your finger, it senses the touch. During normal mode operation, the orange light is on and during Timer Mode operation, the green light is on. When you push the green button, you can check the operating rpm.

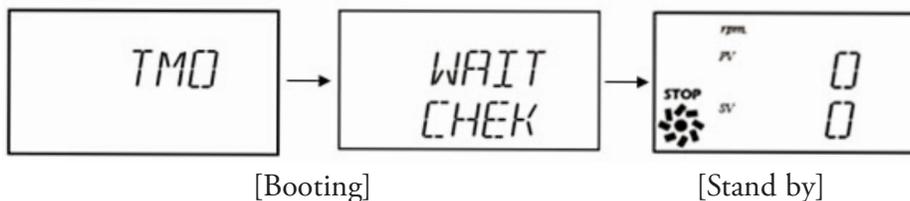
-  (3) TIME button : Timer and Run time can be verified

It is Touch Sensitive Capacitive Button. So, when you just touch the button with your finger, it senses the touch. During Timer Mode operation, the orange light is on. During operation, if you push it, you can check how long it has operated and during stop, if you push it, you can set timer.

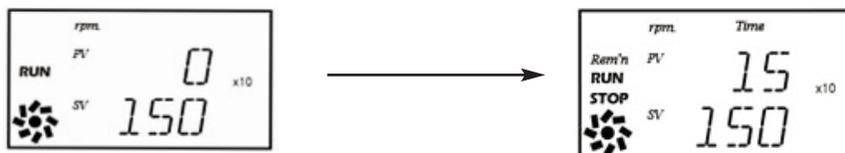
- (4) Dial knob : RPM setting, Input time, or stop the unit

## Start and Stop

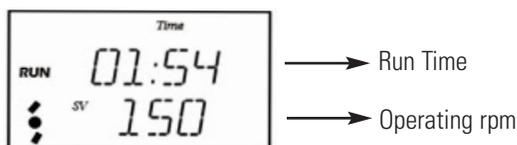
(1) Turn on the switch at the right bottom of the unit.



(2) Dial the knob and set the desired RPM.



(3) Run time can be verified during shaking if you press  button.



Display returns to previous display about after 10 seconds.

(4) You can stop the unit if you set SV to 0 or press the dial knob.

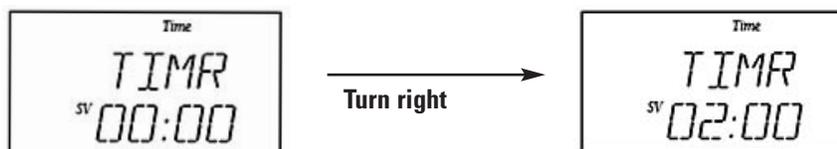
## How to Set the Timer

(1) Press Timer button when the unit stops.



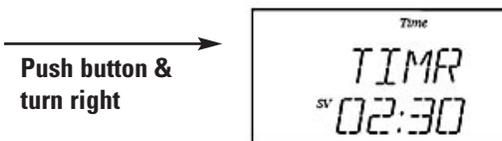
(2) Time input display shows when you press the dial knob.

STEP 1: Input hour by rotating dial knob to right or left direction.



STEP 2: Press dial knob 1 time.

STEP 3: Input minute by rotating dial knob to right or left direction.

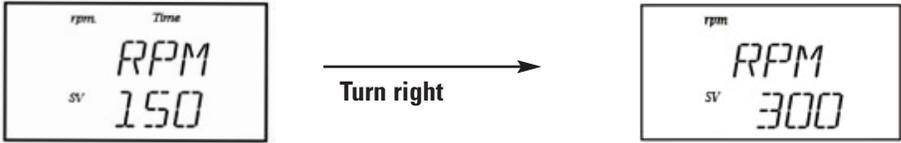


STEP 4: Press dial knob 1 time.

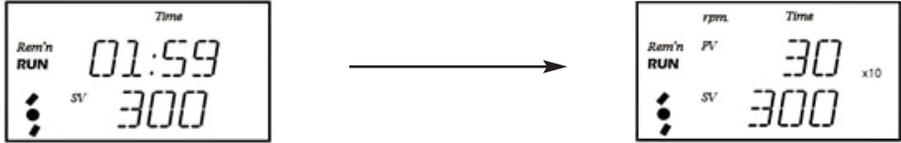
Display moves to next mode (RPM setting)

# How to Set the Timer (continued)

(3) Input RPM by dialing the knob. Press dial knob 1 time to save set value and unit starts shaking. Remaining time and set value (RPM) shows on display.



(4) During operation, you can check RPM by pressing RPM button.



Display returns to previous display in 10 sec.

(5) Shaking stops and alarms when the time is terminated. If you press dial knob or touch button, display returns to stand by status



# Stop Timer

Timer function can be stopped as follows;

STEP 1: Press the dial knob during operation.



STEP 2: Choose STOP YES by rotating the dial knob to the clockwise.



STEP 3: Press the dial knob.



If you press dial knob or Timer button, the ending sound ends.

- Timer Mode can be cancelled in any step if the Timer button is pressed to get back to standby mode. If the Timer button is pressed again, time or rpm can be set.
- Timer Mode can be stopped as indicated above.

## Stop Timer (continued)

### WARNING

- The unit can get damaged if it get overload.
- Sample cannot be over 4kg.
- If sample being more than 4kg, enough forced vortex cannot be generated and will not be uniform.

### CAUTION

- Use the unit after you check if the main body connected with plate tray and other attachments exactly.
- Do not put too much sample in the tray for preventing by contamination each samples.

## Safety Device for Overload

Performance of motor does not work well with an overload. Internal safety circuit stops operation with an alarm. The unit operates fine after re-booting.

## Section 5 Maintenance

Classification	Inspection cycle	
	Daily	Weekly
<b>General</b>		
Power cord		
- The conditions of connection for power supply and an adaptor	•	
- The presence of power supply and an adaptor contact wetting, and cable peeling off, and out of contact	•	
Tray, accessory cleaning		•
Surface cleaning		•
<b>Main Body</b>		
Controller display status	•	
Controller function checking	•	
Motor on/off status	•	
Check attachment connection for being tight	•	

### Cleaning of Tray and Unit Body

Remove a contaminant by cleaning the unit frequently with a soft cloth before and after using, otherwise it cannot be readily wiped out for a long time. Keep the unit clean always without any contaminant.

#### WARNING

- Do not soak the product in the water to clean.

### Keeping Product

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

## Section 6 Troubleshooting

Electrical 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.
	Check the electrical cord connection at the unit to ensure it is fully seated.	If the socket / plug / main power line are cut, request service.
	PCB has damaged by reagent	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.
	Inner circuit defect	Request service.
No VFD	Main plug is not inserted correctly	Check electrical cord connection at the unit to ensure it is fully seated.
	Inner circuit defect	Request service.
Button doesn't work	Button switch has damage	Pull out the button to check connector and than retry operating. Otherwise, request service.

**Section 6**  
Troubleshooting

<b>Troubles During Operation</b>	<b>Cause</b>	<b>Action</b>
Dial button doesn't operate well	Capacitive sensing initialization error	Request service.
Touch button doesn't operate well	Capacitance sensor initialization errors	Off the power switch on the power supply is blocked. In a few moments to initialize the controller power supply.
Spinning speed cannot be controlled properly.	DC Motor and circuit problem.	Request service.
	Motor and circuit defect.	Request service.
If there are severe changes in rotational speed	Heavy leaning to one side of sample tray is located	Reduce load or tray in the center
Proper vortexing and mixing is not formed	Overloaded by the amount of work overload on the motor	Use in a fixed range of uses
Noise at operation	Combination between plate tray and plate or adapter is loosened	Operate the unit after installing micro-plate or adapter with the plate tray.
	Tube is not seated well in the hole	Mix after inserting holder and tube to the hole correctly
	Inner rotating support defect	Request service.
Operating suddenly stops	Motor stops by over pressure	Set proper max. load value to limit overload safety device. Re-boot for normal operation
	BLDC motor and circuit defect	Request service.

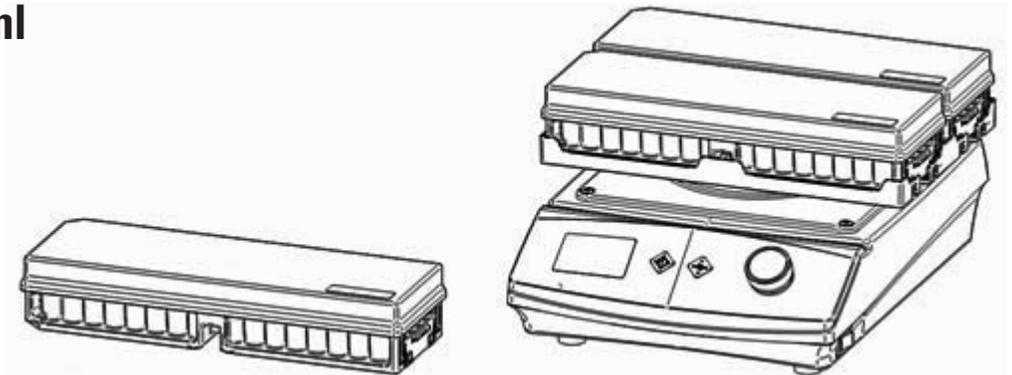
## Section 7 Accessories

Maximum four of microplates are provided as standard. If you attach any of below optional adapters, Tube support 1.5ml, 15ml 50ml Tube support can be used as well. In that case, rpm should be lower than the speed range of the technical specifications.

To purchase optional accessories, see our website.

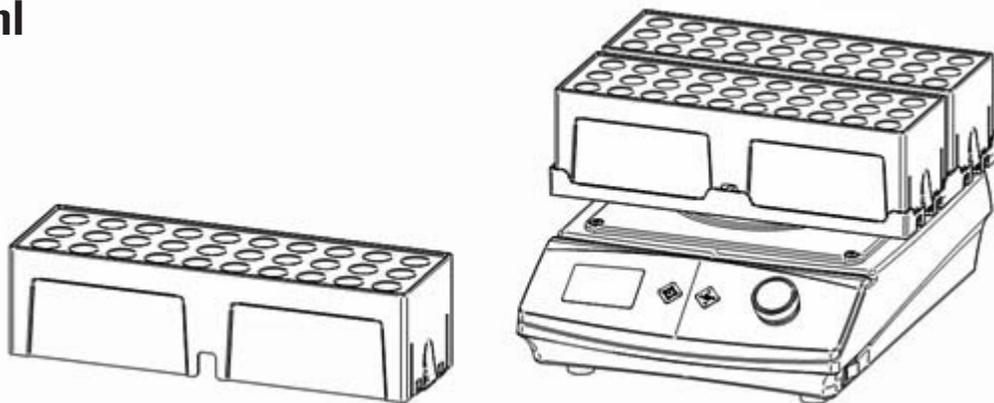
Item	Catalog Number	Material	Description
Tube support 1.5ml	88880114	PC	Tube support (1.5ml)
Tube support 15ml	88880115	ABS	Tube support (15ml)
Tube support 50ml	88880116	ABS	Tube support (50ml)

### Tube Support 1.5ml



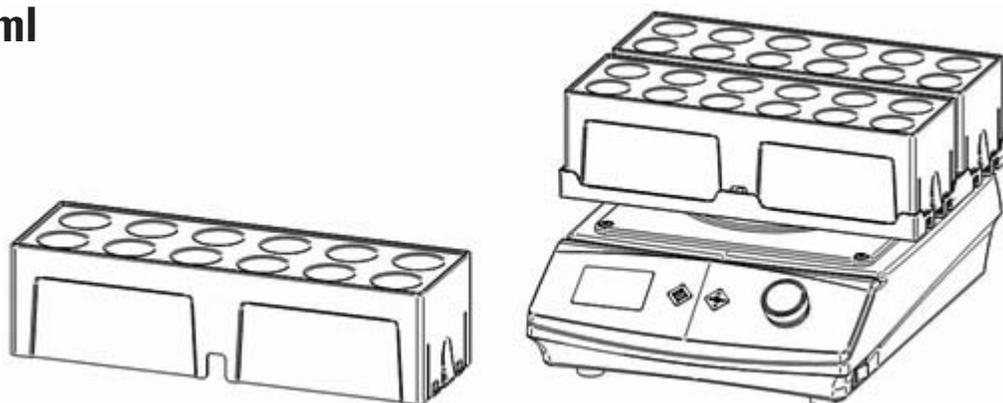
Attach two racks on the plate. For balanced fit, micro-tubes should be attached to the racks with bilateral symmetry. Use the cap to prevent micro-tube's break away.

## Tube Support 15ml



Attach two racks on the plate. For balanced fit, conical tubes should be attached to the racks with bilateral symmetry.

## Tube Support 50ml



Attach two racks on the plate. For balanced fit, conical tubes should be attached to the racks with bilateral symmetry.

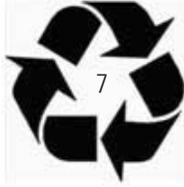
## Section 8 Technical Specifications

Item / Model		Compact Digital MicroPlate Shaker
Shaking System	Speed range (rpm)	150~ 1,200
	Speed control type	Feedback Control PID
	Orbital diameter (mm/inch, dia)	3 / 0.12
	Timer	1min to 99 hr 59 min
Safety device		Over current protection
Max. Load including attachment (kg / lbs)		4 / 8.8
Motor type		BLDC motor
Control panel		VFD (Vacuum Fluorescent Display), Touch key, Dial Button
Dimensions	Overall Dimension (W×D×H, mm/inch)	249 x 329 x 127 / 9.8 x 13 x 5
	Tray dimension (W x D, mm/inch)	267 x 185 / 10.5 x 7.3
	Net Weight (kg / lbs)	7.7 / 17
Electrical requirement		100V ~ 240V, 50 / 60 Hz

*\* If not specially mentioned, the standard value is from statues of 25°C, 60%R.H.*

*\* Specifications can be changed without prior notice for quality upgrade*

## Disposing of the Product



Disposing of your instrument must be done in environmentally responsible way if it has been potentially exposed to bio-agents or radioactive samples. Failure to follow stringent requirements for instrument disposal may lead to actions against you and your organization.

- (1) First, check with your laboratory or organization to ensure that you are following all the policies and procedures for disposal of laboratory equipments.
- (2) If not possible, contact your local governing body for regulations regarding disposal of laboratory equipments. Thermo Scientific highly recommends you to find a local service provider that can properly dispose of your instrument.

## THERMO FISHER SCIENTIFIC STANDARD PRODUCT WARRANTY

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows for shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the first year warranty period.

During the first two (2) years, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor included. Installation and calibration are not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of components parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo Fisher Scientific postage paid and replacement parts are shipped FOB destination.

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Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1-800-438-4851 (USA and Canada) or 1-740-373-4763. We're ready to answer your questions on equipment warranty, operation, maintenance, service and special application. Outside the USA, contact your local distributor for warranty information.

Rev. 0 9/13



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