



# Operation Manual

# Mini Incubator

Model : IM-10

*Manual No. :24311L002 Version :0.0*

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# 1 Safety Advice




## 1.1 Operation Manual

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 unit. Keep this manual in a safe place nearby for reference and make it easily available to all users.


## 1.2 Danger/Caution/Notice Alerts

This manual highlights **Danger/Caution/Notice** alerts to prevent injuries or property damages and also to achieve optimum performance. Ensure to read the danger alerts and caution alerts in 1.3 and 1.4 carefully before use.

These alerts are classified into three types in this manual depending on the importance and the risk levels as described below:

Symbols	Meaning
	Ignoring this danger alert can cause serious injury or even fatal accident.
	Ignoring this caution alert can cause injury or property damage.
	Ignoring this notice can cause operational problems.

## 1.3 Danger Alerts


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

- ◆ **Check the required electrical requirements on the ID plate of this equipment before use.**

- ◆ **Connect this equipment to a dedicated power outlet nearby.**
- ◆ **Make sure to connect this equipment only to properly grounded power outlets to protect you and your instrument. Do not ground to gas pipes or water pipes.**
- ◆ **Make sure to use the power cord supplied with this unit. (200~250VAC/15A)**
- ◆ **Never install or use this equipment in explosive or flammable atmospheres.**
- ◆ **Never use or store flammable or hazardous substances near to this unit.**
- ◆ **Never use the equipment to heat flammable, explosive or hazardous substances.**
- ◆ **Never expose this equipment to any heat sources including direct sunlight.**
- ◆ **Never allow water, organic solvents, dust, or corrosive gases to get inside the equipment**
- ◆
- ◆ **Never put or insert any objects (especially if conductive or flammable) inside this unit.**
- ◆ **If you observe a strange smoke, odor or noise from the equipment, unplug the power cord immediately and turn off the main power switch. After the smoke or odor disappears, contact your dealer or Jeio Tech if any repair is required.**
- ◆ **Never disassemble, repair, or modify this equipment on your own. Doing so will void your warranty and may result in injuries or product damages.**
- ◆ **Never move this equipment while under operation.**
- ◆ **Always wear proper protective gear (such as goggles, gloves, masks or an apron) when using this unit.**

## 1.4 Caution Alerts

 **CAUTION**

Ignoring the following cautions could cause injuries or property damages.

- ◆ **Do not place heavy objects, including this equipment, on top of the power cord and do not strip, scratch, bend, twist, pull, or heat the power cord. A damaged power cord is a fire and electrical shock hazard.**
- ◆ **Make sure to set up this equipment on a flat, stable, clean, non-slip, dry, and fireproof surface inside a lab with proper safety measures.**
- ◆ **Do not place any device which can be affected by the motor vibrations near this unit.**
- ◆ **Do not touch the power outlet, power socket, or power cord with wet hands. And make sure to connect the power cord directly and firmly to the power outlet and power socket.**
- ◆ **Beware that mechanical shock or vibration can damage this equipment and pay extra attention while moving it. Damages caused by mechanical shock or vibration may result in injury or fire.**
- ◆ **Do not install this equipment near any device that generates high frequency noise such as high frequency welding machines, high frequency sewing machines, or SCR power controllers.**
- ◆ **Before cleaning, make sure to unplug the power cord to avoid electric shock or fire.**
- ◆ **Do not use chlorine bleach, ammonia-based cleaners, abrasives, ammonia, or metal scouring pads. Wipe with a soft damp cloth or a sponge soaked in water or diluted neutral detergent.**

## 2 General Description

### 2.1 Product Introduction

This Mini Incubator can be use biotechnology, Chemistry, Pharmacy, Biology, etc.

This product functions suitable to use the following purposes;

- Solid microbial culture and growth experiments
- Enzyme experiments
- Serum experiments
- Incubation experiments
- Quality control of food processing
- Seed Germination

Maximum 8 microplates can be inserted to inner chamber for efficiently ELISA.

### 2.2 Key Features

#### 2.2.1 Superior performance

- Microprocessor PID Feedback Control  
Fast and precise temperature control is provided by the microprocessor PID controller.
- OFFSET functions  
In case you need to use your own thermometer for temperature control for specific applications, there can be some differences between the temperature of your thermometer and the displayed temperature of this unit. If needed, you can offset such temperature differences ranging to  $\pm 50^{\circ}\text{C}$  by  $0.1^{\circ}\text{C}$  interval.

#### 2.2.2 Convenience

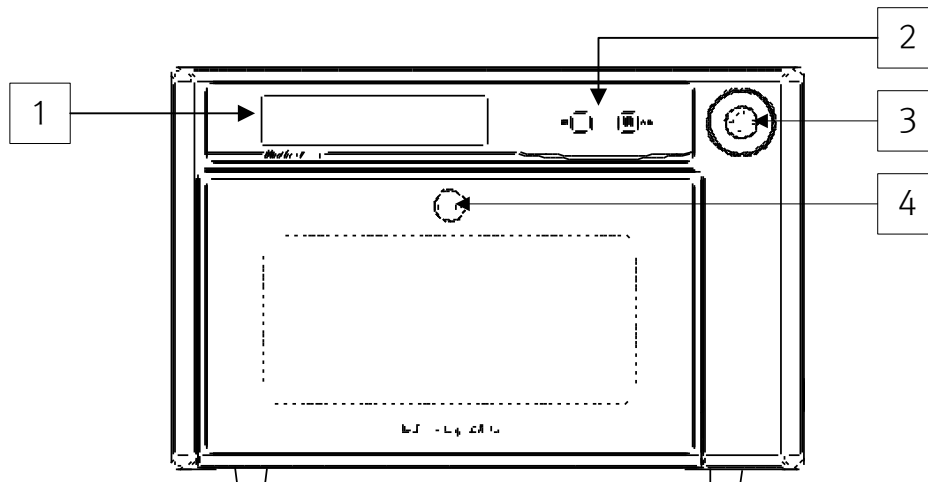
- Compact design for efficient lab space utilization by eliminating conventional bottle holder carousel
- Ease-of-operation enabled by a vivid and colorful VFD (vacuum fluorescent display), four touch-sensitive buttons, and a jog dial
- Transparent polycarbonate window providing a clear view of the chamber interior
- Standard offer 2 height-adjustable wire shelves

### 2.2.3 Safety

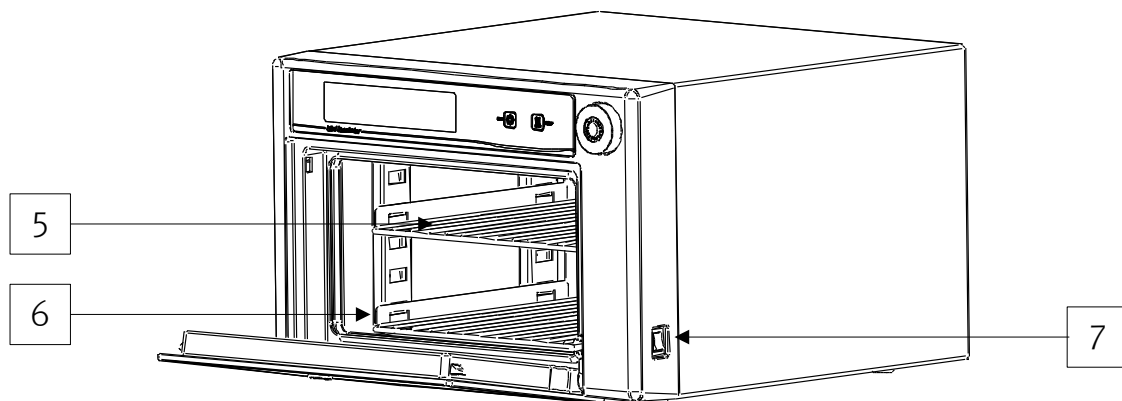
- Overheating prevent device  
Protection of the control panel and heater against overheating by automatic power cutoff together with visual alarms
  
- Door alarm  
1<sup>st</sup> : when the door is open, the warning lamp is flickering  
2<sup>nd</sup> : when the door is open for more than 15 sec, the audible alarm is operating.



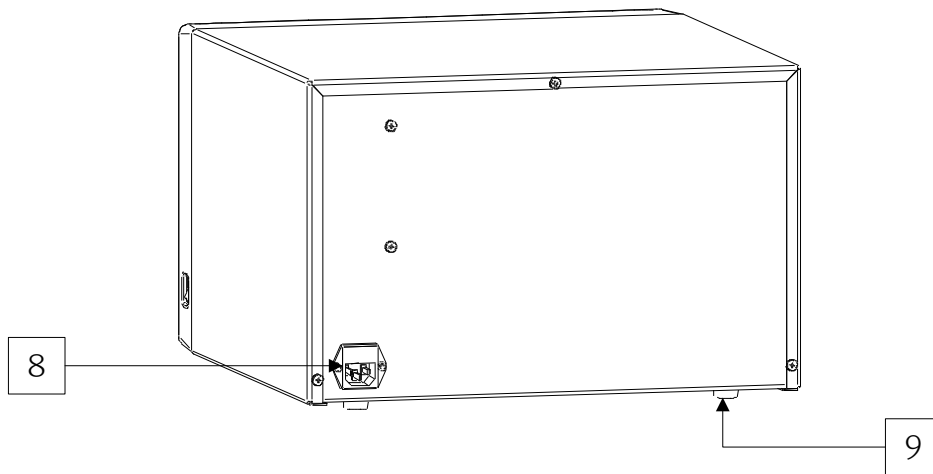
### 2.3 Construction



- (1) **VFD Control Panel**
- (2) **Touch-sensitive Buttons**
- (3) **Jog Dial**
- (4) **Push Button**
- (5) **Non-slip Pad**



- (6) **Wire Shelves : user can set maximim 4 shelves.**
- (7) **Shelve hanger bracket.**
- (8) **Power switch**



(9) **Socket**

(10) **Foot**

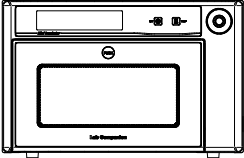
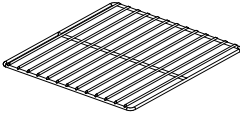
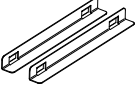
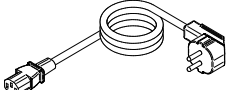

### 3 Installation

#### 3.1 Checking Shipment Damage and Unpacking

Upon receiving the equipment, check to ensure that no damage has occurred during shipment. It is important that any damage that occurred during shipment must be detected before unpacking. If you find such damage, notify the carrier immediately.

#### 3.2 Checking the Contents of the Package

After unpacking, check to ensure that all the following items are included in the package. If not, contact your dealer or Jeio Tech immediately.

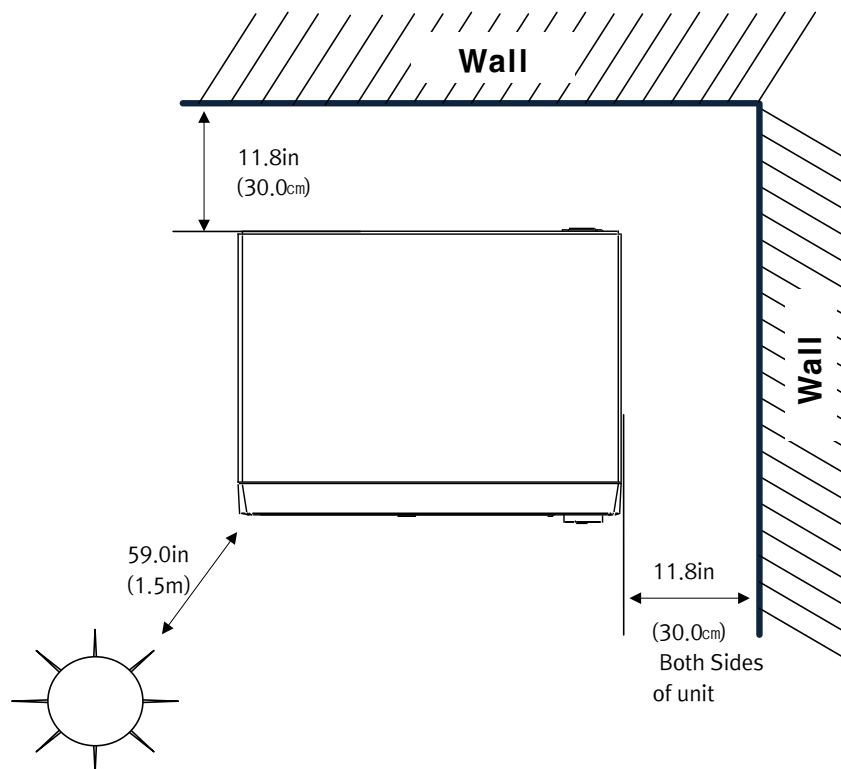
Item	Figure	Quantity	Description
Main Body		1	-
Wire shelf		2	-
Bracket for a shelf		4	-
Power Cord		1	-
User manual		1	-

### 3.3 Where to Install

Before installing the unit, make sure to observe the following danger alerts for your safety.

 **DANGER**

- Never install or use this equipment in explosive atmospheres.
- Never install or use this equipment near to hazardous or flammable substances.
- Never install this equipment closer than 30 cm (12 inches) to a wall.
- Observe the minimum distances of 1.5 m from any heat sources.
- Never expose this equipment to direct sunlight.
- Never install this equipment near any device that generates high frequency noises.




### 3.4 Operating Conditions

This equipment is designed for indoor use in laboratory environments and to be operated only by properly trained staff knowledgeable in safe laboratory practices.

The operating conditions for this equipment are as follows:

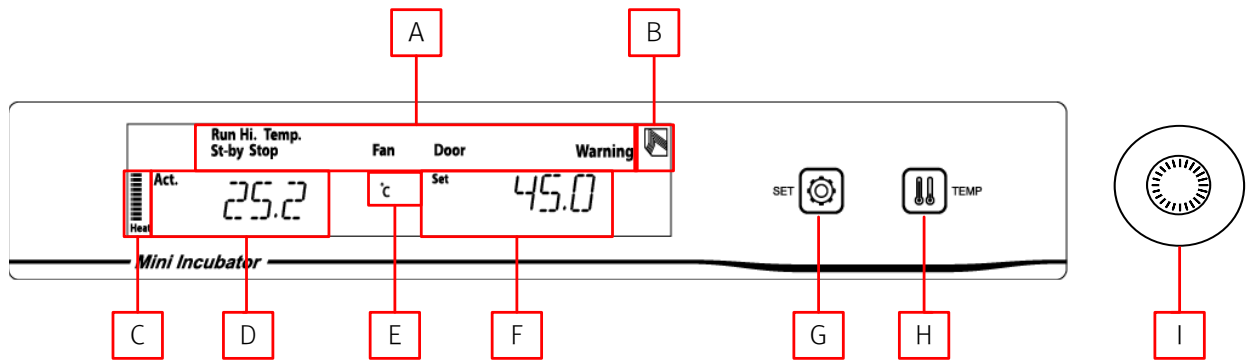
Permissible Ambient Temperature	5 to 30°C (41 to 86°F)
Permissible Relative Humidity	10 to 80%
Permissible Altitude	0 to 2,000 m (6,562 ft)

### 3.5 Required Checking before Operation

 <b>DANGER</b>
<ul style="list-style-type: none"><li>● Check whether the unit is installed on a flat, stable, clean, non-slip, dry, and fireproof surface inside a lab with proper safety measures.</li><li>● Check whether the equipment is level and fixed properly by the rubber feet.</li><li>● Check whether the minimum distances (30 cm or 12 inches) from other devices are observed.</li><li>● Check whether any device which can be affected by the motor vibrations is placed near this unit.</li><li>● Check whether any flammable, explosive or hazardous substances are inside the equipment.</li><li>● Check whether all the power cords are firmly connected.</li></ul>

## 4 Operation

### 4.1 Control Panel



#### VFD (Vacuum Fluorescent Display)

The vivid and colorful VFD allows you to monitor the following operational information:

<b>A</b>	<b>Run</b>	indicates active operation
	<b>Hi. Temp.</b>	indicates overheated condition due to malfunction
	<b>St-by</b>	indicates stand-by mode
	<b>Stop</b>	indicates stopped operation
	<b>Fan</b>	indicates fan activation
	<b>Door</b>	indicates opened door
	<b>Warning</b>	indicates alarm activation
<b>B</b>	Lab companion	logo
<b>C</b>	<b>Heat</b>	indicates heater activation
<b>D</b>	<b>Act.</b>	indicates actual (current) value
<b>E</b>	<b>°C</b>	indicates temperature unit
<b>F</b>	<b>Set</b>	indicates set value

### Touch-sensitive Buttons

Note that the colors of these buttons can be changed between orange and green. If the buttons illuminate in orange color, it indicates that the functions related to the buttons are activated.

When the buttons illuminate in green color, you can change the related settings or monitor the related operational status using these buttons.

<b>G</b>	<b>SET</b>	allows you to set various settings
<b>H</b>	<b>TEMP</b>	allows you to turn the temperature control function on or off

### Jog Dial

<b>I</b>	<b>Jog Dial</b>	allows you to start/stop the operation, to select desired temperature or rocking speed, to select desired functions, to set the timer, etc.
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## 4.2 Operation

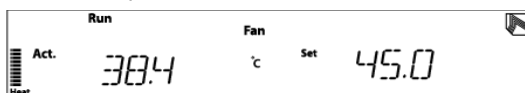
### 4.2.1 How to operate

Step 1 : Power ON, the button is located product right side of bottom.

Step 2 : Press TEMP button, set the temperature value. (refer 4.2.2 input temperature value)

Step 3 : When you press jog dial, the product is starting to move set temperature.

[Product operation]

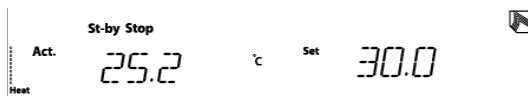


### CAUTION

- Touching this equipment carelessly, during operation or even after power cutoff, can cause burns.

#### 4.2.2 Input the setting temperature

You can change temperature value use of TEMP button during the product operating.

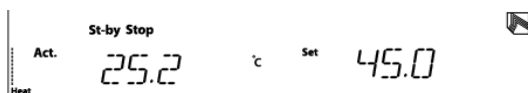


Step 1 : Press TEMP button.



TEMP. SET lamp is flicking.

Step 2 : Change set temperature by jog dial. And press jog dial to save set temperature.

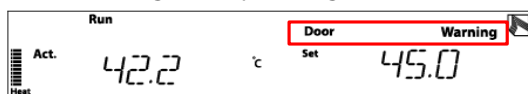


#### 4.2.3 Pause and re-operation

If user decide the product need pause, just open the product door. And when the product door is closed, the product is operating again.

But the door is open for more than 15 sec, the audible alarm is operating.

[Pause during the operating]

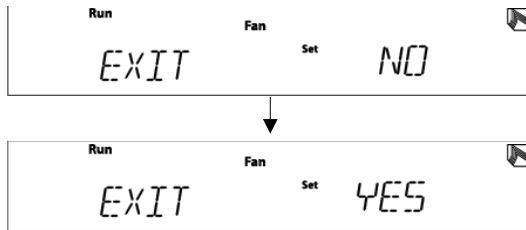


#### 4.2.4 Operating stop

During the operating, user decides the product need to stop. Press jog dial and turning dial from "EXIT NO → EXIT YES" after then press dial, again

[Product operation stop]

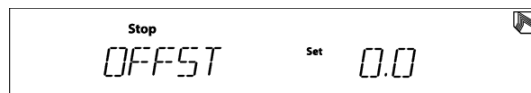




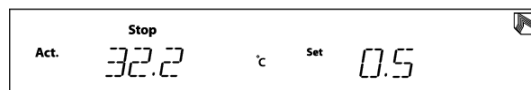
### 4.3 Temperature Offsetting (Calibration)

The displayed temperature of this equipment can be different from the temperature measured by your own thermometer which you want to use as standards. In such cases, you can offset such temperature differences as follows:

- 1) Press the **SET Button** under simple mode.
- 2) Turn the **Jog Dial** to select '**OFFST**' (offsetting).



- 3) Press the **Jog Dial** again and select the temperature offsetting value by turning it:



[Note that the offsetting value range is  $\pm 50^{\circ}\text{C}$  at  $0.1^{\circ}\text{C}$  increments.]

- 4) Press the **Jog Dial** again to save the desired temperature offsetting value.
- 5) Press the **SET Button** to finish the temperature offsetting.

## **NOTICE**

- The temperature offsetting value is calculated by subtracting the displayed temperature from the temperature of your own thermometer.
- Pressing the **SET Button** during temperature offsetting procedures allows you to return to the previous step.

## 5 Maintenance

### 5.1 Cleaning

#### **WARNING**

- Never immerse this equipment in water or any other liquid.
- Do not allow any liquid or wet material to get inside the unit when cleaning.
- Do not reconnect this equipment to power outlets until all cleaned surfaces have dried.

#### **CAUTION**

- Do not use chlorine bleach, ammonia-based cleaners, abrasives, ammonia, or metal scouring pads when cleaning.

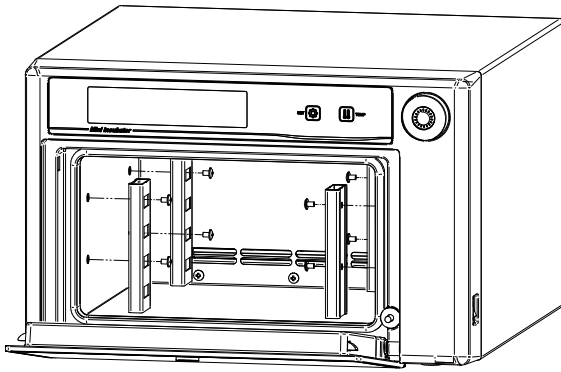
Always make sure to keep the equipment and accessories clean. Dirt and other foreign substances can cause fire or electric shock. Before attempting cleaning,

- (1) disconnect the power cord from the power outlet and ensure that the equipment is cool enough,
- (2) wipe with a soft dry cloth first to remove any foreign matter and, if not enough,
- (3) wipe with a soft damp cloth or a sponge soaked in water or diluted neutral detergent when necessary.

Note also that cleaning is made much easier if spills are attended to promptly.

[Shelf level adjuster decomposition method]

The shelf level adjuster can be disassembled like follow pictures;



Step 1 : Take out cord from power supply and Cut off power.

Step 2 : Remove the screw which is located internal top and bottom use of screw driver.

Step 3 : Remove Shelf level adjuster

## 5.2 Relocation

If you need to move the equipment to another place,

- (1) disconnect the power cord from the power outlet,
- (2) pack the equipment and its accessories into the original packaging or any other suitable container before moving

### **CAUTION**

Pay attention to avoid mechanical shock or vibration while moving the equipment. Damages caused by mechanical shock or vibration may result in injury or fire.

## 5.3 Storage

If you know you will not use this equipment for an extended period of time,

- (1) disconnect the power cord from the power outlet and
- (2) clean the equipment with soft cloth.
- (3) pack the equipment properly and make sure to store it in dry place.

## 6 Troubleshooting

### 6.1 Power Troubles

<b>Problem</b>	<b>Cause</b>	<b>Corrective Action</b>
<b>No power</b>	Unsuitable power supply	Meet the electrical requirements of this equipment before use.
	Power cutoff by a circuit breaker or power blackout	Find out why blackout or cutoff happened and restore power. If there is a short circuit or leakage, trace the source of the problem and fix it.
	Loose power connection	Reconnect the power cord firmly to the power outlet as well as to the power socket at the back of the equipment.
	Damages in power cords, power outlets, plugs, or power switches	Replace the damaged part with a proper one.
	Internal circuit failure	Contact Jeio Tech for service.
<b>Repetitive tripping of the circuit breaker</b>	Electrical overload	Disconnect all the appliances connected to the breaker first and reconnect them one by one to find the reason for the overload.
	Wet power cords, power outlets, or plugs	Dry the wet parts thoroughly and reconnect them. .
	Damages in power cords, power outlets, plugs, or power switches	Replace the damaged part with a proper one.
	Internal circuit failure	Contact Jeio Tech for service.

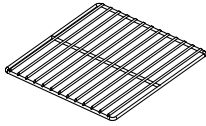
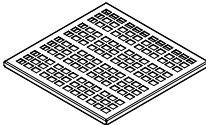
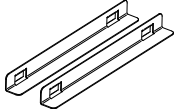
<b>Display malfunction with power on</b>	No illumination on the power switch LED	Check whether power blackout or cutoff happened and restore power, if possible.
	Loose power connection	Reconnect the power cord firmly to the power outlet as well as to the power socket at the back of the equipment.
	Internal circuit failure	Contact Jeio Tech for service.
<b>No operation with power on</b>	Power cutoff by built-in overheat prevention circuit	If the equipment is overheated, the built-in overheat prevention circuit stops heating to protect the equipment. In such cases, let the equipment cool down for some time before power reconnection.
	Internal circuit failure	Contact Jeio Tech for service.
<b>Unexpected termination of operation</b>	Strong noise nearby	Check whether any device is generating strong noise. If so, relocate either this equipment or the device. .

## 6.2 Malfunctions during Operation

<b>Problem</b>	<b>Cause</b>	<b>Corrective Action</b>
<b>Jog dial malfunction</b>	Damaged jog dial	Contact Jeio Tech for service.
<b>VFD display malfunction</b>	Internal circuit failure	Contact Jeio Tech for service.
<b>Temperature control failure</b>	Damaged temperature sensor, fan, bimetal sensor, or heater	Contact Jeio Tech for service.
<b>Button malfunction</b>	Damaged button	Contact Jeio Tech for service.

<b>Temperature overshoot</b>	Lack of water in the water tray	Add water to the water tray.
<b>No temperature increase</b>	Damaged fan, heater, or door alarm switch	Contact Jeio Tech for service.

## 7 Accessories

Component	Figure	Description	Cat. No.
Wire shelf (W x D x H , mm)		427 x 427 x 7, Stainless steel	EDA8244
Perforated shelf (W x D x H , mm)		427 x 427 x 12, Stainless steel	AAA24511
Bracket for a shelf (W x D x H , mm)		230 x 18 x 20, Stainless steel	-



## 8 Appendix

### 8.1 Technical Specifications

Item / Model		Mini Incubator / IM-10
Temp.	range (°C/°F)	Amb.+5 to 65/+9 to 149
	Fluctuation at 37°C (±°C/°F)	0.5/0.9
	Variation at 37°C (±°C/°F)	0.5/0.9
	Heating time to 37°C (min)	5
	Recovery time at 37°C (min)	< 2 minutes after door opening of 30sec.
	Heater output, max. (W)	200
	Controller	PID feedback control
Chamber volume(L/cu ft)		10/0.4
Safety device		Over current protection, Over temp. protection
System warning		Door open, Over temp.
Control panel		VFD(Vacuum Fluorescent Display), 2 Touch key, Jog dial
Material		Polycarbonate, ABS, Powder coated Steel, Stainless Steel
Weight (kg/lbs)		12.8/28.2
Dimension (W x D x H)	Overall (mm/inch)	400 x 410 x 264 / 15.7 x 16.1 x 10.4
	Chamber inner (mm/inch)	278 x 262 x 160 / 11 x 10.4x 6.3
Electrical requirements (230V/50/60 Hz, A)		1.0
Electrical requirements (120V/50/60 Hz, A)		2.1
Permissible ambient temperature (°C)		5 to 30
Permissible relative humidity (%)		80
Permissible Altitude (m)		2000

- ※ Unless otherwise specified, the above-mentioned data represent values at 25°C and 60% RH.
- ※ Permissible environmental conditions: 5 to 40°C, maximum 80% RH.
- ※ Jeio Tech reserves the right to make changes in design and specifications without prior notice.

## 8.2 Equipment Disposal

Disposing of this equipment must be done in an environmentally responsible way if it has been potentially exposed to bio-agents or radioactive samples. Failure to follow stringent requirements for equipment 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. Jeio Tech highly recommends you to find a local service provider that can properly dispose of your instrument.

## 8.3 Warranty and Disclaimer

Jeio Tech warrants to the original consumer that the products it manufactures will be free of defects and perform as specified for a period of two year from the purchase date if the equipment was used according to the instructions in this operation manual and only with accessories or consumable parts approved by Jeio Tech.

Any of Jeio Tech's products which, under normal operating conditions, proves defective in material or in workmanship, within two year from the purchase date will be repaired or replaced free of charge.

Our warranty excludes accessories or consumable parts and does not apply to faults resulting from abuse, misuse, alteration, insufficient care, maintenance contrary to the instructions in this operation manual.

Warranty claims can be processed faster if the equipment's serial number, detailed description of the problem, and its operating conditions are provided. Consumers will be required to submit the original receipt as proof of purchase date to support a warranty claim.

JEIO TECH HEREBY DISCLAIMS ALL OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, EXPRESS OR IMPLIED BY LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

CUSTOMER'S SOLE REMEDY FOR ANY DEFECTIVE PRODUCT WILL BE AS STATED ABOVE, AND IN NO EVENT WILL JEIO TECH BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES IN CONNECTION WITH THE PRODUCT.

#### **8.4 After-sales Service and Customer Assistance**

Our after-sales service responds to your questions concerning maintenance and repair of this equipment as well as spare parts. In case of a warranty claim, repair or purchase of replacement parts or in case of queries or other problems, please contact your local dealer or Jeio Tech representative.

➤ **International Sales Head Office (Korea)**

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